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A Review of Factors that Promote Resilience in Youth with ADHD and ADHD Symptoms

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Abstract The vast majority of research on youth with ADHD has focused on risk factors and describing the types of impairment individuals with ADHD experience. However, functional outcomes associated with ADHD are heterogeneous, and although many youth with ADHD experience significant negative outcomes (e.g., school dropout), some are successful in multiple domains of functioning (e.g., pursue and graduate college). There is a growing body of literature supporting the existence of factors that protect youth with ADHD from experiencing negative outcomes, but there is no published synthesis of this literature. Accordingly, the goals of this review are to conceptualize risk–resilience in the context of ADHD using a developmental psychopathology framework and to systematically review and critique evidence for promotive and protective factors in the context of ADHD. The literature search focused specifically on resilience in the context of ADHD symptoms or an ADHD diagnosis and identified 21 studies, including clinic, school, and community samples. Findings of promotive and/or protective factors are summarized across individual, family, and social–community systems. Overall, we know very little of the buffering processes for these youth, given that the study of promotive and protective factors in ADHD is in its infancy. The strongest evidence to date was found for social- and family-level systems. Specifically, multiple longitudinal studies support social acceptance as a protective factor, buffering against negative outcomes such as poor academic performance and comorbid depressive symptoms for youth with ADHD. There was also compelling evidence supporting positive parenting as a promotive factor. In terms of individual-level factors, positive or modest self-perceptions of competence were identified as a promotive factor in multiple studies. Future directions for research that will catalyze the study of resilience with ADHD are provided, and the potential for targeting protective mechanisms with intervention and prevention is discussed.

Keywords Attention-deficit/hyperactivity disorder · Protective factors · Resilience · Promotive factors · Risk · Adaptive outcomes · Competence · Developmental psychopathology · Adjustment

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterized by developmentally inappropriate and impairing inattention and/or hyperactivity and impulsivity (American Psychiatric Association 2013). ADHD is one of the most common mental health disorders in childhood, with prevalence rates of 3–9 % in the USA and worldwide (Merikangas et al. 2010; Polanczyk et al. 2007). Children and adolescents with ADHD often experience clinically significant impairment across multiple domains of functioning (see Barkley 2014, for a review). Numerous studies have found that ADHD predicts adverse functional outcomes for youth, including academic failure, delinquency, conduct problems, family conflict, impaired peer relationships, and chronic health problems (DuPaul and Langberg

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2014; Johnston and Mash 2001; Molina et al. 2007; Mannuzza et al. 2004; Hoza et al. 2005). Compared to their non-ADHD peers, adolescents and young adults with ADHD exhibit higher rates of risky sexual behaviors, personal injury, risky driving behavior, incarceration, unemployment, substance use problems, and relationship impairments (e.g., Barkley et al. 2006; Lee et al. 2011; Molina and Pelham 2014). Decades of research have explored risk factors that increase the probability of youth with ADHD experiencing these negative outcomes, and multiple risk factors have been identified, such as comorbid anxiety or depression, executive functioning deficits, parental psychopathology, and conduct problems (e.g., see Barkley 2014; Becker et al. 2012; Waschbusch 2002 for reviews).

Although a majority of youth with ADHD experience social, academic, and family difficulties, a focused look reveals wide heterogeneity. As a group, youth with ADHD display considerable variation in the severity and onset of functional impairment and in the development of comorbid psychological disorders (Barkley 2014; Wåhlstedt et al. 2009). In fact, a minority of individuals with ADHD largely avoid these long-term negative outcomes and are successful in multiple domains of functioning (Biederman et al. 1998; Lee et al. 2008). For example, longitudinal studies following youth with ADHD into young adulthood have found 20–50 % successfully graduate from high school and pursue college (Barkley et al. 2006; Hechtman 1999; Kuriyan et al. 2013). Indeed, a small body of literature suggests that there is a subgroup of individuals with ADHD who function well in some domains despite impairment in other domains (Lee et al. 2008; Modesto-Lowe et al. 2011). For example, in a sample of adolescents with ADHD, Biederman et al. (1998) found that approximately 20 % were functioning well (i.e., defined as scores above the 5th percentile of scores in comparison with a non-ADHD group) across the school, social, and emotional domains, 20 % were performing poorly in all three domains, and 60 % displayed mixed outcomes. Recognizing this heterogeneity has fueled interest in identifying potential protective mechanisms that contribute to resilient outcomes for a minority of youth with ADHD.

The goal of this review is to better understand why and how some youth manifest positive outcomes in the context of having ADHD or elevated symptoms of ADHD. Within the developmental psychopathology framework, there is emphasis on the identification of risk *and* protective factors within the youth, family, or social–community systems that contribute to adjustment over time (see Cicchetti and Curtis 2007; Cicchetti and Toth 2009; Masten 2014). Whereas risks factors increase vulnerability for negative outcomes, protective factors serve to buffer a child from negative outcomes by promoting positive adaptation, even in the context of risk (Luthar et al. 2000). Investigators studying resilience examine dynamic pathways to successful as well as maladaptive outcomes (Wright and Masten 2015). Findings about protective factors and resilience in the context of ADHD can be used to promote effective management of ADHD by building positive assets and improving contexts that support positive outcomes. However, presently, we know very little about what distinguishes resilient and non-resilient trajectories among youth with ADHD as research has historically emphasized risk factors. Considerably less attention has been dedicated to clarifying how and what protective factors buffer against or modify the course of ADHD. Understanding protective factors for positive adjustment in the context of ADHD may provide a window into processes to be targeted and enhanced in prevention or intervention efforts to promote resilient development among this high-risk population.

Objectives of the Empirical Review

This paper will review and integrate the literature on resilience among youth with ADHD or ADHD symptoms. Specifically, this review will (1) evaluate empirical studies that report findings regarding putative promotive and protective mechanisms when exposed to risk of ADHD or associated problems among youth with ADHD; (2) identify key protective mechanisms for different risk contexts that garner empirical support; (3) synthesize the mechanisms identified as promotive and protective against ADHD and associated risk contexts across differential functional outcomes; and (4) discuss weaknesses of the current state of the literature as well as promising avenues for future work that advance our understanding of resilience in the context of ADHD. Further, this paper will discuss implications for prevention and intervention efforts aimed at guiding public policy and social programs to improve outcomes for youth with ADHD.

Developmental Psychopathology as a Guiding Framework

This review utilizes a developmental psychopathology framework (e.g., Cicchetti and Toth 2009; Masten 2014) in order to draw attention to relevant promotive/protective processes and methodological considerations. Accordingly, this next section focuses on briefly defining the developmental framework terms that will be used to guide this review.

Resilience

Resilience is a broad term that reflects "positive patterns of adaptation in the context of adversity" (Masten and Obradovic 2006, p. 14). By definition, resilience requires

both (1) experiencing risk or adversity and (2) having positive adjustment outcomes despite risk experiences (Luthar et al. 2000). Resilience is conceptualized within a dynamic ecological systems framework, encompassing interactions of many systems across levels, both within and outside the individual (Masten 2014; Wright et al. 2013). Resilience has increasingly been recognized as central to the promotion of mental health, but efforts to identify factors that promote resilience have been complicated by differing views regarding the theoretical and methodological applications of their effect (Farrell et al. 2011; Luthar et al. 2006). Initially described in the literature broadly as "protective factors," the field has since adopted the terms *promotive effects* (also referred to as "compensatory") to describe main effects and reserves the term *protective effects* to describe interactive processes (Masten 2014; Mikami and Hinshaw 2003). Promotive factors are beneficial to all individuals (i.e., predict positive outcomes similarly for those at both high and low levels of risk), whereas protective factors are particularly important at high levels of risk for mitigating or reducing the effects of risk on adaptive outcomes (Wright et al. 2013). The key difference in these two concepts is being whether the factor had an effect under the context of risk (e.g., presence of ADHD). Luthar et al. (2000) and Masten and Tellegen (2012) provide thorough conceptual reviews as well as illustrative figures to describe the key differences between promotive and protective effects. As such, for the purpose of this review, protective will be defined as an interaction with risk and promotive will be defined as those demonstrating a main effect.

The very notion of protective mechanisms depends on the presence of some risk (Obradovic et al. 2012). By definition, risk signifies an elevated probability of a negative developmental outcome for individuals of a designated risk group (e.g., youth with ADHD), but it does not indicate the precise nature of the threat to an individual or differentiate which individuals with the risk will experience a negative outcome. Risk is often multifaceted and risk factors frequently co-occur, often measured by assessments of "cumulative risk" (Evans et al. 2013). The examination of multiple risk and protective factors has been increasingly used by investigators, beginning with Rutter (1987), who found that it was not any particular risk factor, but the number of risk factors in a child's background that led to disorder and dysfunction. It should also be noted that risk and protective factors are often inversely related to each other and in some cases reflect opposite ends of the same continuum (e.g., poor versus effective self-regulation skills, low versus high IQ). For the purposes of this review, risk factors are variables that demonstrate negative effects on developmental outcomes. Specifically, risk factors included the presence of an ADHD diagnosis (i.e., in samples with ADHD and controls), ADHD symptom severity, and associated problems (e.g., oppositional behavior, depressive symptoms, peer rejection, and academic failure) in the context of youth diagnosed with ADHD.

Methodology

The study of resilience comprises decades of research, which offers several key methodological considerations for studying protective processes. Most often, investigators test moderating effects, where a potential moderator variable serves to buffer, ameliorate or in some other way protect youth from the full effects of a potential risk factor (Masten 2014). Sometimes the same construct can function as a promotive and protective factor, in which case a main effect and an interaction effect would be present (Luthar et al. 2000). Resilience research has increasingly recognized the role of developmental systems in causal explanations of protective processes (Cicchetti and Curtis 2007; Masten and Tellegen 2012). As such, more sophisticated modeling strategies have been used to consider the interactional, transactional, and multiple-level models of development (Kaplan et al. 2009; Masten 2014). These models allow for testing cross-domain effects of specific domains for both within-time covariance and across-time continuity within domains (e.g., see Obradovic et al. 2010; Masten and Tellegen 2012). Findings from models such as these have significantly informed treatment approaches aimed at breaking coercive interactions between parents and their children and promoting adaptive longitudinal outcomes (Patterson et al. 2010).

