



Bullying and Depression in Youth with ADHD: A Systematic Review

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Abstract

Background Youth with attention deficit / hyperactivity disorder (ADHD) are at increased independent risk for bullying involvement *or* depression yet the topic of bullying involvement *and* depression in ADHD is poorly understood and largely considered without a guiding theoretical framework.

Objective The primary aim of this review was to synthesize the bullying: depression in ADHD literature using existing bullying and ADHD: depression frameworks and consider the current state of evidence supporting or contradicting these models. Secondary aims included reviewing the limitations of the existing research and providing recommendations for future research.

Method Electronic databases were used to select articles published on this topic. Quantitative, peer reviewed empirical studies conducted on youth with ADHD who were assessed for bullying involvement and depressive symptoms were included. Thirteen studies met strict inclusion criteria.

Results Uniformly, the existing studies reported positive associations between ADHD symptoms/diagnoses, bullying involvement and depressive symptoms. ADHD served as a diathesis for bullying involvement which in turn acted as a moderator of the relation between ADHD symptoms and depressive symptoms (i.e., depression emerges in youth with ADHD if and when they get involved in bullying). Some support, although less voluminous, also existed for bullying involvement as a mediator, or explaining factor, in the link between ADHD and depressive symptoms.

Conclusion Positive associations were reported consistently between bullying involvement and depressive symptoms in youth with ADHD. Findings also suggest that bullying involvement may serve as both a moderator (where bullying increases risk of depression in youth with ADHD) and as a potential mediator of the relationship between ADHD and depression (where bullying is one mechanism whereby ADHD may lead to depression). However, additional longitudinal research is needed to test the temporal associations implied by mediational models, or intervention research aimed at reducing bullying involvements leads to decreased risk of depression in youth with ADHD.

Keywords Bullying · Peer victimization · ADHD · Depression · Comorbidity

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Introduction

Within the past decade, youth¹ bullying has been labeled a public health problem (CDC 2015). The prevalence of youth bullying involvement (as a perpetrator, victim or both) is estimated to be 19% (CDC 2018). Media reports of youth impacted by bullying have brought considerable public awareness to the topic; parents are particularly concerned about the associated negative psychological consequences (especially depression) which accompany bullying involvement (Clarke 2017). Youth depression prevalence rates have also increased in the past decade and now exceed 11% (Mojtabai, Olfson and Han 2016). Not surprisingly, parents identify bullying and depression as *the* two largest concerns they have for their children (Pew Research Center, 2018). Thus, efforts to further understand bullying involvement and depression have considerable public health value.

Attention deficit / hyperactivity disorder (ADHD) is a childhood-onset disorder which continues to increase in prevalence, with some estimates indicating 11% of youth in the United States have ever been diagnosed with ADHD (Visser et al. 2014). Youth with ADHD are at increased independent risk for bullying involvement (McQuade et al. 2018) or depression (Biederman et al. 2006) yet the topic of bullying involvement *and* depression in ADHD has historically been less well studied. Due to its high prevalence rate as well as the independent associations ADHD has with bullying involvement and depression, efforts to understand bullying involvement and depression in ADHD are a clinically significant topic. Not surprisingly, within the past decade, an emerging literature has been published on the topic of bullying involvement and depression in ADHD, yet no review has attempted to synthesize these findings. Thus, the primary aim of this review is to synthesize this literature using existing bullying (Swearer and Hymel 2015) and ADHD (Meizner et al. 2014) frameworks and consider the current state of evidence supporting or contradicting these models. Secondary aims include critically assessing the quality of the extant literature and identifying gaps that still need to be explored.

Bullying

Bullying is defined as a repetitive aggressive behavior that occurs in an unequal power dynamic between a bully (i.e., perpetrator) and victim (i.e., target; Olweus 1993). Bullying can be enacted through different forms of aggressive behavior; for example, physical or direct bullying typically describes a situation when a bully confronts a victim face-to-face with physical actions (e.g., hitting, kicking, taunting verbal threats; Olweus, 1993). Relational or indirect bullying tends to be less obvious and can include spreading rumors, gossiping, and social manipulation and exclusion (Craig et al. 2009; Miller and Vaillancourt 2007; Olweus 1993). Physical (direct) bullying is more common in younger children (Bjorkqvist, Osterman, and Kaukiainen 1991) and relational (indirect) bullying is more prevalent in older children and adolescents due to gains in social awareness and normative expectations (Nishina, Juvonen, and Witkow 2005). Boys are often perceived as more overtly aggressive than girls (Putallaz et al. 2007), and boys report more involvement in physical bullying than girls (Carbone-Lopez, Esbensen, & Brick 2010; Crick and Grotpeter 1995). While boys and girls are equally involved in relational bullying (Casper and Card

¹ Unless otherwise specified, please consider “youth” to encompass both children and adolescents.

2017), girls use relational forms of bullying more than physical and report finding relational victimization more harmful than boys do (Crick 1995; Putallaz et al. 2007).

Bullying and Psychopathology

Bullying involvement (both perpetrator and victim roles) is associated with depression diagnoses (Klomek et al. 2007; Nansel et al. 2004) and multiple associated features of depression, including suicidal ideation and attempts (Kim et al. 2015; Klomek et al. 2007; Yen et al. 2014a, b), increased feelings of loneliness (Oldehinkel et al. 2004) and social withdrawal and low self-esteem (Darney et al. 2013). Children who both bully others and are bullied by others (i.e., “bully-victims”) have the worst outcomes and are at greatest risk for depression and depressive symptoms (Copeland, Wolke, Angold, and Costello 2013; Kim et al. 2009; Yang et al. 2016).

Oppositional defiant disorder (ODD) is also associated with both bullying victimization and perpetration (Cook et al. 2010). ODD is characterized by a pattern of defiance, anger, irritability and/or vindictiveness and is the most prevalent of all comorbidities associated with ADHD (Harvey, Bruaux, and Lugo-Candelas 2016). Importantly, ODD is associated with bullying involvement in ADHD (McQuade et al. 2018) and is also a longitudinal risk factor for subsequent depression in youth with ADHD (Evans, Cooley, Blossom, Pederson, Tampke, and Fite 2019).

Bullying Theory

Youth involved in bullying behavior (both perpetration and victimization) exhibit poorer psychosocial functioning than youth who are not involved in bullying (Casper and Card 2017; Copeland et al. 2013). To better understand the relationship between bullying, psychosocial functioning and psychopathology (e.g., internalizing disorders, externalizing disorders), Swearer and Hymel (2015) developed a bullying theory based upon social ecological (Bronfenbrenner 1979) and diathesis-stress models. Their bullying model proposes that psychopathology results from the interaction between individual differences/biological vulnerabilities (i.e., diatheses) and environmental stressors (e.g., negative life event, experience of bullying as a victim or perpetrator).

ADHD is a Diathesis for Bullying Involvement

Compared to their typically developing peers, youth with ADHD are more likely to be involved in bullying as both victims (Schoeler et al. 2019; Sciberras, Ohan, and Anderson 2012) and perpetrators (Holmberg and Hjern 2008; Hu, Wen-Jiun, and Cheng-Feng 2016; Verlinden et al. 2015). Impulsivity and poor emotion regulation (Diamantopoulou, Henricsson, and Rydell 2005) and difficulties with appropriate social skills and emotion recognition (Murray-Close et al. 2010) contribute to youth with ADHD being disliked by their peers and subsequently, are at increased risk of being bullied and/or bullying others (Taylor, Saylor, Twyman, and Macias 2010). The awareness of being disliked, in turn, can affect self-esteem and increase feelings of loneliness (Oldehinkel, Rosmalen, Veenstra, Dijkstra, and Ormel 2007), further increasing the risk of being victimized or reacting as a perpetrator in a cyclical, negative feedback loop (Swearer and

Hymel 2015). Thus, when viewed from the Swearer and Hymel (2015) model, ADHD and its associated features represents a diathesis for bullying involvement, both as a perpetrator and a victim.

ADHD and Depression

Youth with ADHD demonstrate functional impairments across multiple domains (e.g., social, family, and academic domains) and decreased quality of life compared to youth without ADHD (Bussing et al. 2010; Molina et al. 2009). Among the impairments that youth with ADHD experience, perhaps the most impactful are those in the social domain (Mikami 2010). Youth with ADHD are often impaired in their abilities to appropriately interact with peers and struggle to make and maintain friendships (Hoza 2007). Additionally, social impairments are the most resistant to intervention (Hoza 2007) and have more negative distal consequences into adulthood than other ADHD-associated impairments (see Shaw et al. 2012 for review).

