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# Measurement of Symptom Severity and Impairment

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Lawrence J. Lewandowski, Benjamin J. Lovett,  
and Michael Gordon

Maria, a fifth grader with a measured IQ in the gifted range (135), has reading skills that are only slightly above average (a standard score of 108). There is a significant discrepancy between her ability and her level of achievement. Does this mean that Brenda has a learning disability in the area of reading? Is a score of 108 a deficit in relation to most people? The reading score may be a relative weakness, but does Maria need special education services and test accommodations?

Alex, a law school graduate who cannot seem to pass the Bar Exam, has concerns about his attention and concentration abilities, reports this to his doctor, and receives a diagnosis of ADHD. He had no previous history of a disorder and performed well in high school and college. Is a diagnosis made in young adulthood and based on self-reported symptoms enough evidence to formulate such a diagnosis? Is a law school graduate likely to be impaired relative to most people, and should his recent diagnosis qualify him for testing accommodations the next time that he takes the Bar Exam?

Maria and Alex's cases raise many of the questions inherent in the definition of impairment and the relationship of symptoms to impairment. In this chapter, we will examine the relationship between measures of symptoms and impairment. In

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L.J. Lewandowski, Ph.D. (✉)  
Department of Psychology, Syracuse University, 430 Huntington Hall, Syracuse,  
NY 13244, USA  
e-mail: [ljlewand@syr.edu](mailto:ljlewand@syr.edu)

B.J. Lovett, Ph.D.  
Department of Psychology, SUNY Cortland, P.O. Box 2000, Cortland, NY 13045, USA  
e-mail: [Benjamin.Lovett@cortland.edu](mailto:Benjamin.Lovett@cortland.edu)

M. Gordon, Ph.D.  
Department of Psychiatry, SUNY Upstate, Syracuse, NY, USA  
e-mail: [Gordonm301@gmail.com](mailto:Gordonm301@gmail.com)

particular, we will review this relationship with regard to ADHD. We offer three reasons for focusing on this disorder. First, much recent research has examined symptom–impairment relationships here, so the empirical base is larger than it is elsewhere. Second, ADHD is a disorder for which impairment is especially important, due to the high frequency of symptoms in both people with and without the disorder (e.g., Lewandowski, Lovett, Gordon, & Coddling, 2008). Finally, ADHD rarely occurs by itself (Barkley, 2006), and this high comorbidity leads the ADHD researcher to naturally examine groups of participants with many different psychiatric problems. Before turning to research on ADHD, however, we briefly review research in psychopathology more generally and discuss some of the general issues in the measurement of impairment.

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## 11.1 Impairment as a Diagnostic Criterion

Since the publication of the DSM-III in 1980, clinicians and researchers have been made aware of the importance of impairment in addition to the number and severity of symptoms in considering a patient’s psychiatric diagnosis. Since 1980, the DSM has been revised several times, but its focus on impairment has remained essentially the same. Specifically, impairment has remained a part of the diagnostic criteria for most mental disorders. The most recent revision (DSM-5; APA, 2013) includes a “clinical significance criterion” of impairment in a majority of the disorder definitions. DSM-5 recognizes that symptom presentation itself is not equivalent to pathology and may be present in individuals who do not have a mental disorder. “Therefore, a generic diagnostic criterion requiring distress or disability has been used to establish disorder thresholds, usually worded ‘the disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning’” (p. 21).

Despite this inclusion of an impairment criterion, whether clinicians adhere to it in practice is uncertain. Although little research has examined this, it appears that most clinicians rely primarily on the DSM descriptions of the *symptoms* of the various disorders, which are discussed in more detail than impairment (Gordon, Lewandowski, Murphy, & Dempsey, 2002). Even clinical scientists and other scholars sometimes overlook this important aspect of the DSM. Indeed, many critiques of DSM-based diagnostic systems (e.g., Eriksen & Kress, 2005; Kutchins & Kirk, 1997) accuse them of focusing exclusively on symptoms and neglecting the individual’s life context. Unfortunately, the DSM-5 may lead to even more neglect of impairment, since the multiaxial system of DSM-IV has been removed, and with it the Global Assessment of Functioning (the GAF; Axis V)—the 100-point scale that integrated an assessment of symptom severity with an assessment of impairment (Smith et al., 2011).