Findings support that a variety of protective processes across ecological systems should be examined simultaneously and longitudinally to better understand individual differences in developmental pathways and contextual variation. Longitudinal data assessing multiple time points are essential for understanding how protective factors change the developmental trajectories of high-risk youth (Masten and Tellegen 2012). Cross-sectional studies are an important initial step in highlighting constructs of interest and yielding hypotheses about potential processes and relationships. However, understanding pathways, "turning points," and processes related to change require longitudinal data (Masten 2014). Longitudinal models capture the capacity for change that exists throughout development and provide valuable insight into the possible processes that may operate to produce stability or change in functioning.

Fundamental Promotive and Protective Systems

Through their widespread study over the past 50 years, there are several core protective factors that have universally and consistently demonstrated promotive and protective effects across diverse risks, ethnic groups, geographic, and

sociocultural contexts (Masten 2014; Wright et al. 2013). Masten (2014) has nicknamed this recurrent list of factors associated with resilience, "the short list," and posited that these factors represent fundamental adaptive systems. These processes have been identified across three broad levels of influence: (1) *individual* mechanisms, (2) *family* systems, and (3) *social–community* mechanisms including peers, teachers, and other adults (see Wright and Masten 2015, for a review of these constructs). At the most proximal, individual level, these include intellectual ability, temperament, autonomy, self-regulation, social skills, self-esteem, coping strategies, motivation, and cultural beliefs (e.g., Masten et al. 2005; Wills et al. 2007). Family-level protective factors include family warmth, cohesion, structure, emotional support, positive styles of attachment, and a close bond with caregivers (e.g., Farrell et al. 2011; Masten and Obradovic 2006). Other systems involve the broader social–community context and consist of positive peer relations, social acceptance, positive school experiences, religious organizations, and relationships with prosocial adults in the wider community (Masten et al. 2005; Vaughan et al. 2010). Each of these is likely to exert a beneficial influence for youth with ADHD, but research efforts are needed to evaluate whether the benefits are due to promotive direct effects, interactions that buffer the negative effects of risk factors, or meditational processes in the variability of outcomes. Given these considerations, this review focuses on identifying individual, family, and social–community promotive and protective factors in the context of ADHD in order to draw attention to relevant processes and offer promising avenues for future work.

Method

Search Procedure and Review Parameters

Pertinent peer-reviewed studies were identified through keyword searches in major publication databases (e.g., PsycINFO, PubMed, and Google Scholar). Search terms (or word stems) consisted of (ADHD, ADD, attention-deficit disorder, attention-deficit hyperactivity disorder, attention problems, inattention, hyperactivity, impulsivity) and (resilience, resilient, protective factors, competence, buffer, promotive effects, promote, variable- and person-focused, positive outcomes). Search terms were also added to the base terms for each area of developmental domain assessed (e.g., family, social, and academic). After the initial search, specific examples of protective and promotive mechanisms (e.g., social support and parenting) were searched based on the previous findings to ensure comprehensiveness. Manual searches of prominent relevant journals (i.e., *Child Development, Developmental Psychology, Development and Psychopathology, Journal of Abnormal Child Psychology, Journal of Abnormal Psychology, Journal of Attention Disorders, Journal of Clinical Child and Adolescent Psychology, Journal of Child Psychology and Psychiatry, Journal of Consulting and Clinical Psychology*) were also conducted. Finally, the reference sections of identified manuscripts were screened for additional studies. Studies in print or online publication in English in a peer-reviewed journal between January 1980 and February 2016 were included.

Studies in the present review satisfied the following inclusion criteria: (1) examined promotive or protective factors in relation to the risk of ADHD symptom severity or associated problems in the context of ADHD; (2) participants were from a clinical sample (i.e., a diagnosis of ADHD) or school and community samples where symptoms of ADHD[1] (i.e., inattention and/or hyperactivity/impulsivity) were specifically examined as risk factors and non-ADHD samples were only included if studies specifically examined interactions between ADHD and other predictors; (3) all participants aged 18 or younger at baseline; (4) the study of potentially malleable factors (i.e., excluded those limited to fixed factors that may not be malleable to intervention including IQ, family status, parent education); (5) examined factors outside of those representing "lack of risk" (e.g., "lower symptoms" or "absence of parent–child conflict") or "lack of ADHD" (i.e., studies that examined ADHD as an outcome were excluded); and (6) use of non-intervention data (see Hinshaw 2007, for a review of moderators of intervention outcomes). The only exception was studies that specifically evaluated and documented that treatment effects were no longer present and did not demonstrate effects on the variables examined in the study (e.g., McQuade et al. 2011).

These specific review criteria were selected in order to examine potential promotive and protective factors across all levels of the social–ecological model including individual and contextual/environmental factors (Bronfenbrenner 1979). The primary rationale for the systematic study of resilience is to inform practice, prevention, and policy efforts directed toward fostering resilience when it is not likely to occur naturally. As such, only studies of clearly malleable factors were included, whereas more fixed factors (e.g., IQ, family status, and parent education level) were excluded. Importantly, studies examining

[1] As highlighted by others (e.g., Fergusson and Horwood 1995), it is important to note the distinction between categorical and dimensional approaches to symptoms. Although a focus of this issue is beyond the scope of this paper, careful language is used throughout the text and tables to indicate whether studies examined participants with psychiatric diagnoses, clinical cutoffs, or continuous measures of symptomatology.

ADHD as the outcome were excluded as they address different questions about the etiology of ADHD and may not inform potential intervention strategies. Additionally, studies that measured the "absence of risk" were not considered, given that the lack of problems is not sufficient to describe resilience mechanisms (Masten et al. 2008). Lastly, for consistency in defining ADHD (i.e., diagnosis and symptomatology), studies before 1980 were not considered given the significant changes in symptom criteria for ADHD with the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) in 1980 (American Psychiatric Association 1980).

The first author screened the abstracts of all identified articles for relevance to the current review, and full-text articles of pertinent studies were obtained. A total of 179 full-text articles were obtained and screened by the first author, of which 158 were excluded for the following reasons: did not examine promotive or protective factors ($n = 102$); comprised of community-based or general population samples, and did not examine interactions between ADHD and other predictors ($n = 13$); included adult samples at baseline ($n = 4$); only studied non-malleable factors ($n = 19$); only examined absence of risk or lack of ADHD as an outcome ($n = 9$); and were in the context of interventions ($n = 11$).

In presenting the results in the subsequent section, research design and representativeness of the samples are specifically considered. Regarding design, it is important to note whether the studies are cross-sectional or longitudinal, as well as the specific developmental period covered (e.g., childhood to adolescence and adolescence to emerging adulthood). As described above, longitudinal data are optimal and important for studying resilience in order to best capture the individual and context over time. However, given that the study of protective factors in ADHD is in its infancy, cross-sectional studies remain informative for some purposes such as highlighting constructs of interest and yielding hypotheses about potential processes and relationships for further longitudinal research. In reviewing study findings, we also consider how different sample characteristics might impact the interpretability of the results. Some of the factors considered include sample composition (e.g., sample of youth diagnosed with ADHD vs. sample of youth with and without ADHD), diversity (with respect to race and gender), location (country), and sample size. Detailed information about sample characteristics and study design is provided in Table 1.

Results

Twenty-one studies met all of the inclusion criteria. Table 1 provides details on the research design, sample composition and demographics, measures, risk context, promotive/protective factors, covariates, and results of these studies. Consistent with developmental frameworks for resilience (e.g., Luthar et al. 2000; Masten 2014), the results are summarized in the text below organized by the three levels of promotive/protective factors that are central across resilience work: (a) individual factors, (b) family mechanisms, and (c) social–community factors. Six studies examined factors across multiple domains (e.g., individual and family levels); in these cases, the studies are listed again under each domain. For each domain, the empirical support for protective and promotive effects is discussed separately, and evidence from longitudinal studies is presented first given the above noted limitations associated with cross-sectional research.

Individual Factors

As listed in Table 1, 12 studies examined individual-level promotive and protective effects against ADHD, ADHD symptoms, or associated problems. The strongest evidence to date is for the promotive effect of self-perceptions of competence, with three studies demonstrating promotive effects (McQuade et al. 2011; Mikami and Hinshaw 2006; Schei et al. 2015). There is also preliminary evidence from cross-sectional studies demonstrating the promotive effects of academic enabling behaviors and skills (e.g., Martin 2014; Volpe et al. 2006).

Protective Effects

Out of six studies that examined protective effects, only one cross-sectional study (i.e., Mikami and Hinshaw 2003) demonstrated the buffering role of an individual mechanism against ADHD. Mikami and Hinshaw (2003) found that goal-directed solitary play buffered against ADHD status for predicting decreased depressed/anxious behavior in a cross-sectional sample of girls (aged 6–13) with ($n = 91$) and without ($n = 58$) ADHD. However, when examined in the follow-up longitudinal study (Mikami and Hinshaw 2006) 5 years later, the same variable actually predicted increased problem behaviors (internalizing, externalizing, substance use) in adolescence (aged 11–18), controlling for ADHD status and childhood (baseline) levels of outcomes in the model. To explain this contradictory finding, Mikami and Hinshaw (2006) suggest that goal-directed play may be adaptive in childhood but becomes increasingly maladaptive in adolescence as the peer domain becomes increasingly salient. However, it remains unclear whether solitary play has a promotive or protective role against ADHD.

