

Overview of Design Approaches in The *Cool Teens CD* and Other Computer Programs for Adolescent Anxiety

Mike Cunningham (mjjcunning@hotmail.com)

Centre for Emotional Health (CEH), Dept. of Psychology
Macquarie University, Sydney NSW 2109 Australia

Abstract

The *Cool Teens CD-ROM* is an 8-module self-help treatment program for adolescents with anxiety, for use over approximately 12 weeks on a home computer. Participant feedback in a recently reported study showed generally high satisfaction with the multimedia content, the modules, and the delivery format of the CD-ROM. In the emerging area of computer-based cognitive behavioural therapy (CCBT), no one program or its evaluation is likely to provide all of the answers to the key research question in the field: what are the most appropriate and effective formats for the delivery of CCBT to young people? Therefore, it is also important to learn from the design and outcomes reported for programs being developed for adolescents by other research groups. Every program has its own unique overall delivery format and purpose, and data from each one can provide an overall picture of the strengths and weaknesses of various approaches. This paper provides an overview of several design and implementation approaches used in other programs that have been developed recently for teenagers with anxiety and related disorders.

Keywords: *Anxiety disorders; adolescents; cognitive behavioural therapy; computer-based CBT; multimedia*

Introduction

As discussed in the article “Examination of Barriers to Treatment and User Preferences With Computer-based Therapy Using *The Cool Teens CD-ROM* for Adolescent Anxiety” (Cunningham & Wuthrich, 2008), computer-based cognitive behavioural therapy (CCBT) might be one way to try to overcome some of the barriers associated with the traditional methods of delivering psychotherapy programs to teenagers with anxiety. CCBT provides an answer to the call to explore more “creative and innovative” approaches to treatment (Department of Health and Ageing, 2004). It has the potential to offer more accessible, confidential, time-limited, low-cost, non-face to face interventions, which might also be less confronting and more engaging for this age group. As described by Cunningham & Wuthrich (2008), a project team at Macquarie University’s Anxiety Research Unit at the Centre for Emotional Health has developed and is evaluating *The Cool Teens CD*, an independent self-help multimedia

therapy program specifically for adolescents with anxiety (Cunningham, Rapee, & Lyneham, 2006; Cunningham, et al, 2008).

Although CCBT has been shown to be of value for anxious adults for some years now, programs for an adolescent target audience have only recently become a research interest. At the time that the *Cool Teens* project began in early 2004, no such programs had yet been fully developed specifically for adolescents.

Up to that point in time, only one computer-based anxiety intervention study involving young people had been reported. A game for treating spider phobia—computer-aided vicarious exposure (CAVE)—had been evaluated in a randomised, controlled trial of 28 10–17 year-olds (Dewis et al., 2001). While this study involved adolescents, the computer program used did not appear to have been designed specifically for young people. The behavioural assessment test component of the program used for the young participants in this trial was adapted from an earlier adult treatment protocol. Despite not being an entirely youth-specific intervention, the results of this study showed that three 45-min sessions with CAVE resulted in clinically significant improvements in spider phobia symptomatology on a number of measures compared to a wait-list in this younger age group. In this study, live graded exposure achieved superior results than the computer program.

Two recent reviews show that CCBT interventions have been shown to be a clinically efficacious and acceptable therapy format for various forms of anxiety in adults (Griffiths & Christensen, 2006; Spek et al., 2006). For several reasons, technology-based delivery options may be even more acceptable and beneficial to young people than to adults (Davis, Quittner, Stack, & Young, 2004). The potential use of CCBT is underpinned by the fact that increasing numbers of Australian adolescents have access to computers (Australian Bureau of Statistics, 2004) and use the Internet to seek help for mental health problems (Mission Australia, 2005). It is reasonable to expect that many young people would be likely to embrace a computer-based therapy option. Further encouragement that CCBT might be appropriate for young people comes from earlier research findings that showed some specific computer programs to be acceptable for delivering educational content on various medical health conditions in young people.

