Adm Policy Ment Health (2013) 40:87–95
DOI 10.1007/s10488-011-0377-5

ORIGINAL PAPER

The Dissemination of Computer-Based Psychological Treatment: A Preliminary Analysis of Patient and Clinician Perceptions

Matthew M. Carper · R. Kathryn McHugh · David H. Barlow

Published online: 15 October 2011

Abstract Computerized cognitive behavioral therapy is an efficacious treatment for anxiety and depression with the potential to improve access to evidence-based care. However, its adoption in clinical practice in the US has been low and thus there is a need for identification of barriers to its use. We examined treatment-seeking patient ($n = 55$) and clinician ($n = 26$) perceptions of computer-based psychological treatment (CBPT) using Diffusion of Innovations theory as a conceptual framework. Diffusion of Innovations theory emphasizes potential adopter perceptions as being key to understanding adoption decisions, thus making it an ideal framework for evaluating barriers to use. Overall, treatment-seeking patients held slightly negative perceptions of CBPT, while clinicians' perceptions were more neutral. In both groups, perceptions of observability (seeing or hearing about the treatment in use) were rated lowest. Implications for dissemination efforts and suggestions for future research are discussed.

Keywords Computers · Technology · Dissemination · Diffusion of innovations · Depression · Anxiety

M. M. Carper · R. K. McHugh · D. H. Barlow
Center for Anxiety and Related Disorders, Department of Psychology, Boston University, Boston, MA, USA

M. M. Carper (✉)
Child and Adolescent Anxiety Disorders Clinic, Department of Psychology, Temple University, 1701 North 13th Street, Philadelphia, PA 19122-6085, USA
e-mail: matthew.carper@temple.edu

Introduction

Despite the importance of increasing access to evidence-based practice (President's New Freedom Commission 2004; U.S. Department of Health and Human Services 1999) the dissemination of empirically supported psychological treatments (ESTs) from research centers to service delivery organizations remains a major challenge to the field (e.g., Budman et al. 2003; McHugh and Barlow 2010; Miller et al. 2006). In recent years, information technology has been increasingly used as a novel means to improve the transportability of ESTs and facilitate successful dissemination and implementation. Computer- and Internet-based interventions, such as computerized cognitive behavioral therapy are a particularly promising application of this technology. Computer-based psychological treatments (CBPTs) utilize a computer-based delivery method for psychological treatments and have been used as an adjunct to treatment-as-usual or as a stand-alone intervention. Excitement about the benefits of CBPT is evident in the proliferation of computerized programs for anxiety (e.g., Roy-Byrne et al. 2010; Sullivan et al. 2007), mood (e.g., Proudfoot et al. 2003; Wright et al. 2002), eating (e.g., Celio et al. 2000), and substance use disorders (e.g., Carroll et al. 2008).

Many studies of CBPT have demonstrated that this delivery method can achieve good clinical outcomes, with the strongest support to date for depression and anxiety (for review, see Reger and Gahm 2009; Spek et al. 2007). For example, a meta-analysis of 19 randomized controlled trials of treatment for anxiety disorders found that outcomes of CBPT were superior to waitlist and placebo groups and similar to those of traditional face-to-face psychotherapy (Reger and Gahm 2009). Direct comparisons of CBPT and face-to-face therapy have also yielded promising results for

CBPT (e.g., Kenardy et al. 2003). For example, a randomized trial of CBPT for panic disorder found no significant differences in outcome between the CBPT intervention and face-to-face cognitive behavioral therapy (CBT; Kiropoulos et al. 2008). CBPT may also yield cost advantages relative to traditional psychotherapy (Alleman 2002; Chester and Glass 2006), including favorable cost-offset (Department of Health 2007).

The potential advantages of this method of delivery of psychological services are numerous. Given recent estimates that 77% of North Americans, 61% of Oceana's and Australia's inhabitants, and 58% of Europeans have access to the Internet (Internet World Statistics 2011), the potential reach of CBPT is exceptionally broad. As such, CBPT could provide access to services for populations for whom these services were previously unavailable, such as those with geographic, health, language, transportation, and other barriers to treatment access (Chester and Glass 2006; Griffiths and Christensen 2007; Haberstroh et al. 2007; Rochlen et al. 2004). Further advantages of CBPT include potentially mitigating the stigma of seeking psychological services (Gega et al. 2004), decreasing the amount of clinician time needed for each patient (thus, increasing the number of clinician hours available to meet the growing demand for services; Kaltenthaler et al. 2008), and the ability to function as an adjunct to face-to-face therapy (e.g., to clarify and reinforce treatment concepts; Anderson et al. 2004).