Promotive Effects

For promotive effects, one important theme that arose across individual-level studies was that positive self-perceptions of competence in the context of ADHD promoted

Table 1 Studies examining promotive or protective factors in relation to ADHD

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Individual							
Arnold et al. (2012)	*School-based sample*: $N = 467$ children in pre-K, *Mage* = 4.66 years, 58 % Black, 29 % White	Cross-sectional; variable-focused	TR Attention problems (TRS) TR Aggression (TRS)	*Promotive and Protective* TR social skills (SSRS) SR feelings about school (FAS)	Gender, race/ethnicity	Preliteracy (WJ-III) Language (PPVT) Mathematics (WJ-III)	Promotive effect of social skills to academics after controlling aggression and IA. *NS* protective effects for SSRS and FAS when interacted with IA. Thus, those with elevated attention problems were no more or less protected by SSRS or FAR than comparisons
Biederman et al. (1998)	*ADHD and non-ADHD:* $N = 153$ boys, aged 6–17, all White, $n = 85$ persistent ADHD, $n = 68$ non-ADHD	Longitudinal (2 waves, 4 years); person-focused	Persistent ADHD diagnostic status (KSADS)	*Promotive* PR T1 emotional functioning (CBCL) PR/SR T1 social functioning (SAI)	Family size, SES, comorbidity, and maternal psychopathology	T2 PR and SR social functioning (SAI) T2 PR Emotional (CBCL) T2 School functioning	Among those with persistent ADHD, normalized emotional functioning at baseline predicted normalized school functioning at follow-up, and normalized social functioning at baseline predicted normalized emotional functioning at follow-up
Dvorsky et al. (2016)[a]	*ADHD sample:* $N = 93$ middle school students with ADHD ages 10–14, 72 % Male, 78 % White, 16 % Black	Longitudinal (2 waves, 18 months); variable-focused	PR/TR IA (DBD) PR/TR HI (DBD) PR/TR ODD (DBD)	*Promotive and Protective* PR and SR social skills (SSIS)	Gender, medication status, age, grade, IQ; T1 GPA and T1 impairment	Follow-up School grades (GPA) Follow-up TR academic impairment	NS promotive or protective effects for SR or PR social skills for predicting either follow-up GPA or TR academic impairment
Latimer et al. (2003)[a]	*ADHD and non-ADHD:* $N = 174$, aged 7–11 at T1 and 13–17 at T3, 93 % White, 76 % Male, $n = 115$ ADHD, $n = 59$ non-ADHD	Longitudinal (3 waves, 6 years); variable-focused	ADHD status (DICA) Parental psychopathology (SCID)	*Promotive* Achievement (WRAT, WJ) PR, TR, and SR adjustment (BASC, PCSC)	Gender, parental marriage status	Global functioning Achievement PR behavioral adjustment	Promotive effect of achievement for positively influencing adjustment. Indirect effect of ADHD status on global functioning through latent factor of emotional/behavioral adjustment

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Martin (2014)	*ADHD and non-ADHD:* $N = 3915$ from Australian junior and senior high schools, aged 11–18, $n = 136$ ADHD, $n = 3779$ non-ADHD peers	Cross-sectional; variable-focused	ADHD diagnostic status (based on SR of prior diagnosis)	*Promotive* Prior achievement Motivation (MES) Personality (IEBM): Open, Extravert, Neurotic, Agreeable, Conscientious	Specific LD, parent's job and education, gender, age	SR Failed grade/ repetition (ARRS) SR School refusal (ARRS) SR Changing classes (ARRS) SR Expulsion/ Suspension (ARRS) SR Uncompleted work (ARRS)	Direct effect of motivation on reduced school refusal. Direct effect of agreeableness for decreased grade repetition, changed classes, suspensions, and expulsions. Direct effect of conscientiousness for academic failure and uncompleted work. All promotive effects present after controlling for ADHD. Did not examine interaction effects
McQuade et al. (2011)	*ADHD sample:* $N = 88$ boys with ADHD, aged 8–12 at T1 and 11–15 at T2 86 % White, 8 % Black, 5.6 % other or mixed	Longitudinal (2 waves, 3 years); variable-focused	ADHD sample T1 depression (CDI) Baseline attribution styles (CASQ)	*Promotive* Change (T1–T2) in SR competency in scholastic, social, and behavioral domains (SPPC)	TR competency at T1 and T2	Depression (CDI) Attribution of negative events (CASQ) Attribution of positive events (CASQ)	SR scholastic, social, and behavioral competence promoted decreased depression controlling for T1 depression. In simultaneous model, change in social was the sole predictor of decreased depression. Positive changes in SR social competence promoted T2 attribution of positive and negative events
Mikami and Hinshaw (2003)[a]	*ADHD and non-ADHD:* $N = 149$ girls, aged 6–13, 53 % White, $n = 91$ ADHD, $n = 58$ non-ADHD	Cross-sectional; variable-focused	ADHD diagnosis Peer rejection (sociometric, PR popularity, TR DSP)	*Promotive and Protective*[b] Observations of goal-directed solitary play		Aggression (TRF) Depressed/Anxious (CDI, TRF, CBCL) Substance Use (SAQ)	Promotive effect of goal-directed play for decreased depressed/anxious behavior. Protective effect for goal-directed play against ADHD for predicting depressed/ anxious behavior. All 3-way interactions *ns*
Mikami and Hinshaw (2006)[a]	*ADHD and non-ADHD:* $N = 209$ girls, aged 6–13 at T1 and 11–18 at T2, 50 % White, $n = 127$ ADHD, $n = 82$ non-ADHD	Longitudinal (2 waves, 5 years); variable-focused	Childhood ADHD diagnosis Peer rejection (sociometric, PR popularity, TR DSP)	*Promotive and Protective* Self-perceived scholastic competence (SPPC) Observations of goal-directed solitary play	Achievement (WIAT), T1 externalizing, T1 internalizing	Externalizing (TRF) Internalizing (CBCL) Eating pathology (EDI) Substance use (SAQ)	When baseline levels of outcomes were controlled, promotive effect of self-perceived scholastic competence for internalizing, externalizing and substance use. Solitary play predicted greater problem behavior longitudinally. All interactions *ns*

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Mikami et al. (2015)	*ADHD sample:* $N = 63$ with ADHD, aged 6–10, 67 % male, 81 % White, 9 % Black	Cross-sectional; variable-focused	PR and TR ADHD symptom severity	*Promotive* PR child's social skills (SSRS)	PR and TR ADHD (CSI)	Parental negativity (observed) Parental affiliate stigma	After controlling for PR and TR ADHD, PR social skills had a promotive effect on reducing parental affiliate stigma and parental negativity. Mediation model *ns*
Schei et al. (2015)[a]	*ADHD sample:* $N = 194$ with ADHD, aged 13–18, 55 % White; from Norwegian hospital	Cross-sectional; variable-focused	Emotion/conduct (SDQ) ADHD symptoms (PRS, SDQ)	*Promotive and Protective* Individual competencies (i.e., Personal Competence, Social Competence, Structured Style) (READ)	Age, medication status	Quality of life (ILC)	Latent factor of individual competencies promoted quality of life. Indirect effects for individual competences mediating the relation between emotion/conduct problems with quality of life. All interactions *ns*
Vitaro et al. (2005)[a]	*School-based sample:* $N = 4340$, aged 5–6, in kindergarten at T1, 95 % Canadian whites, $N = 879$ used in analyses	Longitudinal (2 waves, 15 years); variable-centered	Aggression (PBQ) IA/HI symptoms (PBQ) Anxiety (PBQ)	*Promotive and Protective* TR Prosociality (PBQ)	Sex, SES	High school diploma attainment	Promotive effects for PBQ in predicting high school completion, with compensatory role after controlling for risks of ADHD symptoms, aggression, anxiety, and sociofamily adversity. All interaction effects were *ns*. Thus, those with elevated ADHD were no more or less protected by PBQ than comparisons
Volpe et al. (2006)	*ADHD and non-ADHD:* $N = 146$ grades 1–6, 72 % White, 19 % Latino, 9 % Black; $n = 103$ ADHD, $n = 43$ comparison	Cross-sectional; variable-centered	TR ADHD symptoms (TRS) TR Conduct Problems (BASC)	*Promotive* TR engagement, Interpersonal skills, motivation and study skills (ACES)	Control: grades as measure of prior achievement	Math and reading achievement (WJ)	Interpersonal skills and motivation indirect (promotive) effects mediating the relation from ADHD to math and reading achievement. Promotive effects of study skills for math and reading, and engagement for predicting math

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Family							
Chronis et al. (2007)	*ADHD sample:* $N = 108$ with ADHD, aged 4–7 at baseline and 12–15 at follow-up, 81.5 % Male, 67 % White/Non-Hispanic, 27 % African-American, 6 % Other	Longitudinal (8 waves, 8 years); multi-level; variable- and person-focused	PR and TR ADHD symptoms (DBD) PR and TR overall impairment (IRS) Maternal depression and APD (SCID) Negative parenting and commands (DPICS)	*Promotive and Protective* Positive parenting (praise, positive affect, physical positive) from structured task and play situation (DPICS)	Family income, informants available (PR and/or TR), race/ethnicity, age, gender, IQ, and maternal education	PR and TR conduct problems at trajectories and follow-up (DBD)	Positive parenting (during structured task) promoted decreased conduct problems. *NS* protective effect of positive parenting in the context of maternal depression. For course of conduct problems over years 2–8: those with highest positive parenting at T1 had the lowest conduct over time. Correlations show positive parenting via structured task significantly negatively associated with conduct at waves 3–7
Healey et al. (2011)	*ADHD sample:* $N = 138$ with ADHD, aged 3–4, 76 % male, 41 % White, 20 % Hispanic 14 % Black, 6 % Asian, 19 % Other	Cross-sectional; variable-focused	PR and TR ADHD symptoms (ARS) TR impulsivity (TABC) Parent stress (PSI) PR Inconsistent and Punitive style (APQ)	*Promotive and Protective*[b] PR Positive parenting (APQ-P)	Gender, age, SES	Global child functioning (CGAS)	Positive parenting style promoted global functioning after controlling for negative parenting style, ADHD severity, impulsivity, and parenting stress (the latter 3 significant). Positive parenting demonstrated significant protective effect with ADHD in predicting child functioning, after controlling for inconsistent and punitive parenting
Hinshaw et al. (1998)	*ADHD and non-ADHD:* $N = 133$ boys, aged 6–12, 56 % White, 17 % Black, 11 % Latino, $n = 73$ with ADHD, $n = 60$ comparisons	Cross-sectional; variable-focused	ADHD status Aggression, isolation Antisocial behavior (LCAB) SR depression (CDI)	*Promotive and Protective* PR Maternal authoritative parenting (IAP)	IQ, reading, parental psych, authoritarian, and permissive (IAP)	Peer sociometric nominations Peer-rated social preference	Maternal authoritative parenting beliefs had promotive effect on peer social preference, after controlling for ADHD, aggression, social isolation, and antisocial behavior. Authoritativeness × ADHD interactions *ns*