The positive relationship between interpersonal impairments and depression is particularly well-established in the youth ADHD literature (e.g., Biederman et al. 2008a, b; Chronis-Tuscano et al. 2010; Meinzer et al. 2016). ADHD symptoms can disrupt peer relationships for those with ADHD and lead to depression (Hoza et al. 2005). In fact, nearly 30% of youth with ADHD meet criteria for depression (Bauermeister et al. 2007; Hassan et al. 2013). Children and adolescents who meet criteria for both ADHD and depression are more functionally impaired than youth who meet criteria for either disorder alone (Biederman et al. 2008a, b).

ADHD and Depression Theory

As a way to understand this common comorbidity, Meinzer and colleagues (2014) developed an ADHD and depression theory which describes two pathways to depression in youth with ADHD. One pathway suggests that comorbidity is based upon similar etiological variables which contribute to both disorders. Meinzer and colleagues posit that ADHD and depression are both heritable and have large genetic overlap (Cole, Ball, Martin, Scourfield, and McGuffin 2009), associated with low reward responsivity (Scheres, Milham, Knutson, and Castellanos 2007), deficits in emotion regulation (Barkley 1997; Compas, Jaser, and Benson 2009; Walcott and Landau 2004) and with parents who demonstrate low interpersonal warmth (Humphreys et al. 2013; Ostrander and Herman 2006).

The second pathway to depression suggested by Meinzer and colleagues posits that depression comorbidities are secondary to the associated functional impairments commonly reported in ADHD (Meinzer et al. 2014). Specifically, youth with ADHD often experience a number of functional impairments which mediate the relationship between ADHD symptoms and depression (Humphreys et al. 2013; Meinzer et al. 2013). Social impairments mediate the relationship between ADHD and depression (Meinzer et al. 2014). Notably, youth with ADHD who are involved in either victimization or perpetration of bullying also experience elevated symptoms of depression (Hu et al. 2016; Roy et al. 2015). Thus, in the context of Meinzer and colleagues' ADHD: depression theory, bullying involvement is consistent with the second pathway between ADHD and depression.

Current Review Aims

Given the independent association between bullying, ADHD and depression and the negative outcomes associated with each, better understanding the associations between bullying and depression in youth with ADHD is important. Not surprisingly, within the past decade, an emerging literature has been published on the topic of bullying involvement and depression in ADHD, yet no review has attempted to synthesize these findings. Thus, the primary aim of this review is to (1) synthesize this burgeoning literature using existing bullying (Swearer and Hymel 2015) and ADHD (Meinzer et al. 2014) frameworks and consider the current state of evidence supporting or contradicting these models using a systematic review process. Secondary aims of the systematic review are to (2) assess study quality as a means of identifying gaps and inconsistencies in the existing literature. These gaps and inconsistencies will then serve as a basis for (3) developing future research direction suggestions. Given the heterogeneous nature of methods used across studies to assess ADHD, bullying, and depression, a meta-analysis is not an appropriate way to examine this topic.

Method

Search Procedures and Systematic Review Parameters

To search for associations between ADHD, bullying, and depression, search terms consisting of (ADHD OR ADD OR attention deficit disorder OR attention-deficit/hyperactivity disorder) and (bullying OR cyberbullying OR victimization, OR victim OR peer victimization OR bully) and (depression OR depressive) were included. Search terms were determined a priori and then subsequently refined by noting the keywords assigned to relevant included articles. Relevant peer-reviewed empirical studies were identified through keyword searches in major publication databases (ERIC, PsycINFO, PubMed, and Google Scholar). These databases were searched for relevant articles using search strings, composed using standardized vocabulary (e.g. MeSH terms) based upon the above identified key words and Boolean operators. Additionally, reference sections of the included manuscripts were screened for additional studies (snowballing). Studies in print or online publications in a peer-reviewed journal were considered. Relevant academic conferences were also searched (online) for conference papers and posters that were never published. These include the Society for Research in Child Development, Society for Research in Adolescence, American Educational Research Association, American Professional Society of ADHD and Related Disorders, American Academy of Child and Adolescent Psychiatry and Association for Behavioral and Cognitive Therapies.

Studies in the present review satisfied the following inclusion criteria: 1) an empirical study or case study, 2) participants had a diagnosis of ADHD/ADD or ADHD symptoms, 3) studies included measurement of bullying involvement (perpetration, either passive victimization or reactive victimization/bully-victim roles; cyberbullying) AND depression or depressive symptoms, 4) consisted of child and/or adolescent samples, and 5) were written or translated into English.

Given that it is common for ADHD to be comorbid with other disorders (Biederman et al. 2005; Wählstedt, Thorell, and Bohlin 2009), this review included studies which examined youth with ADHD and other comorbid conditions. Studies that did not have

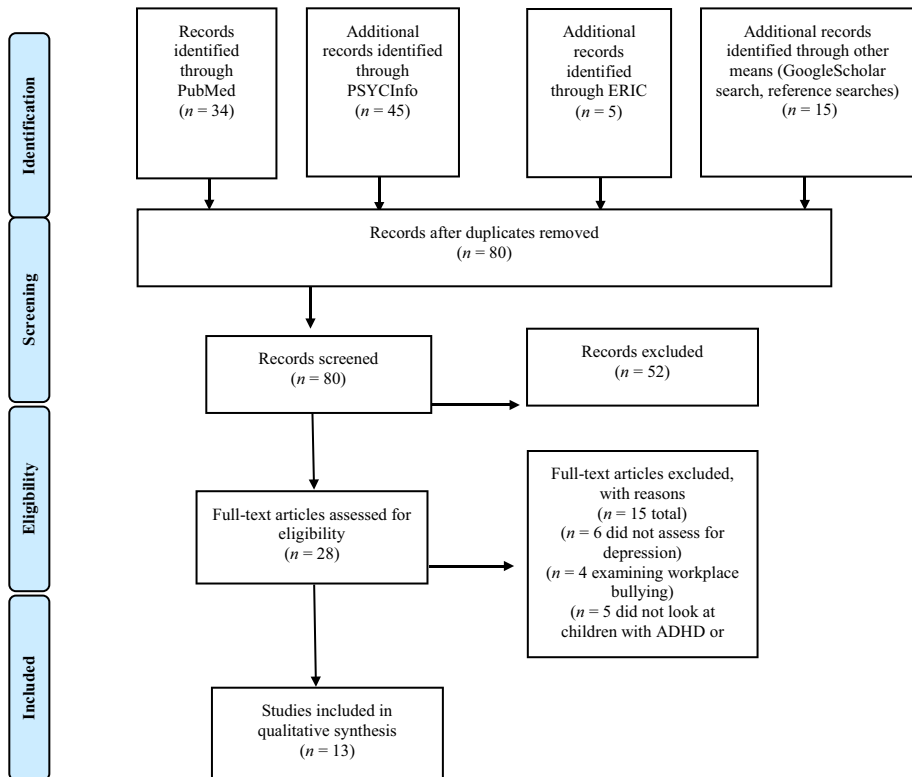


Fig. 1 Flow Diagram of systematic review

a specific measure of depression or depressive symptoms were excluded. For example, some bullying studies assessed for “internalizing disorders” broadly. Youth with depression frequently report co-occurring anxiety (Brady and Kendall 1992; Garber and Weersing 2010). While undeniably related constructs (both internalizing disorders), anxiety and depression are sufficiently distinct to view each as independent, especially in youth (Brady and Kendall 1992; Cummings, Caporino, and Kendall 2014). Thus, the current review focused on depression as construct independent from anxiety and internalizing disorders more broadly.

The first author (JS) performed the search, reviewed titles and removed duplicates in May 2020. Eighty abstracts were reviewed by JS and 52 abstracts were excluded for failing to meet all inclusion criteria. Twenty-eight articles were identified for full paper review. Final inclusion of studies ($n=13$) was based on consensus of both authors (JS and KA). The two authors achieved high inter-rater reliability ($\text{kappa}=1.0$) for satisfying inclusion criteria. Reasons for exclusions are detailed in Fig. 1 and most often included failure to assess all three variables. The IRB at BLINDED FOR REVIEW considered this project to be exempt and IRB approval was obtained prior to starting the project. No potential conflict of interest existed for either author in the form of grants, employment by, consultancy for, shared ownership in, or any close relationship with, an organization whose interests, financial or otherwise, may be affected by the publication of the paper.

