

# Are We Ready for Computerized Adaptive Testing?

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Gibbons and colleagues' article (1) in this issue highlights an emerging methodology of considerable value to psychiatric services. Computerized adaptive testing (CAT) has multiple advantages over standard paper-and-pencil assessment tools (2). CAT uses existing data to streamline and individualize the measurement process. By selecting items of particular relevance to an individual respondent, CAT applications simultaneously reduce the number of needed questions, increase measurement precision, and decrease respondent burden. CAT's applicability has been demonstrated, but its full potential for psychiatric services has yet to be realized.

Streamlining and individualizing assessment of diagnosis and symptoms offer many potential benefits to psychiatric services research and practice. Asking fewer questions improves efficiency, freeing time for clinical care or more comprehensive assessments. Computerized assessment can give clinicians real-time data that can be put to immediate use. Individualized assessment, which takes an individual's prior symptoms and functioning into account, can increase the precision of ongoing outcome monitoring and enhance the personalization of disease management programs. The multidimensional approach to assessment that is reflected in the bifactor model can improve the evaluation of comorbid conditions and integrate dimensional and categorical diagnostic paradigms.

Creating item banks that aggregate data across populations and settings makes it possible to equate assessments conducted with different items to enrich available evidence about the prevalence of disorders, course of illness, and the impact of interventions.

One can envision multiple applications of CAT in clinical and research settings. For example, a computer kiosk in a primary care waiting room could be used to screen patients for common mood and anxiety disorders. After a brief interaction with a touch-screen monitor, each patient's results could be available to primary care providers by the time the patient reaches the exam room. Longitudinal follow-up assessments in a drug trial could be tailored to each patient's previously reported symptoms and be administered and recorded by an interviewer using a handheld device communicating with a distant item bank. A Web-based depression management program could elicit patient-reported assessments individualized to each participant's prior experiences and convert responses to the metrics of other standardized measures.

Unfortunately, the technology and infrastructure needed to implement CAT are currently beyond the reach of most clinicians and researchers. Basic computer equipment is often unavailable. Assessments are frequently conducted in settings where computer use is impractical. Existing CAT software is highly technical. Implementation of

CAT relies on large banks of previously collected and calibrated responses to multiple measures. Banks of items relevant to psychiatric services are not widely available, and when they exist, they are not readily accessible.

Considerable collaborative effort is needed to develop the infrastructure that would make mental health-focused CAT widely available and accessible. Ongoing work provides a foundation for needed development. The National Institutes of Health is currently sponsoring the Patient-Reported Outcomes Measurement Information System (PROMIS) (2), which provides a basic CAT infrastructure for measuring health outcomes. PROMIS includes an item bank and a Web-based interface for selection, administration, and management of CAT and associated paper-and-pencil outcome measures, all of which are in the public domain. PROMIS now focuses on general outcomes applicable to a range of chronic diseases. However, the PROMIS project's strategies and methods could be integrated with developing item banks of mental health measures. Continued investment in flexible and accessible technology that would make CAT a reality in psychiatric services could yield multiple benefits.

## References

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2. Reeve BB, Hays RD, Bjorner JB, et al: Psychometric evaluation and calibration of health-related quality of life item banks: plans for the Patient-Reported Outcomes Measurement Information System (PROMIS). *Medical Care* 45(suppl 1):S22-S31, 2007

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