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Kawabata et al. (2012)	*School-based sample:* $N = 2463$ students in grades 1–9 in northern Taiwan, aged 6–16	Cross-sectional; variable-focused; multi-level	TR IA, HI, and opposition (CTRS) PR overprotection (PBI)	*Promotive and Protective*[b] PR Maternal affection/care (PBI)	Age, gender, maternal education	PR Academics (SAI) PR School social problems (SAI) PR Negative peer relations (SAI)	Main effect for IA and maternal affection on all outcomes. All moderations *ns,* with exception of 3-way interaction of age, maternal affection, and IA for school social problems, such that maternal affection buffered IA to social problems for older children
Latimer et al. (2003)[a]	*ADHD and non-ADHD:* $N = 174$, aged 7–11 at T1 and 13–17 at T3, 93 % White, 76 % Male, $n = 115$ ADHD, $n = 59$ non-ADHD	Longitudinal (3 waves, 6 years); variable-focused	ADHD status (DICA) Parental psychopathology (SCID)	*Promotive* Maternal adjustment/parenting skill (BASC, BMSA, FOC)	Gender, parental marriage status	Global functioning Achievement PR behavioral adjustment	For all: maternal adjustment/parenting skill (i.e., communication coping skills, management, parental control, and family cohesion) promotes child's emotional/behavioral adjustment
Ostrander and Herman (2006)	*ADHD and non-ADHD:* $N = 362$, grades 1–4, 79 % male, 95 % White $n = 232$ ADHD and $n = 130$ comparisons	Cross-sectional; variable-focused	ADHD status SR external locus of control (BASC)	*Promotive* PR parent management (BMSA)		SR external locus of control (BASC) SR/PR depression (BASC, CDI, CBCL)	Parent management demonstrated a small direct (promotive) effect in for predicting lower depression for all ages. Parent management partially mediated the relationship between ADHD and depression
Schei et al., (2015)*	*ADHD sample:* $N = 194$ with ADHD, aged 13–18, 55 % White; from Norwegian hospital	Cross-sectional; variable-focused	SR emotion/conduct problems (SDQ) ADHD symptoms (PRS, SDQ)	*Promotive and Protective* SR Family cohesion (READ)	Age, medication status	SR Quality of Life (ILC)	Promotive effects of family cohesion for quality of life. Family cohesion mediates the relation between ADHD symptoms, emotional and conduct problems with quality of life. All moderating effects were *ns*
Theule et al. (2011)	*ADHD and non-ADHD:* $N = 95$, children aged 8–12, $n = 50$ ADHD and $n = 45$ comparison	Cross-sectional; variable-focused	ADHD symptoms and Opposition (PRS, TRS) Parental ADHD	*Promotive* PR family social support (FSS)	Gender, age, parent education, marital status	PR Parental stress (PSI)	In teacher-rated model, social support promotes decreased parent stress, controlling ADHD symptoms and parent ADHD. All interactions effects *ns*

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Vitaro et al. (2005)[a]	*School-based sample:* $N = 4340$, aged 5–6 at T1, 95 % Canadian whites, $N = 879$ used in analyses	Longitudinal (2 waves, 15 years); variable-centered	PR aggression and IA/HI symptoms (PBQ) PR Anxiety (PBQ)	*Promotive and Protective* PR Parent pleasure, discipline, and stimulation (PCRA)	Sex	High school diploma attainment	Parent pleasure discipline had promotive (main) effects for high school completion, demonstrating compensatory role after controlling for risks. All interaction effects were *ns*
Social/community							
Becker et al. (2013)	*Community-based sample:* $N = 131$, aged 5–13, 53 % Male, 66 % African-American, 21 % White	Longitudinal (2 waves, 1 year); variable-focused	TR ADHD symptoms (DBD)	*Promotive and Protective*[b] SR friendship intimacy exchange (FQQ)	Baseline social problems (TRF), age, and sex (moderator)	Social problems (TRF)	Friendship intimacy demonstrated protective effect to ADHD for decreased social problems. The relation between ADHD and social problems was *ns* for those with high friendship intimacy
Cardoos and Hinshaw (2011)	*ADHD* and *non-ADHD:* $N = 228$ Girls at summer day camp, aged 6–12, 53 % White, $n = 140$ ADHD and $n = 88$ comparison	Longitudinal (3 waves, 5 weeks); variable-focused	ADHD diagnosis (DISC) Externalizing (CBCL and TRF composite) Internalizing (CBCL and TRF composite) PR social (CBCL)	*Promotive and Protective* Peer-rated friendship presence (i.e., presence of at least one friend) Friend status (i.e., all friends with ADHD vs. at least one comparison friend)		Peer-rated peer victimization	For all: friendship presence promoted decreased victimization, protective effects for friendship presence against internalizing, externalizing, and social problems for victimization. All 3-way interactions with ADHD and friendship were *ns*. Thus, girls with ADHD were no more or less protected by a friendship than comparison girls
Dvorsky et al. (2016)[a]	*ADHD sample:* $N = 93$ middle school students with ADHD aged 10–14, 72 % Male, 78 % White, 16 % Black	Longitudinal (2 waves, 18 months); variable-focused	PR/TR IA (DBD) PR/TR HI (DBD) PR/TR ODD (DBD)	*Promotive and Protective*[b] PR and SR social acceptance (SPPC)	Gender, medication status, age, grade, IQ; T1 GPA and T1 impairment	Follow-up School grades (GPA) Follow-up TR academic impairment	Promotive effect of SR and PR social acceptance for predicting follow-up GPA and TR academic impairment. Parent- and student-rated social acceptance demonstrated protective effects to inattention and increased grades after controlling for baseline grades and intelligence

Table 1 continued

Authors	Sample	Design	Risk context(s)	Promotive/protective factor(s)	Covariates	Outcomes	Key findings
Mikami and Hinshaw (2003)[a]	*ADHD and non-ADHD:* $N = 149$ girls, aged 6–13, 53 % White, $n = 91$ ADHD, $n = 58$ non-ADHD	Cross-sectional; variable-focused	ADHD diagnosis Peer rejection (sociometric, PR popularity, TR DSP)	*Promotive and Protective* Popularity with adults (nominated by staff)	Achievement (WIAT)	Aggression (TRF) Depressed/anxious (CDI, TRF, CBCL)	Promotive effect of popularity with adults for aggression, but ns effect for depressed/anxious behavior. Ns protective effects against ADHD status
McQuade et al. (2014)	*ADHD and non-ADHD:* $N = 349$ from MTA study, aged 8–13 at T1, 78 % male, 65 % White, 15 % Black, $n = 226$ ADHD and $n = 123$ comparisons	Longitudinal (2 waves, 1 year); variable-focused	ADHD group status Low peer-rated social preference T1 depression (CDI)	*Promotive and Protective*[b] Self-perceived social acceptance (SPPC)	Gender	Follow-up SR child's depression (CDI) Follow-up aggression and conduct (DSM-IV)	Promotive effect of SR social acceptance on T2 depression after controlling for effect of ADHD. *NS* interactions of social acceptance and ADHD. Significant 3-way interaction: SR social acceptance protected against ADHD and predicted reduced depression for those with lower peer preference
Mikami and Hinshaw (2006)[a]	*ADHD* and *non-ADHD:* $N = 209$ girls, aged 6–13 at T1 and 11–18 at T2, 50 % White, $n = 127$ ADHD, $n = 82$ non-ADHD	Longitudinal (2 waves, 5 years); variable-focused	Childhood ADHD diagnosis Peer rejection (sociometric, PR popularity, TR DSP)	*Promotive and Protective* Popularity with adults (nominated by staff)	Achievement (WIAT), baseline externalizing and internalizing	Externalizing (TRF) Internalizing (CBCL) Achievement (WIAT) Eating pathology (EDI) Substance use (SAQ)	No significant promotive or protective effects found against ADHD status for any outcomes. Popularity with adults had "marginally significant" main effect ($p = .08$) and interaction effect ($p = .06$) with peer rejection for achievement
Schei et al. (2015)[a]	*ADHD sample:* $N = 194$ with ADHD, aged 13–18, 55 % White; from Norwegian hospital	Cross-sectional; variable-focused	SR emotion and conduct (SDQ) PR and SR ADHD (PRS, SDQ)	*Promotive and Protective* SR Social resources (READ)	Age, medication status	SR Quality of Life (ILC)	Positive direct (promotive) effects for social resources predicting QoL. Indirect effects of social resources mediating the relation between emotional and conduct problems with QoL. All interactions *ns*