Data Extraction, Analysis and Synthesis

Key elements that were abstracted from selected studies included details about the year of publication, study design, sample (size, age, method of ascertainment, country of ascertainment), presence of comparison group, measurement (ADHD, depression, bullying) and informants (parents, teachers, youth). The salient results of each study were reported, including both those that showed statistical significance and null findings. Data extraction was completed by first author (JS) and was verified by second author (KA). After the first author (JS) completed an individual review of each included article (documented in a table form), tables were exchanged and reviewed for discrepancies. Discrepancies were discussed and reconciled among both authors. Quality ratings were not coded nor used to exclude studies. Rather, quality ratings were discussed in consensus conferences between the two authors and primarily used to identify gaps and inconsistencies in the literature and generate future research considerations.

Following data extraction and quality analysis, a narrative synthesis was completed following Economic and Social Research Council (ESRC) guidelines (Popay et al. 2006). Based upon our guiding bullying and ADHD: depression conceptual frameworks, relationships in the published data between bullying involvement and depression in youth with ADHD were considered. The narrative synthesis also considered the methodological quality of the primary studies included in the review and concluded with an assessment of the strength of the evidence available for drawing conclusions.

Results

This systematic literature review was completed in May 2020. Thirteen studies met all inclusion/exclusion criteria (see Fig. 1 for review process and Table 1 for details on the included study demographics, research design, the inclusion of comparison groups and key findings). For details on study assessment of ADHD, bullying subtypes, and bullying roles, see Table 2. For details regarding measurement of ADHD, bullying, and depressive symptoms and diagnoses, see Table 3. All studies were published between 2007–2020 with the majority published since 2015. Of the 13 included studies, two had a prospective longitudinal design and 11 had a cross-sectional design.

Aim 1: Theory Guided Synthesis

Social-Ecological Diathesis–Stress Model of Bullying Involvement

The Swearer and Hymel (2015) bullying theory posits that the presence of ADHD (both disorder and symptoms) serves as a diathesis (risk factor) for development of depression. Involvement in bullying is a stress that may lead to this outcome (i.e., development of depression/depressive symptoms). When viewed from this model, bullying involvement is a *moderator* of the relation between ADHD symptoms and depressive symptoms (i.e., depression emerges in youth with ADHD if and when they get involved in bullying).

Table 1 Summary of reviewed studies

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
<i>Longitudinal studies</i>				
Roy et al. 2015	<i>N</i> = 728; Age range = 11–25 years Timepoint 1: <i>M</i> age = 13.6, <i>SD</i> = .53, 51% girls; Timepoint 2: <i>M</i> age = 19.1, <i>SD</i> = .60, 52.3% girls Recruited from 5 municipalities, including both urban and rural areas; participants had to be affiliated with a primary school	The Netherlands	–	ADHD symptoms were associated with peer dislike ($r_s = .17$, $p > .001$) and victimization ($r_s = .11$, $p = .001$) Peer dislike, victimization, and ADHD symptoms were associated with an increased risk for depressive outcomes Students who were disliked were 1.4 times more at risk for depression compared to non-disliked students Students who were victimized (compared to those who were disliked) were 1.6 times more at-risk for depression (this gradually decreased and disappeared after about 2 years) In boys, peer dislike and victimization did not mediate the effect of ADHD symptoms on depression. In girls, peer dislike mediated 7% and victimization mediated 3% of the effect of ADHD symptoms on depression Peer dislike mediated 4% of the effect of ADHD symptoms on depression, whereas victimization mediated 3% of the effect of ADHD symptoms on depression. When included simultaneously, the peer variables explained 7% of the effect of ADHD symptoms on depression

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
Evans et al. 2019	N= 346; Age range at baseline: 5–8); 51% female n = 109 kinder n = 111 1st graders n = 126 2nd graders Recruited from schools in a small town in the U.S. Midwest	United States	–	Inattention predicted elevated depressive symptoms in Grades K–2 ($\beta = .19, p < .001$) and Grades 3–5 ($\beta = .09, p < .05$), revealing a concurrent and longitudinal effect Inattention significantly predicted relational ($\beta = .17, p < .01$) and physical victimization ($\beta = .10, p < .01$) at Grades K–2 but not at Grades 3–5 ($\beta = -.04, p > .05$) and ($\beta = .07, p < .1$), respectively Hyperactivity-impulsivity was not strongly associated with relational or physical victimization in Grade K–2 but emerged as the only predictor of higher levels of relational ($\beta = .20, p < .01$) and physical victimization ($\beta = .13, p < .01$) in Grades 3–5 Inattention showed robust cross-sectional links to victimization (both forms) at Grades K–2 and only hyperactivity-impulsivity was longitudinally predictive of greater victimization in Grades 3–5 Children with higher levels of teacher-reported inattention in Grades K–2 had significantly higher depressive symptoms ($\beta = .16, p < .05$)

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
<i>Cross-sectional studies</i>				
Monopoli et al. 2020	N=123; Age range: 6th–8th grade 51% 6th graders 33% 7th graders 15% 8th graders Recruited from nine schools from urban, suburban, and rural locations	United States	–	Significant positive relationships were found between victimization ($M = 1.84$, $SD = .75$) and depression ($M = 52.16$, $SD = 15.24$), $r(112) = .33$, $p < .01$ The relationship between social skills and victimization was not significant, however social skills was found to be a protective factor of peer victimization The regression model significantly predicted peer victimization ($F(9, 112) = 8.14$, $p < .01$) and explained 39.5% of the variance in peer victimization Neither gender nor grade were significantly associated with peer victimization The Wald tests revealed anxiety had a stronger relationship than depression with peer victimization (Wald = 2.34, $p < .05$) Without anxiety in the model, depression was a significant predictor of peer victimization ($\beta = .25$, $p < .01$) and explained 6.1% of the variance in peer victimization. When anxiety was included in the model, depression explained just .4% of the variance in peer victimization In the younger child group, mothers and their children had lower agreement on the child's victimization of physical bullying when the child had more hyperactive/impulsive symptoms ($p = .003$) In the older child group, mothers and their children had lower agreement on the child's victimization of physical bullying when children had fewer depressive symptoms ($p = .001$)
Hu et al. 2018	N=462; Age range = 6–18 years; M age = 11.1, SD = 2.7, 79.6% boys Participants were recruited from two child/adolescent psychiatric outpatient clinics	Taiwan, China	–	

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
Becker et al. 2017	N = 131; Age range = 11 to 15 years; M age = 12.56, SD = .98, 73% boys, 75.5% White All participants were middle school students; recruited through participating schools	United States	–	There was a significant main effect of relational victimization in relation to depression ($\beta = .28, p = .009$), whereas neither physical nor reputational victimization was significantly associated with depression when sex and relational victimization were in the model Relational victimization was not significantly associated with female adolescents' depression ($\beta = -.08, p = .71$), relational victimization was significantly positively associated with depression for male adolescents ($\beta = .38, p = .001$) Those with significant pain reported more severe depression ($p < .001$) and worse sleep quality ($p < .001$) than did those without significant pain Compared with participants with ADHD who did not report being bullied, participants with ADHD who were the victims of verbal bullying and relational bullying and physical bullying were more likely to report significant pain and pain-induced functional impairment Severity of inattention symptoms was positively associated with the severity of depressive symptoms after controlling for the effects of sex and age ($\beta = .176, p = .012$) BIS score was positively associated with the severity of depressive symptoms ($\beta = .313, p = < .001$) and ($\beta = -.08, p = .71$) Being a bully victim and a bully perpetrator were positively associated with the severity of depressive symptoms; ($\beta = .190, p = .001$) and ($\beta = .228, p = < .001$), respectively Bully-victims reported more severe depressive symptoms than those who were not victimized ($\beta = .190, p = .001$) When looking at the relationship between depression and bullying involvement, age was positively associated with depression ($\beta = .188, p = .001$)
Yeh et al. 2017	N = 144; Age range = 6–18 years; M age = 11.0, SD = 2.8; 79.9% boys Recruited from two child/adolescent psychiatric outpatient clinics	Taiwan, China	–	
Hu et al. 2016	N = 287; Age range = 11 to 18 years; M age = 13.1, SD = 2.0 years; Males = 87.5% All diagnosed with ADHD prior to study enrollment Recruited from child/adolescent psychiatric outpatient clinics of two medical centers	Taiwan, China	–	

