


Mental Disorders Among Gifted and Nongifted Youth: A Selected Review of the Epidemiologic Literature

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Abstract

Given the ongoing debate over whether giftedness is associated with mental health disorders, there is a great need to highlight and compare results from the most methodologically rigorous studies. Surprisingly, the vast majority of literature reviews and background sections of research articles include studies that do not directly compare gifted and nongifted youth. Furthermore, almost no attention has been paid to how differences in the definitions of giftedness or mental health outcomes of interest affect the interpretation and comparison of studies. The authors apply an epidemiologic perspective for thinking about these issues, highlight many of the challenges of studying this population, and present results from meta-analyses that include the most methodologically rigorous studies comparing rates of depression, bipolar disorder, anxiety, suicide ideation, and attention deficit hyperactivity disorder (ADHD) between gifted and nongifted youth. They conclude with recommendations to strengthen research in this area.

Putting the research to use

Through this review we sought to provide concrete recommendations to strengthen future research on the mental health of gifted children. Most notably, future studies should assess large, population-based cohorts that include both gifted and nongifted individuals. Researchers should also move toward describing their study population according to their specific aptitudes, talents, skills or abilities, rather than using the general term 'gifted'. Thinking more specifically about these relationships will not only help us to understand the association between giftedness and mental health, but will also increase the potential to effectively shape programs and policies for gifted youth, focusing resources on the most vulnerable.

Keywords

gifted, mental health, adolescents, depression, anxiety

Over the past century, there has been a dramatic shift in the perception of educators, researchers, and the public about the mental health of gifted youth. In the late 1800s, it was widely thought that giftedness increased vulnerability to mental and emotional problems and some even argued that giftedness may be linked with insanity (Gallagher, 1990; Neihart, 1999). Although evidence has emerged over the past decades suggesting that gifted youth may not be as vulnerable as once thought (Neihart, 2002b), there remains a common view that “gifted [youth] are more sensitive to interpersonal conflicts and experience greater degrees of alienation and stress than do their peers as a result of their cognitive capacities” (Neihart, 1999).

Others have argued that gifted children are at lower risk for mental and emotional problems (Neihart, 1999), and cognitive skills are often cited as a key protective factor against the potentially harmful effects of stressful life events (Fergusson & Lunskey, 1996; Garmezy, Masten, & Tellegen,

1984; Kandel et al., 1988; Masten, 1988; Werner, 1989). The work of Lewis Terman and others have contributed greatly to the view that giftedness may confer a mental health advantage (Terman, 1925, 1935, 1947, 1959). Terman's cohort of gifted individuals, followed since 1922 (Sears, 1984), has exhibited similar or lower rates of mental or emotional problems compared with the general public across their life course. In addition, research on cognitive ability across the full spectrum has found inverse associations between childhood cognitive skills and subsequent mental health problems, including posttraumatic stress disorder (PTSD; Koenen,

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Moffitt, Poulton, Martin, & Caspi, 2007; Kremen et al., 2007), and generalized anxiety disorder (Martin et al., 2007).

Today, as the field of giftedness evolves, literature continues to be published to support both views. Rectifying these disparate findings can be challenging and at times frustrating for teachers, counselors, researchers, and families working to support gifted children. Although several comprehensive reviews have been completed to summarize the current state of the literature (Gust-Brey & Cross, 1999; Neihart, 2002a, 2002b), they, as well as the majority of background sections of published manuscripts, present numerous findings from studies that examine the mental health of gifted children only, without directly comparing them with their nongifted peers. Without an appropriate comparison group whose mental health outcomes have been assessed in an identical manner, it is not clear whether it is giftedness itself that confers the advantage (or disadvantage), or whether there may be some other factor (e.g., dedicated teachers and school staff) that may confer a mental health advantage (or disadvantage) to all children, regardless of whether the children are gifted. Second, the majority of review articles have not focused on the wide variability in how *giftedness* or *mental health outcomes* are defined across studies. A closer examination is warranted as differences in study findings may be due to how these constructs are defined and may provide important insight into subgroups of gifted youth who may be at particular risk for a given mental health outcome.

In this article, we draw on the field of public health and offer an epidemiologic perspective for thinking about research related to the mental and emotional problems of gifted youth. We begin by reviewing the current state of knowledge on depression, bipolar disorder, anxiety, suicide ideation, and attention deficit hyperactivity disorder among youth in general, focusing in particular on rates of these disorders in the general population. Second, we highlight some of the challenges of studying the mental health of gifted youth and, third, review the strongest studies to date, from an epidemiologic perspective, that examine differences in the prevalence of these disorders between gifted and nongifted youth. The purpose of this review is not to be inclusive of all studies published on this topic to date, but to be selective with regard to those we assessed to have the most rigorous study design and methods for examining the mental health of gifted compared with nongifted youth. We conclude with recommendations for future research in this area.