Barkley et al. (2006) have distinguished between symptoms and impairment by defining the former as “the behavioral expressions associated with the disorder” and the latter as “the consequences that ensue for the individual as a result of these

behaviors” (p. 2). If we take these definitions as being useful, we can think about the relationship between symptoms and impairment by asking whether individuals who have more behavioral manifestations of some type of psychopathology typically have more negative life consequences. If symptom severity and impairment are identical or correlate almost perfectly, assessing one is tantamount to assessing both, but if the relationship is contingent and far from perfect, each must be assessed separately. Also, it may be the case that treatment interventions need to be informed differentially by both symptoms and negative life consequences. Treating impulsivity and treating drunken driving may call for quite different interventions.

In the child psychiatric literature, there is now a fair amount of research examining the symptom–impairment relationship, and this research generally supports the need for examining impairment as distinct from symptoms. In one study, Angold, Costello, Farmer, Burns, and Erkanli (1999) examined 1015 children aged 9–13, comparing children who exhibited enough psychiatric symptoms to meet DSM-III-R criteria for at least one disorder to those who exhibited subclinical levels of symptoms. These investigators found that the lives of children who did not meet DSM symptom criteria were just as disrupted as the lives of children who met symptom criteria, and that a substantial number of children did meet DSM-III-R criteria for a diagnosis but were not impaired.

A study by Bird et al. (1996) also suggested that both symptoms and functional impairment need to be considered separately when making diagnostic decisions. Their study compared two global measures of impairment, the Children’s Global Assessment Scale (CGAS; Shaffer et al., 1983) and the Columbia Impairment Scale (CIS; Bird et al., 1993). In the process of comparing these measures, the investigators found that each correlated only moderately with symptom counts, again indicating that symptoms and severity are related but distinct constructs.

Other researchers have examined the symptoms–impairment relationship by determining incidence estimates for a disorder based on symptoms and then investigating whether those estimates shrink significantly when an impairment criterion is added. In one study utilizing this analytic technique, Bird et al. (1988) found that 49.5% of children in a community sample met DSM criteria for at least one disorder when symptoms alone were required for a diagnosis, but when an additional criterion of moderate impairment was applied, the prevalence went down to 17%. Shaffer et al. (1996) found similar results in that 4.5% of their large sample met ADHD criteria based on reports of symptoms, but only 2.8% did when parent reports of impairment were considered in the diagnostic decision.

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## 11.2 Measurement of Impairment

Before examining research on ADHD as an illustrative example of complex symptom–impairment relationships, we take a brief detour to consider the measures of impairment that are frequently used in this literature. Unlike the

DSM-based checklists used in the assessment of symptoms, there is no type of impairment measure that has become the standard. Instead, a wide variety of measures have been used to assess clinical impairment, including clinician ratings, parent and teacher reports, as well as counts of negative life events (e.g., number of arrests). Our overview of various impairment measures is not meant to be exhaustive, and we refer the reader to more comprehensive reviews of these instruments (Canino, Costello, & Angold, 1999; Costello, Angold, & Keeler, 1999; Winters, Collett, & Myers, 2005). Table 11.1 presents the major features of 11 different impairment instruments, showing both the availability and diversity of impairment measures.

Measures of impairment are typically divided into *unidimensional* (or *global*) scales, which yield a single score interpreted as the individual's overall level of impairment, and *multidimensional* (or *domain-specific*) measures, which yield several scores, each pertaining to a different domain of functioning. In general, unidimensional scales are more helpful for research purposes than in clinical practice, where scores that average across different areas (e.g., academic functioning and social functioning) can mask impairments that should serve as the focus of behavioral interventions (cf. Pelham & Fabiano, 2001). Moreover, Winters et al. (2005) noted that unidimensional scales are more likely than multidimensional scales to confound symptoms and impairment, since symptoms of psychopathology are more likely to overlap conceptually with a total impairment score than with any individual area of functioning.

One commonly used unidimensional measure is the Children's Global Assessment Scale (CGAS; Bird, 1999). Assessing a child using the CGAS requires first gathering a wide variety of data on the child, and then using this information to assign the child a score between 1 and 100, where higher scores indicate higher levels of functioning (and thus, lower levels of impairment). Paragraph-long descriptions are given for each range of 10 points (e.g., 31–40), and a degree of clinical judgment is used to assign the final score within each 10-point range. Despite this apparently somewhat subjective procedure, the CGAS exhibits good psychometric characteristics (Canino et al., 1999; Winters et al., 2005). Its interrater reliability is .84, and its test-retest reliability over a 19-day interval is .83. Moreover, validation studies have found substantial correlations between CGAS scores and DSM-IV Axis V (Global Assessment of Functioning) scores.