Dragone et al. (2002) developed and evaluated an interactive multimedia CD—*Kidz with Leukemia: A Space Adventure*—for ages 4–11 years. Compared with children who used a book, those using the computer program showed increased feelings of control over their health and reported a high level of satisfaction with this delivery method. Davis et al. (2004) reported that their educational CD-ROM—*STARBRIGHT Fitting Cystic Fibrosis Into Your Life Everyday*—increased both disease-related knowledge and competence of coping strategies in a group of 7–17 year-old participants with cystic fibrosis.

In an exploratory study comparing delivery methods for a drug abuse prevention program to schools, Di Noia, Schwinn, Dastur, & Schinke (2003) report findings that suggest potential benefits of electronic means (both CD and website) over conventional printed pamphlets for improving accessibility, self-efficacy, and behavioural intention variables. Butler, Chiauzzi, Thum, & Budman (2004) found that CD-ROM-based delivery of vocational rehabilitation information received significantly better satisfaction ratings than print material.

In summary, considerable data suggest that many young people find computer-based delivery to be an acceptable method of receiving health information, and data from the CAVE program already support the use of this technology-based approach for anxiety in youth (Dewis et al., 2001).

In designing the structure and content formats of *The Cool Teens CD*, a model for delivering information on several CBT techniques was created. The chosen approach was an adaptation of the Learning Object model commonly used in the world of E-Learning (Cisco Systems Inc., 2000). This model provided a framework for the consistent presentation of content and helped guide the development of appropriate multimedia components, resulting in the creation of programs modules referred to as Therapy Objects (Figure 1).

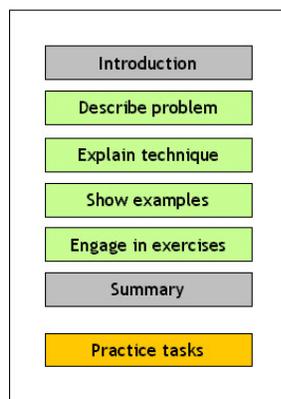


Figure 1. Cool Teens “Therapy Object”

The *Cool Teens CD* uses a combination of text, illustrations, audio, cartoons, live video, and interactive forms to deliver 8 CBT modules:

1. Understanding Anxiety – Background information on anxiety and introduction to the program characters
2. Setting Goals – Suggestions on how to get the best results from the program
3. Realistic Thinking I – A cognitive restructuring technique to replace worried thoughts with realistic, calmer ones
4. Stepladders I – An exposure technique to help face fears using a step-by-step approach
5. Stepladders II – Advanced use of exposure
6. Realistic Thinking II – Making cognitive restructuring easier to use in everyday situations
7. Other Coping Skills – Strategies for dealing with anxiety, e.g., problem solving, assertiveness
8. Staying Cool – Key tips about preventing future problems with anxiety

The program modules contain information, exercises, hypothetical scenarios, and case studies. They also have practice tasks that the user performs outside of the time they spend on the computer program. Users create their own username and password and enter data at various stages of program use. The entire program is ideally used over 8 to 12 weeks, but individuals will move at their own pace depending on the severity and nature of their problems and other factors, e.g., how much time they can dedicate to the practice tasks.

A book chapter about the development of CCBT for young people (Cunningham, Donovan, & March, 2007) presented a comparison of 2 Australian programs for anxiety in adolescents: *The Cool Teens CD* (Cunningham et al., 2006), and the BRAVE–ONLINE website (Spence, Donovan, March, et al., 2008) and proposed an 8-question approach to making the key decisions involved with designing these programs:

1. How Will the Program Be Used? (e.g., self-help or with a therapist, for which specific problems)
2. What Project Approaches Will Help to Bring Success? (a team approach is essential)
3. What CBT Components Will Be Included? (e.g., psychoeducation, cognitive restructuring)
4. What Overall Experience Do You Want to Provide for the User? (short sessions, repeated weekly or monthly program use)
5. What Technical Implementation is Most Appropriate? (CD, website, or both)
6. What Graphic and Design Style Will be Used? (must be age appropriate)
7. What Can Be Added to Enhance the Therapeutic Alliance? (e.g., email, phone calls)
8. What Incentive and Monitoring Systems Can Be Added? (e.g., reminders, rewards)

Each individual development project will decide their own responses to these questions. However, there are many broad issues to be explored in the emerging area of CCBT, and no one program or its evaluation is likely to provide all of the answers to the key research question in the field: what are the most appropriate and effective formats for the delivery of CCBT to young people? Therefore, it is important to learn from the design and outcomes reported for programs being developed for adolescents by other research groups. Since every program has its own unique overall delivery format and purpose, data from each one can be combined to provide an overall picture of the strengths and weaknesses of various approaches. This paper therefore provides an overview of various design approaches used in some programs that have been developed recently for teenagers with anxiety.