Despite its many potential advantages and support for its efficacy, rates of adoption of CBPT in the US remain low. Available data on perceptions of and barriers to use of CBPT are limited and existing studies have reported mixed findings. In studies of patients or potential CBPT consumers, researchers have identified both perceived benefits of CBPT (e.g., anonymity and convenience; Young 2005) as well as perceived limitations (e.g., the loss of the therapeutic alliance due to the absence of nonverbal cues; Haberstroh et al. 2007; Rochlen et al. 2004). In general, results have suggested that CBPT is perceived as less favorable relative to face-to-face therapy (Chang and Chang 2004; Leibert et al. 2006; Rochlen et al. 2004); however, results have been equivocal. In a postal survey of individuals responding to a teletext article on the BBC on self-help therapies for OCD and agoraphobia, Graham et al. (2000) found that 91% of responders indicated they wanted access to self-help services via a computerized program. Stallard et al. (2010) examined perceptions of CBPT among youth and parents of youth attending mental health services and found that roughly three quarters of the youth surveyed indicated a preference for receiving face-to-face treatment relative to CBPT; parents, on the other hand, tended to have positive perceptions of CBPT. Similarly, in a study examining individual differences between individuals who prefer to receive mental health information in person and those who prefer to receive mental health information via a computer, Klein and Cook (2010) found that over 75% of respondents preferred face-to-face therapy to CBPT. However, the authors also found that although a vast majority of their sample was willing to try CBPT, many had limited knowledge about the intervention (Klein and Cook 2010).

Given these equivocal findings, more research is needed to understand barriers to use. A particularly promising strategy for evaluating perceptions of use is to draw from theories of dissemination and implementation. For example, several models of dissemination emphasize the characteristics of potential adopters as key to the spread of an innovation (e.g., Brown 1995; Rogers 2003). Such perspectives linking dissemination and implementation science to the study of perceptions may aid in advancing understanding of the adoption and utilization of these treatments.

The present study aims to use a widely accepted dissemination theory to evaluate perceptions of CBPT among clinicians and patients who presented to a specialty clinic seeking treatment for anxiety and/or depression. The aims of this study were threefold: (a) to use a dissemination theory framework to evaluate patient and clinician perceptions of CBPT, (b) to examine whether individual difference variables are associated with perceptions of CBPT, and (c) to determine relative patient preferences for various types of CBPT that are currently available. In this exploratory study, we used Diffusion of Innovations theory (Rogers 2003) as a framework for defining and evaluating categories of perceptions hypothesized to be associated with adoption. Rogers (2003) identified five categories of perceived characteristics of an innovation that influence the adoption rate—*relative advantage* (degree to which an innovation is better than alternatives), *compatibility* (degree to which an innovation fits with one's beliefs and preferences), *complexity* (degree to which an innovation is difficult to use), *trialability* (degree to which one is able to use an innovation on a trial basis), and *observability* (how frequently one sees an innovation being used and/or knows someone who uses the innovation; Rogers 2003). The relevance of these five domains has been supported across varied disciplines (e.g., agriculture, medicine, information technology).

We hypothesized that greater comfort with the Internet and lower age would be associated with positive perceptions of CBPT among patients. These associations were chosen because those with greater comfort using the Internet might feel more comfortable interacting with a clinician using this medium; similarly, those who have used computers for more of their lives (e.g., younger individuals) might be more accepting of a computer's role in the psychotherapy process. Indeed, younger individuals

use the Internet to seek information regarding their health more often than older individuals (Cotten and Gupta 2004). Additionally, we hypothesized that distance from psychological services would be positively associated with patient perceptions, such that those farther from services would have more favorable perceptions given the potential barrier of distance to receiving face-to-face therapy. In the clinician group, we hypothesized that age would be negatively associated with perceptions.

Method

Participants

Adult patients age 18 and older seeking treatment at the Center for Anxiety and Related Disorders (CARD) for a unipolar depressive or anxiety disorder and clinicians specializing the in treatment of anxiety and depression were recruited for this study. Potential participants in the patient group were identified from a review of intake assessments, and eligible participants were contacted by phone or responded to posted advertisements. In order to be eligible for the study, potential participants in the patient group had to receive a clinical level diagnosis of a unipolar depressive or anxiety disorder based on a structured clinical interview. In order to provide a sample naïve to CBPT, and thus more representative of the population as a whole, interested participants were instructed to complete the survey only if they had not received CBPT in the past. However, no individual screened for eligibility reported receiving this form of treatment previously.

Participants in the patient group were 55 adults (35 female, 19 male, 1 transgendered) aged 18–64 years (M = 30.7, SD = 11.5). Ninety-one percent of participants were Caucasian and 9.1% identified themselves as of Spanish origin, Hispanic, or Latino/a. Participants were highly educated, with 29% having completed some college, 40% with a college degree, and 27% with a graduate degree; one participant did not report this information. At the time of assessment, 10.9% of participants were students, 23.6% were unemployed, 16.4% worked part time, and 40% worked full time; one participant did not report this information.

Participants in the clinician group were identified if they delivered ESTs for mood and/or anxiety disorders on a regular basis (e.g., with greater than 50% of their patients) and worked in one of two local-area outpatient treatment facilities, including CARD. Study staff contacted potential participants via email and provided a link to the web-based questionnaire battery.

Participants in the clinician group were 26 adults (23 female, 3 male) aged 24–41 (M = 29.8, SD = 3.6). Eighty-five percent of participants were Caucasian and 3.8% of participants identified themselves as of Spanish origin, Hispanic, or Latino/a; one participant did not report this information. Fifty-four percent of clinicians held a Ph.D., 42.3% held a M.A. or M.S., and 7.7% obtained a B.A. or B.S. Of the 26 clinicians, 24 reported that they delivered ESTs with greater than 75% of their patients. The majority (84.6%) of clinicians reported working primarily in an outpatient treatment facility and only one participant had previous experience utilizing CBPT. Participants in both groups provided informed consent, and the study received approval from the Boston University Institutional Review Board.

