

Intellectual Giftedness and Psychopathology in Children and Adolescents: A Systematic Literature Review

Exceptional Children
1–24
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DOI: 10.1177/0014402915598779
ec.sagepub.com


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Abstract

Using a systematic search strategy in which intellectual giftedness was operationalized in terms of IQ score, the authors examined evidence from studies reporting on associations between this aspect of giftedness and psychopathology. A total of 18 studies met the inclusion criteria: compared gifted (IQ ≥ 125) and nongifted (IQ = 90–110) peers or used IQ as a continuous variable (IQ = 90–125+) and used empirically validated psychopathology measures. Overall, results indicated that gifted children demonstrate superior socio-emotional adjustment and less behavioral difficulties than their typically developing peers. Issues that may bias the findings in this direction are highlighted, including the tendency to select participants from gifted programs. Some socio-emotional and behavioral difficulties associated with giftedness were found when dimensions such as levels of giftedness and ethnicity were considered. Recommendations for future research include the use of adequate sample size, longitudinal studies, individually administered cognitive abilities tests, and specific age-appropriate psychopathology measures; and testing interaction effects between variables, such as age, ethnicity, and gender.

In recent decades, the association between intellectual giftedness and psychopathology in children and adolescents has been subject to extensive research, not only in relation to academic performance, but also with regard to broader child development and adjustment issues. Despite the considerable progress that has been made in research concerning the behavioral and socio-emotional characteristics of gifted children, findings vary greatly. Research in this field has produced evidence suggesting that these children are potentially vulnerable to socio-emotional difficulties, including poor peer relationships, anxiety, depression, and even self-harm (Delisle, 1980; Manaster & Powell, 1983; Plucker & Levy, 2001; Silverman, 1993; Wellisch & Brown, 2012). Yet some studies have found gifted children to be better adjusted than their typically developing peers in domains including social maturity (Eklund, Tanner, Stoll, &

Anway, 2015; Kelly & Colangelo, 1984; Neihart, 1999; Neihart, Reis, Robinson, & Moon, 2002; Pontes de França-Freitas, Del Prette, & Del Prette, 2014), with high levels of intelligence identified as a protective factor against internalizing problems such as generalized anxiety disorder and posttraumatic stress disorder (Fergusson & Lynskey, 1996; Kandel et al., 1988; Koenen, Moffitt, Poulton, Martin, & Caspi, 2007; Martin et al., 2007). Meanwhile, other studies have found that gifted children exhibit no more behavioral or emotional adjustment difficulties than their typical peers,

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with only a minority requiring special interventions (Morawska & Sanders, 2008).

Despite the considerable progress that has been made in research concerning the behavioral and socio-emotional characteristics of gifted children, findings vary greatly.

Such varied findings as these highlight the need to review the literature in this field to identify factors that may account for discrepancies. The use of varied definitions of intellectual giftedness across studies, the broad range and limitations of methodologies, and the distinct approaches to conceptualizing research questions are all possible factors. Two issues appear to be particularly relevant. First, approaches to defining and operationalizing giftedness have varied considerably across studies, often in terms of the extent to which an emphasis is placed on academic achievement versus cognitive abilities. As such, whereas some studies have sampled participants based on their enrolment in special “gifted” classes or educational programs (Eklund et al., 2015; Stornelli, Flett, & Hewitt, 2009), others have done so on the basis of achievement-based assessments (Harrison & Van Haneghan, 2011) or IQ tests (Dwairy, 2004; Rudasill, Adelson, Callahan, Houlihan, & Keizer, 2012). Second, whereas some studies have investigated rates of socio-emotional dysfunction within groups of children and adolescents identified as gifted (Zeidner & Schleyer, 1999), others have compared children and adolescents identified as gifted with those identified as nongifted (Guignard, Jaquet, & Lubart, 2012; Riaz, Shahzad, Riaz, & Khanam, 2013; Vlahovic-Stetic, Vidovic, & Arambasic, 1999). Other studies have interpreted rates of psychopathology in samples of gifted children in relation to rates reported for general normative samples, despite potential differences in the distribution of various demographic variables between such samples (e.g., Beer, 1991; Morawska & Sanders, 2008;

Parker, 1996). Identifying factors that account for finding discrepancies would help inform future research.

Research on the Association Between Giftedness and Psychopathology

This article provides a systematic review of empirical research that examines the association between giftedness and psychopathology in childhood and adolescence. Several reviews of the literature in this area have been completed to date, some of which have included studies that have examined the mental health of gifted children only without comparison to their typical peers (Gust-Brey & Cross, 1999; Neihart et al., 2002). Studies lacking comparative groups limit and confound the interpretation of results as it is then unclear whether the results are due to the giftedness or other factors, such as committed teachers or encouraging parents. A review by Martin, Burns, and Schonlau (2009) emphasized the need to consider the findings of previous research in light of these methodological issues. Our review builds on previous reviews in a number of ways. First, Martin et al. focused exclusively on emotional problems (mood/anxiety) and attention deficit hyperactivity disorder, and did not examine the association between giftedness and general conduct problems or, in diagnostic terms, disruptive behavior disorders. Given the high prevalence of disruptive behavior problems across childhood (e.g., prevalence of oppositional defiance disorder ranges from 1% to 20% and conduct disorders ranges from <1% to >10%; Beauchaine & Hinshaw, 2013) and anecdotal evidence to suggest that parents often attribute such problems to giftedness (Edwards, 2009), this omission is particularly noteworthy. As such, we investigated associations between intellectual giftedness and the propensity to either internalize problems (e.g., anxiety, fear, shyness, low self-esteem), or externalize them in the form of conduct problems, physical aggression, and underage drinking or delinquent behavior.

Second, in our review we employed a comprehensive search strategy based on the Cochrane method (Higgins & Green, 2011), a modern systematic approach that aims to answer the specific research question by identifying all existing research on the topic across all age groups and with no restrictions in relation to a specific time frame. The Cochrane method is an explicit, reproducible methodology that identifies and appraises risk of bias and synthesizes all research-based evidence that fits a prespecified set of objectives and eligibility criteria (Higgins & Green, 2011). Hence, it improves the accessibility of empirical evidence for researchers and policy makers and also allows researchers to identify possible methodological limitations of previous research to better inform and strengthen future research. In contrast, the Martin et al. (2009) review included articles published between 1983 and 2008 that focused only on child and adolescent mental health.