Method

Many of the latest CCBT projects for young people have not yet been fully reported broadly in the literature, but early information has been presented at several national and international conferences held by organisations dealing with CBT, anxiety disorders, and youth health. Recent reports from psychology, CBT, and human-computer interaction conference proceedings and literature were reviewed over the course of the past 4 years, with a particular focus on intervention programs for the treatment of anxiety disorders in teenagers. All multimedia programs of interest were listed and followed through new publications, conferences, and news releases.

Results

Early reports or research findings from the evaluation of appropriate programs were found for 10 products, including the *Cool Teens CD* from the author's research institution (Table 1). This is not a comprehensive list of all recent work in the field (e.g., it does not include any virtual reality (VR) projects) but it provides an overall picture of the range of current approaches being explored by researchers in the field. I will now present a brief overview of each of these programs, and summarise early feedback where available. Further information on each program, including detailed content structure, early research findings, ongoing studies, availability, and cost, is available from the websites links provided.

BRAVE for Teenagers – ONLINE is a CBT program for anxious adolescents aged 13–17 years delivered on the Internet (Spence et al., 2008). This program involves ten 1-hour youth sessions, 5-6 parent sessions, and two booster sessions. The program includes text, colourful graphics, animation, quizzes, games, and interactive forms. The young person completes a variety of exercises and home tasks online that are accessible to a therapist, who provides help or reinforcement as appropriate. Two case studies have recently been published to describe early experiences with the program. An earlier version of BRAVE for younger children was successfully delivered using a combination of Internet sessions and clinic visits (Spence, Holmes, March, & Lipp, 2006).

Table 1: Recently developed computer-based programs for adolescents.

| Program | Delivery | Age* | Research or Product Website |
|----------------------------------|------------|----------|---|
| BRAVE | Web | 13–17 | http://www2.psy.uq.edu.au/webexp/kids coping/ |
| CAVE | CD | 10–17 | http://www.medicine.utas.edu.au/research/mentalhealth/ |
| CLIMATE Schools | Web | Students | http://www.climateschools.tv/ |
| Cool Teens | CD | 14–18 | http://www.psy.mq.edu.au/MUARU/child/highschool.htm |
| Coping Cat | CD | 8–13 | http://www.cope-a-lot.com/ |
| MoodGYM** | Web | 15–16 | http://www.moodgym.anu.edu.au/ |
| Reach Out! Central | Web (both) | 16–25 | http://www.reachout.com.au/default.asp?ti=2011 |
| StressandAnxietyin Teenagers.com | Both | Under 18 | http://www.stressandanxietyinteenagers.com/ |
| Stressbusters** | CD | 12–16 | N/A |
| Why Me? | Both | 11–16 | http://www.ocdaction.org.uk/ocdaction/index.asp?id=296 |
| Working Things Out | CD-DVD | 13–15 | http://www.workingthingsout.ie/ |

* Target age stated in program or being studied; ** Primarily (or also) a depression program

As mentioned earlier, use of the **CAVE** program for spider phobia resulted in significant symptom improvement in participants (Dewis et al., 2001). The project's website states that new software is being developed to incorporate colour and 3-D images into the program and to allow it to be downloaded from the Internet.

CLIMATE for Schools is a project delivering online health education courses for alcohol, stress, and other problems (including anxiety), to empower students by learning about ways to avoid illness and to optimise their mental health. It uses cartoon-style illustrations with speech and thought bubbles. Assessment quizzes, work samples, and suggested homework activities are included in each module. Preliminary results show that the alcohol and stress modules are effective, with the other modules currently being evaluated in randomised controlled trials (Andrews, Van Vliet, & Wuthrich, 2007).