Procedures

Data were collected via SurveyMonkey, a web-based data collection program. Following initial screening to determine eligibility in the patient group (there was no screening for the clinician group), participants were provided with the information needed to access the data collection program. Informed consent was obtained through the program. In the patient group, 55 participants provided informed consent and completed study procedures; 7 participants provided informed consent and did not complete the study; and 3 participants declined informed consent. In the clinician group, 26 participants provided informed consent and completed study procedures; 4 participants provided informed consent and did not complete the study. Following provision of consent, participants were asked to read a brief description of CBPT before completing study measures.[1]

Measures

Participants completed the self-report questionnaires described below. Following completion of the questionnaires, participants in the patient group read descriptions of several delivery methods of CBPT and were asked to rank their preference for each, from most to least preferred if they were to receive CBPT in the future. This method was used successfully in a recent study to evaluate patient preferences for therapeutic modalities in the treatment of posttraumatic stress disorder (Becker et al. 2007). Therapy descriptions were modeled after those in the available literature and included descriptions for the most common types of CBPT based on recent reviews (Chester and Glass 2006): email-based psychotherapy, instant-message-based psychotherapy, webcam-based psychotherapy, CBPT in a primary care setting, CBPT with reduced therapist support,

[1] Text of this description is available upon request from the corresponding author.

and purely self-help CBPT. The theoretical orientation of CBPT was not specifically discussed in the therapy descriptions because the focus was on perceptions of the delivery method and not the specific treatment itself. Additionally, patients were asked to report distance from mental health services, length of time using the Internet, and to rate their comfort with using the Internet on a 10-point Likert-type scale anchored from 1 (not at all) to 10 (extremely).

Demographics Questionnaire

A short demographics questionnaire was provided to participants in the patient group asking them to rate their age, gender, ethnicity, race, education, estimated annual income, area of residence (e.g., rural, urban, suburban), distance to mental-health services, length of time using the Internet, comfort using the Internet, employment status, and marital status. In the clinician group, participants were asked to report their age, gender, ethnicity, race, education, estimated percentage of patients with whom they deliver ESTs, work setting, and previous experience delivering CBPT.

Perceptions of Computerized Therapy Questionnaire: Patient and Clinician Versions (PCTQ -P & -C)

The PCTQ (Carper et al. 2010) are 39—(PCTQ-P) and 45-item (PCTQ-C) self-report questionnaires designed to assess patient and clinician perceptions of CBPT in accordance with Diffusion of Innovations theory (Rogers 2003). The PCTQ was loosely adapted from Moore and Benbasat's (1991) Perceived Characteristics of Innovating scale (PCI), a measure designed to assess individuals' perceptions of an information technology innovation (based on Diffusion of Innovations theory). We also included two questions evaluating *future use intentions*—allowing participants to rate their likelihood of using CBPT in the future. As behavioral intentions are a robust predictor of behavior, and intentions to use an innovation are associated with subsequent usage (e.g., Davis et al. 1989), intentions may serve as a rough proxy for future adoption.

Initial items for inclusion in the PCTQ were developed after a thorough review of the literature on CBPT and item structure was adapted from the PCI. The resultant item content was then adapted to create both a 39-item patient version (PCTQ-P) and a 45-item clinician version (PCTQ-C) assessing perceptions of relative advantage (e.g., PCTQ-P: "Receiving computerized therapy would save money relative to other treatment options." PCTQ-C: "Delivering computerized therapy would make it easier for patients to access therapy."), compatibility (e.g., PCTQ-P: "I think that receiving computerized therapy would fit well with the way I like to receive therapy." PCTQ-C: "I think that delivering computerized therapy would fit well with the way I like to deliver therapy."), complexity (e.g., PCTQ-P: "Learning to operate a computerized therapy program would be easy for me." PCTQ-C: "I believe I have adequate training to deliver computerized interventions."), observability (e.g., PCTQ-P: "In my social circle, I know people who receive computerized therapy." PCTQ-C: "Among my social/professional connections, I know people who deliver computerized therapy."), trialability (e.g., PCTQ-P and PCTQ-C: "Before deciding whether to use any computerized therapy programs, I would be able to properly try them out."), and future use intentions (e.g., PCTQ-P: "If I were to seek therapy in the future, I would consider computerized therapy." PCTQ-C: "I would consider using a computerized therapy program with my patients."). Responses are rated on a Likert-type scale anchored from 1 ("strongly disagree") to 7 ("strongly agree"). A panel of three psychologists evaluated the face validity of these versions. The PCTQ-P has demonstrated adequate internal consistency on all subscales (Cronbach's α's = 0.66–0.89) with the exception of trialability (α = 0.25) and good evidence of concurrent validity (Carper et al. 2010). Because of low α values for trialability, this subscale was dropped from the analysis.

