

Evidence-Based Assessment of Attention-Deficit/Hyperactivity Disorder: Measuring Outcomes

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This column focuses on the valid, reliable, and useful measurement of treatment effects in children and adolescents with attention-deficit/hyperactivity disorder (ADHD) treated in practice settings. Recall that the composite case of Polly refers to an 11 year-old female who was evaluated and determined to have probably met diagnostic criteria for ADHD, combined type (Frazier and Youngstrom, 2006). This column considers how to evaluate her treatment.

SYMPTOMS AND IMPAIRMENT

Assessment targets are usually either symptoms of the disorder and/or related impairment. These categories are primarily differentiated by assigning those characteristics listed as diagnostic criteria in the *DSM-IV-TR* (American Psychiatric Association, 2000) to the category of symptom and those characteristics that define an area of functioning to the category of impairment. Although the distinctions between these categories of outcome measures are somewhat arbitrary and the categories frequently overlap, there are also important differences (Gordon et al., 2005). In

fact, the literature indicates that symptoms do not predict future outcomes and are usually not the basis for referral.

Impaired functioning in family, social, and academic domains does predict future outcomes and is the most important target for treatment (Pelham et al., 2005). Furthermore, there is evidence that ADHD symptoms and impairment respond differently to treatment. Reports of group differences in outcomes in the Multimodal Treatment Study of ADHD (MTA) at 14 and 24 months indicate that medication alone and a combination of medication and their psychosocial treatments produced equivalent benefits for symptoms (MTA Cooperative Group, 1999, 2004). Combined medication and psychosocial treatment resulted in advantages over medication treatment alone for measures of impairment (Conners et al., 1997; MTA Cooperative Group, 1999, 2004), suggesting that the combination may have unique benefits for impairment over gains obtainable through medication alone.

Our previous report (Frazier and Youngstrom, 2006) indicated that Polly's parents sought an evaluation to determine whether Polly had ADHD; however, once determined, the parents wanted to improve her functioning at home, in school, and with friends. Therefore, the measurement of treatment outcomes for Polly focuses on specific indices of functioning in these domains.

SOURCES OF ASSESSMENT DATA

The recommended practice for assessing children's impairment includes gathering information from the child's parents and classroom teachers (American Academy of Child and Adolescent Psychiatry, 1997; American Academy of Pediatrics, 2001; Pelham et al., 2005), both standardized quantitative measures as well as qualitative data. Because Polly is having academic and social problems at school, pretreatment teacher ratings of

Accepted April 13, 2006.

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The case of Polly is a composite created to exemplify a complex clinical problem and does not refer to any specific patient.

Dr. Evans's work was supported by grants from the National Institute of Mental Health (R34 PAR-03-078) and the Virginia Tobacco Settlement Foundation (8520140). Dr. Youngstrom's work was supported by a grant from the National Institute of Mental Health (R01 MH066647).

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DOI: 10.1097/01.chi.0000228355.23606.14

functioning are warranted. However, because Polly is in the sixth grade at a middle school, which teacher should complete the ratings? Achenbach (1991) has recommended giving the rating scale to “whichever teachers know the child reasonably well.” The choice may be difficult in a secondary school setting where a student may have six teachers for approximately 1 hour/day. Another option is to collect data from all of Polly’s teachers, but this approach has drawbacks as well: First, secondary school teacher ratings do not provide data on functioning in less structured settings such as the cafeteria, hallway, and bus settings where many youths with ADHD have behavioral difficulties. Second, interrater reliability is poor among secondary school teachers (Evans et al., 2005a; Molina et al., 1998; Simpson, 1991). Third, the validity of teacher ratings is questionable when compared with data from direct observation (Evans et al., 2005a). Finally, collecting data from all of Polly’s teachers may make decisions about the direction or magnitude of change over time difficult or impossible to interpret (Evans et al., 2005b).

Relying on the parent report of a child’s school functioning is also problematic. Teachers tend to report a greater number of school symptoms than do parents, whereas parent reports of school behavior were found to be influenced by their observation of behavior in the home (Mitsis et al., 2000). The authors concluded that for school-age children “parent reports of ADHD behaviors in school are not an adequate substitute for direct teacher input.” The participants in this study were in elementary school, where parents frequently profess to know more about their child’s behavior than at the middle or high school level; parent reports of symptoms and impairment at school may, therefore, be even more inadequate for secondary school students. To avoid many of the problems associated with parent and teacher reports about school functioning, some suggest that self-report may be a viable option, although others suggest that it is not (Conners et al., 1997; Glutting et al., 2005; Jensen et al., 1999; Smith et al., 2000). This research has not yet been conclusive, but there are clearly serious problems noted with the self-report of children and adolescents with ADHD (Hoza et al., 2002).