Camp Cope-A-Lot: The Coping Cat CD is a new 12-session interactive CD-ROM-based program providing CBT for 7 to 13-year old anxious youth (Khanna & Kendall, 2008). The program consists of 6 sessions for the child alone, followed by 6 sessions with therapist guidance. Initial responses to a prototype from youth and therapists are favourable. The project includes CBT4CBT, the first computer-based clinician training program in CBT for anxiety in youth.

Reach Out! Central (ROC) is an online interactive space that helps explore how thinking, behaviour and feelings interact (Webb, Sullivan, & Nicholas, 2006). The site allows the person to try out different ways of reacting to real-life situations. "Choose your own adventure" and "maybe even get a new perspective on things". While it is not a full CBT program, it shows an interesting method of delivering therapy components. Positive feedback was received from 224 initial young people who visited the site. The developers mentioned that a CD version and an anxiety module might be developed in the future.

Stress and Anxiety in Teenagers is an interactive game that guides young people through anxiety symptoms and ways to combat these problems (Richards & Scott, 2004). It uses a delivery template and approach developed earlier for depression, offering both website and CD versions. The program is designed to help teenagers to identify symptoms of stress and anxiety. Users visit various areas of a park: Winding Woods - guide to stress & anxiety; Tree of Wisdom - recognising symptoms; Maze - questions; Boating Pond - relaxation; Secret Garden - personal stories; Boaters Café - Resources.

Why Me? is a multimedia information program for young people with obsessive compulsive disorder (Chowdhury, Caulfield, & Heyman, 2003). Developed initially as a CD-ROM rich in video, it was then made available as a website, demonstrating the possibility of delivering similar experiences with online and offline delivery formats. The program presents the science behind OCD, shows how families, teachers and others can help, and features stories from young people about their experiences.

Working Things Out (Brosnan, Sharry, & Fitzpatrick, & Boyle, 2006) is an interactive CD-ROM educational and therapeutic tool for use with a professional for individuals or groups dealing with problems such as anxiety. It is based on a storytelling approach, using engaging graphics and voiceover. The stories are brief, animated movies with voiceover narrations and soundtracks. They share personal experiences and show how some young people have overcome their challenges, with a focus on passing on advice and learning to others with similar problems.

Two other programs, designed primarily for treating depression, are also worth including in a review of design strategies used in programs for adolescents.

MoodGYM is an online CCBT program for depression that has also had positive results for anxiety. MoodGYM consists of 5 modules, a workbook, and interactive extras. It includes assessments of anxiety and depression, 'warp' thinking, life-event stress, parental relationships, and pleasant event scheduling. This program has been shown to be effective for adults but it was originally designed for young people and is also being evaluated with adolescent boys and girls (O'Kearney, Gibson, Christensen, & Griffiths, 2006; O'Kearney, Kang, Christensen, & Griffiths, 2008).

Stressbusters is an interactive CD-ROM for young people with depression (Robinson, Smith, Abeles, Proudfoot, Verduyn, & Yule, 2004). The software development company that designed the program describe that it has an "interface design built entirely in 3D". Since its content is based on a manual that had been effective for face to-face therapy, efficacy data from this program will provide interesting insights into computerization.

Discussion

As suggested earlier, no one program or its evaluation is likely to provide the answers to the key research question posed: what are the most appropriate and effective formats for delivering

CCBT to adolescents with anxiety? Since high uptake of therapy options, and low attrition rates in those patients who start using these programs, are both issues of critical importance, it is important to learn as much as possible from the approaches and experiences from the development of programs by colleagues in other research groups.

This is especially important given the considerable investments required to design and develop programs and the rapid evolution of delivery technology—the traditional 5-year time period for developing and evaluating new interventions makes computer-based programs extremely vulnerable to being out of date in terms of software or hardware, or at the very least in terms of graphical interface or style trends, by the time a program is developed and fully assessed.

Research findings from the initial evaluation of the innovative programs listed in this article suggest a trend towards reasonably high acceptance of CCBT as a delivery option for adolescents with anxiety and related conditions. Given that only early research data and information are currently available for these programs, it would be premature to make any direct comparisons between their various designs and approaches. This brief overview article highlights several designs and approaches currently being evaluated and prepares clinicians and researchers in the field to expect future data regarding effectiveness and user satisfaction with these programs.