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The third significant aspect of the current review is the definition of *giftedness* applied. Approaches to defining and operationalizing the term *intellectual giftedness* in studies included in previous reviews (Gust-Brey & Cross, 1999; Martin et al., 2009; Neihart et al., 2002) have differed substantially, especially in terms of the degree to which focus is placed on academic achievement versus cognitive abilities. Some definitions characterize giftedness as a combination of high potential and high performance, whereas others distinguish between giftedness (potential) and talent (achievement). For example, Gagné's (1995, 2003) differentiated model of giftedness and talent distinguishes between potential and achievement, suggesting the presence of high abilities (e.g., intellectual, creative,

socioaffective potential) that may or may not develop into talent (achievement) depending on catalysts such as motivation, temperament, and the individual's environment. Other conceptualizations of giftedness assume that superior ability is not sufficient to identify giftedness. For example, Renzulli's (1978) three-ring definition suggests that giftedness can be understood as an interaction between high ability (top 15–20% in any domain), creativity, and task commitment, found in certain people, at certain times, under certain conditions. Alternatively, Sternberg (1984, 1995, 1997) defined intellectual giftedness as an interaction among three aspects of intelligence (i.e., analytical, creative, and practical). Gardner's (2000) definition proposed eight independent abilities including verbal–linguistic, logical–mathematical, spatial, musical, bodily–kinesthetic, interpersonal, intrapersonal, and naturalist. Models that demand the expression of giftedness, for example, achievement levels, unlike Gagné's model, may overlook underachieving individuals with exceptional intellectual ability who lack the high grade point averages and positive teacher recommendations required to be identified as gifted. Levels of achievement may be undermined by factors such as poverty, physical or learning disabilities, motivational or emotional problems, or even a disinclination to display talents. One approach to maximizing the identification of such students is to employ criteria particularly relevant to aptitude, such as a score on an IQ test, rather than a reliance on demonstrated achievement.

For the purpose of this review we therefore examined whether the nature of the association between intellectual giftedness and psychopathology might be clarified at least in part by operationalizing intellectual giftedness in terms of intelligence, as indexed by IQ measurement. In our view, such a definition is most in line with the notion of intellectual potential, which composes at least part of the most commonly used definitions of giftedness (e.g., Gagné, 1995, 2003; Renzulli & Reis, 1985, 1997; Sternberg, 1984). Such tests have been found to be highly reliable. They have also been shown to predict school achievement, providing useful information regarding a child's abilities (Brody, 1997; Duckworth,

Quinn, & Tsukayama, 2012; Haywood, 2004; Lubinski, 2004; Lynn & Mikk, 2009; Pastuszak et al., 2014; Sattler, 2001). Moreover, such tests are frequently used to make placement decisions for gifted children, as well as students with learning disabilities or intellectual disability. Given that these tests are standardized and have been subject to extensive psychometric investigation, the use of intelligence tests, especially individually administered tests such as Wechsler Intelligence Scale for Children—4th ed. (WISC-IV; Wechsler, 2003) and the Stanford–Binet—5th ed. (Nelson Education, 2009), is often considered to add a degree of objective support to the identification process.

Method

Search Strategy

We conducted a comprehensive literature search of published articles using the following databases: PsycINFO, MEDLINE, PreMEDLINE, ERIC, Evidence Based Medicine Reviews, Cochrane Database of Systematic Reviews, and Database of Abstracts of Reviews of Effects. The following keywords were used: *gifted*, *high ability*, *high IQ*, *high intelligence*, *high aptitude*, *anxiety*, *depression*, *psychopathology*, *internalizing problems*, *externalizing problems*, *behavior problems*, *conduct disorders*, and *delinquency*. We also examined reference lists of articles and published reviews to identify other relevant studies, and contacted various authors of included studies to determine if there were additional studies that they considered would meet the review criteria.

Selection and Exclusion

Identified studies investigated associations between giftedness and dimensions of various psychopathologies (internalizing and externalizing) that were published in English in peer-reviewed journals or were dissertations, with no restrictions on publication date or sample age. The last date searched was

November 14, 2014. Studies were included if they compared identified gifted ($IQ \geq 125$, i.e., in the superior range of intelligence; Gregory, 1994) and nongifted samples ($IQ = 90-110$), or used IQ as a continuous variable. IQ levels were either directly measured as a variable in the study using empirically validated cognitive ability tests (verbal and/or nonverbal) or the authors had stated that participants in the gifted class/program had been assessed on a reliable individual/group-administered IQ measurement. Like many measurement tools, all IQ tests are subject to some disparity in scores when readministered to the same individual on several occasions. Hence, on any given occasion, such tests have an intrinsic error of measurement around the specific score attained. Sattler (2008) suggested that overall standard scores (e.g., full-scale IQ) should be reported with a confidence interval that represents a range of standard scores in which an individual's score is liable to fall a certain percentage of the time (e.g., 90% or 95% of the time). For example, on the widely used WISC-IV (Wechsler, 2003), an IQ score of 130 (commonly accepted as high intellectual ability) falls in the range of 124–134 (95% of the time). Hence, we selected a cutoff IQ score of 125 or above to accommodate this possible error of measurement and not exclude studies unnecessarily.

In addition, studies were required to have used published, empirically validated psychopathology measures. We excluded studies involving participants of dual diagnosis of intellectual giftedness and attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), or learning disability (LD) to remove confounding variable effects (e.g., anxiety) commonly associated with these difficulties irrespective of ability level. The earliest published study included was 1962 and the most recent study was 2013. The review article titles and abstracts were coded by a second rater (95% interrater agreement); articles where disagreement occurred were discussed between the raters and agreement reached as to whether inclusion criteria were satisfied. Figure 1 presents a diagram of the study selection process.