Attitudes Toward Seeking Professional Psychological Help Scale Shortened Form (ATSPPH-SF)

In the patient group, the ATSPPH-SF (Fischer and Farina 1995), a 10-item self-report measure was also administered. The ATSPPH-SF uses a Likert-type scale ranging from 0 (disagree) to 3 (agree), with higher scores reflecting more positive attitudes toward seeking professional psychological help. The ATSPPH-SF has been found to be reliable (α = 0.86), and responses have been found to be stable over time (test–retest reliability over 4-week period was 0.80; Fischer and Farina 1995). In the present study, the ATSPPH-SF was used to determine if attitudes toward CBPT were distinct from general attitudes toward seeking psychological help.

Statistical Analysis

To examine our first aim, the evaluation of perceptions of CBPT, descriptive statistics were utilized to characterize mean levels of patient and clinician perceptions with respect to Rogers' (2003) five factors that may influence adoption. One sample *t*-tests were conducted with a comparison value of 0 to determine whether mean scores on the subscales of the PCTQ were significantly different from neutral. Our second aim, to determine if individual difference variables are associated with perceptions of CBPT, was evaluated using uncorrected Pearson's correlations between subscale

scores on the PCTQ-P, time using the Internet, distance from mental health services, and age in the patient group. The association between age and subscale scores on the PCTQ-C was evaluated in the clinician group using uncorrected Pearson's correlations. In addition, correlations were calculated to examine the concurrent and discriminant validity of the PCTQ-P with respect to the ATSPPH-SF. To evaluate our third aim, to determine relative patient preferences for various forms of CBPT, descriptive statistics were utilized to determine the frequency at which responses were rated as the top, top two, bottom, or bottom two choices. This study was adequately powered to detect medium to large effect sizes for each of these aims.

Results

Analyses for skewness revealed that age and the subscales of the PCTQ were approximately normally distributed and reflected an adequate range of scores. In addition to calculating subscale scores on the PCTQ, we also calculated a total-item score by averaging all measure items to create a global index of patient perceptions of CBPT. We then performed a linear transformation of scores on the PCTQ so a score of 0 would indicate neutral perceptions; thus, scores on the PCTQ can range from −3 (reflecting strongly negative perceptions) to 3 (reflecting strongly positive perceptions).

Descriptive Analyses

The distribution of scores on the PCTQ-P and PCTQ-C are presented in Table 1. In the patient group, participant scores reflected neutral to somewhat negative perceptions of CBPT overall. Mean scores on each of the subscales are as follows: relative advantage = −0.20 (SD = 0.76); compatibility = −0.17 (SD = 1.00); complexity = 0.21 (SD = 0.84); and observability = −2.52 (SD = 0.89); and total score = −0.35 (SD = 0.69). The patient group reported low future use intentions ($M = -1.19$, SD = 1.42), reflecting a small to moderate tendency not to pursue this treatment modality in the future. Perceptions of observability, $t(55) = -21.10$, $P < 0.001$, future use intentions, $t(55) = -6.24$, $P < 0.001$, and total scores, $t(55) = -3.74$, $P < 0.001$ were significantly different from neutral. Perceptions of relative advantage, $t(55) = -1.98$, $P = 0.05$, and complexity, $t(55) = 1.86$, $P = 0.07$ were marginally significantly different from neutral.

A different pattern of perceptions emerged in the clinician group, with scores on the PCTQ-C reflecting neutral perceptions on average. Mean scores on the PCTQ-C are as follows: relative advantage = −0.01 (SD = 0.64); compatibility = 0.13 (SD = 1.19); complexity = −0.13 (SD = 0.98); observability = −0.87 (SD = 1.68); and total score = −0.05 (SD = 0.79). Future use intentions also were approximately neutral ($M = 0.13$, SD = 1.41). Only perceptions of observability, $t(25) = -2.64$, $P \leq 0.01$, were significantly different from neutral.

Table 1 Distribution of scores on the PCTQ-P ($n = 55$) and PCTQ-C ($n = 26$)

	Mean (SD)	Range
Patient group (PCTQ-P)		
Relative advantage	−0.20 (0.76)	−2.08–1.58
Compatibility	−0.17 (1.00)	−2.50–1.88
Complexity	0.21 (0.84)	−3.00–1.62
Observability	−2.52 (0.89)	−3.00–1.00
Trialability	−0.15 (0.85)	−2.67–1.33
Future use intentions	−1.19 (1.42)	−3.00–1.50
Total score	−0.35 (0.69)	−2.56–0.92
Clinician group (PCTQ-C)		
Relative advantage	−0.01 (0.64)	−1.00–1.12
Compatibility	0.13 (1.19)	−2.33–1.67
Complexity	−0.13 (0.98)	−2.22–1.44
Observability	−0.87 (1.68)	−3.00–3.00
Trialability	0.12 (0.72)	−1.00–1.67
Future use intentions	0.13 (1.41)	−2.50–2.00
Total score	−0.05 (0.79)	−1.64–1.17

Association Between Attitudes Toward Psychological Help and Perceptions

The ATSPPH-SF ($M = 2.29$, SD = 0.45) did not exhibit significant correlations with relative advantage ($r = 0.11$, ns), complexity ($r = 0.07$, ns), observability ($r = -0.12$, ns), future use intentions ($r = 0.13$, ns), or total scores on the PCTQ-P ($r = 0.16$, ns). These findings suggest that perceptions of CBPT are distinct from general attitudes toward seeking professional psychological help. However, the association between the ATSPPH-SF and compatibility approached significance ($r = 0.24$, $P = 0.08$), suggesting that perceptions of compatibility may be more strongly associated with general help seeking attitudes than other types of perceptions.