Constructs listed under risk context and promotive/protective factor(s) include all those examined in the study. Specific measures/assessment tools are included in parentheses; please see reference for full measurement descriptions. ADHD sample, samples of participants that were all classified as having an ADHD diagnosis; ADHD and non-ADHD, samples of participants that include both those who were and were not diagnosed with ADHD; school-based sample and community-based sample, general population samples that were not diagnosed with ADHD; Mage, mean age of participants, which is only reported when the sample age range is not provided by the authors (e.g., Arnold et al. 2012); *ADHD*, Attention-deficit/hyperactivity disorder; ns, non-significant; SR, self- or student-rated/ratings; PR, parent-rated/ratings; TR, teacher-rated/ratings; IA, inattention or attention problems; HI, hyperactivity/impulsivity; SES, socioeconomic status; LD, specific learning disability; IVs, independent variables; APD, Antisocial Personality Disorder; T1, Time 1 or baseline; T2, Time 2; T3, Time 3; FSIQ, Full-scale Intelligence Quotient; AUD, alcohol use disorder; NS, non-signficant or no signficant; DUD, drug use disorder

[a] Studies that are listed under multiple table headings

[b] Studies that demonstrate significant protective effects

against the development of depression or internalizing symptoms (e.g., McQuade et al. 2011; Mikami and Hinshaw 2006) as well as promoted overall quality of life (Schei et al. 2015). This was demonstrated in studies of middle childhood to early adolescence (i.e., aged 8–12; McQuade et al. 2011) and later adolescence (i.e., aged 11–18; Mikami and Hinshaw 2006; Schei et al. 2015). The strongest evidence for these promotive effects was demonstrated in two longitudinal studies of adolescents (McQuade et al. 2011; Mikami and Hinshaw 2006). First, in a longitudinal sample of boys with ADHD ($N = 88$, aged 8–12), McQuade et al. (2011) demonstrated the promotive effects of social, scholastic, and behavior/conduct domains of self-perceived competence against depression, controlling for baseline levels of the outcomes and teachers' perceptions of boys' competency. When these promotive effects were evaluated simultaneously in a single model, only self-perceived social competence was promotive against depressive symptoms. Another longitudinal study demonstrated the promotive effects of competence with a sample of adolescent girls (aged 11–18) with and without ADHD (Mikami and Hinshaw 2006). Mikami and Hinshaw (2006) demonstrated promotive effects of self-perceived scholastic competence for predicting not only decreased internalizing symptoms, but also externalizing behaviors and substance use after controlling for actual levels of academic achievement, ADHD status, baseline impairment, and peer rejection. An important strength across each of these promotive studies is the multi-method and multi-informant design, which included parent, teacher/staff, and youth ratings, as well as behavioral observations and sociometric nominations.

The only other study to examine the promotive effects of competence in a sample of youth diagnosed with ADHD was a cross-sectional study of adolescents (aged 13–18) with ADHD ($N = 194$; Schei et al. 2015). Specifically, a latent measure of competence (i.e., self-report of social competence, personal competence and structured style) demonstrated a direct effect on quality of life as well as an indirect effect, mediating the relationship between emotion and conduct problems with quality of life. These models controlled for the effects of age, sex, ADHD symptom severity, medication status, and family variables.

Preliminary evidence from three cross-sectional studies also supports the promotive effects of several "academic enabling" behaviors or skills (e.g., motivation, study skills, engagement, interpersonal skills, and social behavior) for promoting positive academic performance after controlling for ADHD (Arnold et al. 2012; Martin 2014; Vitaro et al. 2005; Volpe et al. 2006). However, findings were mixed across studies with some academic factors demonstrating promotive effects for a particular outcome, but not others, and no studies finding protective effects against ADHD. For example, motivation demonstrates promotive effects for math and reading achievement among elementary school-aged children with ($n = 103$) and without ADHD ($n = 43$; Volpe et al. 2006), but not against more ecological outcomes such academic failure, repeating a grade, and uncompleted work among middle and high school-aged adolescents with ($n = 136$) and without ADHD ($n = 3779$; Martin 2014). Importantly, all these studies were cross-sectional, with the exception of one that included two data points (Vitaro et al. 2005). Further, these studies included combined samples of youth with and without ADHD (Martin 2014; Volpe et al. 2006) as well as general school-based samples (Arnold et al. 2012; Vitaro et al. 2005). Overall, there was mixed support for academic enablers as promotive factors, depending on the sample characteristics and area of academic adjustment examined.

Interestingly, across all of the studies identified in this review, no study demonstrated protective effects for social skills, and several studies found either no effect or a small effect for the promotive role of social skills (Mikami et al. 2015; McQuade et al. 2014; Dvorsky et al. 2016) when examined across a variety of risk contexts and outcomes. Only two studies (Arnold et al. 2012; Vitaro et al. 2005) found promotive effects of social skills, and these were in general school-based samples of preschool children. Further, when examined in a sample of youth diagnosed with ADHD (Dvorsky et al. 2016), parent- and adolescent-rated social skills did not demonstrate promotive or protective effects with follow-up academic outcomes. As such, there is no evidence that social skills serve as a protective or promotive factor for children or adolescents diagnosed with ADHD.

Family Factors

Nine studies examined family-level promotive and protective effects. The strongest evidence to date is for positive parenting, with seven studies demonstrating the promotive effects of positive attitudes, parenting behaviors/style, emotional support/intellectual stimulation, and affection (Chronis et al. 2007; Healey et al. 2011; Hinshaw et al. 1998; Kawabata et al. 2012; Latimer et al. 2003; Ostrander and Herman 2006; Vitaro et al. 2005) and two of these studies demonstrating protective effects (Healey et al. 2011; Kawabata et al. 2012). Preliminary evidence from cross-sectional studies also supports the promotive effects of family environment factors for promoting positive adjustment after controlling for ADHD symptom severity (Schei et al. 2015; Theule et al. 2011).

Protective Effects

Out of six studies that examined protective effects of family mechanisms, only two cross-sectional studies

(Healey et al. 2011; Kawabata et al. 2012) demonstrated the buffering role of positive parenting against ADHD. First, in a sample of pre-K children ($N = 138$; aged 3–4) diagnosed with ADHD, positive parenting protected against parent- and teacher-rated ADHD symptom severity in predicting participants' overall functioning, after controlling for inconsistent and punitive parenting (Healey et al. 2011). In contrast to evidence supporting positive parenting in early childhood, Kawabata et al. (2012) found a significant three-way interaction between maternal affection, inattention, and age such that maternal affection buffered the association between inattention severity and social problems only for older children (grades 4–6). Importantly, this finding is in the context of a large school-based sample of Taiwanese youth ($N = 2463$; grades 1–9) and may not generalize to other samples of youth diagnosed with ADHD.

Promotive Effects

The majority of evidence for positive parenting is in the context of early childhood samples (aged 3–7), with one exemplar longitudinal study examining latent developmental trajectories of behavior spanning from early childhood to adolescence (Chronis et al. 2007). Specifically, in a longitudinal study of young children diagnosed with ADHD, positive parenting behaviors during a structured observation task (at aged 4–7) significantly promoted against the development of comorbid conduct problems over the course of 8 years into adolescence (Chronis et al. 2007). Importantly, this model controlled for medication status, demographic characteristics (i.e., family income, race/ethnicity, age, gender, IQ, and maternal education), maternal depression as well as baseline levels of ADHD symptoms, conduct problems, and overall impairment. A significant strength of this study is the use of objective observation measures of parenting behaviors as opposed to subjective parent ratings. Two other longitudinal studies demonstrate the promotive role of positive parenting controlling for the risk of ADHD, including one comprised of youth with and without ADHD (Latimer et al. 2003) and one general population sample of preschool-aged youth (Vitaro et al. 2005). Both studies found that regardless of the presence of risk of ADHD symptoms, positive parenting was promotive of positive adjustment for all youth (i.e., with and without ADHD), after controlling for the effects of ADHD diagnostic status or symptom severity.

Four additional cross-sectional studies found support for the promotive effects of positive parenting (Healey et al. 2011; Kawabata et al. 2012; Hinshaw et al. 1998; Ostrander and Herman 2006). First, in a cross-sectional sample of young children (aged 3–4) diagnosed with ADHD ($N = 180$), parent-rated positive parenting promoted global child functioning after controlling for negative parenting style, parent- and teacher-rated ADHD symptom severity, teacher-rated impulsivity, and parent stress. Two additional cross-sectional studies found evidence for the promotive effects of parenting style in children with and without ADHD (Hinshaw et al. 1998; Ostrander and Herman 2006). Maternal authoritative parenting promoted peer-rated social preference after controlling for the risk effects of ADHD diagnostic status, social isolation, aggression, and antisocial behavior as well as relevant covariates (i.e., IQ, achievement, and parental psychopathology) in a sample of boys (aged 6–12) with ($n = 73$) and without ADHD ($n = 60$; Hinshaw et al. 1998). The authors examined interactions with ADHD status and authoritative parenting; however, no significant interactive or protective effects were found. In another cross-sectional study of youth (grades 1–4) with ($n = 232$) and without ADHD ($n = 130$), a broad measure of parent management demonstrated a small promotive effect against depression and partially mediated the relationship from ADHD diagnostic status to depression (Ostrander and Herman 2006). Lastly, Kawabata et al. (2012) found a promotive effect for parent-rated maternal affection in predicting decreased concurrent academic problems, school social problems, and negative peer relations, after controlling for the risk of ADHD in school-based sample of Taiwanese students ($N = 2463$).

Preliminary evidence from two cross-sectional studies also supports family environment factors, including family cohesion and support, in promoting positive adjustment for adolescent samples across a variety of risk contexts including youth with ADHD (Schei et al. 2015) and samples comprised of youth with and without ADHD (Theule et al. 2011). The strongest evidence is from Schei et al. (2015), who demonstrated that in a sample of adolescents with ADHD ($N = 194$; aged 13–18), family cohesion not only had a direct effect for promoting adjustment after controlling for ADHD symptoms, age and medication status, but also mediated the relations between ADHD symptom severity and quality of life. Family cohesion also mediated the association between self-reported emotion/conduct problems and quality of life, controlling for ADHD symptoms, age, and medication status (Schei et al. 2015). In another study of children (aged 8–12) with ($n = 50$) and without ADHD ($n = 45$), family social support promoted decreased parental stress in the context of controlling for parent- and teacher-rated ADHD symptoms and oppositional behavior as well as relevant demographic characteristics (i.e., gender, age, parent education, and marital status) in the model (Theule et al. 2011).