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
Kim et al. 2015	N = 532; Age Range not reported School A: <i>M</i> age = 11.30, 51.8% boys School B: <i>M</i> age = 11.32, 55.3% boys All sixth graders recruited from two elementary schools with similar socioeconomic status	Korea	“Normal group” compared to “High Risk Group” (i.e., more ADHD symptom severity)	<p>Comparisons of peer relationships and clinical-scale scores according to gender: Female students ($M = 11.05$, $SD = 7.32$) scored significantly higher than male students ($M = 9.46$, $SD = 7.12$) on the CDI, suggesting a higher prevalence of depressive symptoms among female students than among male students, $t(561) = -2.59$, $p = .010$; $d = .022$</p> <p>Comparisons of peer relationships and clinical-scale scores according to the severity and extent of ADHD symptoms: The high-risk group ($M = 11.59$, $SD = 7.36$) did not score significantly higher than the normal group on the depression scale ($M = 1.00$, $SD = 7.20$), $t(56) = -1.57$, $p = .118$, $d = .22$ The high-risk group ($M = 4.18$, $SD = 5.54$) did not score significantly higher than the normal group ($M = 2.82$, $SD = 4.11$), on the bullying scale, $t(56) = -1.78$, $p = .080$; $d = .28$</p> <p>The correlations between peer relationships and the severity and extent of ADHD symptoms: ADHD symptoms were significantly correlated with depression $r(561) = .139$, $p = < .01$, impulsiveness $r(561) = .173$, $p = < .01$; inattention-hyperactivity $r(561) = .245$, $p = < .01$, social relationships $r(561) = -.101$, $p = < .05$, school bullying $r(561) = .167$, $p = < .01$, and oppositional defiant disorder $r(561) = .57$, $p = < .01$ Quality of social relationships deteriorate as ADHD symptoms become more severe</p>

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
Mayer et al. 2015	N=1,707 mothers (total); Age range of children =6–18 years Psychiatric sample: $n = 1,512$; $M_{age} = 9.2$, 68.4% boys Recruited from outpatient diagnostic clinics Control sample: $n = 186$; $M_{age} = 8.7$, 43.5% boys Recruited from population-based epidemiologic study of sleep	United States	Control children (i.e., community children not on psychotropic medication and without intellectual disability, autism, ADHD, learning disability, or acquired brain injury)	Children with high depressive and ADHD-Inattentive symptoms were more likely to be victims ($F(6, 1706) = 43.9$, $p < .0001$, Bonferroni $p < .05$, $d = .2 - .9$) than other children in the sample
Yen et al. 2014a, b	N=251, Age range = 11–18 years, $M_{age} = 13.1$, $SD = 2.0$, 100% males All diagnosed with ADHD prior to study enrollment Recruited from child/adolescent psychiatric outpatient clinics	Taiwan, China	–	There were no significant associations between being a cyberbullying victim and ADHD-related factors and psychiatric comorbidities (i.e., depression) Controlling for the effects of gender and age, cyberbullying victims reported more severe depressive symptoms ($\beta = .221$, $p = .001$) than did those who were not cyberbullying victims ($\beta = -.038$, $p = .586$) There were no significant differences in depressive symptoms observed between those who were and were not cyberbullying perpetrators
Kowalski & Fedina, 2011	N=42, Age range = 10–20 years, $M_{age} = 13.69$, $SD = 2.61$, 57.1% boys, 73% White All participants were enrolled in grades 5 through 12; participants were attending a summer wilderness camp for children with ADHD and Asperger Syndrome	United States	–	Individuals not involved with bullying experienced lower depressive symptoms $F(2, 31) = 5.11$, $p < .01$ ($n^2 = .23$) than victims and perpetrators Victims and perpetrators did not differ from one another on depressive symptoms, $p_s > .05$

Table 1 (continued)

Study	Sample size, age and ascertainment	Country of study	Comparison group	Key depression and bullying findings
Taylor et al. 2010	N=94, Age range = 8–17 years, <i>M</i> age = not reported; 56% boys Participants were recruited from primary care and pediatric clinics	United States	3 groups: participants with a verifiable ADHD diagnosis, participants with a verifiable ADHD and comorbid diagnosis, and participants verified by physician record to have no diagnosis	For children in the ADHD-only group, bully-victims had significantly worse parent-reported internalizing scores ($t(83) = -2.18, p = .04$) and self-reported depression ($t(86) = -3.40, p = .001$) than children who were bullies and victims in the ADHD-only group
Humphrey et al. 2007	N = 116, Age range = 4–18 years, <i>M</i> age = 9.95, <i>SD</i> = 3.5, 78.4% boys, 82.8% White All psycho-educational assessment files from Child and Adolescent Psychiatry program were searched for ADHD diagnoses	United States	–	Peer victimization was positively correlated to depressive symptoms with a large effect size, ($r = .48, p < .001$)

Attention deficit/hyperactivity disorder (ADHD); Behavior inhibition system (BIS); Childhood Depression Inventory (CDI)

Evidence Supporting the Social-Ecological Diathesis–Stress Model of Bullying Involvement

Bullying involvement and depression were considered in a large sample of youth with and without ADHD ascertained from primary care clinics. Youth with ADHD reported higher levels of bullying victimization (yet not perpetration) compared to non-ADHD control participants. Compared to youth with ADHD who had no bullying involvement, youth with ADHD who were involved with bullying had higher self-reported depression symptoms. This study was one of the very few to consider those involved in *both* perpetration and victimization; bully-victims had the highest levels of self-reported depression (Taylor et al. 2010).

In a sample of early adolescents with ADHD ascertained in schools, a moderate positive relationship was reported between adolescent report of peer victimization and depression ($r=0.33$). Social acceptance was associated negatively with peer victimization at the same strength level ($r=-0.33$). Gender and age were not significantly predictive of peer victimization in early adolescents with ADHD. Anxiety, not depression, was more strongly predictive of peer victimization; without anxiety in the peer victimization predictive model, however, depression was a significant predictor ($\beta=0.25$) of peer victimization (Monopoli et al. 2020).

In a cross-sectional sample of early adolescents with ADHD, relational victimization was associated with greater depressive symptoms for males ($\beta=0.38$) but not females (Becker et al. 2017). In that same sample, 57% of participants reported experiencing at least one victimization episode weekly, most often relational victimization. This cross-sectional gender finding (associations only emerged for males) is inconsistent with the longitudinal gender finding (associations only for females) regarding depression and bullying involvement.

Using a clinically-ascertained sample of youth with ADHD (M age = 11.0 years, $SD=2.8$ years), Yeh et al. (2017) reported that ADHD symptoms and bullying involvement (both perpetration and victimization) were significantly associated with depression. Similarly, in a cross-sectional sample of 287 adolescents with ADHD, bullying victims and bullying perpetrators with ADHD both reported higher levels of depressive symptoms compared to adolescents with ADHD who were not involved in bullying (Hu et al. 2016). In their sample, 6.3% of adolescents with ADHD had clinically significant levels of depression and the severity of inattention symptoms was positively associated with the severity of depression, even after controlling for the effects of sex and age.

In a cross-sectional study examining cyberbullying in 251 male adolescents with ADHD, past year cyberbullying victimization (19% prevalence rate) was positively associated with age and non-cyberbullying victimization (Yen et al. 2014a, b). Past year cyberbullying perpetration (14% prevalence rate) was also associated with age and non-cyberbullying perpetration, yet additionally found to be associated with ADHD-Combined type status. After controlling for the effect of age, cyberbullying victims with ADHD (yet not cyberbullying perpetrators) reported higher levels of depression ($\beta=0.22$).