As a result of successful findings from pilot studies involving program prototypes, larger randomised controlled trials are now underway involving many of the programs introduced above. Clinical outcomes findings from these and future studies will provide valuable efficacy data in the field of CCBT. In addition, evaluation of user feedback to the various approaches used (e.g., website compared to CD-ROM, self-help compared to varying levels of therapist support) will provide valuable information and guidance for the enhancement of these treatments and for the development of future programs. The reporting of more comprehensive efficacy and user satisfaction data from the Cool Teens and other project research teams over the next few years is eagerly anticipated to greatly improve our overall knowledge in this emerging field.

Acknowledgments

This review is based on work conducted while Mike Cunningham was a PhD student (international Macquarie University Research Scholarship holder) under the academic supervision of Prof. Ron Rapee.

References

Andrews G, Vliet H, van, Wuthrich V. (2007). The reduction of anxiety in school children: preliminary

- results with www.climateschools.tv, in *Anxiety Disorders: Current controversies, future directions*. Edited by Castle D, Hood S, Kyrios M. Fitzroy, *Australian Postgraduate Medicine*, 149-159.
- Australian Bureau of Statistics. (2004). *Household use of information technology, Australia, 2002 and 2003* (No. 8146.0). Canberra, Australian Capital Territory.
- Brosnan, E., Fitzpatrick, C., Sharry, J., & Boyle, R. (2006). An Evaluation of the Integrated use of a Multimedia Storytelling System within a Psychotherapy Intervention for Adolescents. Conference on Human Factors in Computing Systems (CHI) 2006. Montréal, Québec, Canada.
- Butler, S.F., Chiauzzi, E., Thum, C.C., & Budman, S.H. (2004). Working It Out: Development and Testing of a Multimedia, Vocational Education Program. *Substance Use & Misuse*, 39, 2525-2558.
- Cisco Systems, Inc. (2000). *Reusable Learning Object Strategy - Definition, Creation Process, and Guidelines for Building* (Version 3.1). CA, USA.
- Chowdhury, U., Caulfield, C., & Heyman, I. (2003). Service innovations. A group for children and adolescents with obsessive-compulsive disorder. *Psychiatric Bulletin*, 27, 187-189.
- Cunningham, M.J., Rapee, R.M., & Lyneham, H.J. (2006). *The Cool Teens CD-ROM: A multimedia self-help program for adolescents with anxiety*. *Youth Studies Australia* 25, 50-56.
- Cunningham, M.J., Rapee, R.M., Lyneham, H.J., Schniering, C.A., Hudson, J.L., & Wuthrich, V. (2006). *The Cool Teens CD-ROM - An anxiety management program for young people*. *Macquarie University Anxiety Research Unit (MUARU)*: Sydney.
- Cunningham, M.J., Donovan, C.L., & March, S. (2007). Developing and Delivering Computer-based CBT for Anxiety Disorders in Young People. In D. Einstein, (Ed). *Innovations and Advances in Cognitive Behaviour Therapy*. Sydney: Australian Academic Press.
- Cunningham, M.J., Wuthrich, V.M., Rapee, R.M., Lyneham, H.J., Schniering, C.A., & Hudson, J.L. (2008). The Cool Teens CD-ROM for anxiety disorders in adolescents: A pilot case series. *Eur Child Adolesc Psychiatry*. 2008 Jun 18. [Epub ahead of print].
- Cunningham, M.J. & Wuthrich, (2008). Examination of Barriers to Treatment and User Preferences With Computer-based Therapy Using The Cool Teens CD for Adolescent Anxiety. *Electronic Journal of Applied Psychology*.
- Davis, M.A., Quittner, A.L., Stack, C.M., & Yang, M.C. (2004). Controlled evaluation of the STARBRIGHT CD-ROM program for children and adolescents with Cystic Fibrosis. *J Pediatr Psychol*, 29, 259-67.
- Department of Health and Ageing. (2004). *Responding to the Mental Health Needs of Young People in Australia. Discussion Paper: Principles*