Social–Community Factors

Across the seven studies identified, the most compelling evidence comes from four longitudinal studies

demonstrating the role of friendship presence, friendship quality, and peer acceptance for protecting or promoting positive adjustment in the context of ADHD symptoms (Becker et al. 2013; Cardoos and Hinshaw 2011; Dvorsky et al. 2016; McQuade et al. 2014).

Protective Effects

All seven studies included analyses to examine protective mechanisms in the context of ADHD or ADHD symptoms; however, only three found protective effects (Becker et al. 2013; Dvorsky et al. 2016; McQuade et al. 2014). The strongest evidence for social protective factors was found for social acceptance, demonstrating protective effects in a sample of adolescents diagnosed with ADHD (i.e., Dvorsky et al. 2016) as well as a sample of adolescents with and without ADHD (i.e., McQuade et al. 2014). First, in a longitudinal sample of 93 adolescents (aged 10–14) diagnosed with ADHD, Dvorsky et al. (2016) demonstrated that the relationship between inattention symptom severity and low grades was attenuated for adolescents with high social acceptance, even after controlling for baseline grades and intelligence. Models examined both parent and adolescent ratings of social acceptance and demonstrated "protective-enhancing" effects (e.g., Luthar et al. 2000) such that adolescents' competence in grades is augmented by social acceptance even with increasing risk of inattention. Social acceptance also demonstrated protective effects in longitudinal sample comprised of youth (aged 8–13) with ($n = 226$) and without ($n = 123$) ADHD from the Multimodal Treatment of ADHD (MTA) study (McQuade et al. 2014). Specifically, a significant three-way interaction arose for peer preference × self-perceived social acceptance × ADHD in predicting depression and aggression/conduct, controlling for gender and baseline levels of depression and aggression/conduct. Specifically, for youth with ADHD and low peer preference, higher self-perceived social acceptance protected against increases in depression; however, for predicting aggression/conduct, high peer preference and having a more modest perception of competence were protective for those with ADHD. Interestingly, self-perceived social acceptance did not demonstrate protective effects against ADHD status via two-way interactions for predicting depression or aggression/conduct. Lastly, a longitudinal study using community-based sample of youth at risk for disruptive behavior disorders (aged 5–13) demonstrated that high friendship intimacy buffers against ADHD symptom severity in predicting future teacher-rated social problems, after controlling for baseline social problems (Becker et al. 2013). This model also controlled for differences across age and sex of participants.

Promotive Effects

Three longitudinal studies demonstrate the promotive effects of social mechanisms (Dvorsky et al. 2016; Cardoos and Hinshaw 2011; McQuade et al. 2014). First, in longitudinal sample of adolescents with ADHD, parent- and adolescent-rated social acceptance promoted increased grades and decreased teacher-rated academic impairment at follow-up, after controlling for ADHD symptom severity, oppositional behavior, IQ, and baseline functioning of the outcomes in each of the models (Dvorsky et al. 2016). Second, in a sample of youth with and without ADHD, McQuade et al. (2014) demonstrate that self-perceived social acceptance promoted decreases in subsequent depression after considering the direct effect of ADHD and baseline depression. Third, Cardoos and Hinshaw (2011) also demonstrated the promotive effects of friendships in a longitudinal sample of girls (aged 6–12) from a summer day camp ($n = 140$ with ADHD, $n = 88$ comparison). Specifically, friendship presence promoted decreased peer victimization after controlling for internalizing symptoms, externalizing behaviors, and social problems; however, no significant interactions between friendship and ADHD status were found (Cardoos and Hinshaw 2011). Although this was a short-term longitudinal study (5 weeks), friendships were measured via sociometric and peer nomination methods, which are considered the gold standards for assessing these domains.

Two additional cross-sectional studies provide evidence for broad social support and resources promoting positive outcomes (Schei et al. 2015; Mikami and Hinshaw 2003). The strongest of these comes from a study of adolescents diagnosed with ADHD (aged 13–18), which found direct and indirect promotive effects of a self-reported latent construct of social resources for predicting quality of life (Schei et al. 2015). Another study by Mikami and Hinshaw (2003) demonstrated mixed effects for popularity with adults, measured using nominations from summer camp staff in a sample of youth with and without ADHD. Specifically, in the cross-sectional study (Mikami and Hinshaw 2003), after controlling for ADHD status, popularity with adults demonstrated promotive effects for reducing aggression, but not for depressed/anxious behavior. However, in the follow-up longitudinal study (Mikami and Hinshaw 2006), no significant promotive or protective effects of popularity with adults were found at aged 11–18.

Discussion

The purpose of this review was to evaluate the extant literature regarding the role of promotive and protective factors in relation to the functioning of youth with ADHD

or dimensional ADHD symptoms. The number of studies that were relevant to this particular review was limited ($N = 21$), qualifying the strength of any conclusions that can be drawn. Further, differing findings were sometimes observed across various risk contexts, promotive/protective mechanisms, and outcome domains. Nevertheless, a number of interesting trends emerged that have important implications for future research. The strongest evidence to date for promotive and protective factors in the context of ADHD was found across social and family systems. Specifically, several longitudinal studies demonstrate the *protective* effects of social–community factors. Further, while only two cross-sectional studies demonstrate protective effects of family-level factors, several longitudinal studies found promotive effects.

For social–community-level factors, the strongest longitudinal evidence was for social acceptance. Specifically, social acceptance buffered against inattention in predicting higher school grades in a sample of adolescents with ADHD (Dvorsky et al. 2016) and buffered against a diagnosis of ADHD in predicting reduced depressive symptoms in a sample of youth with and without ADHD (McQuade et al. 2014). Becker et al.'s study (2013) was the only other longitudinal study to find a protective effect for a social–community factor. In that study, friendship intimacy buffered against ADHD symptoms in predicting decreased social problems (Becker et al. 2013). There is also preliminary cross-sectional evidence for friendship presence, social support, and quality relationships promoting positive adjustment in the context of ADHD symptoms. Social–community factors such as social competence and positive peer relationships are significantly related to youth's ability to adapt to life stressors (Masten and Coatsworth 1998). Friendships provide support systems that can foster positive emotional, social, and academic adjustment (Rubin 2002). Decades of research also support important elements of effective community environments, including positive role models from prosocial adults in the community, participation in community organizations, and supportive teacher relationships as having a protective influence on youth (Karapetian and Gradoes 2005). Interestingly, the majority of studies examining social mechanisms included samples of middle childhood, with only three studies examining adolescent samples (Dvorsky et al. 2016; Mikami and Hinshaw 2006; Schei et al. 2015). Given the increased saliency of peer relationships during adolescence (Lerner and Castellino 2002), it is important to study the role of these mechanisms with older adolescent samples as well. Social–community mechanisms were also limited to peer relationships or support, with fewer studies evaluating the role of relationships with adults such as teachers (Mikami and Hinshaw 2003, 2006). Future research should examine other social–community mechanisms in the context of ADHD, such as teacher–student relationships, school environment, neighborhood, and community factors, all of which have been identified as promotive or protective in the general population (Masten 2014; Wright et al. 2013).

Although evidence for protective effects of family-level factors is limited to two cross-sectional studies (Healey et al. 2011; Kawabata et al. 2012), there is compelling longitudinal evidence for the promotive effects of positive parenting for youth diagnosed with ADHD (e.g., Chronis et al. 2007; Hinshaw et al. 1998). Preliminary cross-sectional evidence is also available for family cohesion and support for promoting positive outcomes for adolescents with ADHD (Schei et al. 2015; Theule et al. 2011). Overall, these findings suggest that specific positive parenting mechanisms are critical during early ages, and family cohesion/support may be especially relevant during adolescence. These findings are consistent with decades of research, demonstrating that positive parenting is one of the most important resources for helping youth overcome adversity (Masten 2001; Steinberg and Morris 2001). For example, an authoritative parenting style has been found to promote adolescents' academic success (Glasgow et al. 1997) and to protect adolescents from problem behavior (Baumrind 1991). In the context of the present review specific to youth with ADHD, it seems likely that positive parenting and family cohesion foster a sense of attachment and commitment to parental values, which helps youth avoid risky situations and behavior (e.g., substance use and delinquency). Another possibility is that for youth with ADHD or ADHD symptoms, positive parenting may be an important source of social support and social modeling, leading to reduced problems in their interactions with peers and teachers. This assertion is consistent with the studies in this review that found that parental support and authoritative parenting promote higher levels of social competence for youth with ADHD (e.g., Hinshaw et al. 1998). In sum, with the exception of a few studies (Chronis et al. 2007; Latimer et al. 2003; Vitaro et al. 2005), the majority of evidence for family mechanisms is limited to cross-sectional designs. This permits investigating cohort or age differences across samples as a measure of temporal change (e.g., see Kawabata et al. 2012), but does not allow for developmental models to be explicitly tested. Additional research should evaluate other family factors, such as positive interparental relationships, sibling relationships, and parental involvement in child's education, which have been identified as promotive or protective in the general population (e.g., Wright et al. 2013)