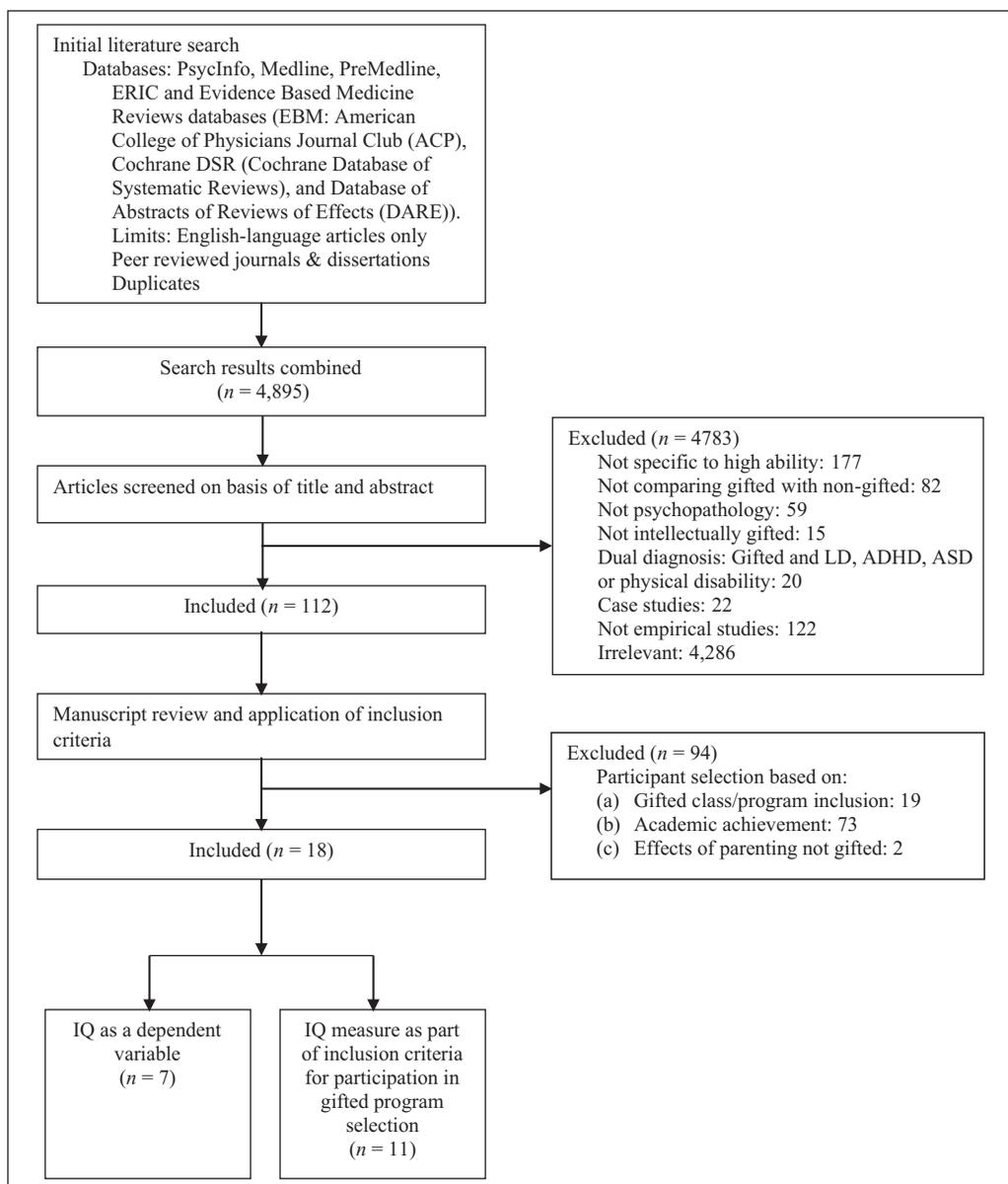


Figure 1. Study selection process. LD = learning disability; ADHD = attention deficit hyperactivity disorder; ASD = autism spectrum disorder.

Data Analysis

Studies were evaluated based on participant selection, sample size, how the key variable was defined, study design, and measures of ability and psychopathology. We used an adapted version of the Cochrane risk for bias tool (random allocation, allocation concealment, inclusion of a control condition, assessment of clinical sta-

tus) to assess risk of bias: performance bias (blinding of participants and personnel), detection bias (blinding of outcome assessment), attrition bias, and reporting bias (Higgins & Green, 2011). *Bias* refers to systematic error, or divergence from the truth, in results or inferences, and can differ in size from small to very large. Assessing risk of bias is essential as it helps establish the credibility of the study results.

More rigorous studies are more likely to produce results that are closer to the truth (low risk) compared to less rigorous studies (high risk). Study characteristic details are presented in Table 1.

Results

In all, we identified 18 studies that met the review criteria. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement and guidelines to guide the summary of evidence (Liberati et al., 2009) to ensure appropriate and transparent reporting of results. Results are summarized in terms of study characteristics and design (i.e., cross-sectional, longitudinal, comparison of gifted group with a published normative/average group or an average group assessed within the study), sample selection and characteristics (i.e., inclusion in special classes/programs, gender, ethnic composition, age, and sample size), cognitive ability measures (test type and method of administration), outcome measures (i.e., published/empirically validated and self-report vs. other report measures), and aspects of the key variable (i.e., how it was defined and variables assessed). Results are presented across two methods of participant selection: (a) individually or group-administered cognitive ability assessments ($IQ > 120$) as a variable in the study or (b) inclusion in a gifted and talented program or class in which the authors of the study stated the main criteria for membership was an ability test ($IQ > 120$). The main findings are summarized in Table 2.

Outcomes

All identified studies employed a cross-sectional design and included male and female participants, except for one male-participant-only study (Shaywitz et al., 2001). Of the 18 studies, 17 compared gifted ($IQ > 120$) and nongifted ($IQ = 90\text{--}110$) samples and one examined IQ as a continuous variable (Messier & Ward, 1998). In seven of the 18 identified studies (Feldhusen & Klausmeier, 1962; Guénolé et al., 2013; Messier & Ward, 1998; Milgram & Milgram, 1976; Mueller, 2009; Riaz et al., 2013; Rost & Czeschlik, 1994),

gifted participants were selected based on performance on an individual or group-administered cognitive ability test, whereas participants in the remaining 11 studies were selected based on inclusion in a gifted program that required prior assessment of intellectual abilities.

Of the studies, 13 included children aged 5 to 12 years, whereas the remaining five included children aged 11 to 19 years (Field et al., 1998; Gallucci, 1989; Gallucci et al., 1999; Mueller, 2009; Riaz et al., 2013). No adult studies met the inclusion criteria.

All but six studies were conducted in the United States, with two carried out in France (Guénolé et al., 2013; Guignard et al., 2012), two in Germany (Czeschlik & Rost, 1994; Rost & Czeschlik, 1994), one in Israel (Milgram & Milgram, 1976), and one in Pakistan (Riaz et al., 2013). Of the 12 studies, six conducted in the United States (Field et al., 1998; Gallucci, 1989; Gallucci et al., 1999; Merrell & Gill, 1994; Mueller, 2009; Nail & Evans, 1997) included representative ethnic compositions.

Of the 18 studies, four utilized only group-administered ability tests (Czeschlik & Rost, 1994; Ludwig & Cullinan, 1984; Messier & Ward, 1998; Rost & Czeschlik, 1994), with only one of these being not culture-free (Ludwig & Cullinan, 1984). Two studies used a combination of individually administered and culture-free group-administered tests (Guignard et al., 2012; Milgram & Milgram, 1976), two studies used unspecified tests that yielded an IQ value (Kramer, 1987; Nail & Evans, 1997), and the final 10 studies used individually administered tests.

With regard to psychopathology measures, three studies utilized only teacher-rated measures (Ludwig & Cullinan, 1984; Merrell & Gill, 1994; Nail & Evans, 1997) and two studies used parent-rated measures (Gallucci et al., 1999; Guénolé et al., 2013). Three studies employed a combination of measures, with one study using parent- and teacher-rated measures (Shaywitz et al., 2001), one using parent- and self-measures (Rost & Czeschlik, 1994), and two using a combination of parent-, teacher-, and self-rated measures (Czeschlik & Rost, 1994; Gallucci, 1989). The remaining nine studies utilized participant self-report tools.