Adolescent Mental Health Disorders

Depression. Although depression was historically thought to affect only adults, research over the past two decades has documented that individuals with major depression often have their first depressive episode in adolescence or young adulthood (Evans et al., 2005). Major depression is characterized by depressed or irritable mood or markedly diminished

interest or pleasure in almost all activities for at least a 2-week period, causing significant impairment in academic, social, and other areas of functioning (Evans et al., 2005). The prevalence of recent depressive episodes among youth ranges between 20% and 30% (Evans et al., 2005; Offord et al., 1987; Reinherz, Giaconia, Hauf, Wasserman, & Silverman, 1999), and the National Comorbidity Survey (NCS) reports a lifetime prevalence of major depressive disorder of about 14% among 15- to 18-year-olds, with an additional 11% reporting a history of minor depression (Evans et al., 2005; Kessler & Walters, 1998). Youth younger than 15 years of age were not included in the NCS, although prevalence estimates are expected to be similar (Evans et al., 2005).

Bipolar disorder. Bipolar disorder, also known as manic-depressive illness, is a disorder characterized by dramatic mood swings between periods of feeling “high” and/or extremely irritable (i.e., mania) and periods of feeling sad and depressed (National Institute of Mental Health, 2008b). These highs and lows are severe and affect a person’s ability to function. The prevalence of bipolar disorder among youth in the general population is low. The 1990 NCS suggests a lifetime prevalence of Bipolar I (the classic form of the illness) of 1.3% for individuals between 15 and 17 years of age (Kessler et al., 1994). However, other children and youth may suffer from a milder form of the illness characterized by severe mood swings that do not fully meet the criteria for bipolar disorder outlined in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*; Evans et al., 2005).

Anxiety. Anxiety and fear are closely related. Whereas fear is a natural, adaptive response to a realistic threat, anxiety is a more pervasive emotion that may drive unreasonable or excessive reactions to a perceived threat (Foa et al., 2005). Anxiety disorders can onset at any age and are diagnosed when the anxiety becomes severe enough to prevent developmentally appropriate activities or behaviors (Foa et al., 2005; Klein & Pine, 2001). One challenge with studying anxiety disorders is that anxiety exists on a continuum. Although many people experience some level of anxiety, the challenge is in determining when that anxiety becomes severe enough to require counseling or treatment. Furthermore, anxiety disorders are fairly heterogeneous, and include specific phobia, separation anxiety disorder, social anxiety disorder, obsessive-compulsive disorder, generalized anxiety disorder, panic disorder, and PTSD (Foa et al., 2005). Prevalence estimates suggest that at any given point in time, 3% to 5% of children and adolescents suffer from an anxiety disorder (Foa et al., 2005).

Suicide ideation. Currently, suicide is the third leading cause of death among youth (Centers for Disease Control and Prevention [CDC], n.d.-a). Youth suicide increased markedly between the mid-1950s and 1990, but rates have dropped since then to a rate of 4.5 per 100,000 (CDC, n.d.-a; Hendin et al., 2005). Equally important to the rate of completed suicide are the proportions of adolescents who

reported attempting a suicide or reported having suicidal thoughts or ideation. Data from the 2007 Youth Risk Behavioral Surveillance System (YRBSS) indicated that 6.9% of all high school youth surveyed made one or more suicide attempts in the prior 12-month period (CDC, n.d.-b). In addition, 14.5% reported seriously considering attempting suicide during the past 12 months (CDC, n.d.-b). Given that the YRBSS is based on data from youth attending high school and excludes those who are homeless, runaways, and dropouts, who may be at a higher risk for suicide and suicidal ideation, these data likely underestimate the prevalence of suicide ideation and attempts in the general population of youth (Gould, Fisher, Parides, Flory, & Shaffer, 1996; Gould, Greenberg, Velting, & Shaffer, 2003).