Using a sample of 42 adolescents with ADHD and/or Asperger's Syndrome (M age = 13.69 years, $SD=2.61$), Kowalski and Fedina (2011) reported participants had high levels of bully victimization (57%) and perpetration (38%) over the past two months. In analyses, the two groups were collapsed into one omnibus bullying involvement group. Results indicated significantly higher levels of depression in youth who had

Table 2 ADHD measurement and subtypes of bullying

Study	ADHD measurement	Bullying subtypes	Bullying roles
Roy et al. 2015	ADHD symptoms	Victimization	Victim
Evans et al. 2019	ADHD symptoms	Victimization (i.e., relational bullying and physical bullying)	Victim
Monopoli et al. 2020	ADHD diagnosis (study determined)	Victimization (i.e., Overt, relational, and reputational)	Victim
Hu et al. 2018	ADHD diagnoses (study determined)	Verbal bullying	Victim
		Relational bullying	Perpetrator
		Physical bullying	
Becker et al. 2017	ADHD diagnoses (study determined)	Verbal bullying	Victim
		Relational bullying	Perpetrator
		Physical bullying	
Yeh et al. 2017	ADHD diagnoses (study determined)	Verbal bullying	Victim
		Relational bullying	Perpetrator
		Physical bullying	
Hu et al. 2016	ADHD diagnoses (study determined)	Bullying	Victim
			Perpetrator
Kim et al. 2015	ADHD symptoms	Bullying	Victim
Mayes et al. 2015	ADHD diagnoses (study determined)	Bullying	Victim
			Perpetrator
			Bully-victim
Yen et al. 2014a, b	ADHD diagnoses (preexisting ADHD diagnosis)	Cyberbullying	Perpetrator (cyberbullying)
		Active bullying	Victim (cyberbullying)
		Passive bullying	Victim (active)
			Perpetrator (active)
			Victim (passive)
			Perpetrator (passive)
Kowalski & Fedina, 2011	ADHD diagnoses (preexisting ADHD diagnosis)	Cyberbullying	Perpetrator (cyberbullying)
		Traditional bullying	Victim (cyberbullying)
			Victim (traditional)
			Perpetrator (traditional)

Table 2 (continued)

Study	ADHD measurement	Bullying subtypes	Bullying roles
Taylor et al. 2010	ADHD diagnoses (preexisting ADHD diagnosis)	Bullying	Victim Perpetrator Bully-victim
Humphrey et al. 2007	ADHD diagnoses (preexisting ADHD diagnosis)	Bullying	Victim

Table 3 Assessment of ADHD, bullying, and depression

Study	ADHD measure	Bullying measure	Depression measure
Roy et al. 2015	Child Behavior Checklist (CBCL; parent report), Attention Problem Scale, $\alpha = \text{not reported}$; Youth Self Report (YSR; child/self-report), $\alpha = \text{not reported}$; Teacher's Checklist of Psychopathology (TCP), $\alpha = \text{not reported}$	Peer nomination (assessing for peer dislike and victimization), $\alpha = \text{not reported}$	World Health Organization Composite International Diagnostics Interview (CIDI), version 3 (lifetime and current; child/self-report, $\alpha = \text{not reported}$)
Evans et al. 2019	Disruptive Behavior Disorder Checklist (teacher report); scales: irritability, $\alpha = .86$; defiance, $\alpha = .89$; inattention, $\alpha = .96$; hyperactivity-impulsivity, $\alpha = .95$	Social Experiences Questionnaire (teacher report), teacher relational, $\alpha = .76-.89$; teacher physical, $\alpha = .79-.96$ Victimization of Self scale of the Peer Experiences Questionnaire (child/self-report), student relational, $\alpha = .85$; student physical, $\alpha = .77$	Short Mood and Feelings Questionnaire (SMFQ; child/self-report), $\alpha = .89$ Withdrawn-Depressed scale of the Teacher Report Form, $\alpha = .87-.90$
Monopoli et al. 2020	Parent Children's Interview for Psychiatric Syndromes (P-ChIPS), $\alpha = \text{not reported}$; Or, using the "or" rule (see Lahey et al. 1994); Combined with information provided by the Disruptive Behavior Disorders Rating Scale (DBD; teacher report), $\alpha = \text{not reported}$; And children had to demonstrate impairment based on parent or teacher report on the Impairment Rating Scale (IRS), $\alpha = \text{not reported}$	The Revised Peer Experiences Questionnaire (RPEQ; child/self-report), $\alpha = .91$	The Reynolds Adolescent Depression Scale 2nd edition (RADSD-2; adolescent/self-report), $\alpha = .87$

Table 3 (continued)

Study	ADHD measure	Bullying measure	Depression measure
Hu et al. 2018	<p>Interview with child psychiatrist; Clinical observation of participant's behavior; Child's history provided by parent; Schedule for Nonadaptive and Adaptive Personality (SNAP-IV) Chinese version, short form to assess severity of mother-reported DSM-IV-TR-derived inattention, hyperactivity-impulsivity, and oppositional defiant disorder in the month before the study, α of the three subscales ranged from .87 to .91</p>	<p>School Bullying Experience Questionnaire (C-SEBQ; child/self-report AND parent report), involvement in school bullying one month preceding the study, $\alpha = .74$</p>	<p>Children's Depression Inventory – Taiwanese version (CDI-TW; child/self-report) symptoms one month preceding the study, $\alpha = .83$</p>
Becker et al. 2017	<p>Children's Interview for Psychiatric Syndromes – Parent Version (P-CHIPS); used to diagnose ADHD per DSM-IV criteria, as well as comorbid disorders; Disruptive Behavior Disorder Rating Scale (DBDS; parent report) $\alpha = .91$ (ADHD inattentive); $\alpha = .88$ (ADHD hyperactive-impulsive) DBDS, Teacher-report (only used if parent reported at least four symptoms in either ADHD symptom domain on the P-CHIPS and teacher endorsed at least four symptoms in a domain occurring "pretty much" or "very much" on the DBD), $\alpha =$ not reported</p>	<p>Revised Peer Experiences Questionnaire (RPEQ; child/self-report), involvement in physical, relational, and reputational bullying in the past year, $\alpha = .80$ (physical victimization scale); $\alpha = .69$ (relational victimization); $\alpha = .80$ (reputational victimization)</p>	<p>Reynolds Adolescent Depression Scale, Second Edition (RADSD-2; child/self-report), $\alpha =$ ranged from .80 to .93 for the subscales</p>

Table 3 (continued)

Study	ADHD measure	Bullying measure	Depression measure
Yeh et al. 2017	Interview with child psychiatrist; Clinical observation of participant's behavior; Child's history provided by parent; SNAP-IV Chinese version, short form to assess severity of mother-reported DSM-IV-TR-derived inattention, hyperactivity-impulsivity, and oppositional defiant disorder in the month before the study, $\alpha =$ not reported	C-SEBQ (child/self-report AND parent report), involvement in school bullying one month preceding the study, $\alpha = .74$	CDI-TW; symptoms one month preceding the study, child/self-report, $\alpha = .83$
Hu et al. 2016	Interview with child psychiatrist; Clinical observation of participant's behavior; Child's history provided by parent; SNAP-IV Chinese version, short form to assess severity of mother-reported DSM-IV-TR-derived inattention and hyperactivity-impulsivity in the month before the study, $\alpha = .86$ and $.88$, respectively	C-SEBQ; child/self-report AND parent report, involvement in school bullying one year preceding the study, $\alpha =$ not reported	Center for Epidemiological Studies Depression Scale (CES-D), assess frequency of symptoms in the preceding month, child/self-report, $\alpha = .86$
Kim et al. 2015	Conners-Wells' Adolescent Self-Report Scale (Short Form) [CASS(S); child/self-report]; assessment of ADHD symptoms, $\alpha =$ not reported Korean ADHD Rating Scale (K-ARS; parent report and teacher report); assessment of ADHD symptoms in school-age children; frequency of the problem behavior, $\alpha =$ not reported for both parent and teacher report	School Bullying Self-Rating Questionnaire (SBSRQ), $\alpha =$ not reported	CDI; symptoms in the past two weeks, child/self-report, $\alpha =$ not reported

Table 3 (continued)