Table 1. Characteristics of Identified Studies.

Study	N	Sample description	Design	Cognitive ability assessment measure	Ability groups	Outcomes	Outcome measures
I. Cognitive ability as a variable assessed in the study							
Feldhusen and Klausmeier (1962)	120	Gender: 60 M, 60 F IQ levels: 40 low, 40 average, 40 gifted Ethnic Composition: U.S. students—unspecified Mean age/range: 9–11	Cross-sectional	WISC individually administered	Low = 56–81 Average = 90–110 High = 120–146	Anxiety	CMAS
Guénolé et al. (2013)	144	Gender: 102 M, 42 F IQ levels: gifted and matched control Ethnic composition: French—unspecified Mean age/range: 8–11	Cross-sectional	WISC-III (French version) individually administered	FSIQ: 132–145.2 VIQ: 130–144.6 PIQ: 118.6–136.6 Control: random selection	Psychopathology	CBCL (French version)
Messier and Ward (1998)	207	Gender: 180 M, 27 F IQ levels: continuous gifted and nongifted Ethnic composition: 68% African American, 4% minority, 28% Caucasian Mean age/range: 8–11	Cross-sectional	Raven's Advanced Progressive Matrices group administered	High IQ: >95th percentile (>125) Average IQ: 90th percentile Low IQ: <50th percentile	Depression	CDI
Milgram and Milgram (1976)	492	Gender: Gifted: 113 M, 69 F; nongifted: 165 M, 145 F IQ levels: continuous gifted and nongifted Ethnic composition: 68% African American, 4% minority, 28% Caucasian Mean age/range: 8–11	Cross-sectional	WISC individually administered Raven Standard Progressive Matrices (A-E) Milta Group administered	High IQ: 135–146 Control group: 50th Percentile	Anxiety Test anxiety Self-concept Locus of control	Tennessee Self Concept Scale Locus of Control Scale TASC and GASC (Hebrew versions)

(continued)

Table 1. (continued)

Study	N	Sample description	Design	Cognitive ability assessment measure	Ability groups	Outcomes	Outcome measures
Mueller (2009)	1,524	Gender: 800 M, 724 F IQ levels: gifted and matched average Ethnicity: Caucasian 75.6%, African American 10.8%, Hispanic 8%, Asian Pacific Islander 4.9%, Other 0.7% Mean age/range: 12–19	Cross-sectional	PPVT and AHPVT individually administered	High IQ: 123–146 Average IQ: 85–115	Depressive symptoms	ASP CES-D
Riaz et al. (2013)	197	Gender: 121 M, 76 F IQ levels: 93 gifted (43 M, 50 F) and 104 average (78 M, 26 F) Ethnic composition: Pakistani students—unspecified	Cross-sectional	RIAS individually administered	High IQ: > 130 Average IQ: 90–110	Adjustment	RAASI
Rost and Czeschlik (1994)	100	Mean age/range: 12–16 Gender: 50 M, 50 F IQ levels: gifted and nongifted Ethnic composition: German—unspecified Mean age/range: 10	Cross-sectional	CFT20 KFT subscales (VI and V4) Group administered	Gifted F: 119.3–130.7 Gifted M: 126.0–132.0 Control F: 104.1–109.9 Control M: 100.9–109.1	Anxiety, neuroticism, behavioral problems	HANES AFS MVL ALK
2. Cognitive ability as a requirement for inclusion in a gifted program/class							
Czeschlik and Rost (1994)	100	Gender: 50 M, 50 F IQ levels: 50 gifted, 50 average Ethnic composition: German students—unspecified Mean Age/Range: 9.75–10.25	Cross-sectional	CFT20 KFT-2 subtests: Vocabulary and Verbal Group administered	Gifted F = 121–133 Gifted M = 124–134 Control F = 95–109 Control M = 94–107	Anxiety Behavioral problems	HANES-KJ AFS MVL LEBO

(continued)

Table 1. (continued)

Study	N	Sample description	Design	Cognitive ability assessment measure	Ability groups	Outcomes	Outcome measures
Field et al. (1998)	224	Gender: gifted 32 F, 30 M; average 85 F, 77 M IQ levels: 62 gifted, 162 average Ethnic composition: gifted—Caucasian 4%, African American 9%, Hispanic 29%, Asian 11%, Other 2%; average—Caucasian 20%, African American 13%, Hispanic 53%, Asian American 4%, Other 4%	Cross-sectional	WISC ^a individually administered	Gifted = IQ ≥ 132	Depression Self-esteem	CES-D Self-Esteem Scale
Gallucci (1989)	99	Mean age/range: 14.5 Gender: gifted 38 M, 34 F; average 11 M, 16 F IQ levels: gifted and average Ethnic composition: Caucasian 67, African American 4, Asian American 1 Mean age/range: 11–16	Cross-sectional	SB-LM or WISC-R individually administered	Gifted = IQ ≥ 135 Average = 104.73	Psychopathology	CBCL CBCL-TRF Rorschach
Gallucci, Middleton, and Kline (1999)	140	Gender: Gifted in gifted residential program 26 M, 18 F, gifted in 1-hour weekly pullout program 18 M, 16 F; average 33 M, 29 F IQ levels: gifted and average Ethnic composition: gifted: Caucasian 74%, African American 2%, Asian American 3%, Hispanic 4%, other 5% Mean age/range: 12–16	Cross-sectional	WISC-III Individually administered	Gifted = IQ ≥ 130	Behavioral Problems	CBCL

(continued)

Table 1. (continued)