Attention deficit hyperactivity disorder (ADHD). ADHD is one of the most common mental health disorders among children and is characterized by inattention, hyperactivity, and/or impulsiveness (National Institute of Mental Health, 2008a). Epidemiologic studies suggest that prevalence rates among 6- to 12-year-olds ranges from 4% to 12% in the general population, with similar or slightly lower rates among pediatric primary care settings (Brown et al., 2001). Given that gifted children may at times exhibit symptoms of ADHD in the school setting, particularly if they are not being academically challenged, several authors have called into question the validity of diagnosing ADHD among gifted children (Baum, Olenchak, & Owen, 1998; Tucker & Hafenstein, 1997; Webb & Latimer, 1993). However, recent evidence from the Massachusetts General Hospital Family Studies of ADHD suggests that ADHD is a valid diagnosis for gifted children and youth (Antshel et al., 2007; Antshel et al., 2008).

Challenges in Studying the Mental Health of Gifted Youth

As illustrated above, there are challenges to understanding and quantifying the mental health of youth in general. Additional challenges arise when trying to assess the mental health of gifted youth specifically.

The definition of giftedness. The lack of agreement about the definition of giftedness is a major challenge for researchers studying the association between giftedness and mental health outcomes (Bracken & Brown, 2006). In a recent study, Pfeiffer (2003) interviewed 64 experts and found that 94% reported definitions and conceptualization of gifted and talented as their number one concern, followed by problems with identifying gifted and talented students (41%; Pfeiffer, 2003). In 1972, the field of education described gifted children as those who are

[C]apable of high performance including those with demonstrated achievement and/or potential ability in any of the following areas: (a) General intellectual ability, (2) Specific academic aptitude, (3) Creative or

productive thinking, (4) Leadership ability, (5) Visual or performing arts, (6) Psychomotor ability. (Marland, 1972, p. 10)

Since then, however, others have proposed additional definitions in an effort to move the focus away from IQ testing, and have extended and expanded the definition of giftedness to include talents (Renzulli & Purcell, 1994; Van Tassel-Baska, 1998) and multiple intelligences (Gardner, 1983, 1993).

The challenge with having multiple definitions, ways to interpret those definitions, and methods to identify gifted children who meet criteria outlined in those definitions, is that it results in tremendous heterogeneity among the gifted populations under study. As such, results of research examining the mental health of gifted youth are less generalizable, and replication of findings becomes more challenging.

Lack of a comparison group. Another challenge with the current literature is that a large proportion of studies are based on small samples, case studies, or psychological autopsies that do not include a comparison group of nongifted children. Even larger studies using Terman's cohort of gifted children do not compare mental health outcomes of gifted with nongifted youth (Beer, 1991; Garland & Zigler, 1999; Hull-Blanks, Kerr, & Kupius, 2004; Parker, 1996; Pearson & Beer, 1990; Terman, 1925). Although a limited number of studies have compared their findings for gifted youth with published averages for the general population (e.g., Garland & Zigler, 1999; Parker, 1996), there are limitations to published averages for the general population of youth, as described above. In addition, there is often great variability in the assessment of mental or emotional outcomes across studies, and a general population sample may differ significantly from the one under study on characteristics such as gender or family history of the disorder, which might explain all or part of the differences in mental health outcomes observed between the two populations. Although studies of gifted children alone may provide important information and evidence about a range of specific topics, they should not be used as evidence to support the hypothesis that gifted children *overall* are at increased or decreased risk for mental or emotional problems (Cross, 1996).

Mental health measurement. Another challenge in the current literature is that there is a tremendous range in the choice of measures to assess mental health. Although the variability in outcome measures is less of a concern when psychometrically tested instruments are used to assess depression or anxiety specifically, a challenge arises with the use of subscales from measures assessing broader constructs such as self-concept. Subscales, or item clusters, may be labeled "anxiety" or "depression," but they may not have gone through rigorous reliability and validity testing independent of the full scale, and may be measuring slightly different aspects of mental health than scales designed explicitly to

assess mental health outcomes. As such, scholars should be cautious when comparing results across studies, as the assessment tool may play a role in observed differences among study findings.

Another concern is that the vast majority of studies assess symptomatology rather than mental health diagnoses. Although symptomatology allows us to understand subclinical levels of mental health disorders, a current gap in the literature is that there is not a solid understanding of the rates of major depressive disorder, generalized anxiety disorder, or other more severe mental and emotional problems among gifted youth.

Advocacy. A final concern for research on the mental and emotional problems of gifted youth is the tendency—intentional or not—to present study findings in a way that overstates the empirical evidence. Cross (1996) found that the majority of discussions about the prevalence of suicide among gifted youth generally lacked empirical evidence, or cited dated or only marginally related studies to support their positions (Cross, 1996; Gust-Brey & Cross, 1999). Cross (1996) also identified a pattern, which he called “reification of speculation,” where authors cited the work of others to support their position, paying little attention to whether the studies they cited provided strong empirical evidence for their case. Finally, his review found that the publications on suicide often contained the hidden agendas of authors who were either advocating for gifted children in an attempt to “normalize them,” or, alternatively, were portraying them as having significant problems in an attempt to justify additional services for gifted youth (Cross, 1996; Gust-Brey & Cross, 1999).