A relatively new unidimensional measure of impairment is the Barkley Functional Impairment Scale (BFIS). This scale of 15 items (domains of impairment) is implicitly targeted toward individuals with ADHD, but it may be used for anyone experiencing psychosocial impairment. The BFIS is a self- and other-report instrument that takes a few minutes to complete. Respondents rate the extent of difficulty (0 = not at all, to 9 = severe) that they or someone they know is having in various life activities (e.g., at work, in relationships, etc.). Normative score tables are available for three age groups (18–39, 40–59, and 60–89). There also is a quick screen version available that covers six domains (items). While one could treat each domain/item as a separate entity, at least for purposes of examining areas of change during treatment, such one-item clinical interpretations must be made cautiously because

**Table 11.1** Selected standardized measures of clinical impairment

Instrument and source	Dimensionality	Procedure	Standardization
Adaptive Behavior Assessment System-Second Edition (Harrison & Oakland, 2003)	Multidimensional	Comprehensive rating scale indicating whether or not the individual is able to do certain behaviors and how frequently they are performed	Well standardized on nationally representative sample; for school-age children, the normative sample was over 1600
ADHD-FX (Haack, Gerdes, Lawton, & Schneider, 2014)	Unidimensional	Parent rates child's functional impairment on 32 items across home, school, and peer domains	Culturally sensitive instrument available in English & Spanish. Not standardized yet. Offers a global impairment score
Brief Impairment Scale (Bird et al., 2005)	Multidimensional	Brief (23-item) rating scale yielding scores for three areas of functioning: interpersonal relations, school/work, and self-fulfillment	Several samples have been used, but none are meant to be nationally representative. Various cut scores are proposed based on the sample norms, but at the present time, criterion-referenced score interpretation is superior
Child Behavior Checklist Social Competence Scale (Achenbach 1991a, 1991b)	Multidimensional	Parent rates children's competence in the areas of school, sports/hobbies, and social relationships as above average, average, or below average	Excellent standardization on large nationally representative samples of clinically referred and nonreferred children
Children's Global Assessment Scale (Bird, 1999)	Unidimensional	Clinician uses other assessment data and back general information to make a judgment concerning overall functioning, assigning the child a score between 1 and 100	No normative sample used in development, but cut scores are available based off of large-sample trials of the scale
Barkley Functional Impairment Scale (Barkley, 2011)	Unidimensional	Self- and other-report measure for adults that assesses 15 domains (long form) of potential impairment (i.e., home life, work, education, relationships, driving, self-care). Also has short form (six domains)	Standardized on a sample of 1249 adults. Norms provided for age groups (18–39, 40–59, 60–89), and total

(continued)

**Table 11.1** (continued)

Instrument and source	Dimensionality	Procedure	Standardization
Home Situations Questionnaire (Barkley, 1997)	Unidimensional	Parent notes whether rule-breaking and oppositionality occurs in any of 16 settings and the degree to which each setting is a problem situation for the child. The number of problem situations and mean severity are calculated	Limited norms are available, but a criterion-referenced interpretation of scores is preferred
Impairment Rating Scale (Fabiano et al., 2006)	Multidimensional	For each of six (school) or seven (home) domains, teacher or parent places a mark along a line representing a continuum of impairment; an average score across domains can also be calculated	Normative data have not been reported, so criterion-referenced interpretation is required
School Situations Questionnaire (Barkley, 1997)	Unidimensional	Teacher notes whether child presents problems in any of 12 school settings and the degree to which each is a problem situation for the child. The number of problem situations and mean severity are calculated	Limited norms are available, but a criterion-referenced interpretation of scores is preferred
Social Adjustment Inventory for Children and Adolescents (John et al., 1987)	Multidimensional	77-item scale administered in semi-structured interview format by trained clinician; covers four areas: school functioning, spare-time activities, peer functioning, & family functioning	Normative data have not been reported, so criterion-referenced interpretation is required
WHODAS 2.0 (World Health Organization, 2012)	Multidimensional	Long (36 items) and short (12 items) scales completed by structured interview or self-report for ages 18 & up; provides six domain scores and a summary score; offered in multiple languages	Standardized on samples across 19 countries; good psychometric properties; percentile scores provided on degree of disability

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these items are not reliable or sensitive enough to make clear distinctions. The Mean Impairment score and Percent Domains Impaired score provide global indices of impairment, and both show acceptable levels of reliability and validity.