Study	N	Sample description	Design	Cognitive ability assessment measure	Ability groups	Outcomes	Outcome measures
Guignard et al. (2012)	132	Gender: M and F (unknown numbers) IQ levels: gifted 61, average 71 Ethnic composition: Parisian students—unspecified Average age/range: gifted 10.95, mean Group 1: 11.6, Group 2: 11.0	Cross-sectional	WISC-IV individually administered or CFT group administered	Gifted = IQ ≥ 130	Anxiety Perfectionism	RCMAS
Kramer (1987; dissertation)	161	Gender: 78 M, 80 F (3 unaccounted for) IQ levels: gifted and nongifted Ethnic composition: Caucasian Average age/range: 11–15	Cross-sectional	Unspecified ^a administered	Gifted: IQ > 130 Nongifted: IQ = 90–109	Anxiety Perfectionism Attribution style	RCMAS PS ASQ
Lehman and Erdwins (1981)	48	Gender: Gifted in gifted program 16 (9 M, 7 F); 2 average groups: Group 1: 8 M, 8 F; Group 2: 8 M, 8 F IQ levels: gifted and average Ethnic composition: Caucasian Mean age/range: gifted 8.6; average Group 1: 8.1, Group 2: 12.8	Cross-sectional	SB-LM individually administered	High IQ: 141–165 Average: 90–110	Personal and social adjustment	CTP-AA CSAVS
Ludwig and Cullinan (1984)	216	Gender: 108 F, 108 M IQ levels: gifted and average Ethnic composition: U.S.—unspecified Mean age/range: 5–11	Cross-sectional	OLSAT group administered	96th percentile (>126)	Antisocial behavior problems	BPC
Merrell and Gill (1994)	162	Gender: 90 M, 72 F IQ levels: Gifted and average Ethnic composition: Caucasian 80%, Hispanic 9%, Asian American 7%, African American 2% Mean age/range: 5–12	Cross-sectional	WISC-R individually administered	High IQ : ≥130 High performance in work (academic and/or creative) Nongifted: unspecified	Social skills and antisocial behavior	SSBS

(continued)

Table 1. (continued)

Study	N	Sample description	Design	Cognitive ability assessment measure	Ability groups	Outcomes	Outcome measures
Nail and Evans (1997)	212	Gender: gifted: 55 M, 60 F nongifted: 97 IQ levels: gifted Ethnic composition: Caucasian 80%, Hispanic 9%, Asian American 7%, African American 2% Mean age/range: 5–12	Cross-sectional	Unspecified ^a	High: IQ > 128 Nongifted: unspecified	Emotional symptoms	SRP
Shaywitz et al. (2001)	87	Gender: 87 M (35 gifted, 52 nongifted) IQ levels: gifted, average, and learning disabled Ethnic composition: U.S.—unspecified Mean age/range: gifted 11.3, average 11.3, LD 11.5.	Cross-sectional	WISC-R individually administered	High IQ: ≥ 130 Average: 75–126 (M = 97.7) LD: 100–135 (M = 116.6)	Behavior problems	ACTRS YCI

Note. ACTRS = Abbreviated Conners Teacher Rating scale (Conners & Barkley, 1985); AFS = well-established German questionnaire for measuring test anxiety (manifest anxiety and social desirability subscales); ALK = Child Characteristics and Behaviour Problems (T. Ehlers, 1981); ASP = Adolescent Self-Report Questionnaire (Rushon, Forcier, & Schectman, 2002); ASQ = Attributional Style Questionnaire (Peterson et al., 1982); BPC = Behavior Problem Checklist (Quay & Peterson, 1975); CBCL = Child Behavior Checklist (Achenbach, 1991 [French version]; Achenbach & Edelbrock, 1983); CBCL-TRF = Child Behavior Checklist = Teacher's Response Form (Achenbach & Edelbrock, 1983); CDI = Children's Depression Inventory (Kovacs, 1985); CES-D = Center for Epidemiological Studies Depression Scale (Radloff, 1977); CMAS = Children's Form of Manifest Anxiety Scales (3 subscales: Physiological, Worry/Oversensitivity, Social Thoughts/Fears (Castaneda, Boyd, Palermo, & Palermo, 1956); CSAVS = Children's Social Attitude & Values Scale (Solomon, Kendall, & Oberlander, 1976); CTP-AA = California Test of Personality—Primary & Elementary (Thorpe, Clark, & Tieg, 1953); GASC = General Anxiety Scale for Children (Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960); General HANES-K) = well-established German questionnaire (Intraversion/Extraversion subscales); LEBO = Teacher Questionnaire (Merz, 1983); MVL = Marburg Behaviour Checklist (B. Ehlers, Ehlers, & Makus, 1978); PS = Perfectionism Scale (1985); RAASI = Reynolds Adolescent Adjustment Screening Inventory (W. M. Reynolds, 2001); RCMAS = Revised Children's Form of Manifest Anxiety Scales (3 subscales: Physiological, Worry/Oversensitivity, Social Thoughts/Fears); Rorschach (Rorschach, 1927); Self-Esteem Scale (Field & Yando, 1991); SRP = Self Report of Personality (C. R. Reynolds & Kamphaus, 1992); SSBS = School Social Behavior Scales (Merrell, 1993); TASC = Test Anxiety Scale for Children (Sarason, Davidson, Lighthall, & Waite, 1958); YCI = Yale Children's Inventory (Shaywitz, Holahan, Marchione, Sadler, & Shaywitz, 1992). *Assessment of cognitive ability*: AHPVT = Add Health Picture Vocabulary Test (used as proxy for IQ assessment); CFT = Cattell's Culture Fair Intelligence Test; CFT20 = German adaptation (Weiss, 1978) of Cattell's Culture Fair Intelligence Test, Scale 2 (Cattell, 1960); KFT = German adaptation of Thorndike-Hagen Cognitive Abilities Test (Thorndike & Hagen, 1971); OLSAT = Otis-Lennon School Ability Test (2nd ed.; Otis & Lennon, 1982); PPVT = Peabody Picture Vocabulary Test (Dunn & Dunn, 2007); Raven's Advanced Progressive Matrices (Raven, 1962); RIAS = Reynolds Intellectual Assessment Scale (C. R. Reynolds & Kamphaus, 2003); SB-LM = Stanford-Binet LM (Terman & Merrill, 1973); WISC = Wechsler Intelligence Scale for Children (Wechsler, 1949); WISC-R = Wechsler Intelligence Scale for Children—Revised (Wechsler, 1974); WISC-III = Wechsler Intelligence Scale for Children—3rd Edition (Wechsler, 1991); WISC-IV = Wechsler Intelligence Scale for Children—4th Edition (Wechsler, 2003).

^aThe cognitive ability test used in the Field et al. (1998) study was unnamed. However, cutoff details supplied suggest it may have been a WISC. The Kramer (1987) and Nail and Evans (1997) studies were unspecified but yielded IQ scores.

Table 2. Study Outcomes of Link Between High Intellectual Ability and Psychopathology and Personal and Social Adjustment.