Method

To conduct this review, we searched published literature for studies comparing the prevalence of mental health conditions among gifted and nongifted children and adolescents. We searched MEDLINE, PubMed, PsychInfo, ERIC, and GoogleScholar using the following keywords: gifted, academically talented, intellectually superior, mental health, mental illness, depression, bipolar, anxiety, ADHD, attention deficit, psychiatric condition, and suicide. We also examined the reference lists of these papers and published reviews of the literature to identify other relevant studies. We limited our search to studies published within the past 25 years (from 1983 to 2008). Studies were included in our review if they compared mental health conditions among gifted and nongifted populations and focused on child and adolescent mental health outcomes; we did not evaluate studies that observed mental health outcomes in adulthood.

Based on the findings of the literature review, we conducted meta-analyses for depression and anxiety. A formal meta-analysis was not conducted for bipolar disorder, suicide ideation, or ADHD because of the small sample size of studies that met inclusion criteria.

Given the range of outcomes used in the studies, meta-analyses were conducted by computing standardized mean differences, or effect sizes for each study (Cohen, 1988). For one study (Benony, Van Der Elst, Chahraoui, Benony, & Marnier, 2007), only the translated abstract was available and the effect size (ES) was inferred from the sample size and the p value assuming an unpaired two-sided t test. We conducted sensitivity analyses to determine the robustness of our conclusions by omitting one study at a time and examining the effect on the conclusions. The possibility of publication bias was assessed by evaluating a funnel plot of ESs for asymmetry, which results from the nonpublication of small, negative trials. Because graphical evaluation can be subjective, we also conducted an adjusted rank correlation test (Begg & Mazumdar, 1994) and a regression asymmetry test (Egger, Davey Smith, Schneider, & Minder, 1997). We conducted all analyses using Stata10 with $p < .05$ considered significant.

In a few instances, studies used multiple scales, only one of which can be used in a meta-analysis. We chose as follows: Children’s Depression Scale (Bartell & Reynolds, 1986), Revised Children’s Manifest Scale (Reynolds & Bradley, 1983), parent-reported scale (Richards, Encel, & Shute, 2003), and the total results rather than by results by gender (Forsyth, 1987).

Results

Overall, we identified nine studies that met the criteria described above. Descriptions of the studies are listed in Table 1 along with information about the study sample, outcomes assessed, outcome measures, and the definition of giftedness.

Defining Giftedness

As mentioned above, one challenge with studying gifted children is that there is no single, agreed on definition. As such, none of the studies we reviewed defined *giftedness* in the same manner. Five studies based the definition on enrollment in school gifted programs, although criteria for entrance into these programs were largely unspecified (Bartell & Reynolds, 1986; Metha & McWhirter, 1997; Reynolds & Bradley, 1983; Scholwinski & Reynolds, 1985; Tong & Yewchuk, 1996). Three studies based the definition on standardized tests (Baker, 1995; Benony et al., 2007; Richards et al., 2003), although these three studies used seven different standardized tests: SAT (Baker, 1995); other standardized achievement tests (not specified (Baker, 1995); Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Benony et al., 2007); Wechsler Intelligence Scale for Children (WISC; Benony et al., 2007); Jenkins Non-Verbal Group Test (Richards et al., 2003); Intermediate G group assessment (Richards, 2003); and the ACER MLMQ test of language and mathematics (Richards et al., 2003). Finally, two studies based the definition of giftedness on “established

Table 1. Study Overviews, Sample Descriptions, Mental Health Outcomes, and Definitions of Giftedness