- and Strategies*. Retrieved July 19, 2008, from <http://www.health.gov.au/internet/main/publishing.nsf/Content/mental-pubs-r-respond-toc>
- Dewis, L.M., Kirkby, K.C., Martin, F., Daniels, B.A., Gilroy, L.J., & Menzies, R.G. (2001). Computer-aided vicarious exposure versus live graded exposure for spider phobia in children. *J Behav Ther Exp Psychiatry*, 32, 17-27.
- Di Noia, J., Schwinn, T.M., Dastur, Z.A., & Schinke, S.P. (2003). The relative efficacy of pamphlets, CD-ROM, and the Internet for disseminating adolescent drug abuse prevention programs: an exploratory study. *Preventive Medicine*, 37, 646-653.
- Dragone, M.A., Bush, P.J., Jones, J.K., Bearison, D.J., & Kamani S. (2002). Development and evaluation of an interactive CD-ROM for children with leukemia and their families. *Patient Educ Couns*, 46, 297-307.
- Griffiths, K.M. & Christensen, H. (2006). Review of randomised controlled trials of Internet interventions for mental disorders and related conditions. *Clinical Psychologist*, 10, 16-29.
- Mission Australia. (2005). 2004 National Youth Survey. Moved on Mission Australia website.
- Khanna, M.S. & Kendall, P.C. (2008) Computer Assisted CBT for Child Anxiety: Development of the Coping Cat CD Rom. *Cognitive and Behavioral Practice*, 15, 159-165.
- O’Kearney, R., Gibson, M., Christensen, H., & Griffiths, K.M. (2006). Effects of a cognitive-behavioural Internet program on depression, vulnerability to depression and stigma in adolescent males: A school based controlled trial. *Cognitive Behaviour Therapy*, 35, 43-54.
- O’Kearney R., Kang C., Christensen H., & Griffiths K.M. (2008). A Controlled Trial of a School-based Internet Program for Reducing Depressive Symptoms in Adolescent Girls. *Depression & Anxiety*. [Epub ahead of print]
- Richards, C. & Scott, E. (2004). The development and evaluation of a depression CD-ROM and website for adolescents. EABCT conference proceedings, Manchester, UK. Accessed January 2007, no longer available online.
- Robinson, A., Smith, P., Abeles, P., Proudfoot, J., Verduyn, C., & Yule, W. (2004) Stressbusters: Developing an interactive multimedia CD-ROM for the treatment of depression in adolescents. EABCT conference proceedings, Manchester, UK. Accessed January 2007, no longer available online.
- Spek, V., Cuijpers, P., Nyklicek, I., Riper, H., Keyzer, J., & Pop, V. (2006). Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: a meta-analysis. *Psychological Medicine*, 20, 1-10.
- Spence, S.H., Donovan, C.L., March, S. Gamble, A. Anderson, R., Prosser, S. Kercher, A., & Kenardy, J. (2008) Online CBT in the Treatment of Child and Adolescent Anxiety Disorders: Issues in the Development of BRAVE-ONLINE and Two Case Illustrations. *Behavioural and Cognitive Psychotherapy*, 36, 411-430.
- Spence, S. H., Holmes, J. M., March, S., & Lipp, O. V. (2006). The Feasibility and Outcome of Clinic Plus Internet Delivery of Cognitive-Behavior Therapy for Childhood Anxiety. *Journal of Consulting and Clinical Psychology*, 74, 614-621.
- Webb, M., Sullivan, C., & Nicholas, J. (2006, October). Using the Internet and Game Based Technologies to Promote Health to Young People. Presentation, AACBT Annual Conference, Sydney.

Research Profile

Mike Cunningham (PhD, MPhil, DipIT) is a medical editor and instructional designer of computer-based programs for healthcare education and services. He is particularly focused on the application of technology for delivering psychotherapy and in pursuing international collaboration to evaluate translated and transcultural versions of effective programs.

Correspondence to: Mike Cunningham
Centre for Emotional Health (CEH), Dept. of Psychology, Macquarie University,
Sydney NSW 2109 Australia
mjccunning@hotmail.com