Study		
1. Cognitive ability as a variable assessed in the study		
Feldhusen and Klausmeier (1962)	N/A	N/A
Guénolé et al. (2013)	N/A	N/A
Messier and Ward (1998)	N/A	N/A
Milgram and Milgram (1976)	N/A	N/A
Mueller (2009)	N/A	N/A
	Adjustment (AB, AC, ED, PS)**	
	Total: $d = -1.37$	Low
	Males: $d = -1.09$	Low
Riaz et al. (2013)	Females: $d = -2.3$	Low
	Extraversion	
	Males: $d = -0.10$	Low
	Females: $d = -0.09$	Low
	Sociability	
	Males: $d = 0.22$	Low
	Females: $d = -0.20$	Low
	Anxiety	
	Males: $d = 0.26$	Low
	Females: $d = 0.22$	Low
	Social desirability	
	Males: $d = -0.89$	High
Rost and Czeschlik (1994)	Females: $d = -0.79$	High
2. Cognitive ability as a requirement for inclusion in a gifted program/class		
Czeschlik and Rost (1994)	N/A	N/A
Field et al. (1998)	Self-esteem: $d = 0.02$	Low
	Depression: $d = -0.12$	Low
Gallucci (1989)	Nonentrenched, creative responses	
	Task 1: $d = -1.12$	Low
	Task 2: $d = 2.29$	Low
Gallucci et al. (1999)	N/A	N/A
Guignard et al. (2012)	N/A	N/A
Kramer (1987)	Anxiety: $d = -0.35$	
	Perfectionism: $d = 0.18$	
Lehman and Erdwins (1981)	N/A	N/A
	Conduct disorder	
	Girls: $d = -0.27$	Low
	Boys: $d = 0.04$	Low
	Personality problem	
	Girls: $d = -0.18$	Low
	Boys: $d = -0.30$	Low
	Inadequacy/immaturity	
	Girls: $d = -0.37$	Low
	Boys: $d = -0.34$	Low
	Socialized/delinquency	
	Girls: $d = -0.12$	Low
Ludwig and Cullinan (1984)	Boys: $d = -0.17$	

(continued)

Table 2. (continued)

Study		
Merrell and Gill (1994)	Social competence	
	Interpersonal: $d = 0.48$	Medium
	Self-management: $d = 0.30$	Low
	Academic: $d = 0.23$	Low
	Social competence total: $d = 0.40$	Low–medium
	Antisocial behavior	
	Hostile–irritable: $d = -0.30$	Low
	Antisocial–aggressive: $d = -0.47$	Medium
	Disruptive–demanding: $d = -0.32$	Low
	Antisocial behavior total: $d = -0.35$	Low
	Emotional symptoms	
	Total: $d = -0.42$	Low–medium
	Y9: $d = -0.84$	High
Y10: $d = -0.47$	Medium	
Y11: $d = -0.22$	Low	
Y12: $d = -0.12$	Low	
Nail and Evans (1997)	Behavioral	
	Activity: $d = 0.50$	Medium
Shaywitz et al. (2001)	Impulsivity: $d = 0.91$	High
	Tractability: $d = 0.72$	High
	Negative affect: $d = 1.00$	High
	Family history of behavioral problems: $d = 0.30$	Low

Note. AB = Antisocial Behaviour; AC = Anger Control Problems; ED = Emotional Distress; PS = Positive Self. d = Cohen's d .

Within our search, all but two (Guérolé et al., 2013; Messier & Ward, 1998) of the identified studies reported evidence that overall intellectually gifted children were socially better adjusted and displayed less internalizing and behavioral difficulties than their nonintellectually gifted counterparts. These two studies indicated vulnerability to behavioral difficulties related to specific intellectually gifted populations. First, Guérolé and colleagues (2013) found that when compared to a normative sample, clinically referred intellectually gifted children tended to have increased behavioral problems. Moreover, this study showed that gifted children who displayed a significant verbal–performance discrepancy tended to exhibit significantly more emotional and behavioral problems than gifted children lacking such a discrepancy. Second, Messier and Ward (1998) showed that high-ability delinquents in detention centers may be more vulnerable to depression than those who are nonintellectually gifted.

Findings from 12 of the 18 studies indicated that overall intellectually gifted young people compared to nonintellectually gifted peers appeared to be less prone to anxiety (Czeschlik & Rost, 1994; Feldhusen & Klausmeier, 1962; Kramer, 1987; Milgram & Milgram, 1976; Rost & Czeschlik, 1994) with fewer or equal numbers of behavior problems (Czeschlik & Rost, 1994; Gallucci et al., 1999; Ludwig & Cullinan, 1984; Rost & Czeschlik, 1994). They also appeared to display higher levels of interpersonal skills (Lehman & Erdwins, 1981; Ludwig & Cullinan, 1984; Merrell & Gill, 1994) and adjustment (Riaz et al., 2013). Of the 18 studies, four reported mixed evidence of both positive and negative associations between intellectual giftedness and psychopathology (Merrell & Gill, 1994; Mueller, 2009; Shaywitz et al., 2001) and complex relationships between intellectual giftedness and anxiety and perfectionism (Guignard et al., 2012).

Merrell and Gill (1994) reported that although intellectual giftedness appeared to be associated with advanced social skills and low levels of problem behaviors, a small subset of intellectually gifted students seemed to display serious behavioral or emotional problems. Further, evidence from Shaywitz and colleagues' (2001) study indicated that the level of behavior problems in a highly intellectually gifted group (IQ = 140–154) was similar to a group of students with learning disabilities, and significantly higher than for a low intellectually gifted group (IQ = 124–139). Mueller's (2009) findings indicated differences in the predictors of depressive symptoms among intellectually gifted and non-intellectually gifted participants. Whereas age and gender appeared to be predictors for both groups, ethnicity was a significant predictor only for the intellectually gifted group in the presence of protective factors (i.e., positive self-concept, parent-family connectedness, and school belonging). Finally, Guignard and colleagues (2012) reported paradoxical findings in their investigation of the association between intellectual giftedness and both perfectionism and anxiety. Intellectually gifted sixth graders (younger than their grade-level peers because of curriculum acceleration) were compared with fifth-grade (allowing same-age comparisons) and sixth-grade control groups. The intellectually gifted group were found to express higher perfectionism and similar levels of anxiety compared to the sixth-grade non-intellectually gifted group, and the same level of perfectionism but higher anxiety as the non-intellectually gifted fifth graders (similar-aged peers). No studies related to suicidal ideation and bipolar disorder met review criteria.

Risk of Bias

Risk of bias for individual studies is reported in Table 3. The Cochrane Handbook for Systematic Reviews of Interventions' domains and formatting suggestions was adapted to better assess nonexperimental designs with insufficient information to allow low-risk/high-risk judgment (Higgins & Green, 2011). Overall risk of bias across the studies was low

to moderate, with most studies including sufficient information to adequately code results. In 11 of the 18 studies (see Table 1), results may have been skewed in favor of a negative association between intellectual giftedness and psychopathology as participants were selected based on inclusion in a gifted program. Possibly, this selection strategy may have overrepresented highly functional, achieving individuals and excluded underachieving intellectually gifted children whose potential was masked by certain psychopathologies, limiting identification, and indicating an increased risk of selection bias. Nine studies used only self-assessment, which could increase the risk of detection bias, due to limited objective ratings of performance. Nine studies included parent and/or teacher scores, which may have been sensitive to bias due to a halo effect. However, such a bias may be diminished by using more than one rater and assessing interrater reliability, thereby creating a degree of objectivity (Czeschlik & Rost, 1994; Gallucci, 1989; Rost & Czeschlik, 1994; Shaywitz et al., 2001). None of the studies included objective measures, such as behavioral observations, hence possibly increasing the risk of detection bias. Attrition bias was not relevant given that there was no pre- and postexperiment data to compare.

Discussion

Our systematic review involved the use of a comprehensive strategy to identify and assess all existing research that examines the association between intellectual giftedness, as operationalized by IQ, and child psychopathology (i.e., internalizing and externalizing problems). Studies including IQ as part of the intellectually gifted identification process were included to increase the likelihood that underachieving high-ability students were not overlooked. The most consistent finding across the identified studies over time was that intellectual giftedness was associated with decreased levels of psychopathology among children and adolescents. The empirical evidence suggests that intellectually gifted groups exhibit superior social/emotional

Table 3. Risk of Bias Levels According to an Adapted Version of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011).

Type of bias	Selection		Performance		Detection	Reporting	
Study	Selection from a biased pool	Control condition	Group inclusion	Blinding of participants	Blinding of outcome ax/adhering to scripted protocols	Objective performance ratings/>1 rater	Selective reporting
Feldhusen and Klausmeier (1962)	+	+	+	+	+	—	?
Czeschlik and Rost (1994)	+	+	?	+	+	+	?
Field et al. (1998)	?	+	?	+	+	—	?
Gallucci (1989)	?	+	?	+	+	+	?
Gallucci et al. (1999)	?	+	?	+	+	—	?
Guérolé et al. (2013)	?	+	+	+	+	—	?
Guignard et al. (2012)	?	+	?	+	+	—	?
Kramer (1987; dissertation)	?	+	?	+	+	—	?
Lehman and Erdwins (1981)	?	+	?	+	+	—	?
Ludwig and Cullinan (1984)	?	+	?	+	+	—	?
Merrell and Gill (1994)	?	+	?	+	+	—	?
Messier and Ward (1998)	?	+	+	+	+	—	?
Milgram and Milgram (1976)	+	+	+	+	+	—	?
Mueller (2009)	+	+	+	+	+	—	?
Nail and Evans (1997)	?	+	?	+	+	—	?
Riaz et al. (2013)	+	+	+	+	+	—	?
Rost and Czeschlik (1994)	+	+	+	+	+	+	?
Shaywitz et al. (2001)	?	+	?	+	+	+	?

Note. + = low risk of bias (or judged not to affect outcome); – = high risk of bias; ? = unclear risk of bias; ax = assessment. Adaptation included (a) changing the “objective rating of performance” to “objective performance ratings/>1 rater”; (b) removal of five aspects of bias that were not relevant to the present review (under “selection”: random generation, allocation concealment, and assessed clinical status; under “performance”: blinding of personnel/adhering to script protocol; under “attrition”: incomplete outcome data/attrition bias).

functioning compared to nonintellectually gifted children in terms of significantly lower levels of anxiety (Czeschlik & Rost, 1994; Feldhusen & Klausmeier, 1962; Guignard et al., 2012;

Kramer, 1987; Milgram & Milgram, 1976; Rost & Czeschlik, 1994). Overall, intellectually gifted children also show less evidence of depression (Field et al., 1998; Mueller, 2009),

behavioral problems (Gallucci et al., 1999; Ludwig & Cullinan, 1984; Merrell & Gill, 1994; Rost & Czeschlik, 1994; Shaywitz et al., 2001), as well as overall psychopathology (Gallucci, 1989; Nail & Evans, 1997). Moreover, they seem to exhibit higher levels of adaptive competencies such as high self-esteem and well-developed social skills (Field et al., 1998; Lehman & Erdwins, 1981; Merrell & Gill, 1994; Milgram & Milgram, 1976). It is interesting to consider these results in light of the new perspective emerging through recent neuroscience findings. The results of the Coplan and colleagues (2012) study suggest that both worry and intelligence exhibit an inverse correlation with certain metabolites in the subcortical white matter (the part of the brain related to intelligence) indicating that worry may have coevolved with intelligence in humans as a positive, adaptive mechanism.

The most consistent finding across the identified studies over time was that intellectual giftedness was associated with decreased levels of psychopathology among children and adolescents.

Only four studies reported some evidence of both advantages and difficulties associated with intellectual giftedness. Whereas Merrell and Gill (1994) found evidence that the majority of intellectually gifted students displayed advanced social skills and low levels of problem behaviors compared to their average peers, the study results indicated that a small subset of intellectually gifted students display serious behavioral or emotional problems. In addition, the Shaywitz and colleagues (2001) study found evidence of difficulties in the subset of highly intellectually gifted students (IQ = 140–154), who appeared to display similar levels of behavioral problems as a group of students with learning disabilities, which is significantly higher than those of a low intellectually gifted group (IQ = 124–139). Such findings suggest that the gifted population is not a homogenous group and that specific difficulties may be identified when different levels of giftedness are considered.

Evidence from the other two studies indicates that intellectual giftedness may also be associated with distinct risk processes, such as the interplay between perfectionism and anxiety in gifted children, compared to their non-intellectually gifted peers (Guignard et al., 2012). Mueller's (2009) findings suggest that age and gender may also act as risk factors in depression for both the intellectually gifted and nongifted groups, but that only ethnicity is a significant predictor for the intellectually gifted group even in the presence of protective factors (i.e., positive self-concept, parent-family connectedness, school belonging).

It is apparent that methodological issues may also have bearing on the nature of results. These include participant selection criteria, adequacy of sample sizes, and types of cognitive and psychopathology tests used, as well as study design. To begin with, using intellectual potential based on an assessment of cognitive abilities offers an efficient way to compare human intellectual capability (Sattler, 2002). Moreover, it allows for identification of underachieving intellectually gifted children and adolescents. Yet despite decades of research in this area, out of the 112 relevant studies that emerged in the search, only 18 studies were identified (16.0%) where intelligence was actually measured as a study variable, or where its measurement was part of the selection criteria for inclusion in a gifted class, and empirically validated psychopathology measures were used. Given that intelligence is a common element in most definitions of giftedness (e.g., Gagné, 2003; Renzulli, 1978; Sternberg, 1984), and that the relationship between intelligence test performance and academic performance is well documented (Brody, 1997; Duckworth et al., 2012; Haywood, 2004; Lubinski, 2004; Lynn & Mikk, 2009; Pastuszak et al., 2014; Sattler, 2002), this finding may reflect a limitation in recent studies.

It should be noted that only four out of the 18 included studies were conducted within the past 5 years, and the remaining 14 studies more than 13 years ago. These results may potentially reflect a shift away from the use of IQ to index intellectual giftedness, and toward

the use of other indices, such as achievement levels only, or an emphasis on multiple measures of identification. Of the 18 included studies in this review, six used multiple measures for identifying intellectual giftedness, including academic achievement (Feldhusen & Klausmeier, 1962; Ludwig & Cullinan, 1984; Mueller, 2009; Nail & Evans, 1997; Rost & Czeschlik, 1994; Shaywitz et al., 2001).

It is important to note a potential disadvantage in using the IQ definition of intelligence (cutoff point of $IQ \geq 125$) as one of the selection criteria for the studies included in this review. IQ-only identification does not lend itself to some views of intelligence and assesses only a specific range of ability, missing a child's strengths in other areas, such as music or art, or in specific abilities, such as mathematics. Consequently, we did not include research studies examining these aspects of giftedness, including some studies conducted in residential academies with highly achieving adolescents. However, the specific research question for this review involved intellectual ability, not other areas of giftedness or specific abilities. Moreover, it is important to note that the various procedures used for identifying intellectually gifted students are perhaps best understood as providing sources of information with which to make judgments regarding giftedness, as opposed to representing tests of diagnostic status.

Of the 18 identified studies, 11 involved participants from specialized gifted programs, who had received some recognition for their abilities, with only seven studies (Feldhusen & Klausmeier, 1962; Guénolé et al., 2013; Messier & Ward, 1998; Milgram & Milgram, 1976; Mueller, 2009; Riaz et al., 2013; Rost & Czeschlik, 1994) assessing IQ as a variable in the study. It is possible that the nature of the gifted program selection process results in members who are functioning well in school (academically, behaviorally, and socially), potentially leading to participant selection bias in studies that underestimates the prevalence of intellectually gifted children with behavioral or other difficulties (Ziegler & Raul, 2000).

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Further, despite the evidence of associations between intellectual giftedness and factors such as ethnicity, perfectionism, and anxiety, none of the studies identified in our review actually conducted statistical analyses to determine interaction effects that might help explain complex issues. Indeed, various studies not included in the review have indicated that parental styles (e.g., Dwairy, 2004; Olszewski-Kubilius, Lee, & Thomson, 2014; Tam & Phillipson, 2013) as well as developmental periods and transitions, such as the shift to adolescence and stages of school transition (Dishion & Kavanagh, 2003; Moilanen, Shaw, & Maxwell, 2010), may significantly affect the mental health and psychological adjustment of intellectually gifted children. In addition, the cascade effects literature emphasizes that the risk for developing any form of psychopathology is influenced by synergistic, direct, and indirect interactions among the organism, its environment, and the processes that promote the difficulty across the life span (Cicchetti, 1990, 2002; Cicchetti & Curtis, 2006; Cicchetti & Schneider-Rosen, 1986; Doan, Fuller-Rowell, & Evans, 2012; Masten, Burt, & Coatsworth, 2006; Masten & Cicchetti, 2010; Masten et al., 2005; Shonkoff, Boyce, & McEwen, 2009). This perspective highlights an important deficiency in the literature, that is, the need to examine interaction effects within a longitudinal study framework.

Finally, our review also highlighted the need to consider the possibility that different measures of psychopathology may test different aspects of the same construct or rely on global measures of emotional problems. Thus, it

is possible that a consideration of specific age-appropriate dimensions of psychopathologies is necessary to identify associations between intellectual giftedness and psychopathology in childhood (Holmbeck et al., 2008). For example, developmental trajectories of anxiety often present separation problems in early childhood as preceding problems in worry or social phobia that emerge in later childhood or adolescence. Hence, studies examining emotional problems or anxiety that do not investigate the occurrence of specific forms of these problems at distinct ages may miss the effect.

Our review also highlighted the need to consider the possibility that different measures of psychopathology may test different aspects of the same construct or rely on global measures of emotional problems.

Future Directions

A number of key recommendations can be made based on the issues identified in our review to inform and facilitate more accurate, comprehensive and meaningful future research. First, models in this area are most likely to be informed by data collected from larger, more ethnically diverse and representative samples, and longitudinal designs that allow for examination of risk and protective processes in the developmental trajectories of gifted children. Second, future studies would benefit by selecting participants using cognitive ability tests as part of a multidimensional, multi-informant selection process (Eklund et al., 2015; Mandelman, Barbot, Tan, & Grigorenko, 2013; Richards, Encel, & Shute, 2003), and not just including those attending specialized gifted programs or who have only demonstrated high academic achievement. Third, tests that differentiate meaningful dimensions and subtypes of psychopathology of importance to distinct developmental periods, rather than global measures of emotional problems, are recommended. Finally, there is an apparent need for the investigation of factors that may interact with giftedness to confer risk or

protective effects, such as ethnicity, gender, and age, as well as dynamics related to family and socialization.

Conclusion

Our systematic review investigated the empirical evidence examining the association between giftedness and psychopathology and found that results generally support the view that high ability is a protective factor against both internalizing and externalizing difficulties for children and adolescents. Issues that may bias the findings in this direction include the tendency to select participants from gifted programs. There are a number of innovative aspects to our review. First, we used an unrestricted comprehensive strategy to identify and examine all existing research in this area in terms of a wide-ranging array of psychopathologies (internalizing and externalizing), unrestricted by date of study or age of participants. Second, we examined whether the nature of the association between intellectual giftedness and psychopathology might be clarified by operationalizing intellectual giftedness as intelligence (IQ level), a central aspect to the most commonly used definitions of giftedness (Renzulli & Reis, 1985, 1997; Sattler, 2002). In our view, using intelligence (as indexed by IQ) in operationalizing intellectual giftedness rather than achievement levels only is critical in avoiding potential selection bias whereby only high achieving participants are represented, thereby underestimating the prevalence of intellectually gifted children with behavioral or other difficulties (Ziegler & Raul, 2000). Third, we excluded studies of dual diagnoses, such as giftedness and ADHD, LD, or ASD to remove confounding variable effects, such as the anxiety or mood problems associated with these difficulties irrespective of ability levels. Recommendations for future research include the use of large population-based groups including both gifted and nongifted individuals, as well as participant selection not based on gifted program inclusion, adequate sample size, individually administered cognitive abilities tests, and psychopathology measures that rely on specific age-appropriate dimensions. The need for longitudinal studies and testing interac-

tion effects between variables, such as age, ethnicity, and gender, as well as a focus on specific gifted populations (clinically referred or delinquent), is also identified. Future research based on such approaches is likely to make the greatest contribution toward informing programs and policies for gifted children and adolescents, allowing resources to be more effectively directed to meet the needs of this population.

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Manuscript received December 2014; accepted June 2015.