Citation	Sample Description	Outcomes Assessed	Outcome Measures	Definition of Gifted
Baker (1995)	146 students from Midwestern communities; 32 (22%) "exceptionally gifted" 9th grade students; 58 (40%) "gifted" students, Grades 9 to 11 and 7 to 10, from suburban high schools; 56 (38%) "academically average" students Grades 9 to 11 from the public high schools	Depression, suicide ideation	Reynolds Adolescent Depression Scale Suicidal Ideation Questionnaire (SIQ). SIQJr was used for junior high school students	Exceptionally gifted: Scored more than 900 on the Scholastic Aptitude Test (SAT) taken at age 13 as part of the Northwest Talent Search Program Gifted: top 5% of class rankings ($n = 46$) or above 95th percentile on standardized achievement tests ($n = 12$)
Bartell and Reynolds (1986)	145 gifted and nongifted fourth and fifth grade children; 110 (76%) were gifted	Depression	Child Depression Scale (CDS); Children's Depression Inventory (CDI); Teacher Depression Rating	Enrolled in the Lighthouse Project School, a federally funded project to develop academic programming for gifted children
Benony et al. (2007)	46 gifted and nongifted students in Dijon, France matched on age and parents' socioeconomic level; 23 (46%) were gifted	Depression	Child Behavior Check List (CBCL)	WPPSI or WISC III ≥ 130
Bracken and Brown (2006)	90 gifted and nongifted students matched on grade, race, gender. Half were male, 88% White, 22% were aged 5 to 9, 29% were aged 10 to 13, 49% were aged 14 to 18; 45 (50%) were gifted	Depression, anxiety	Clinical Assessment of Behavior	Based on state and district guidelines and criteria (not specified)
Forsyth, P. (1987)	134 gifted children, French immersion, and regular classroom children; 42 (31%) were gifted	Anxiety	State-Trait Anxiety Inventory for Children (STAIC) A-Trait Scale	Established criteria of intelligence and creativity (not specified)
Metha and McWhirter (1997)	72 gifted and nongifted 7th and 8th grade students from an inner-city elementary school district in a large southwestern city; 34 (47%) were gifted	Depression, suicide ideation	Beck Depression Inventory; Sum of two questions selected from Adolescent Life Change Event Scale (ALCES) and one from Beck Depression Inventory (BDI). Range 0-5, higher is more suicide ideation	Gifted students were enrolled in a district-wide gifted program. They had demonstrated achievement, potential, or both in academic aptitude, creativity, leadership availability, visual or performing arts ability, psychomotor ability, or general intellectual ability
Reynolds and Bradley (1983)	794 gifted and nongifted children in Grades 2 through 12; 465 (59%) were gifted	Anxiety	Revised Children's Manifest Anxiety Scale (RCMAS) and State-Trait Anxiety Inventory for Children (STAIC) A-Trait-Scale	Participated in special education programs for gifted children. (Criteria for admission to programs varied, but all required a Binet or Wechsler IQ > 129)
Richards et al. (2003)	58 students enrolled at a private school in Adelaide, South Australia, in Grades 7 to 10. Mean age = 14.5 years; 33 (57%) were gifted	Depression, anxiety	Emotional Symptoms Index, Depression Scale; Behavioral Assessment System for Children (BASC), parent and teacher ratings	IQ ≥ 127 on one of three tests of general reasoning ability: Jenkins Nonverbal Group test, Intermediate G group assessment, or ACER MLMQ Test of language and mathematics

(continued)

Table 1. (continued)

Citation	Sample Description	Outcomes Assessed	Outcome Measures	Definition of Gifted
Tong and Yewchuk (1996)	78 academically gifted and nongifted students in Canada, Grades 10 to 12; 39 (50%) were gifted	Anxiety	Piers–Harris Children’s Self-Concept Scale, Anxiety Subscale	Enrollment in the academic challenge program. Eligibility is based on academic achievement, recommendation by teachers and school counselors, IQ tests, and previous identification as gifted during elementary and/or junior high school

Note: WPPSI = Wechsler Preschool and Primary Scale of Intelligence; WISC = Wechsler Intelligence Scale for Children.