Lastly, there is minimal evidence supporting any individual-level factors as *protective*, with only one cross-sectional study demonstrating protective effects for solitary play among young girls (Mikami and Hinshaw 2003); however, a follow-up longitudinal study with the same participants found that it was no longer protective and

instead was associated with negative outcomes in adolescence (Mikami and Hinshaw 2006). The strongest evidence for individual factors comes from longitudinal studies demonstrating the promotive effects of positive and modest self-perception (i.e., self-perceptions of social, scholastic, behavior, and overall competencies). Specifically, positive self-perceptions of competence in the context of ADHD promoted again the development of depression and internalizing symptoms (e.g., McQuade et al. 2011; Mikami and Hinshaw 2006), as well as promoted overall quality of life (Schei et al. 2015). These findings align with the large body of literature supporting positive self-concept and self-efficacy as promotive of positive adjustment and protective against risk across heterogeneous populations and environments (e.g., Masten 2014; Rutter 1987; Wyman et al. 1993). Indeed, self-concept, or the way youth and adolescents think and feel about themselves, influences their reaction and subsequent adjustment to difficult life events (Rutter 1987). For example, individuals with positive self-concept are hopeful about their future, believe in their ability to impact their situation, are confident in their abilities to overcome obstacles, and make use of resources in their lives (Werner and Smith 2001; Werner 1993). Further, individuals with a realistic, positive sense of self are more likely to adopt active coping strategies, whereas low self-concept has been associated with unsuccessful coping strategies, depression and anxiety as well as delinquency (e.g., Dumont and Provost 1999; Levy 1999; Youngstrom et al. 2003). Interestingly, findings supporting promotive effects of positive self-perceptions of competence would seem to be counter to research, suggesting that children with ADHD and a "positive illusory bias (PIB)" experience negative outcomes (e.g., Hoza et al. 2010). However, studies of PIB are traditionally focused on youth with ADHD who have inflated, or "biased" self-perceptions, as compared to other raters such as parents or teachers. Importantly, there is a strong body of literature, suggesting that self-perceptions and "reality" have different, but equally important, implications for adjustment (Harter 1985; Harter and Whitesell 1996). As such, there may be an important difference between youth with ADHD who have realistic positive self-appraisals, and youth with ADHD who have inaccurate self-appraisals (e.g., Swanson et al. 2012). This highlights the importance of a multi-informant approach for evaluating promotive and protective factors in the context of ADHD.

Limitations and Considerations for Future Research

Across all individual, family, and social systems examined, several promotive effects were observed across a variety of risk contexts and outcomes, but relatively less evidence is available for protective factors with only six studies demonstrating significant protective effects of the 13 that included analyses for such effects. One potential implication of these findings is that tests of statistical interactions in non-experimental research are greatly underpowered (McClelland and Judd 1993). Indeed, many studies were restricted to small sample sizes and effect sizes, although rarely reported, were often small. This is a common challenge in research on protective mechanisms (Scott et al. 2015). Importantly, this does not mean that such protective factors are not relevant. In fact, the lack of consistency in predicting positive outcomes across domains and time suggests that total resilience is rare, if not non-existent for youth with ADHD. It is likely that multiple pathways exist (i.e., equifinality; Luthar et al. 2000) and that the presence of multiple pathways in any given sample at least partly explains the divergent findings reported to date. Integration efforts are also qualified by the fact that many studies have relatively small samples of high-risk youth (e.g., Biederman et al. 1998; Mikami et al. 2015; Theule et al. 2011), single-informant measurement approaches (e.g., Martin 2014; Volpe et al. 2006), cross-sectional and correlational designs (e.g., Ostrander and Herman 2006; Schei et al. 2015), or longitudinal studies that examine a promotive/protective construct at only one occasion (e.g., Latimer et al. 2003; Vitaro et al. 2005). Further, the extant literature has very little to say about the processes through which promotive and protective factors have their influence. For example, we hypothesize that adolescents' social acceptance may buffer against ADHD in predicting academic outcomes through mediating mechanisms of keeping youth connected in school and away from deviant peer groups. Large-scale studies using prospective longitudinal designs that address multiple outcomes of functioning as well as multiple risk and promotive/protective variables will help to improve our understanding of the heterogeneity and specifically resilient outcomes of youth with ADHD.

Future investigations of resilience in ADHD would also benefit from a more thorough grounding in developmental science. Although there are several commendable studies that follow the developmental psychopathology framework (e.g., Chronis et al. 2007; Dvorsky et al. 2016; Mikami and Hinshaw 2003, 2006), many studies included this review did not have specific aims or hypotheses related to promotive or protective mechanisms in the context of ADHD. Indeed, only 16 studies in the review described intentionally examining resilience mechanisms, of which only 5 included samples of youth diagnosed with ADHD and 7 included samples of youth with and without ADHD. The remaining 4 studies examined promotive and protective effects for school-based or community samples of youth in relation to ADHD symptoms in predicting adjustment. Further, some studies even describe or interpret findings

through a negative lens (e.g., lack of competence predicts increased impairment); however, they evaluate positive constructs such as family support (Theule et al. 2011). Indeed, despite being one of the most studied childhood mental health disorders, the developmental pathways linking ADHD to adaptive or successful outcomes are not well understood. This underscores the importance of future investigations of resilience in ADHD including a clearly delineated theoretical framework within which hypotheses about salient protective processes are considered in respect to the specific risk of the sample under study.

Age Differences

It has been suggested that different mechanisms (e.g., family and social) may be related to functional outcomes at different stages of development (e.g., Masten and Obradovic 2006). In the context of ADHD, it seems likely that protective effects will vary for individuals who have experienced chronic ADHD (e.g., older adolescents with persistent ADHD) compared to younger children recently diagnosed with ADHD. Further, symptoms of hyperactivity and impulsivity tend to decline as youth with ADHD age, meaning that the risk variables/profile may also change across development. However, relatively little research on resilience in the context of ADHD has adopted a developmental framework, which makes it difficult to understand how these mechanisms fit into the progression of adaptive functioning among youth with ADHD. Further, inconsistencies in this research also arise from the failure to measure or control for age differences, which have the potential to confound results. Most of the studies in this review focused specifically on middle childhood (13/21; aged 6–12), followed by samples of adolescence (4/21; aged 12–18) and samples of early childhood (4/21; aged 2–6). Some studies grouped diverse ages of youth together (e.g., aged 6–17), with minimal regard to potential developmental differences (e.g., Biederman et al. 1998). One study identified variables that appear to be protective at one age (Mikami and Hinshaw 2003), but are later found to be risk factors in longitudinal work. Another study specifically examined age effects (Kawabata et al. 2012) and found maternal affection to only be protective among older children (grades 7–9), but not younger children (grades 1–6). Future studies that examine ADHD and protective mechanisms should be explicit as to which stage of development is the focus and why, to help clarify whether different mechanisms are important for different developmental contexts. It may also be informative to take into account the developmental progression and change in risk and protective mechanisms over time.

Cultural Context

Future research on resilience in ADHD must include racial/ethnic minority populations of youth in sizeable enough numbers to support analyses that can inform about racial/ethnic differences. A protective factor in one context or culture may not be as protective in another (Lerner and Castellino 2002). For example, in the parenting literature, harsh and authoritarian parenting was a risk for later conduct problems among European American but not African-American youth (Deater-Deckard and Dodge 1997). Although a number of the studies included in this review had diverse samples, few specifically examined racial/ethnic differences. Further, cultural factors including traditions, beliefs, and community support services undoubtedly provide a wide variety of protective functions, though these have not been studied in research on resilience in ADHD.

Risk Contexts

The promotive and protective mechanisms in this review have been examined in a variety of risk contexts. As such, caution is warranted for generalizing across levels of risk. Studies vary greatly in how they operationalize high-risk status, which has ranged from ADHD symptom severity (on a dimensional scale), ADHD diagnostic status (by a categorical definition), or presence of comorbid problem with ADHD (e.g., Chronis et al. 2007). When symptom severity is examined as the risk context, individuals are often sampled from ADHD only samples or community-based samples and classified according to arbitrary cutoff thresholds of symptom severity (e.g., Becker et al. 2013; Arnold et al. 2012). These dimensional classification methods are used as proxy measures of severity of ADHD symptoms, which may be subject to measurement error, rater bias, and information bias. However, when ADHD diagnostic status is examined as the risk context (e.g., in samples of those with and without ADHD), ADHD symptom severity may be subject to restriction of range or ceiling effects. As such, it is plausible that protective mechanisms may have differing effects across each of these groups. Overall, some of the reported effects (or lack thereof) may be due to the risk context examined rather than the promotive/protective mechanism. Unfortunately, the same protective mechanism is rarely examined across different risk contexts (e.g., at-risk and diagnosed samples), and this can lead to inconsistent findings when taken out of context. For example, it is unknown whether friendship quality mechanisms shown to buffer against ADHD symptom severity in a sample of at-risk youth (e.g., Becker et al. 2013) would also buffer against other risks commonly associated with ADHD such as oppositional behaviors,

anxiety, or substance use behaviors in a sample of youth diagnosed with ADHD. It is important for future work to collect groups of youth with and without ADHD within a single study in order to identify whether unique protective mechanisms exist.

Considerations for Future Avenues of Research

In addition to the recommendations above regarding research designs and sample characteristics, below are five promising areas for future research rooted in the framework of developmental psychopathology that will lead to a better understanding of the potential resilience pathways associated with ADHD: (1) measurement, (2) developmental cascades, (3) multiple levels of analysis, (4) person-centered approaches, and (5) the role of genes and biological mechanisms.

Measurement

Improvements in the measurement of promotive and protective constructs are needed including (a) broadening the scope of risks and protective variables examined and (b) giving careful consideration of specificity of risk and protective constructs, in order to fully understand the effects of promotive and protective mechanisms in the context of ADHD. For example, as recently highlighted by McQuade et al. (2011), more research is needed that examines the protective effect of self-perceived competence in addition to the broader constructs of inflated self-perceptions that have received the bulk of attention to date. Also, in line with Bronfenbrenner's (1979) ecological systems theory, exploration of the interdependence and reciprocal interactions between micro-level (e.g., school, family, and friends) and macro-level (e.g., neighborhood and culture) factors is an important avenue for future research. In fact, support for the bidirectional child–family influences with ADHD families (e.g., Deault 2010) demonstrates such interactions and is a promising launching place for resilience study. Developmental research also suggests that there is a cumulative effect of multiple risk or promotive/protective indicators within the individual person and their various systems of development (Evans et al. 2013). Only a few studies in this review examined interactions across multiple risks (e.g., Mikami and Hinshaw 2003, 2006), but no studies examined combinations of protective factors including cumulative promotive/protective indicators or how different factors may interact with each other to create especially strong protection or resilience. Another approach to studying resilience in the context of ADHD is to evaluate strengths using measures that have been established for other at-risk populations or examine standardized measures of resilience (e.g., Resiliency Scales for Children and Adolescents; Prince-Embury 2010), which allow for examining assets and strengths within ADHD populations relative to normative samples.