There are at least as many multidimensional as unidimensional scales that measure impairment in some fashion; one representative measure is the Social Adjustment Inventory for Children and Adolescents (SAICA; John, Gammon, Prusoff, & Warner, 1987). The SAICA is a semi-structured interview administered by a clinician to either a parent or directly to the child. The 77 questions load on several subscales, including spare-time activities, peer problems, and sibling relationships. The internal consistency of the scale's total score is low, but given the heterogenous content, this is to be expected. The interrater agreement is considerably higher, and validation studies have included findings of a significant difference between children with and without ADHD. However, the clinical utility of the SAICA is limited by the lack of a normative sample (Winters et al., 2005); although scores can be used to track progress during an intervention, they are difficult to interpret when used in diagnosis.

Other multidimensional measures derive from Achenbach's (e.g., 2000) empirical assessment system, and the two most prominent impairment measures found in the system are the Child Behavior Checklist (CBCL) Competency scales (Achenbach, 1991a) and the corresponding Teacher Report Form (TRF) Adaptive Functioning scales (Achenbach, 1991b). Pelham, Fabiano, and Massetti (2005) concluded that measures as simple and as inexpensive as the Child Behavior Checklist and the Teacher Report Form are sufficiently correlated with more comprehensive measures such as achievement that have been used to measure impairment. Empirically derived scales such as the CBCL and TRF assess the symptoms of several childhood disorders (e.g. anxiety, depression, oppositional defiant, ADHD) in addition to impairment, making them more efficient than DSM-IV-based scales that only measure symptoms of a single disorder (Pelham et al.).

Another multidimensional measure that is worth describing in some detail is the Impairment Rating Scale (IRS; Fabiano et al., 2006). The IRS is unlike any of the other impairment measures reviewed here; for each of several domains, the respondent (a parent or teacher) places an "X" along a line that symbolizes a continuum of impairment severity, ranging from "no problem/definitely does not need treatment or special services" to "extreme problem/definitely needs treatment or special services." The parent version has different domains (e.g., relationship with siblings) than the teacher version (e.g., influence on classroom functioning). Although further research must be done, initial results are promising. Fabiano and colleagues reported good psychometric characteristics, including differentiation of children with and without ADHD.

One of the most widely accepted and utilized multidimensional measures of impairment is the World Health Organization Disability Assessment Schedule (WHODAS 2.0, 2012). This is the latest revision of earlier measures developed by the World Health Organization. The WHODAS 2.0 is intended to assess health and disability across a wide range of diseases and disorders in adults. It is linked conceptually to the International Classification of Functioning, Disability, and Health

diagnostic system also developed by WHO. WHODAS 2.0 also has been incorporated into the DSM-5 manual (American Psychiatric Association, 2013, pp. 745–748). Although there are various versions of WHODAS 2.0 (long and short; self-report and structured interview) in many languages, the DSM-5 lists the most common version, the 36-item, self-report form. This version assesses seven areas of functioning (e.g., difficulty with self-care, or getting along with people, etc.) with multiple items (rated on a scale from 1=none, to 5=extreme or cannot do). The scale yields separate domain scores as well as a General Disability (impairment) Score. Normative data are available and the average domain and general scores are used to determine a person's degree of disability in a domain and overall. This instrument also allows a clinician to correct a patient's self-reported score if other information suggests a change; scores that are consistently elevated in a domain or, in general, typically indicate significant clinical impairment.

Standardized measures of impairment have psychometric characteristics comparable to those of symptom rating scales. Moreover, like symptom rating scales, there are many different kinds of impairment measures, each with its own advantages and disadvantages. Diagnosticians working with specific clinical issues (e.g., comorbidities, certain demographic groups, treatment planning) can search the available pool of measures for one that meets their needs. Similarly, researchers examining symptom–impairment relationships can select a measure of impairment that seems most relevant to the symptoms that they are interested in measuring. In the research reviewed below, a variety of impairment measures were utilized within ADHD populations.

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### 11.3 Relationship of Symptoms and Impairment in ADHD

The inclusion of an impairment criterion in diagnosis is particularly important in the assessment of ADHD as compared to many other mental disorders. High functioning people who live apparently unimpaired lives may experience many of the symptoms of ADHD. As such, the relationship between symptoms and impairment merits special attention in the case of ADHD.

Gordon et al. (2006) conducted the most comprehensive analysis of the relationship between symptoms and impairment by reanalyzing data from four large-scale studies. The first study reviewed by Gordon and colleagues, the Massachusetts General Hospital (MGH) Longitudinal Families Study (Biederman et al., 1992, 1999), included 280 children with ADHD diagnoses (based on DSM-III-R criteria) and 240 non-ADHD controls; half of the participants in each group were girls, and all of the children were between 6 and 17 years of age. Children with ADHD were recruited from referrals to a pediatric psychopharmacology clinic at the MGH and from a local HMO, whereas control participants were selected from outpatients at pediatric medical clinics. The MGH Longitudinal Families Study used many different measurement instruments. However, in the Gordon and colleagues' reanalysis, data from the Attention subscale of the Child Behavior Checklist (CBCL; Achenbach & McConaughy, 1987) and the Schedule for Affective Disorders and Schizophrenia



Epidemiologic version for School-Age Children (K-SADS-E; Orvaschel & Puig-Antich, 1987) were selected as the symptom measurements, whereas the Social Adjustment Inventory for Children and Adolescents (SAICA; John et al., 1987) and the Competence subscales of the CBCL (Activities, Social, and School) were considered as the measures of impairment.

In this MGH dataset, the correlations between symptoms and impairment never exceeded  $r = .43$ , and therefore, symptom levels accounted for no more than 19% of the variance in impairment levels. Additionally, based on impairment criteria established for the SAICA (having a score below 5th percentile of control group), Gordon et al. (2006) concluded that only 23% of the ADHD sample was both symptomatic and impaired. Alternatively stated, more than three quarters of the children identified as having ADHD through the use of symptom counts would not have been diagnosed if the impairment criterion had been considered. It is noteworthy that these figures were derived using only a single measure of symptoms and a single measure of impairment; since, in clinical practice, multiple pieces of information from multiple informants are used, an even smaller proportion of the sample would likely to have been rated both symptomatic and impaired by *all* informants.

In another study reanalyzed by Gordon et al. (2006), the Vermont Family Genetics Study (Hudziak, Copeland, Stanger, & Wadsworth, 2004), very similar results were found regarding the relationship between symptoms and impairment. This study included 187 children with ADHD and 183 randomly selected siblings of the ADHD participants, all between 6 and 18 years of age. Families were recruited from local pediatricians and psychiatrists and through newspaper advertisements and posters placed throughout the county. In this study, the symptom measures consisted of the Predominantly Inattentive and Hyperactive-Impulsive Subscales of the Vermont Structured Diagnostic Interview (Hudziak et al., 2004), and the impairment measures again included the Competency Scales of the CBCL. The correlations between symptoms and impairment were higher than those in the MGH study, but still none of the correlations accounted for more than 25% of the variance.

A third analysis described in Gordon et al. (2006) was conducted using patients from an outpatient mental health care center in Ontario, Canada, where the Brief Child and Family Phone Interview (BCFPI; Cunningham, Pettingill, & Boyle, 2004) was administered as part of a standard intake procedure for approximately 1900 consecutive referrals. Administration of this 30 min structured phone interview to parents and teachers of children aged 3–18 yielded information on both symptoms and impairment. The subscale of symptoms that was most closely related to ADHD was called “Regulating Attention, Impulsivity and Activity Level” and was composed of six items. Seven different subscales tapped impairment, and these included “Child’s Social Participation,” “Quality of the Child’s Social Relationships,” “School Participation and Achievement,” and “Global Child/Youth Functioning.” Similar to the results found in the previous two datasets, each of the correlations between the ADHD-related symptoms and the impairment subscales was below about 0.40. The impairment measures correlating the highest with the symptom measure were “Quality of the Child’s Social Relationships” and “Global Family Situation,” (each with a correlation of  $r = 0.39$ ), and the “Global Family Situation”

was not even a direct measure of the *child's* level of impairment. Admittedly, had the impairment measures been combined, the relationship with symptoms might have been stronger, but since impairment in more than one area is required for a proper ADHD diagnosis, aggregating the subscale scores would have resulted in a measure with less diagnostic utility.

The fourth and final reanalysis conducted in Gordon et al. (2006) was the only analysis on adults with ADHD, and it used data from the Milwaukee Longitudinal Study (Barkley, Fischer, Smallish, & Fletcher, 2004). Data from this study were gathered from individuals 19–25 years of age who were originally included in the study as young children and who had been followed for at least 13 years. There were originally 158 subjects diagnosed as hyperactive as children and 81 community controls included in the study. Ninety-one percent of these were male and 9% were female. The hyperactive group had been recruited from consecutive referrals to a child psychology service specializing in the treatment of hyperactive children at Milwaukee Children's Hospital, whereas the community control children had been recruited using a 'snowball' technique (i.e., current participants help recruit new participants). Telephone interviews of both symptoms and impairment were conducted at three points in a subject's life. A DSM-IV-based structured interview to assess ADHD served as the measure of symptoms, while a structured interview of adaptive functioning served as the measure of impairment. Overall, the results extended the finding of a weak relationship between symptoms and impairment. The average correlation coefficient was only  $r = .25$ , and none of the correlations were above 0.50. Given that there was only a single measure of impairment, and that for adult participants, multiple measures of impairment across diverse life activities are even more important, the true relationship between symptoms and *clinical* levels of impairment is likely even weaker than the data reported here.

Based on these four secondary data analyses, Gordon et al. (2006) concluded that there appeared to be a weak relationship between ADHD symptoms and impairment in all four datasets reviewed. The largest correlation found between symptoms and any specific measure of impairment was  $r = .65$  (accounting for about 42% of the variance). However, the majority of the correlations were much smaller, accounting for no more than 10% of the variance. Based on these data, Gordon et al. concluded that symptoms and impairment were distinct dimensions of ADHD that should be measured separately when making diagnostic decisions. However, as has been emphasized, all four of these datasets were analyzed with only a single measure of symptoms and a single measure of impairment, and the need to take a multidimensional approach to impairment measurement was recognized by the same research team in subsequent papers.

As a follow-up to Gordon et al. (2006), a study was conducted (Barkley et al., 2006) addressing this issue of the multidimensional nature of impairment. Three ADHD datasets were examined in this study; two of these had also been included in Gordon and colleagues' earlier paper: data from the Milwaukee Longitudinal Study (Barkley et al., 2004), and data from the outpatient mental health care center in Ontario, Canada. The third dataset was from the UMASS study conducted by

Barkley (reviewed in Barkley, Fischer, & Murphy, 2008), and included 146 adults with clinical diagnoses of ADHD, 97 adults referred to the same clinic who did not have ADHD (but did have other varieties of psychopathology, mainly anxiety and mood disorders), and 109 community control adults. The participants were all between 17 and 69 years of age ( $M=35$ ), and 52% were male. Several ADHD symptom measures were used, including a clinical interview, self-report rating scales, scales completed by others who knew the participant well, employer ratings, and recall of childhood symptoms. The Various self-rated and other-rated impairment measures were also used. Examples of some of the impairment measures included: ever retained in school, difficulty keeping friends, car crashes, and low-grade point average (see Barkley, Murphy, & Fischer, 2008).

Whereas Gordon and colleagues considered each measure of impairment individually, Barkley et al. (2006) aggregated impairment across domains to create an omnibus index of impairment within each dataset. Impairment indices were determined using either dichotomously scored variables (e.g. “ever involved in a teenage pregnancy either as mother or father”), or cut-off criteria (e.g. more than seven citations on their official driving record). These investigators found that analyzing the datasets with the use of impairment indices significantly increased the correlations between symptoms and impairment. Previous correlations from the review by Gordon and colleagues had ranged between .01 and .65, but in Barkley and colleagues’ analyses, the correlations ranged between .43 and .88, with the majority  $>.70$ . That is, when impairment was aggregated across multiple measures and domains, the relationship between symptoms and impairment was found to be approximately twice as strong.

A study conducted by Fabiano et al. (2006) also investigated the relationship between ADHD symptoms and impairment. This study was designed to test the psychometric properties of the Impairment Rating Scale (IRS; see above), specifically developed to assess ADHD impairment based on both parent and teacher report. A series of four analyses were conducted using over 3200 children from preschool to fifth grade recruited from various elementary schools as well as from a medication efficacy trial. The Diagnostic Interview Schedule for Children (DISC; Shaffer et al., 1996) and the Disruptive Behavior Disorders Rating Scale (DBD; Pelham, Gnagy, Greenslade, & Milich, 1992) were used as symptom measures, and the CGAS (Shaffer et al., 1983) was used as an impairment measure, in addition to the IRS. Children were labeled as having ADHD based on parent and teacher report, although the DSM-IV impairment criterion (Criterion D) was not included in the identification of these children.

Fabiano et al. (2006) found moderate to high correlations between symptoms and impairment ( $r=.58-.93$ ) in clinical populations. However, when the same analyses were conducted with a random sample of children from various elementary schools, the correlations between symptoms and impairment were much lower ( $r=.17-.53$ ). Although the IRS was found to be a valid and reliable measure to assess impairment in a child with ADHD, this series of studies demonstrated the variability with which symptoms and impairment are related, since the extent to which these variables were related was dependent on the sample and the source of

the ratings (parent or teacher). Interestingly, the study also showed that the IRS added incremental validity beyond a diagnosis made based on symptoms alone. An  $R^2 = .31$  was found using average teacher symptom ratings alone to predict CGAS scores. This increased to  $R^2 = .38$  (a statistically significant increase) when teacher IRS ratings were added to the equation.

A study by Gathje, Lewandowski, and Gordon (2008) also examined the symptom–impairment relationship in a clinic-referred sample of 314 children (ages 5–17 years). These investigators found modest correlations (ranging from .26 to .32) between maternal reports of symptoms on an ADHD checklist and a composite impairment score (home, school, social, and recreational domains). The symptom–impairment relationship grew slightly stronger based on the cutoff score used to determine impairment (1, 1.5, 2 standard deviations above the mean). Correlations were higher between the Child Behavior Checklist (CBCL; Achenbach 1991a, 1991b), Attention scale score (maternal report), and the impairment cutoffs (.42–.47). They found that symptom count along with CBCL score, Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) score, and gender all contributed significantly to the prediction of impairment. However, these variables collectively only accounted for 30% of the variance in impairment score.

Next, Gathje et al. examined the effects of both symptom and impairment variables on diagnostic classifications of ADHD. Of the sample of 314 students referred to the ADHD clinic, 81% met a liberal criterion for diagnosis based on maternal report on a DSM-IV checklist of ADHD symptoms. When additional criteria were added (Child Behavior Checklist Attention scale score greater than 65, and impairment measure scores of at least 1.5 standard deviations above the mean) the rate dropped to 19%. When an even more stringent criterion on the impairment measure (2 standard deviations above the mean) was required, the classification rate dropped to 2%.

Clearly, then, diagnostic classifications are very different when they are based on symptoms alone versus symptoms plus impairment. The research suggests that symptoms and impairment are related yet separate factors that both need to be part of the diagnostic equation.

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## 11.4 Relationship of Symptoms and Impairment in Other Disorders

After examining the literature on ADHD, in which the correlations between symptoms and impairment were found to be far from perfect and often quite modest, it is reasonable to ask whether ADHD is a special case. Certainly, the nature of ADHD symptoms—specifically, their being so common in the general population (e.g., Lewandowski et al., 2008; Murphy & Barkley, 1996)—suggests that they may be especially poor in serving as a proxy for (or a predictor of) impairment. However, although the research base is currently small, it appears that symptoms and impairment are distinct in other forms of psychopathology as well.

Consider the case of posttraumatic stress disorder (PTSD). After undergoing a traumatic event (e.g., sexual assault, military combat, childhood physical abuse, etc.), many individuals develop a set of symptoms that includes avoidance of cues related to the event, mental re-experiencing of the event (through, e.g., dreams, flashbacks), and a persistent heightened level of arousal or vigilance (Resick & Calhoun, 2001). Intuitively, these symptoms would seem to necessarily lead to impairment, but research suggests otherwise. Breslau and Alvarado (2007) examined data from two large community-based samples ( $N$ s were 2181 and 1698), focusing on those participants who had been exposed to traumatic events (excluding military combat). These investigators found that when the clinical impairment criterion (which is present for PTSD in the DSM criteria) was applied, the conditional probability of developing PTSD was 30% lower; that is, of those who had been exposed to trauma, the proportion who would be diagnosed with PTSD was 10.8% without the application of the impairment criterion, but only 7.8% with the impairment criterion applied. Even symptoms as serious as those associated with PTSD, then, may not always bring impairment along with them, necessitating a separate assessment of impairment.

Similarly, in schizophrenia, Fulford et al. (2013) found that positive, negative, and disorganized symptoms never correlated with measures of impairment above  $r = .5$ , and often the relationships were well below that value. The case of schizophrenia is an especially interesting one, in that common pharmacologic treatments do a better job of addressing positive symptoms, but negative symptoms are more strongly (but still only moderately) related to impairment. Impairment, then, should be measured continuously throughout treatment, in large part to document whether treatment is working.

The importance of impairment in assessment can even be seen in disorders for which “symptoms” are defined more broadly. Consider the case of learning disabilities, in which individuals, typically children, have trouble in specific academic skills, such as reading, writing, and mathematics. Even though the most common method of diagnosing learning disabilities over the years has involved looking for a discrepancy between a student’s ability (typically measured by an IQ test) and his or her achievement in some academic skill area, the DSM-5 guidelines for “specific learning disorders” include what amounts to an impairment criterion, insisting that “The affected academic skills are substantially and quantifiably below those expected for the individual’s chronological age, and cause significant interference with academic or occupational performance...” (p. 67). As noted by many critics, the IQ vs. achievement discrepancy criterion does not take into account the impairment guideline. For example, students with IQ scores in the above average range ( $>130$ ), yet scoring in the average range in achievement, might have a discrepancy but not be impaired because they are performing at the typical level expected for their age and grade (Brody & Mills, 1997). These students, then, have the “symptoms” of a learning disability without the attendant impairment. Proposals to include impairment in the diagnosis of learning disorders (e.g., Dombrowski, Kamphaus, & Reynolds, 2004; Lovett & Lewandowski, 2006) have been met with criticism (e.g.,

Gregg, Coleman, Lindstrom, & Lee, 2007), as if a student's absolute level of academic functioning is unimportant when determining whether an academic problem exists.

To summarize, symptoms and impairment are related, but distinct constructs. Clearly, the intensity and frequency of symptoms are far from perfect predictors of a person's functional outcome. Research indicates that a person can be substantially impaired without manifesting high levels of symptoms, can display many symptoms and have little functional impairment, or can change over time in degree of symptomology and impairment (Sibley et al., 2012). This reality should encourage clinicians to move beyond simple symptom counts toward an evaluation that fully considers the extent of functional impairment. Clinicians should consider incorporating into their evaluations some of the impairment measures reviewed in this chapter.

The addition of impairment measures to one's diagnostic test battery is an important step. Yet the clinician must determine "how much impairment is required to rise to the level of a disorder or disability?" The legal definition of disability established for the ADA and other disability laws requires evidence of a substantial limitation in a major life activity (e.g., learning, speaking, reading, writing, concentrating, etc.). "Substantial" is typically operationalized as functioning that is significantly below that of the population average. Therefore, the legal realm establishes an "average person standard" as the basis from which a substantial limitation is determined. Clinicians have not always embraced the legal construal of disability as a key factor in assigning a diagnosis. In addition, professional diagnostic guidelines, such as the DSM-5, offer little guidance to diagnosticians regarding how to judge the extent of impairment for most disorders. The advice that the diagnostic criteria do provide is very general and inconsistent across diagnoses. Therefore, while the DSM-5 requires evidence of impairment, it is unclear with respect to degree of impairment required to warrant a diagnosis or how to measure that impairment.

We began this chapter by presenting two brief case studies about Maria and Alex. In light of our discussion, it should be apparent that Maria would not be likely to warrant a DSM-5 diagnosis of a Specific Learning Disorder, nor would she qualify for test accommodations under the ADA. While her reading test score falls below her IQ score, her reading skills are well within the average range. It seems implausible to claim that she has a disability when her lowest scores are nonetheless average. Because Maria is not substantially limited in reading relative to persons her age, she likely would not be considered to have a "disability" in the legal sense of the term.

While Alex's case may be less clear cut, his failure to pass a bar examination would not be sufficient to demonstrate impairment. Most people in the general population lack the skills to even consider sitting for such a challenging postgraduate test. That he was able to graduate from high school, college, and law school without any record of impairment or need for formal accommodations argues against the contention that he is impaired. Failing to pass a bar examination is not, by itself, even diagnostic of a disorder. (If it were considered pathognomonic, almost the entire population could fairly be deemed as disordered!) Furthermore, many

non-psychiatric factors could easily account for Alex's struggle with this exam, including test anxiety, poor preparation, or skills that, while average, were not sufficient to allow for easy success on a highly demanding task. While he may not have ADHD, he might well benefit from attention to these other issues.

Cases such as these serve to highlight the importance of considering impairment when making a diagnosis and qualifying a person for treatment services and/or accommodations. Failure to take impairment into account lays the groundwork for misdiagnosis. The evidence is clear that, while a client's symptoms tell some of the diagnostic story, they represent only part of the tale. It is critical for clinicians to also ask questions (and use scales) that explore the impact of symptoms on the person's ability to manage routine real-world tasks normally. From our perspective, every evaluation should ask the question: "Precisely how have the problems you've told me about actually kept you from functioning as well as most other people?" If this fundamental question cannot be answered clearly, clinicians should consider explanations other than those associated with a mental disorder.

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