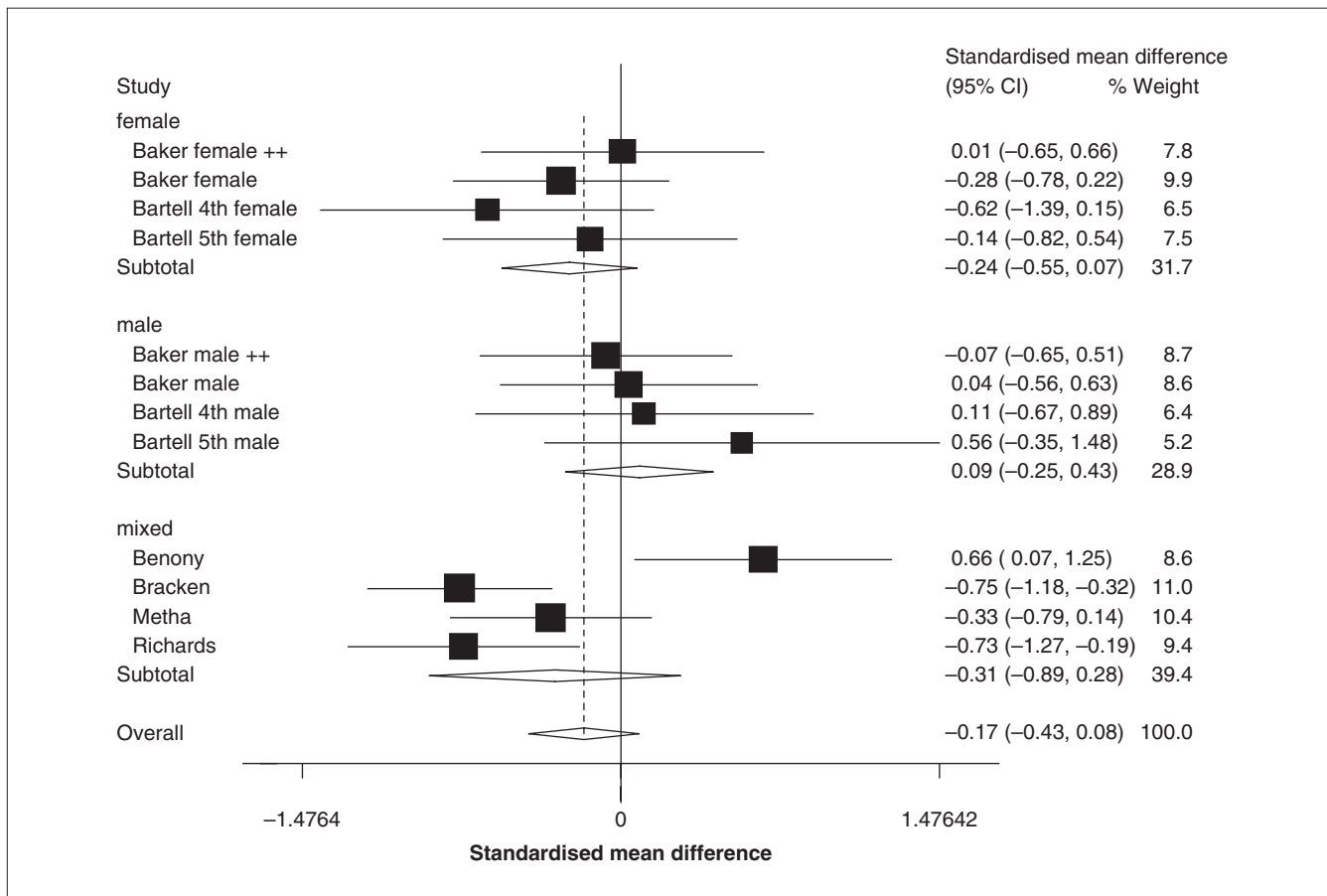


Figure 1. Forest plot for depression studies based on the random effect model^a
 a. Negative standardized mean difference indicates lower depression among gifted youth

criteria of intelligence and creativity” (Forsyth, 1987) and “state and district guidelines” (Bracken & Brown, 2006), but did not specify what those criteria or guidelines were.

The Mental Health of Gifted and Nongifted Youth

Below we summarize the findings from the literature review and meta-analyses. Overall, studies suggest that gifted youth have either the same or lower risk of depression, anxiety, and

suicide ideation. No studies were identified, however, that compared rates of bipolar disorder or ADHD among gifted and nongifted youth.

Depression. Six studies examined depression or depressive symptoms as an outcome; none used the same measure to assess depression.

We used a random effects model for the meta-analysis because of the heterogeneity of the studies ($\chi^2 = 3.96$, $df = 11$, $p = .013$). The resulting forest plot is shown in Figure 1. Each study is represented in a different row with its estimate and