Developmental Cascades

It has long been recognized that problem behaviors associated with ADHD can spread across domains over time through interactions of the individual child, their family and other social systems. For example, when a child's inattention, hyperactivity, or impulsivity negatively impact academic performance, this impacts relationships with teachers, self-concept, and parent–child conflict, which then leads to increased risk of internalizing symptoms (e.g., Humphreys et al. 2013). Studying which protective factors may reduce this negative chain or pathway of behavior (e.g., via moderated mediation) is another important avenue of exploration. It is likely that positive behavior also spreads such that competence builds competence, which may prevent the negative pathways to impairment often associated with ADHD. For example, cross-lagged analyses could model how high parental support predicts improvement academic performance for youth with ADHD through mediators of motivation for school and implementing planning and organization skills. Others have hypothesized that through positive social interactions and high-quality friendships, children with ADHD may gain instrumental and emotional support from peers and friends, providing a context for youth with ADHD to learn positive behaviors or practice skills that subsequently lead to improvement in functional outcomes (e.g., Becker et al. 2013). However, longitudinal data with several data points and transactional analyses are needed to evaluate such hypotheses. Transactional cascade models will likely provide the most fruitful avenues for understanding the intersection of development and psychopathology (see Masten et al. 2005; Masten and Cicchetti 2010). No study to date has used a longitudinal cross-lagged design to evaluate promotive or protective mechanisms for ADHD.

Multiple Levels of Analysis

Most of what is known about the correlates and pathways of ADHD has been gleaned from investigations that focused on relatively narrow domains of variables. Several leaders in developmental psychopathology (Cicchetti and Curtis 2007; Cicchetti and Toth 2009; Wright and Masten 2015) have argued that a comprehensive research agenda is needed, spanning biological, cognitive, psychological, social, and environmental factors. To successfully test theories of various systems of influence affecting youth's resilience, multiple levels of analysis are needed (Wright

and Masten 2015). The majority of studies reviewed here used multiple regressions to analyze their data; however, multi-level modeling (MLM) approaches can properly assess the interrelation between variables, across systems, and account for nesting (e.g., youth nested in classrooms), without violating the assumption of independence of errors or overestimating the association among aggregated variables (Kaplan et al. 2009). Further, MLM can be applied in conjunction with growth curve modeling such that intra-individuals differences in an outcome over time are captured at level 1; individual differences in change over time are at level 2; and a third level can represent changes over time among individuals nested in systems such as schools or classrooms (Grimm et al. 2011; Kaplan et al. 2009). As such, the MLM framework approaches risk and promotive or protective mechanisms from the perspective of a hierarchal structure such that repeated measures are naturally nested within individuals (e.g., Bryk and Raudenbush 1987). For example, MLM analyses could model growth trajectories for risk and promotive mechanisms at the individual level (e.g., biological, cognitive, or psychological) as well as the association of being to particular peer groups, nested within schools or communities. Others have hypothesized that growth in positive developmental trajectories is associated with individual characteristics (e.g., genotype and cognitive mechanisms) nested within family environments, which are characterized by their own level of risk and promotive mechanisms (e.g., Jester et al. 2005; Nigg et al. 2007). Research in resilience against ADHD should examine both risks and protective mechanisms at multiple levels, because biological, psychological, and social factors are integral for the development and maintenance of ADHD and associated impairment (Barkley 2014).

Person-Focused Approaches

Many of the studies in this review use a variable-focused approach to analyses utilizing continuous measures of outcomes, risk, promotive, and protective variables, and not comparing groups based on risk status or outcome. These variable-focused studies are valuable for providing information on protective factors that are associated with positive outcomes in the context of ADHD; however, they do not permit examination of unique group differences or fluctuations in outcomes across domains over time. Person-focused approaches seek to distinguish between adaptive youth and maladaptive youth, who are similar in risk but have different developmental outcomes. This often involves classifying groups of high-risk individuals according to their competence or adaptive behavior and subsequent analyses attempt to determine the moderating and mediating factors that differentiate these groups of individuals (Magnusson 2003; Masten 2014). More recently, person-focused approaches have used latent growth modeling to explore resilient developmental trajectories (e.g., Grimm et al. 2011; Murray et al. 2014). These models examine individual patterns of behavior over time in a group of individuals who share a common risk factor. Although person-focused approaches are widely used in the social sciences (Magnusson 2003), such models have rarely been applied to research on resilience in ADHD with only two studies utilizing these methods in this review (Biederman et al. 1998; Chronis et al. 2007). In an exemplar of the person-focused approach, Chronis and colleagues (2007) found that decreases in individual growth trajectories in conduct problems were promoted by positive parenting behaviors. Overall, person-focused models that utilize latent growth modeling and models that combine both person- and variable-focused approaches (see Muthén and Muthén 2000) are needed to explore individual and group differences in resilient trajectories in the context of ADHD.

The Role of Genes and Biological Mechanisms

The vast majority of what is known about the correlates and pathways of resilience in the context of ADHD has been gleaned from studies focusing on psychosocial factors. Given that the causal mechanisms of ADHD are multifaceted, involving complex interactions between biological and environmental factors, there is a need for research examining the role of biological and genetic factors. Some researchers have examined genetic and psychosocial interactions, but these have focused on negative mechanisms such as inconsistent parenting and family conflict (e.g., Martel et al. 2011). Some of the leading developmental psychopathology researchers have pointed out that important gains could be made by studying biological and psychological systems simultaneously for exploring pathways to resilience (e.g., Wright and Masten 2015). The role of genetic and environmental contributions to resilience in youth with ADHD likely represents an area of expanding research and may generate new ideas about intervention targets.

Clinical Implications of Findings

A compelling rationale for the study of resilience in ADHD is to inform practice, prevention, and policy efforts directed toward creating resilience when it is not likely to occur naturally. The practice and policy implications of these review findings are preliminary but exciting. With respect to assessment screenings, they point to the importance of integrating strength-based assessments to provide a more complete picture of the individual. However, there are

inherent challenges related to measuring strengths, perhaps most importantly is the field's relative absence of assessment tools that focus on constructs such as developmental strengths, adaptive behavior, resiliency, competence, or protective factors. These findings could also be used to inform prevention strategies at the primary, secondary, and tertiary levels. The connections between positive parenting and positive self-perceptions with decreased comorbid conduct problems and internalizing symptoms, respectively, suggest that broader interventions including both positive parenting strategies and cognitive–behavioral strategies to increase self-efficacy or self-perceptions of competence may help address the risk associated with ADHD.

One important consideration in light of findings supporting positive self-perceptions in the context of ADHD is that some youth with ADHD provide elevated ratings of their own functioning (referred to as positive illusory bias; Owens et al. 2007). This may influence whether self-perceived competence reflects true well-being or predicts long-term adjustment for youth with ADHD. Although this elevated self-concept has been proposed as potentially serving a self-protective function (Owens et al. 2007), it is also possible that it prohibits learning from experiences and adjusting behaviors, thereby increasing long-term risks and negative outcomes. Alternatively, it could be that self-perceptions are most relevant for predicting perceptions of resilient outcomes such as decreased depressive symptoms.

A key issue in implementing an early or preventative intervention for ADHD is deciding which children are targeted. Many argue that early interventions are most critical for young children (e.g., DuPaul et al. 2015). In a review of early interventions for ADHD, Sonuga-Barke and Halperin (2010) recommend that intervening early may be more successful than waiting until outcomes or trajectories are formed and then trying to intervene on the negative pathways. As such, early interventions can be applied before the disorder becomes complicated by the experience of repeated failure and impairment. Alternatively, this review also suggests that unique protective factors may operate during middle childhood and adolescence. This finding indicates that preventive interventions should be targeted not only toward young child populations, but also during key developmental transitions throughout adolescence. Finally, if we are to meet the multidimensional needs of children with ADHD across the various systems, it seems clear that no "one size fits all" approach will work. Rather, treatments must be individually tailored and targeted at the points of performance, be it a deficient academic skill or ineffective parent–child communication. As such, research designs and analytic models need to account for individual differences across youth in treatment response (DuPaul et al. 2015).

Conclusions

This review examined the applicability of a developmental psychopathology resilience framework for understanding the heterogeneity associated with ADHD by synthesizing findings about promotive and protective mechanisms. Important work in the area of resilience in youth with ADHD has been completed, although a great deal of work remains. We know very little of the processes by which positive adjustment and developmental competence occur for these youth. Given the multitude of interdependent and reciprocal influences, mechanisms, and processes involved in the etiology and course of ADHD, there is a clear need for more complex theories, research designs, and data-analytic strategies. Overall, there is solid evidence for social acceptance as protective in youth with ADHD. There was also compelling evidence supporting positive parenting as a promotive factor. However, the study of other individual, family, and social mechanisms remains in its infancy. In the next stage of ADHD resilience research, a focus on longitudinal trajectories as well as interacting and underlying developmental processes should be prioritized. As described above, measurement, developmental cascades, multiple levels of analysis, person-focused approaches, and the role of genetic and biological mechanisms are five promising avenues that can guide future work in this area. Together, ongoing and cross-fertilizing intervention and developmental process research can contribute to developmentally sensitive intervention approaches that promote competence and adaptation.

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