Study	ADHD measure	Bullying measure	Depression measure
Mayes et al. 2015	Clinically diagnosed with ADHD and fulfilled the following criteria: 1) symptoms of ADHD observed during psychological testing; 2) low scores relative to IQ on individually administered psychometric measures of attention and impulsivity; 3) ratings of short attention span or distractible on Pediatric Behavior Scale (PBS) by at least two raters (i.e., mother, father, and / or teacher), $\alpha = \text{not reported}$	PBS (mother report), one item of measure assessed bullying and one item of measure assessed victimization, $\alpha = \text{not reported}$	PBS; one item assessed “sadness” (i.e., “sad, unhappy, or depressed) in the past 2 months, (mother report), $\alpha = \text{not reported}$
Yen et al. 2014a, b	Preexisting clinical diagnosis Short version of the SNAP-IV Chinese version (past month), ADHD subscales of inattention, hyperactivity/impulsivity, $\alpha = .86$ and $.88$, respectively	Cyberbullying Experiences Questionnaire (CEQ; self-report) (previous year), subscales: cyberbullying perpetration and victimization, $\alpha = .64$ and $.70$, respectively	Center for Epidemiological Studies Depression Scale (CES-D; Mandarin Chinese version) (self-report), $\alpha = .86$
Kowalski & Fedina, 2011	Preexisting clinical diagnosis	Electronic Bullying Questionnaire, past 4 weeks; (self-report), $\alpha = \text{not reported}$	BDI-Y, child/self-report, $\alpha = .94$
Taylor et al. 2010	CBCL-Parent Report (reported ranges across subscales from $\alpha = .78$ to $.97$)	Reynold’s Bullying and Victimization Scale (RBVS) (self-report), previous month, $\alpha = .93$	CDI-SF; past two weeks, child/self-report, $\alpha = \text{not reported}$
Humphrey et al. 2007	Connors’ Parent Rating Scale-Revised (CPRS-R), past month, (reported ranges from $\alpha = .75$ to $.90$)	CBCL Peer Victimization Scale, (parent reported), 4 items, $\alpha = .80$	CBCL (parent reported) (reported ranges from $\alpha = .78$ to $.97$); CDI, previous two weeks, child/self-report; reported ranges of $\alpha = .71$ to $.89$

Child Behavior Checklist (CBCL); Youth Self Report (YSR); Teacher’s Checklist of Psychopathology (TCP); World Health Organization Composite International Diagnostics Interview (CID); Schedule for Nonadaptive and Adaptive Personality (SNAP-IV); Chinese version of the School Bullying Experience Questionnaire (C-SEBQ); Children’s Depression Inventory – Taiwanese version (CDI-TW); Children’s Interview for Psychiatric Syndromes–Parent Version (P-ChIPS); Disruptive Behavior Disorder Rating Scale (DBDS); Revised Peer Experiences Questionnaire (RPEQ); Reynolds Adolescent Depression Scale, Second Edition (RADSD-2); Center for Epidemiological Studies Depression Scale (CES-D); Connors-Wells’ Adolescent Self-Report Scale (Short Form) (CASS(S)); Korean ADHD Rating Scale (K-ARS); School Bullying Self-Rating Questionnaire (SBSRQ); Children’s Depression Inventory (CDI); Pediatric Behavior Scale (PBS); Cyberbullying Experiences Questionnaire (CEQ); Center for Epidemiological Studies Depression Scale (CES-D); Youth report (YR); Beck Depression Inventory (BDI); Reynold’s Bullying and Victimization Scale (RBVS); Short form (SF); Connors’ Parent Rating Scale-Revised (CPRS-R)

bullying involvement ($\eta^2=0.25$, signifying large effect size). No differences emerged between depression and associations between bully victims and perpetrators.

Hu et al. (2018) sampled 452 youth with ADHD (M age = 11.1 years, $SD=2.7$ years) and their mothers. The primary aim of this study was to investigate child-mother agreement on bullying perpetration and victimization in ADHD. Results indicated that child-mother agreement was uniformly modest (ICC's = 0.3–0.4 for victimization and 0.1–0.2 for perpetration). Child-mother agreement of physical victimization (yet not relational victimization) was moderated by high hyperactivity-impulsivity symptoms and low depressive symptoms. The authors concluded that children with ADHD may annoy peers and parents interpret the peer's annoyed reactions to the child's hyperactivity as justified and not bullying per se. However, the child with ADHD may interpret their peers' reactions as bullying. Child-mother victimization agreement was positively associated with depressive symptoms. The authors concluded that high depressive symptoms may assist parents in detection of bullying involvement (Hu et al. 2018).

Finally, in a psychiatrically ascertained sample of youth with ADHD, parent report of peer victimization was significantly associated ($r=0.53$) with parent reported levels of child depression yet less robustly associated ($r=0.29$) with child reported levels of depression (Humphreys et al. 2007).

In sum, nine studies support the Swearer and Hymel Social-ecological diathesis–stress model of bullying involvement and that ADHD is a diathesis for bullying involvement which in turn acts as a moderator of the relation between ADHD symptoms and depressive symptoms (i.e., depression emerges in youth with ADHD if and when they get involved in bullying).

Evidence Contradicting the Social-Ecological Diathesis–Stress Model of Bullying Involvement

In contrast to the nine studies which support the Swearer and Hymel model, two studies failed to support this theoretical relationship between ADHD, bullying involvement and depression. For example, in a cross-sectional study which considered dimensional ADHD symptoms (not categorical diagnoses) in 562 6th grade students, ADHD symptoms were weakly associated with depressive symptoms ($r=0.14$) and bully victimization ($r=0.17$) (perpetration was not measured). Bullying victimization and depression, however, were strongly ($r=0.52$) associated with each other (Kim et al. 2015).

In a large psychiatric sample of youth with ADHD ($n=801$) and controls ($n=186$), Mayes et al. (2015) found that youth with ADHD had increased risk for all three types of bullying involvement, victimization, perpetration and bully/victims. After statistically controlling for parent report of depression, youth with ADHD-Combined type (yet not Inattentive type) continued to have higher levels of victimization and perpetration involvement. This finding implies that the association between ADHD-Combined and bullying is stronger than the relationship between bullying involvement and depression in youth with ADHD-Inattentive.

ADHD: Depression Theory

The Meizner et al. model (2014) proposes bullying involvement as a mediator, or explaining factor, in the link between ADHD and depressive symptoms. The two longitudinal studies which met inclusion criteria both considered bullying involvement as a mediator.

Both longitudinal studies (Roy et al. 2015; Evans et al. 2019) considered ADHD symptoms (not ADHD diagnoses) and their associations with bullying and depression. Evans et al. (2019) reported that teacher reported early childhood inattention was associated with early childhood peer victimization levels and subsequently predictive of middle childhood depressive symptoms and relational victimization. Teacher reported hyperactivity-impulsivity (yet not inattention) in early childhood was strongly predictive of both relational and physical victimization in middle childhood. Relational and physical victimization were associated strongly with each other ($r=0.59$). In converging models, however, only early childhood inattention was a significant predictor of middle childhood depressive symptoms and relational victimization.

In the other longitudinal study, Roy et al. (2015) reported that in girls, yet not boys, ADHD symptoms were associated with peer victimization in early adolescence ($r=0.11$) which in turn were predictive of subsequent depression in late adolescence. In other words, the impact of ADHD symptoms on depression was partially mediated through peer victimization in girls, yet not boys. Thus, the two longitudinal studies both provide support for the Meinzer et al. (2014) ADHD: depression theory.

Aim 2: Assess Study Quality

Methodological Quality of the Primary Studies Included in the Review

There are several strengths to the existing literature including the heterogeneous country of origin for the studies (seven studies collected data within the United States, four in Taiwan, China, one each in The Netherlands and Korea) and the variety of ascertainment sites (e.g., mental health clinics, schools, summer camps). The consistency of the bullying: depression associations is notable when one considers the heterogeneity of participants and recruitment methods. However, a number of methodological shortcomings exist in the present literature (beyond the aforementioned relative lack of longitudinal data which prohibit full consideration of Meinzer's theory) on the topic of bullying: depression associations in youth with ADHD.