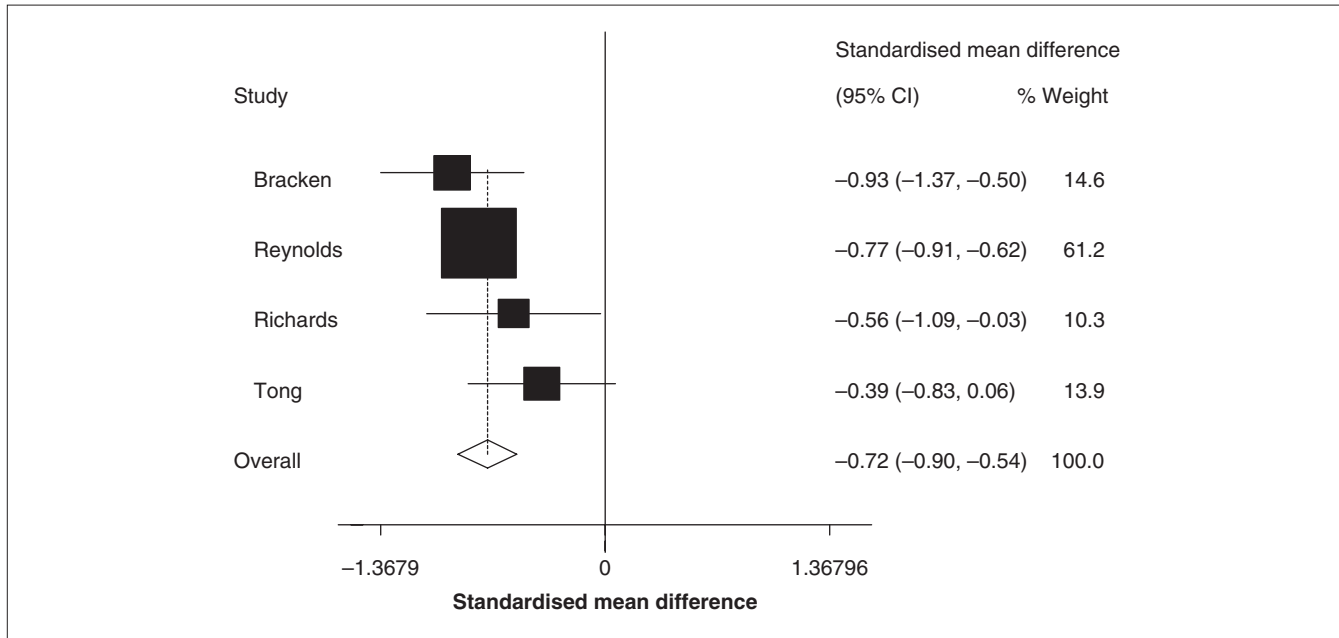


Figure 2. Forest plot for anxiety studies based on the random effect model^a
 a. Negative standardized mean difference indicates lower anxiety among gifted youth

confidence interval. Confidence intervals intersecting with the vertical line in the middle (at zero) indicate that depressive symptomatology does not significantly differ between gifted and nongifted youth. The overall ES of all studies combined is -0.17 and is not significant, suggesting that there is no difference between gifted and nongifted youth with respect to depressive symptomatology. The effect size of studies including girls only ($ES = -0.24$) is smaller than that of studies with boys only ($ES = 0.09$), but the difference is not significant. We found no evidence of a publication bias as neither Egger's test ($p = .104$) nor Begg's test ($p = .533$, continuity corrected) for publication bias were significant.

Bipolar disorder. No studies were identified that compared rates of bipolar disorder among gifted and nongifted youth.

Anxiety. Nine comparisons were made within five studies examining anxiety among gifted and nongifted youth. However, only four studies had sufficient information for inclusion in the meta-analysis as Forsyth (Forsyth, 1987) did not report standard deviations. Although there was no evidence of heterogeneity among the anxiety studies ($\chi^2 = 3.73$, $df = 3$, $p = .292$), we used a random effects model here as well given the limited power due to the small number of comparisons. Overall, we found that gifted children had significantly lower levels of anxiety compared with their nongifted peers ($ES = -0.72$; see Figure 2). The result is dominated by a single study with large sample size (Reynolds, 1983) although the effect size of the other three studies was roughly comparable. We did not assess publication bias because of the small number of studies. Although the Forsyth study was not included in the meta-analyses, its findings are consistent with

our results. There was no difference in the level of anxiety between gifted and nongifted youth overall or for males specifically. Gifted females, however, had slightly higher anxiety than nongifted females (Forsyth, 1987).

Suicidal ideation. Two studies examined suicidal ideation among gifted and nongifted youth (Baker, 1995; Metha & McWhirter, 1997). Baker (Baker, 1995) compared suicide ideation among exceptionally gifted, gifted, and nongifted youth; none of the comparisons were significant. Metha and McWhirter (1997) examined suicide ideation among gifted and nongifted youth and found no significant difference between the two groups.