Association Between Perceptions and Use Intentions

Among patients, all subscales on the PCTQ-P exhibited significant positive correlations in a moderate to large magnitude with future use intentions: relative advantage ($r = 0.70$, $P < 0.001$), compatibility ($r = 0.77$, $P < 0.001$), complexity ($r = 0.39$, $P < 0.01$), observability ($r = 0.34$, $P \leq 0.01$), and the total score ($r = 0.79$, $P < 0.001$).

Future use intentions were significantly and strongly correlated with all PCTQ-C subscales in the clinician

group: relative advantage ($r = 0.76$, $P < 0.001$), compatibility ($r = 0.92$, $P < 0.001$), complexity ($r = 0.66$, $P < 0.001$), observability ($r = 0.41$, $P < 0.05$), and total score ($r = 0.89$, $P < 0.001$).

Individual Difference Variables and Perceptions

In the patient group there was a substantial ceiling effect on the comfort using the Internet scale (only 5 participants rated comfort using the Internet as less than an 8 on a 10-point scale); hence, this was removed from the planned analysis. No significant association was found between age and relative advantage ($r = 0.11$, $P =$ ns), compatibility ($r = 0.18$, $P =$ ns), complexity ($r = -0.08$, $P =$ ns), observability ($r = -0.14$, $P =$ ns), or future use intentions ($r = 0.18$, $P =$ ns). Similarly, no significant association was found between distance from services and relative advantage ($r = -0.02$, $P =$ ns), compatibility ($r = 0.07$, $P =$ ns), complexity ($r = -0.16$, $P =$ ns), observability ($r = -0.14$, $P =$ ns), or future use intentions ($r = 0.18$, $P =$ ns) in the patient group.

In the clinician group, age was not significantly associated with scores on relative advantage ($r = 0.04$, $P =$ ns), compatibility ($r = -0.17$, $P =$ ns), complexity ($r = -0.13$, $P =$ ns), observability ($r = 0.19$, $P =$ ns), or future use intentions ($r = -0.11$, $P =$ ns).

Patient Ranking of Types of CBPT

In evaluating relative patient preferences for various CBPT programs currently available, we followed the procedures used by Becker et al. (2007) and only report analyses of participants' two most preferred and two least preferred forms because participants are likely to have stronger attitudes toward their most and least preferred treatments. The rank order of patient relative preferences is presented in Table 2. Webcam-based CBT emerged as the most preferred therapy and was selected as the top choice by 36.4% of participants. This was followed by CBPT with reduced therapist support, in a primary care setting, instant message-based, email-based, and purely self-help.

Purely self-help CBPT emerged as the least preferred modality, selected as such by 60.0% of participants, and identified as one of the bottom two choices by 74.5% of participants. CBPT with reduced therapist support was identified in the bottom two rankings by the fewest number of participants (20%).

Table 2 Rank order of the percentage of participants' choosing each form of CBPT

Form	Top choice (%)	First or second choice (%)
Webcam-based	36.4	63.6
With reduced therapist support	23.6	29.1
In a primary care setting	12.7	29.1
Instant-message-based	12.7	40.0
Email-based	9.1	21.8
Purely self-help	5.5	9.1
	Last choice (%)	Last or second-to-last choice (%)
Purely self-help	60	74.5
Email-based	14.5	40.0
In a primary care setting	10.9	21.8
Instant-message-based	9.1	21.8
Webcam-based	3.6	21.8
With reduced therapist support	1.8	20.0

Discussion

This study examined perceptions of CBPT among clinicians and treatment-seeking individuals using a novel measure derived from Diffusion of Innovations theory (Rogers 2003). The results are consistent with low adoption rates of this modality, most notably demonstrating a lack of knowledge about the availability of CBPT. Contrary to our initial hypothesis, these perceptions were not associated with age or distance from psychological services; however, the variability of scores in this highly educated, treatment-seeking sample may have limited the ability to detect these associations. Several patterns emerged in the evaluation of patient and clinician perceptions that may be used to inform strategies for disseminating CBPT. Of importance when considering these results is the distinction between negative views of CBPT and negative values with respect to factors that may influence adoption. For example, observability (how often one sees an innovation being used) was rated as very low among the patient group, reflecting a lack of access to information about CBPT. Thus, this does not reflect that patients do not find CBPT to be preferable or acceptable, but rather that they do not know much about it. Interpretation of results on the PCTQ should be considered in the context of likelihood of adoption and not patient acceptability.

The most negatively rated characteristic in the patient and clinician groups was observability, with patient perceptions of this domain well below neutral levels. Low scores on observability may be particularly problematic for adoption rates given its potential impact on other areas of perceptions. Indeed, perceived benefits such as relative advantage (degree to which an innovation is perceived as better than alternatives) may have been mitigated in this

sample because of this lack of knowledge about the intervention.