Despite these serious challenges to assessing changes in school functioning, we need a strategy to assess Polly’s functioning to inform treatment decisions. This requires a choice of measures that reflects the treatment priorities of the parents. If a practitioner does not measure the

parents’ priorities related to social, academic, and family functioning, then care is likely to be deemed ineffective by the family, even if services result in large effects on symptom ratings. Polly’s parents reported that she fails to turn in assignments on time; completes work with careless mistakes; has trouble getting along with peers, siblings, teachers, and parents; and does not follow rules at home and school.

Clinicians may find that the best technique for assessing Polly’s impairment is simply to create a short checklist based on the target behaviors. These checklists form the foundation for daily report cards (DRCs), and data indicate that they are sensitive to medication and psychosocial treatment effects (Pelham et al., 2002). Specific instructions for developing DRCs and using them to measure treatment outcome are provided elsewhere (DuPaul and Stoner, 2003; Evans et al., 1995; Pelham, 2005). DRCs allow for the simple and direct measurement of problems corresponding to parent complaints. For example, Polly’s parents expressed concerns about teacher reports that she talked excessively and without permission in class. In response to this concern, the clinician developed an item based on the operational definition of this presenting problem and used a true-or-false rating scale format to be completed by teachers and parents.

The initial rating scale should reflect all of the presenting problems and be given to all teachers and parents. This allows the clinician to determine which reporters (i.e., parents, teachers) experience which problems, as well as which reporters will return completed forms. After collecting the initial ratings, the items supplied to each rater can be limited to only those problems noted by that rater. The use of self-addressed stamped envelopes, fax, and e-mail (conforming to Health Insurance Portability and Accountability Act requirements) may increase the likelihood of receiving completed scales in a timely manner. Teachers who either report no problems or do not complete and return the initial ratings in a timely manner may be omitted from the assessment process. After baseline levels are established and the specific ratings to be completed by each adult decided, the clinician may begin to use the ratings as a daily or weekly report card intervention. Polly’s clinician recommended to Polly’s parents that they begin with the DRC and then use the response to this intervention to help evaluate the need for medication. If medication is needed, then the DRC could be used to help them determine their response.

Daily Report Card for English Teacher

Monday's Date _____

Student – Polly

Instructions: Please circle either the "yes" or "no" corresponding to each of the three target behaviors and the day of the week. This report should be faxed to Polly's mother at work every Friday before 5:00 pm.

	Monday	Tuesday	Wednesday	Thursday	Friday
Polly spoke only at appropriate times in class in accordance with classroom rules.	Yes No	Yes No	Yes No	Yes No	Yes No
Polly completed and turned in all work due today.	Yes No	Yes No	Yes No	Yes No	Yes No
More than half of Polly's contributions to classroom discussions were relevant and non-redundant.	Yes No	Yes No	Yes No	Yes No	Yes No

Fig. 1 Example of a daily report card for Polly.

To evaluate the effect of home behavioral contingencies using a DRC, Polly's clinician created three items and targeted two classrooms with teachers who reported problems on initial ratings and cooperated with assessment procedures (Figure 1). For Polly to earn contingent privileges at home each evening, she

had to bring the completed DRC to her parents and show that two of the three items were marked as "true" in both classrooms. As the number of items marked as true in both classrooms increased, the criteria for earning privileges were increased (Figure 2). After rarely achieving a rating of "true" for the first 2 weeks, Polly

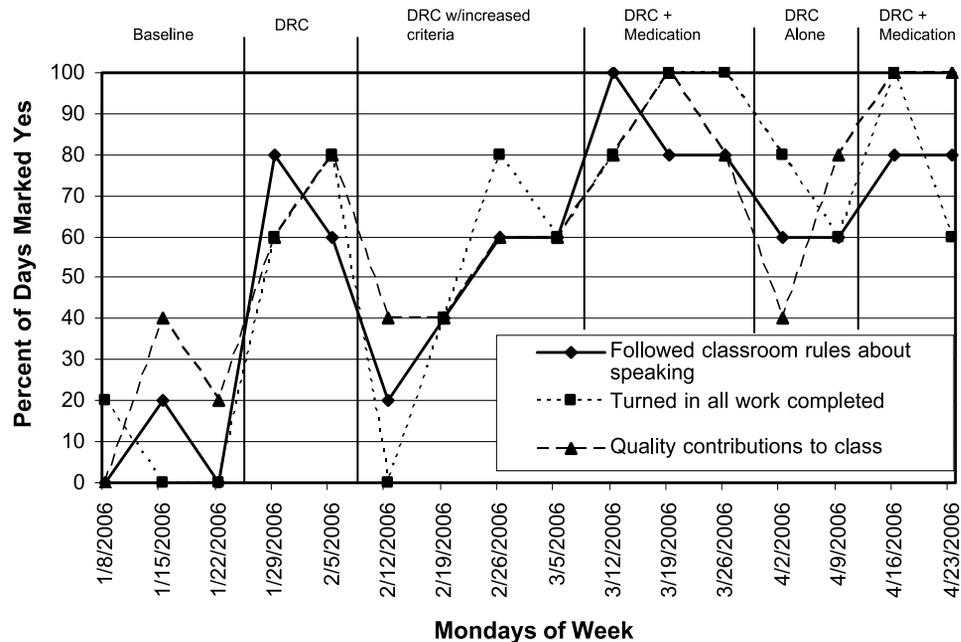


Fig. 2 Daily report card (DRC) data for Polly by treatment condition.

began to experience an increase in the frequency of her positive marks on the DRC.

The increase peaked at a level that demonstrated consistent improvement, but it was still problematic for the teachers. Manipulation of the home-based contingencies had little further effect. The clinician and family decided to assess the potential incremental benefits of medication treatment.

EVALUATING THE VALUE ADDED BY MEDICATION

Based on a discussion of potential costs and benefits, all of the parties involved agreed to a medication trial. Changes in the frequency of positive marks on three DRC school-based items became the primary outcome measure. The medication improved Polly's DRC ratings beyond what they had been with behavioral treatment alone, and the clinician and family decided to maintain this combined treatment. To verify that the improved ratings were attributable to the medication (and not the result of continued improvement in response to the DRC contingencies), a return to "psychosocial treatment only" for 2 weeks was initiated. If Polly's scores deteriorate from the levels achieved with both medication and the DRC, then the practitioner can have confidence that the medication contributed to the benefit. In fact, Polly's ratings returned to the premedication levels, and resuming the medication led to a return to her best DRC ratings.

This simple and effective method for verifying the value added by medication is called a reversal design. This is an especially important practice with difficult cases, when benefit is marginal, or when clinicians are considering an alternative treatment (Guyatt et al., 2000). Reversal designs are not useful when treatment involves the irreversible learning of new skills. Reversal designs can eliminate problems related to the common clinical practice of continued layering of treatments until one achieves a desired outcome. This layering practice can lead to the accumulation of many medication and psychosocial treatments without knowing which treatment components add benefit and which do not. Layering of treatments can unnecessarily increase the costs and risks associated with care.

These results suggest that the most effective treatment of Polly's presenting problems is the combination of medication and DRC monitoring with a behavioral contingency. The treatment and assessment design used in this case leaves open the possibility that the medication

alone may have produced the same final effect as indicated in Figure 2 without having provided the psychosocial treatment. A reversal design may be used to assess this by asking the parents to stop providing the contingencies for DRC scores for a period of time; however, this experiment comes with a cost: First, it frequently takes time and effort on the part of the clinician to achieve consistent implementation of the contingencies by the parents, and asking them to quit for a period of time may compromise long-term adherence. Second, Polly may have learned from the DRC procedures, and therefore she may continue to function in an improved way without the contingencies. As a result, a reversal design is not likely to be helpful in this situation.

In addition to the careful measurement of treatment response, clinicians cannot draw valid conclusions about their services without assessing adherence to treatment. If the clinician does not consider adherence when interpreting the outcome data, then he or she may be inclined to increase the dosage of medicine or intensity of a psychosocial treatment when adherence is the real issue. Asking parents to record days that the child takes medication and to monitor the frequency of prescription refills can help when assessing adherence to medication treatment.

Similarly, asking parents to bring the DRC data to office visits and asking both the parents and Polly about the consistency with which the DRC contingencies are being implemented can inform the clinician about adherence to the DRC procedures. Behavioral techniques that are only partially implemented or provided on a sporadic schedule along with inconsistent administration of medications are common causes of poor response to treatment and should be carefully evaluated before increasing the dosage of either type of treatment. In sum, the two most critical assessment targets for treatment outcome are the fate of the primary presenting problems and adherence. Either measured alone is insufficient to guide treatment decisions. Rating scales and DRCs are probably the most efficient and effective method for measuring presenting problems, and indices of adherence by parents are a crucial supplement to impairment data.

RELATED ASSESSMENT ISSUES

Potential Bias

There is always the potential for adult raters to hold a variety of biases that influence their ratings. Some raters

may believe that African American children are overdiagnosed (or underdiagnosed) or that girls with ADHD are underdiagnosed (or overdiagnosed). Neither of these perspectives necessarily causes a problem for outcome assessment as long as the rater remains constant throughout the treatment process. Some raters may hold biases pertaining to treatment itself, such as a belief that parents and professionals rely too much on medication to treat ADHD. Others may experience frustration with efforts to implement psychosocial treatments when all they really need to do is medicate the child. These biases can compromise outcome assessment because they may lead to adults providing ratings influenced by their desire to prove their point. Direct discussions with Polly and her parents about the teachers being asked to rate Polly may help alert the clinician to such reporter bias.

Coordination of Services

Because there are many professionals who may provide interventions for Polly, including teachers, school counselors, psychologists, and others, it is important that professionals coordinate their treatments. To find the necessary and effective components of treatment, it is important to change no more than one component of care at a time. This requires communication and coordination between providers.

Although each professional may make only one change at a time, without knowing the manipulations of the other providers, multiple modifications to care may be occurring simultaneously, making accurate interpretation of outcome data impossible. Finally, there is a temptation to attribute all change (or lack of change) in Polly's outcome measures to a new treatment being tested. There is a lot that may be changing in her life that can affect outcome measures and confuse interpretation of data (e.g., menstrual cycle, parent conflict, a pet's death). Polly's clinician wisely asks about life events after collecting the data and before making treatment decisions to increase confidence in attributing change to the treatments being measured.

CONCLUSIONS

Even in busy practices, DRCs appear to be a clinically feasible way of defining key behaviors, establishing baselines of functioning, measuring response to treatment, and determining the value added by treatment components such as medication by means of reversal designs.

DRCs also are attractive because they involve less rater burden than many other methods and directly assess real-world functional impairment. In more nuanced applications, the DRC procedures can be used to determine optimal doses of medication, including when medication may not add benefit. These procedures do require clinician attention to teacher and parent feedback over an extended period of time. Data indicate, however, that attempts to incorporate procedures like these into practice have not been embraced (Pliszka et al., 2003). This is unfortunate because community care may be less effective than a well-defined treatment algorithm in part because it is not always guided by regular assessment with outcome measures (Jensen et al., 2001). The use of evidence-based assessment procedures to guide treatment decisions is an important element in closing the science–practice gap and improving care for children and adolescents with ADHD.

Disclosure: Dr. Evans receives funding from Lilly, McNeil, and Novartis to support an annual regional ADHD treatment conference. Dr. Youngstrom has no financial relationships to disclose.

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Primary Care Utilization and Detection of Emotional Distress After Adolescent Traumatic Injury: Identifying an Unmet Need Janice A. Sabin, MSW, PhC, Douglas F. Zatzick, MD, Gregory Jurkovich, MD, Frederick P. Rivara, MD, MPH

Objective: Few investigations have assessed the primary care detection of adolescent posttraumatic emotional distress after an injury. We aimed to determine (1) the level of attachment to primary care providers (PCPs) and school providers among this group of high-risk adolescents, (2) the emotional status of this population postinjury, (3) continuity of care between trauma center and community care, and (4) PCPs' detection of emotional problems in adolescents after an injury. *Methods:* This was a prospective cohort study of traumatically injured adolescents aged 12 to 18 who were admitted to a level I regional trauma center. Adolescents were screened for posttraumatic stress symptoms, depressive symptoms, and alcohol use on the surgical ward and 4 to 6 months postinjury. PCPs were contacted by telephone 4 to 6 months postinjury to assess follow-up care and the detection of emotional distress. *Results:* In the surgical ward, 39.4% of the adolescent patients or their parents reported no identifiable source of regular medical care. Only 24.3% of the patients had visited a PCP during the 4 to 6 months after injury. At 4 to 6 months postinjury, 30% of the adolescents were experiencing high posttraumatic stress symptom levels, 11% were experiencing high depressive symptom levels, and 17% had high levels of alcohol use. PCPs did not detect any new emotional distress or problem drinking during postinjury office visits. *Conclusions:* Injured adolescents represent a high-risk pediatric population, a substantial number of whom develop mental health problems postinjury. Furthermore, almost 40% of adolescents in our study reported no source of primary care. These results suggest that referrals from trauma centers to PCPs are necessary and that an increase in awareness of and screening for adolescent emotional distress postinjury during follow-up appointments and at school should be routine components of postinjury care. **Pediatrics** 2006;117(1):130–138.