Bullying Measurement Shortcomings

As indicated in Tables 2 and 3, a wide range of bullying subtypes, measures and reporters (child, peer, parent) were used in the 13 studies. None of the final included 13 studies differentiated between passive victimization and reactive victimization/bully-victim roles. Similarly, all 13 studies failed to sufficiently operationalize "victim" and "perpetrator." Operationalizing "bullying," more generally, has been an ongoing problem in the literature for a number of years, leading researchers to question whether youth and adults have a similar idea of the behaviors that meet the standards of "bullying" (Vaillancourt, McDougall, Hymel, et al. 2008; Volk, Veenstra, and Espelage 2017). In the 13 reviewed studies, measures of bullying victimization were used to describe any circumstance in which youth endorsed being targeted by their peers. For example, in the study by Mayes and colleagues (2015), parent-reported victimization was based on one item on the Pediatric Behavior Scale (PBS; "gets teased or picked on by other children"). By not including an operational definition of bullying, study participants might have interpreted "bullying" in different ways (Oldenburg, Bosman, and Veenstra 2016). For example, even after receiving specific

training on the definition of bullying, teachers give incomplete definitions of bullying and failed to recognize self-reported victims in their own classrooms (Oldenburg, Bosman, and Veenstra 2016).

Failure to assess “bully-victims”. Only two studies (Mayes et al. 2015; Taylor et al. 2010) included assessment of bully-victims in their research design. By only assessing victimization and perpetration as separate constructs, this research fails to consider the highest risk group for the poorest outcomes.

Insufficient Consideration of Development

The majority of the studies' samples included large age ranges (see Table 1 for age and standard deviation details). For example, one study aggregated retrospective data of participants between the ages of 4 and 18 (Humphrey et al. 2007), another study examined children between the ages of 8 and 17 (Taylor et al. 2010) and three other studies collected data on children between the ages of 6 and 18 (Hu et al. 2018; Mayes et al. 2015; Yeh et al. 2017). Three studies examined participants within an adolescent age range of 10–20 years (Kowalski and Fedina 2011) and 11–18 years (Hu et al. 2016; Yen et al. 2014a, b). Given the clear impact of development on ADHD, depression and bullying, use of such a wide age range may have impacted results.

While several studies controlled for age statistically, given the significant differences in depression symptoms as a function of age (adolescence > childhood; Salk, Hyde, and Abramson 2017) and bullying subtype differences as a function of age (physical in children, relational in adolescents; Modecki et al. 2014), statistical covariation may not be appropriate (Miller and Chapman 2001).

Insufficient Comparison Groups

Overwhelmingly, the majority of studies ($n=9$) did not include a comparison group and thus, examined only individuals who met ADHD inclusion criteria (Becker et al. 2017; Hu et al. 2016, 2018; Humphrey et al. 2007; Kim et al. 2015; Mayes et al. 2015; Roy et al. 2015; Yeh et al. 2017; Yen et al. 2014a, b). Without a comparison group, the extent to which the above bullying: depression associations are specific to ADHD remains unknown. However, there is a vast literature which indicates that bullying involvement (both perpetrator and victim roles) and depressive symptoms are related in the general population (Kim et al. 2015; Klomek et al. 2007; Nansel et al. 2004; Yen et al. 2014a, b), suggesting that this finding would likely have also existed in a comparison group had one existed.

Unequal Gender Representation/Failure to Consider Gender Effects

As shown in Table 1, 11 of the 13 studies had exclusively male samples ($n=1$) or a significant majority male participant with much smaller female representation. While this is justifiable given the higher ADHD prevalence rates in males, the lower statistical power for gender analyses may have muted gender effects on the associations. Likewise, gender differences exist for ADHD subtypes and comorbidities; males are more likely to meet criteria for the combined presentation and have higher ODD and conduct disorder (CD) comorbidity rates (Levy et al. 2005). ODD and CD both include behaviors which are conceptually similar to bullying in their diagnostic criteria (e.g., deliberately

annoying others in ODD, aggression in CD) (APA 2013). Similarly, females are more likely to meet criteria for the inattentive presentation (Biederman et al. 2005; Gaub and Carlson 1997) and have higher depression rates (Hinshaw, Owens, Sami, and Fargeon 2006). Given all of the above, the current state of knowledge about bullying and depression in females with ADHD is far lower than that of males with ADHD.

Failure to Consider Protective Factors

Only two studies (Kim et al. 2015; Monopoli et al. 2020) considered a protective factor (both considered social acceptance). Both studies concluded that social acceptance has protective effects against depression in youth with ADHD who have bullying involvement. For example, using a social network analysis, Monopoli et al. (2020) found that children with elevated ADHD symptoms had fewer close friends; follow-up analyses indicated that students with fewer close friends also experience elevated rates of depressive symptoms and peer victimization.

Only two of the 13 studies (Hu et al. 2016; Yen et al. 2014a, b) considered the impact of prescribed medication for ADHD on bullying: depression associations. No study considered the impact of psychosocial treatment (e.g., psychotherapy) on these outcomes. None of the 13 studies considered the potential impact of parenting variables (e.g., warmth, autonomy support) on the impact of bullying: depression associations in ADHD. Given the significant body of literature which has considered protective factors in ADHD (see Dvorsky and Langberg, 2016 for a review) as well as the focus on the social environment in the Swearer and Hymel (2015) bullying model, the failure to consider protective factors, especially parental variables such as such as emotional support, warmth and autonomy support (Barboza et al. 2009; Bowes et al. 2009; Cook et al. 2010), limits our understanding of bullying and depression in youth with ADHD.

Overall Assessment of the Strength of the Evidence Available for Drawing Conclusions

The extant literature suggests an association, generally moderate to strong in strength, between bullying involvement and depression in ADHD. Relationships were slightly stronger for bullying victimization and in clinically ascertained samples. The severity of ADHD was associated positively with bullying involvement and bullying: depression associations across most studies. While not often assessed, protective factors (in this case, social acceptance) attenuated the strength of the bullying: depression associations. These results are consistent with predictions based upon the two frameworks used to guide this systematic review; as predicted by the social-ecological diathesis–stress model (Swearer and Hymel 2015), ADHD is a diathesis for bullying involvement and bullying involvement is a *moderator* of the relation between ADHD symptoms and depressive symptoms (i.e., depression emerges in youth with ADHD if and when they get involved in bullying). While less often considered, two longitudinal study findings support the Meinzer et al. model (2014) which proposes bullying involvement as a mediator, or explaining factor, in the link between ADHD and depressive symptoms.

Discussion

Youth bullying has been labeled a public health problem (CDC 2015) and youth depression prevalence rates now exceed 11% (Mojtabai, Olfson and Han 2016). Not surprisingly, parents identify bullying and depression as *the* two largest concerns they have for their children (Pew Research Center 2015). Youth with ADHD are at increased independent risk for bullying involvement (McQuade et al. 2018) *or* depression (Biederman et al. 2006) yet the topic of bullying involvement *and* depression in ADHD has historically been less well studied. Thus, efforts to further understand bullying involvement and depression in ADHD have considerable public health value. The primary aim of this review was to synthesize this burgeoning literature on this topic using existing bullying (Swearer and Hymel 2015) and ADHD (Meinzer et al. 2014) frameworks and consider the current state of evidence supporting or contradicting these models using a systematic review process (Grant and Booth 2009). Secondary aims of the systematic review were to assess study quality as a means of identifying gaps and inconsistencies in the existing literature and providing future research directions.

Conceptual Framework Synthesis

Social-Ecological Diathesis–Stress Model

Swearer and Hymel's (2015) bullying model is based upon social ecological (Bronfenbrenner 1979) and diathesis-stress models. The Swearer and Hymel (2015) bullying theory posits that the presence of ADHD (both disorder and symptoms) serves as a diathesis (risk factor) for development of depression. Involvement in bullying is a stressor that may lead to this outcome (i.e., development of depression/depressive symptoms). When viewed from this model, bullying involvement is a *moderator* of the relation between ADHD symptoms and depressive symptoms (i.e., depression emerges in youth with ADHD if and when they get involved in bullying). Importantly, the Swearer and Hymel conceptual model posits that bullying involvement *alone* does not fully explain the development of depression (Bonanno and Hymel 2010). Rather, the stressful life events associated with bullying involvement are exacerbated by existing vulnerabilities (in this case, ADHD). Nine of the 11 studies which considered the moderation model reported results which support the Swearer and Hymel theory. These results are consistent with what has been reported in the non-ADHD literature (Chango et al. 2012; Ferguson et al. 2009), regardless of type of involvement (e.g., bully, victim, bully-victim).

ADHD and Depression Model

The positive relationship between interpersonal impairments and depression is well-established in the youth ADHD literature (e.g., Biederman et al. 2008a, b; Chronis-Tuscano et al. 2010; Meinzer et al. 2016). Meinzer and colleagues (2014) developed an ADHD and depression theory which describes two pathways to depression in youth with ADHD. One of the two pathways to depression posits that depression comorbidities are secondary to the associated functional impairments commonly reported in ADHD. In other words, the Meinzer et al. model (2014) proposes bullying involvement as a mediator, or explaining

factor, in the link between ADHD and depressive symptoms. Both longitudinal studies which considered mediation support Meinzer's theory for bullying victimization. To date, however, no longitudinal study has tested where bullying perpetration in ADHD increases the risk for subsequent depression.

The current literature suggests that stronger conclusions can be reached about the social-ecological diathesis–stress model and bullying involvement as a moderator of the relation between ADHD symptoms and depressive symptoms. Confidence in the ADHD and depression mediational model is presently less robust yet could be enhanced by additional longitudinal research testing the temporal associations implied by the model or if intervention research aimed at reducing bullying involvements leads to decreased risk of depression in youth with ADHD.

Future Research Directions

The synthesized findings of these 13 studies uniformly suggest that further research is needed to better understand bullying: depression associations in ADHD. The following topics are offered as a means of furthering this already burgeoning literature base.

Test Both Theoretical Models More Completely and in an Integrated Fashion

As outlined above, the diathesis-stress component of the Swearer and Hymel (2015) bullying model appears to be supported well in the reviewed literature. Nonetheless, only one of Meinzer's two pathways between ADHD and depression has been considered in the existing literature. The pathway which posits individual difference variables (e.g., low reward responsivity, poor emotion regulation, parenting variables) as central to ADHD: depression associations has largely been unexplored in the current literature. As a way of synthesizing both gaps in theory testing, aspects of the social ecology (parenting variables, family factors) should be considered. In fact, many of the same parenting variables associated with bullying are associated with ADHD: depression pathways (Humphreys et al. 2013; Ostrander and Herman 2006).

Testing both models in an integrated fashion will also permit broader exploration of protective factors, an important construct for understanding resilience (Wille et al. 2008). Given the challenges that children with ADHD experience across contexts (Bauermeister et al. 2007), protective factors are particularly salient in buffering the development of depression (Wüstner et al. 2019). Personal factors such as self-efficacy (Dvorsky and Langberg 2016) and family factors such as positive parenting (Dvorsky and Langberg 2016) and a positive family climate (Shei, Novik, Thomsen, Indredavik, and Jozefiak 2015) promote resilience in children with ADHD. These same protective factors have been found to buffer youth from involvement in bullying (Jackson, Chou, and Browne 2017) including those with depressive symptoms (Hall and Chapman 2018; Shortt and Spence 2006), as well as ADHD (Rajendran, Kruszewski, and Halperin 2016). Future research should consider protective factors, both personal and familial, which may moderate the associations between depression and bullying in youth with ADHD. For example, there is some evidence that parental warmth and autonomy supportive behaviors may serve as a protective factor against bullying involvement in ADHD (Rajendran, Kruszewski, and Halperin 2016).

This type of integrated “theory-knitting” research will necessarily be longitudinal and may provide more complete information regarding the temporal sequencing of cause-effect

for bullying and depression in youth with ADHD. More importantly, given that these associations are likely transactional in nature (Reijntjes Kamphuis, Prinzie and Telch 2010), fully testing these models in an integrated, longitudinal fashion will provide the field information regarding developmental trajectories and associated points of intervention and prevention. Adopting this developmental psychopathology perspective focused on developmental pathways, risk and resilience factors from multiple domains, and the transactional relations among youth and their contexts will likely have maximal yield towards understanding these complex associations.

Investigate Bully-Victims and Distinguish Between Reactive Aggression and Bully Perpetration in ADHD

Youth who are both victimized by their peers and bully others are at risk for worse outcomes, including increased depressive symptoms, than youth who only perpetrate or who are only victimized (Copeland, Wolke, Angold, and Costello 2013; Eisenberg, Gower, McMorris, and Bucchianeri 2015; Mishna, Khoury-Kassabri, Gadalla, and Daciuk 2012; Taylor et al. 2010).

Reactive aggression is common in youth with ADHD (Vitaro, Brendgen and Tremblay 2002), especially in youth with comorbid ODD (Becker et al. 2012). Nonetheless, reactive aggression frequently does not meet the operationalization criteria for bullying (Volk, Veenstra, and Espelage 2017). Future research should explore the differences in reactive aggression and bully perpetration in ADHD, especially as it relates to the bully-victims. For example, secondary to impairments in impulse control and emotion regulation abilities, upon being victimized, youth with ADHD may respond aggressively and physically, appearing to an observer as a bully perpetrator (and hence, a “bully-victim”) (Winters et al. 2018). However, this reactive behavior might not be “bullying” at all, and instead this behavior may be better identified as an impulsive and defensive response to relieve frustration upon being victimized themselves (Volk et al. 2017).

Further Consider ADHD Comorbidities

Depression was selected due to its independent associations with ADHD (Humphreys et al. 2013) and bullying (Klomek et al. 2010). Anxiety also has independent associations with ADHD (Bériault et al. 2018) and bullying (Drazdowski et al. 2019). Anxiety often precedes the onset of depression (Cummings et al. 2014) and may therefore be salient to consider. Comorbid ODD increases the likelihood that youth with ADHD will “fight back” against their perpetrators when provoked (Becker et al. 2016; Sciberras et al. 2012; Verlinden et al. 2015). While this may not be “bullying” at all (see above), it may also increase the likelihood that a youth with ADHD and ODD will become a bully: victim.

ADHD and autism spectrum disorder (ASD) are commonly comorbid (Antshel & Russo 2019). Like ADHD, ASD is independently associated with bullying (Hebron, Oldfield, & Humphrey 2017) and depression (Pezzimenti, Han, Vasa, & Gotham 2019). Bullying victimization in children and adolescents with ASD has been causally linked to depression (Rai et al. 2018). Future research should consider how anxiety, ODD and ASD, both as a categorical diagnosis and a continuous variable trait, may impact the relationship between bullying involvement and depression in ADHD.

Further Consideration of Gender

Future research may want to explore the impact of gender on these two theoretical models. As noted previously, gender differences exist in all three variables considered in this review. For example, gender differences in bullying subtype exist; physical bullying is more common in males (Rosen and Nofziger 2018) while relational bullying is more prevalent than physical bullying in females (Smith, López-Castro, Robinson, and Görzig 2019). Relational bullying is more strongly associated with depression than physical bullying (Barzilay et al. 2017).

Relatedly, no study considered the impact of the well replicated differential friendship patterns in which boys and girls engage. Females tend to prefer small groups or dyads of friendships (i.e., having a best friend), while males tend to prefer relationships with other males in larger groups (Mjaavatn, Frostad, and Pijl 2016). By possessing a smaller social circle, females may be more vulnerable to the negative impacts of bullying (Sapouna and Wolke 2013). Thus, there are multiple reasons to hypothesize that gender may impact the relationship between bullying and depression in ADHD.

Increased Focus on Cyberbullying

As noted in Table 2, only two studies considered cyberbullying. Future research should more carefully examine cyberbullying for several reasons. First, the vast majority of youth own a smartphone, access the Internet and use social media regularly (Influence Central 2018; Pew Research Center 2018). Second, youth report cyberbullying to be a problem they encounter often (Pew Research Center 2018). Third, youth with ADHD are more likely to excessively use the Internet and social media (Andreassen et al. 2016). Excessive social media use, in turn, increases odds for depressive symptoms (Woods and Scott 2016) and also independently increases the risk for cyberbullying involvement (Shah, Das, Muthiah, and Milanaik 2019). Finally, it is common for youth who are bullied in person to bully others online (Heiman, Olenik-Shemesh, and Eden 2015). Thus, for a variety of reasons, cyberbullying in ADHD seems especially relevant to consider in future research on this topic.

Conclusions

Bullying and depressive symptoms in youth with ADHD was explored in 13 studies and across multiple cultures and ascertainment methods. Positive associations were reported consistently between bullying involvement and depressive symptoms in youth with ADHD. This systematic review used two existing conceptual models and attempts to provide a theory-guided synthesis of the burgeoning literature. Future longitudinal research should consider the relationship between bullying involvement and depression.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Animals Of Human Involved/Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

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(Included studies are denoted by *)

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