Complexity (how difficult to use an innovation is perceived to be) is the dimension on which patients and clinicians held discrepant perceptions, though it should be noted that neither the patient nor clinician groups' scores on this domain were significantly different from neutral. This is likely due to the fact that patients only need to have familiarity with computers in order to utilize CBPT interventions, whereas clinicians may be required to undergo training. However, most CBPT programs require relatively little training to deliver (Green and Iverson 2009). Accordingly, emphasizing the ease of use of these interventions to clinicians might increase positive perceptions of CBPT's complexity, and thus facilitate the adoption of such interventions among clinicians.

Analysis of individual items on the PCTQ supported many of the previously hypothesized advantages to using CBPT (for review, see Rochlen et al. 2004; Taylor and Luce 2003; Titov 2007), including reduced cost, easier access to psychotherapy services, and flexibility to individual needs. However, contrary to Young (2005), participants in both groups did not perceive the anonymity offered by CBPT to be advantageous (scores were neutral). This could have been due to differences in participant populations, as participants in the current study were already seeking face-to-face treatment; hence, they were less likely to perceive anonymity as advantageous. Additionally, participants did not perceive that CBPT would include sufficient patient-clinician contact. Studies have found that a greater level of clinician support is associated with better outcomes (see Spek et al. 2007), lower attrition rates (see Titov 2007), and is generally more accepted by patients (Kenwright et al. 2005). As costs increase with additional clinician support, it is important to determine the optimal level of support to maximize cost benefits and patient acceptability (Craske et al. 2009).

Taken together, our findings indicate that patients held neutral to slightly negative perceptions of CBPT in this sample, and reported low intentions to use CBPT in the future. Clinical providers in our sample held neutral perceptions and slightly positive future use intentions. Based on these results, we provide several suggestions for targeting these perceptions as potential barriers to the dissemination of CBPT. These suggestions may also be used for disseminating CBPT more generally, but we specifically focus on CBPT because of the large evidence base supporting its efficacy.

Among both patients and clinicians, observability will be critical to increasing adoption rates. Several strategies may facilitate greater awareness of CBPT, including targeted dissemination and marketing efforts. For example, promoting development and adoption of CBPT programs designed for utilization on the organizational level (i.e., by primary care providers, HMOs, or insurance companies) may increase the number of patients introduced to this intervention. Programs specifically developed for use in primary care settings, such as the *Coordinated Anxiety Learning and Management (CALM)* program (Roy-Byrne et al. 2010) and the related *CALM Tools for Living* system (Craske et al. 2009) have demonstrated preliminary feasibility and effectiveness in these settings.

Moreover, referring patients to a free, empirically supported self-help website such as *MoodGym* or *BluePages* to patients on wait lists to receive treatment, or as an adjunct to traditional face-to-face therapy might allow clinicians to observe the effects of these programs and ultimately lead them to consider adoption. Such referrals would have the added benefit of allowing patients to see a reduction in symptoms prior to entering more intensive face-to-face treatment and to experiment with CBPT programs while still under the care of their clinician. As patients and clinicians begin to see such programs being used, they may gain a better understanding of the conditions under which they would consider utilizing CBPT. In increasing access to information about the benefits of CBPT and encouraging trials of these interventions in both patient and clinician groups, a more rapid spread of information may be seen. In addition, it will be important to test the effectiveness of any strategy to disseminate CBPT on changing perceptions and increasing adoption rates.

To our knowledge, the PCTQ is the first measure of Rogers' (2003) five characteristics for use in psychological treatment dissemination research. The authors are currently evaluating the psychometric properties of the PCTQ in more detail, with attention focused on constructing an adequate subscale for trialability (Carper et al. 2010). Results from the present study indicated that perceptions of the four characteristics studied were strongly associated with future use intentions, suggesting the utility of the PCTQ in future dissemination research. Given that Rogers' (2003) five attributes are inherent characteristics of each innovation, measurement of them at regular intervals throughout a clinical trial—or with different populations—could yield important information regarding changes, or differences, in patient acceptability of novel modalities, ultimately leading to the more successful and population-specific dissemination of psychotherapies. Information on patient perceptions will be critical to informing targeted dissemination efforts based on areas of misinformation and lack of access to information. The current study provides preliminary data on the perceptions of a particularly relevant patient group—treatment-seeking patients diagnosed with unipolar depressive and anxiety disorders who are potential consumers of this modality—and thus can be used to inform strategies to market and otherwise disseminate

CBPT. Additional research in diverse samples will be important to understanding the informational needs of different groups. In addition, the PCTQ is a novel measure that can be used to compare groups within and across studies, and thus has the potential to facilitate a more rapid growth of a literature currently characterized by disparate measurement strategies.

The present study has several limitations. First, both patient and clinician samples were homogeneous relative to socio-demographic variables (e.g., primarily Caucasian and female), thus limiting generalizability of results and the ability to detect associations between perceptions and these variables. Although the rates of emotional disorders are higher in women (Kessler et al. 2005) and the proportion of women is higher than men in psychology graduate training programs (Hart et al. 2010), the proportion of women in this study is likely higher than these base rates. Additionally, since both patient and clinician groups were invited by study staff to participate in the present study, the risk of selection bias may limit the generalizability of the present findings. Further evaluation of perceptions in different settings and with different groups will be needed to identify potential group differences in perceptions that may inform dissemination efforts. The use of web-based data limited our sample to persons who have access to a computer, which further adds to sample homogeneity and may influence the range of perceptions (notably, no participants declined participation due to not having access to a computer). Finally, participants in the patient group presented to a specialty clinic offering face-to-face therapy, which presumably indicates that they feel comfortable with seeing a therapist in person and have access to therapy services in their area. Thus, perceptions of CBPT among this group differ relative to those who do not feel comfortable seeing a therapist in person or have limited access to such services.

There are several important areas for future research. Evaluation of perceptions in diverse patient groups, including those with poor access to mental health care will be important to understanding perceptions in these groups. Potential moderating variables, such as stigma, will also be important to understanding perceptions in certain groups. Additionally, identification of patterns of perceptions in certain individuals may help to identify groups that may be more amenable to adopting CBPT to serve as a first target for efforts to disseminate these treatments, thus facilitating the spread of adoption across groups (see Rogers 2003). Finally, the use of mixed qualitative–quantitative designs may be particularly well-suited to research in this new area of inquiry to inform measure development and validation and to provide information to guide dissemination efforts by capturing elements of perceptions that may not fit existing theories or may be unique to this modality.

Achieving widespread dissemination of CBPT programs will require collaboration among researchers, policy makers, and clinical providers. However, the advantages offered by this modality make it an important area for focusing research efforts. The results of the present study highlight the need to improve education to the public regarding the availability and efficacy of computerized interventions.

Acknowledgments This project was funded by a grant to Mr. Carper by Boston University's Undergraduate Research Opportunities Program. Mr. Carper is now at the Child and Adolescent Anxiety Disorders Clinic, Department of Psychology, Temple University. Dr. McHugh is now at McLean Hospital/Harvard Medical School.

References

Alleman, J. R. (2002). Online counseling: The Internet and mental health treatment. *Psychotherapy: Theory, Research, Practice, Training, 39*, 199–209.

Anderson, P., Jacobs, C., & Rothbaum, B. O. (2004). Computer-supported cognitive behavioral treatment of anxiety disorders. *Journal of Clinical Psychology, 60*, 253–267.

Becker, C. B., Darius, E., & Schaumberg, K. (2007). An analog study of patient preferences for exposure versus alternative treatments for posttraumatic stress disorder. *Behaviour Research and Therapy, 45*, 2861–2873.

Brown, B. S. (1995). Reducing impediments to technology transfer in drug abuse programming. In T. E. Backer, S. L. David, & G. Soucy (Eds.), *Reviewing the behavioral science knowledge base on technology transfer* (NIDA Research Monograph 155, NIH Publication No. 95-4035). Rockville, MD: National Institude on Drug Abuse.

Budman, S. H., Portnoy, D., & Villapiano, A. J. (2003). How to get technological innovation used in behavioral health care: Build it and they still might not come. *Psychotherapy: Theory, Research, Practice, Training, 40*, 45–54.

Carper, M. M., McHugh, R. K., & Barlow, D. H. (2010). Development and initial validation of the perceptions of computerized therapy questionnaire. In R. K. McHugh. & L. C. Santucci (Chairs). *Dissemination and implementation of computerized CBT*. Symposium conducted at the 44th annual convention for the association for behavioral and cognitive therapies, San Francisco, CA.

Carroll, K. M., Ball, S. A., Martino, S., Nich, C., Babuscio, T. A., Nuro, K. F., et al. (2008). Computer-assisted delivery of cognitive-behavioral therapy for addiction: A randomized trial of CBT4CBT. *American Journal of Psychiatry, 165*, 881–888.

Celio, A. A., Winzelberg, A. J., Wilfley, D. E., Eppstein-Herald, D., Springer, E. A., Dev, P., et al. (2000). Reducing risk factors for eating disorders: Comparison of an Internet- and a classroom-delivered psychoeducational program. *Journal of Consulting and Clinical Psychology, 68*, 650–657.

Chang, T., & Chang, R. (2004). Counseling and the Internet: Asian American and Asian international college students' attitudes toward seeking online professional psychological help. *Journal of College Counseling, 7*, 140–149.

Chester, A., & Glass, C. A. (2006). Online counselling: A descriptive analysis of therapy services on the Internet. *British Journal of Guidance & Counselling, 34*, 145–160.

Cotten, S. R., & Gupta, S. S. (2004). Characteristics of online and offline health information seekers and factors that discriminate between them. *Social Science and Medicine, 59*, 1795–1806.

Craske, M. G., Rose, R. D., Lang, A., Welch, S. S., Campbell-Sills, L., Sullivan, G., et al. (2009). Computer-assisted delivery of cognitive behavioral therapy for anxiety disorders in primary care settings. *Depression and Anxiety, 26*, 235–242.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*, 982–1003.

Department of Health. (2007). *Improving access to psychological therapies (IAPT) programme: Computerised cognitive behavioural therapy (cCBT) implementation guidance*. Retrieved from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_073470.

Fischer, E. H., & Farina, A. (1995). Attitudes toward seeking professional psychological help: A shortened form and considerations for research. *Journal of College Student Development, 36*, 368–373.

Gega, L., Marks, I., & Mataix-Cols, D. (2004). Computer-aided CBT self-help for anxiety and depressive disorders: Experience of a London clinic and future directions. *Journal of Clinical Psychology, 60*, 147–157.

Graham, C., Franses, A., Kenwright, M., & Marks, I. (2000). Psychotherapy by computer: A postal survey of responders to a teletext article. *Psychiatric Bulletin, 24*, 331–332.

Green, K. E., & Iverson, K. M. (2009). Computerized cognitive-behavioral therapy in a stepped care model of treatment. *Professional Psychology: Research and Practice, 40*, 96–103.

Griffiths, K. M., & Christensen, H. (2007). Internet-based mental health programs: A powerful tool in the rural medical kit. *Australian Journal of Rural Health, 15*, 81–87.

Haberstroh, S., Duffey, T., Evans, M., Gee, R., & Trepal, H. (2007). The experience of online counseling. *Journal of Mental Health Counseling, 29*, 269–282.

Hart, B. M., Wicherski, M., & Kohout, J. L. (2010, May). *2008–2009 Master's- and doctoral-level students in U.S. and Canadian graduate departments of psychology: 2010 graduate study in psychology*. Retrieved from the American Psychological Association web site: http://www.apa.org/workforce/publications/10-grad-study/students.aspx.

Internet World Statistics. (2011). *World Internet users statistics news and world population stats*. Retrieved from http://internetworldstats.com/stats.htm.

Kaltenthaler, E., Parry, G., Beverley, C., & Ferriter, M. (2008). Computerised cognitive-behavioural therapy for depression: Systematic review. *British Journal of Psychiatry, 193*, 181–184.

Kenardy, J. A., Dow, M. G. T., Johnston, D. W., Newman, M. G., Thomson, A., & Taylor, C. B. (2003). A comparison of delivery methods of cognitive-behavioral therapy for panic disorder: An international multicenter trial. *Journal of Consulting and Clinical Psychology, 71*, 1068–1075.

Kenwright, M., Marks, I., Graham, C., Franses, A., & Mataix-Cols, D. (2005). Brief scheduled phone support from a clinician to enhance computer-aided self-help for obsessive-compulsive disorder: Randomized controlled trial. *Journal of Clinical Psychology, 61*, 1499–1508.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*, 593–602.

Kiropoulos, L. A., Klein, B., Austin, D. W., Gilson, K., Pier, C., Mitchell, J., et al. (2008). Is Internet-based CBT for panic disorder and agoraphobia as effective as face-to-face CBT? *Journal of Anxiety Disorders, 22*, 1273–1284.

Klein, B., & Cook, S. (2010). Preferences for e-mental health services amongst an online Australian sample. *Electronic Journal of Applied Psychology, 6*, 27–38.

Leibert, T., Archer, J., Jr., Munson, J., & York, G. (2006). An exploratory study of client perceptions of Internet counseling and the therapeutic alliance. *Journal of Mental Health Counseling, 28*, 69–83.

McHugh, R. K., & Barlow, D. H. (2010). Dissemination and implementation of evidence-based psychological treatments: A review of current efforts. *American Psychologist, 65*, 73–84.

Miller, W. R., Sorensen, J. L., Selzer, J. A., & Brigham, G. S. (2006). Disseminating evidence-based practices in substance abuse treatment: A review with suggestions. *Journal of Substance Abuse Treatment, 31*, 25–39.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*, 192–222.

President's New Freedom Commission. (2004). *Report of the president's new freedom commission on mental health*. Retrieved from http://www.mentalhealthcommission.gov/reports/FinalReport/toc.html.

Proudfoot, J., Goldberg, D., Mann, A., Everitt, B., Marks, I., & Gray, J. A. (2003). Computerized, interactive, multimedia cognitive-behavioural program for anxiety and depression in general practice. *Psychological Medicine, 33*, 217–227.

Reger, M. A., & Gahm, G. A. (2009). A meta-analysis of the effects of Internet- and computer-based cognitive-behavioral treatments for anxiety. *Journal of Clinical Psychology, 65*, 53–75.

Rochlen, A. B., Beretvas, S. N., & Zack, J. S. (2004a). The online and face-to-face counseling attitudes scales: A validation study. *Measurement and Evaluation in Counseling and Development, 37*, 95–111.

Rochlen, A. B., Zack, J. S., & Speyer, C. (2004b). Online therapy: Review of relevant definitions, debates, and current empirical support. *Journal of Clinical Psychology, 60*, 269–283.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Roy-Byrne, P., Craske, M. G., Sullivan, G., Rose, R. D., Edlund, M. J., & Stein, M. B. (2010). Delivery of evidence-based treatment for multiple anxiety disorders in primary care: A randomized controlled trial. *JAMA, 303*(19), 1921–1928.

Spek, V., Cuijpers, P., Nyklíček, I., Riper, H., Keyzer, J., & Pop, V. (2007). Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: A meta-analysis. *Psychological Medicine, 37*, 319–328.

Stallard, P., Richardson, T., & Velleman, S. (2010). Clinicians' attitudes towards the use of computerized cognitive behaviour therapy (cCBT) with children and adolescents. *Behavioural and Cognitive Psychotherapy, 38*, 545–560.

Sullivan, G., Craske, M. G., Sherbourne, C., Edlund, M. J., Rose, R. D., Golinelli, D., et al. (2007). