

Expanding Pediatric Mental Health Treatment Through Technology: The Promise of Computer-Assisted Therapies (CATs)

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Disparities in accessing mental health care for children and adolescents are a major problem in the United States and elsewhere. This problem stems from many sources, including a significant shortage of child and adolescent psychiatrists and other mental health workers, an unequal distribution of services disproportionately concentrated in urban areas, insufficient awareness of child mental health, stigma associated with mental health problems, challenges to recognizing and diagnosing childhood mental health disorders, and inequities in funding for these services. There have been a number of different approaches to overcoming these barriers to care. This article focuses on the nascent application of computer-assisted therapies (CATs) to overcome the difficulties in accessing effective, evidence-based psychotherapeutic treatments.

CATs are computer-based mental health treatment programs available either on CD-ROM for a personal computer (cCAT) or via the internet (iCAT). They present discreet therapy sessions delivered over a period of time and are typically part of an established psychiatric treatment plan. CATs are aimed to improve access to psychosocial treatments and increase fidelity to evidence-based treatments.¹

Psychiatric consultations to primary care providers (PCPs) aim to improve diagnostic decision making and access to psychosocial and psychopharmacologic treatment for children with mental health and behavioral problems in primary care settings.^{2,3} Whereas PCPs may be more comfortable prescribing psychotropic medications, most rely on non-physician mental health providers to provide psychotherapeutic services, leaving a potential gap in the availability of effective treatments. Various psychotherapies are effective in

treating childhood mental health disorders, but availability of such evidence-based treatments is primarily limited to urban areas and academically-affiliated treatment centers. Conversely, counseling services may be of uneven quality and are less likely to be available in rural or inner-urban areas.^{4,5} CATs offer an accessible, widely available, and standardized approach to address these disparities and improve treatment adherence and outcomes. Moreover, CATs enable providers to take an interactive approach to treatment (ie, video demonstrations of how to manage difficult emotions or situations),⁶ that is both educational and engaging for technologically-savvy young patients.

Computer-Assisted Therapy

What Are Computer-Assisted Therapies (CATs)?

- Usually based on established evidence-based psychosocial treatments.
- Most effective CAT programs with the highest adherence rates involve a relationship with a therapist as part of an agreed treatment plan.
- Most often accessed online.
- Visual formats vary from cognitive-behavioral therapy (CBT)-based verbal cues with or without embellishments to virtual environments resembling a computer game.
- Largely proprietary and/or available for a per-user fee.

CATs are digital programs intended to replicate evidence-based psychiatric treatments. They are generally proprietary, and available online at out-of-pocket costs that can exceed several hundred dollars. The efficacy of many CATs is supported only by pilot studies,

although several have randomized controlled trials that demonstrate their degree of effectiveness compared to placebo, treatment-as-usual (TAU), or in-person CBT.

The History of Computer-Assisted Therapy

Early efforts to convert manualized treatments to computerized formats began in the 1980s, but CATs did not develop in earnest until the mid-1990s, coinciding with increased availability of personal computers. Numerous CATs have since been developed for the treatment of various psychiatric symptoms and disorders, including depression, anxiety, obsessive-compulsive behavior,⁷ preschool anxiety,⁸ social skills for autism spectrum disorder (ASD),⁹ and insomnia.¹⁰

Moodgym, developed in Australia more than 20 years ago, was one of the first attempts to create an effective computer-based treatment for depression.¹¹ However, the program was text-based, which may have contributed to high non-completion rates.¹¹ Other CATs have converted printed manualized CBT to a CD-ROM for personal computers. More recently, CAT developers have utilized video games and animated programs to teach skills¹² with newer, more sophisticated CATs using virtual reality (VR) technology to provide job interview training for adults with ASD,¹³ deliver anger management treatment to an adolescent,¹⁴ and help children overcome school avoidance.¹⁵ Also in development are CATs for treating anxiety in very young children^{16,17} and teaching social skills to children with ASD.¹⁸

CATs in Practice

Currently, CATs are used more frequently in countries with a national health service, such as Australia (the earliest developer of CATs), the Netherlands, Great Britain, and India, among others. These countries emphasize efficient use of limited resources, and CATs allow mental health workers to quickly assist more people. The US lags far behind other countries in CAT utilization and incorporation into practice. The greatest benefits of CATs are increasing the availability of psychosocial treatments in underserved areas, increasing fidelity to evidence-based psychosocial treatment principles, and

improving psychotherapy treatment outcomes. Of the CATs listed in Table 1 (a non-inclusive sample of CAT programs encountered in literature searches for this article), only Camp Cope-a-lot, Cool Little Kids, Cool Teens, moodgym, SPARKS, and Stressbusters are currently available in the US or Canada.

Several reviews have described and compared the effectiveness of available CAT programs as treatment adjuncts, or, rarely, standalone treatments. These reviews made several observations: 1) treatment incorporating CATs compares favorably with standard care; 2) CATs are well-accepted by both consumers and providers; 3) CATs are more effective for the treatment of anxiety than depression; and 4) CATs as a self-help, standalone treatment had high non-completion rates.^{19,20,21} Thus, when integrated into a comprehensive treatment plan via a therapeutic relationship with a caring professional, CATs have the potential to improve patient outcomes and address barriers to care in underserved, at-risk children and adolescents.

Despite encouraging clinical data, CATs are associated with important limitations. First, CATs are expensive, and their use is not currently reimbursed by insurers, making costs prohibitive for their intended patient population. However, Medicare and private medical insurers are moving towards measurement-based outcomes reimbursement, which could make standardized, easily trackable, computerized treatments more attractive to insurers. Even if CATs are not directly reimbursed through insurance, their increased efficiency compared to office-based treatments may offset their costs and prove a worthwhile investment for insurance companies and patients alike. Additionally, not all CATs have proven effective. A large Dutch study testing the cost effectiveness and efficacy of CATs used by patients in several Dutch mental health centers found that CATs, used by only 3% of the sampled patients, were no more effective than TAU but were more costly.²⁹ These findings contrast with most others that show high patient satisfaction and equal or better treatment outcomes among those completing treatment, but without addressing costs.³⁰

Table 1. A Non-Inclusive Sample of Computer-Assisted Therapies (CATs) Programs

Program Name	Therapeutic Target	Age Range	Modality	Randomized Trials	Use of Therapist	Efficacy
BiP OCD ⁷	OCD	Adolescents	iCBT	Yes	Online therapist support	Possibly ^a
BRAVE-Online ²²	Anxiety	Children and adolescents	iCBT	Yes	Internet therapist support	Yes
Bite Back ²³	Depression, anxiety	Adolescents	cCBT	Yes	No	Possibly ^a
Camp Cope-a-Lot ¹	Anxiety	Children, early adolescents	cCBT	Yes	In person for half of the sessions	Probably ^b
Cool Little Kids Online ¹⁷	Anxiety	Parents of preschoolers	cCBT	In progress	Telephone	Unknown
Cool Teens ²⁴	Anxiety	Adolescents	cCBT	Small case study	Telephone	Unknown
iChill ²⁵	Anxiety	Young adults	iCBT and behavioral activation	Yes	Telephone reminders	Ineffective
moodgym ²¹	Depression, anxiety, panic disorder	Adolescents, adults	cCBT or iCBT	Yes	1st session with therapist, then prn	Possibly ^a with therapist assist
Rainbow SPARX ²⁶	Depression	LGBT adolescents	Video game cCBT	No	Weekly site visits or telephone	Possibly ^a
SPARX ¹²	Depression	Adolescents	Video game cCBT	Yes	Weekly site visits or telephone	Possibly ^a
Stressbusters ^{27, 2}	Depression	Adolescents	cCBT	Yes	All sessions	Possibly ^a
Think, Feel, Do ²⁸	Depression or anxiety	Adolescents (11-16)	cCBT	Yes	No	Possibly ^a

Note: ACT = Anger Control Therapy; cCBT = computer-based cognitive behavioral therapy; iCBT = internet-based cognitive behavioral therapy; PD = Panic Disorder.

^a Programs that have been validated by only one controlled study.

^b Programs that have been validated by two or more controlled studies but by the same research group.

In a recent study, CATs failed to show benefit over sham treatment to improve working memory at 6 and 12 months in children with attention-deficit/hyperactivity disorder.³¹ Hoek, *et al.*³² found that an internet-based problem solving therapy was not significantly better than the control wait list for adolescents with anxiety and depression. Similarly, iCHILL, an online-based CAT developed to treat anxiety in young adults, was ineffective across four experimental arms compared to the control arm.²⁴ Notably, neither study involved office-based treatment and the exclusion of this therapeutic relationship may have negatively impacted CAT

outcomes. The above limitations reinforce that CATs are intended to supplement, not replace, evidence-based treatments. Cost concerns also highlight the importance of conducting larger, randomized controlled trials of CATs, as definitive evidence of their utility would make their use more ubiquitous, and subsequently more affordable.

CATs that are entirely self-help and do not include a therapeutic relationship have high non-completion rates and consequently low efficacy. Although CATs do not seem appropriate for treating patients with impaired

reality testing, there certainly could be a role for CATs in prevention and rehabilitation efforts with bipolar disorder or psychosis. These programs are currently being developed.

Future of CATs

CATs are rapidly developing technologies with the potential to increase the availability of psychosocial treatments in underserved areas, optimize treatment monitoring and adherence, and improve psychotherapy treatment outcomes. CATs have already shown promise as adjunctive treatments for anxiety, depression, ASD, and technological advances will likely increase their appeal in youth. These innovative treatment approaches create an exciting frontier for expanding access to effective treatments. However, not all CATs have proven effective, and as with any new treatment, providers must weigh the evidence of their effectiveness for the desired outcome before incorporating them in practice. Providers considering CATs should always download and assess their suitability before using them with patients. Lastly, providers should remember that a strong therapeutic relationship is the most important predictor of successful treatment with CATs and should prioritize fostering this connection.

Take Home Summary

Computer-assisted therapy (CAT) is a promising technology with the capacity to expand availability of high-quality, evidence-based, effective psychotherapy for childhood psychiatric disorders, especially for at-risk youth in under-resourced areas. CATs have been rapidly accepted in countries with a national health care system. However, wide utilization of CATs in the United States awaits a demonstrable reimbursement mechanism.

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