ADHD. While we found no studies that directly compared rates of ADHD among gifted and nongifted youth, Chae, Kim, and Noh (2003) examined differences between the gifted and nongifted on aspects of the Tests of Variables of Attention (TOVA). The TOVA assesses sustained attention and an ADHD score can be computed using TOVA measures. Gifted children performed better than nongifted children in attending to a target stimuli, avoiding errors, showing consistent response patterns, and discriminating target from nontarget stimuli. However, the authors did not present information related to the summary measure of ADHD for the nongifted sample.

Discussion

This review summarized the literature on the mental health of gifted youth over the past 25 years. Somewhat striking is that only nine studies were identified that examined both gifted and nongifted youth within the same study. Regardless

of the limited number of studies, results from our meta-analyses suggest that gifted youth exhibit significantly lower levels of anxiety compared with their nongifted peers ($ES = -0.72$), and do not differ from their nongifted peers with respect to depression or suicide ideation. No studies have been published comparing rates of bipolar disorder or ADHD among gifted and nongifted youth.

Given that we had to infer the ES for the study by Benony et al. (2007), we conducted a sensitivity analysis that revealed that removing this study from the meta-analysis leads to a different conclusion: Gifted children have lower rates of depressive symptomatology compared with their nongifted peers. However, the ES in Benony et al.'s study was not much larger than the second largest ES and was not considered an outlier.

One concern with the current studies is that the majority had very small sample sizes; only two had total sample size over 150 (Reynolds & Bradley, 1983; Scholwinski & Reynolds, 1985). These studies, both conducted by Reynolds and colleagues, were conducted in the mid-1980s. As such, there are no recent, large-scale comparison studies on anxiety among gifted youth, and none for depression, bipolar disorder, suicide ideation, or ADHD. Small studies have the potential to be underpowered, masking any meaningful differences. An examination of Figure 1 shows a fairly consistent pattern of lower depression among gifted youth, yet few of the studies were statistically significant. The implications of this are that the field as a whole has little evidence that gifted children are at lower risk for depression.

Future studies addressing the mental health of gifted youth would benefit from examining large, population-based cohorts or groups of individuals. Ideally, studies designed to examine whether gifted youth are at higher or lower risk for mental or emotional problems compared with their nongifted peers would include a sample of gifted *and* nongifted youth who are assessed at the same time, with the same mental health measures, using the same methods, by the same study team. In addition, more diverse and representative samples would allow researchers to account for the effects of gender, age, and parental psychopathology, which may be related to both giftedness and mental health outcomes.

An additional rationale for population-based studies is that the current literature focuses largely on gifted youth who have been identified and who are receiving specialized services (e.g., in gifted classrooms). One might hypothesize, however, that the prevalence of mental health problems would be higher among gifted children who have not been identified or who are not well-served, as the presence of a mental health disorders may mask their identification.

Another significant challenge for future research is how to resolve the numerous definitions of *giftedness*. Although from a research perspective it would be ideal to have a single definition of giftedness, Cramond (2004) and others have argued that the field should not have to agree on a single

definition of giftedness in order to study outcomes of gifted children. Lessons can be learned, however, from the field of public health that faces similar challenges with the construct of socioeconomic status, as it can also be operationalized in numerous ways (e.g., income, education, occupation). Public health researchers have cautioned that study findings may differ significantly depending on how socioeconomic status was measured and emphasize a need to be more explicit about which aspect of socioeconomic status is being studied or accounted for in analyses so that meaningful conclusions may be drawn (Braveman et al., 2005; Davey Smith et al., 1998). Regardless of whether there ever will be (or should be) a universally accepted definition of giftedness, there is a need for future literature to move away from the general term *gifted* and move toward describing the population according to their specific aptitudes, talents, skills, or abilities. As such, the field can start to identify the relationship between types or aspects of giftedness, alone or in combination, which are most strongly associated with mental and emotional problems.

Utilization of more sophisticated statistical methodologies is also necessary to further understand the association between giftedness and health and differences in study findings. Although the *t* tests and other tests of bivariate relationships used in these studies aid in our general understanding of the differences in mental health between gifted and nongifted children and adolescents, multivariate models are better able to account for potential individual-, family-, and community-level factors that may be related to both giftedness and mental health. Accounting for these will help to isolate the effect of giftedness on mental and emotional health outcomes.

A final recommendation for the field is to identify subgroups of gifted children who are at highest risk for mental health disorders. Whether these subgroups will be based on age, gender, specific types of giftedness, or include special populations such as gifted children with learning disabilities remains to be seen. However, thinking more specifically about these relationships will not only move the field forward in our understanding of the association between giftedness and mental health but will also increase the potential to shape programs and policies for gifted youth, and allow schools and programs to focus resources on the most vulnerable.

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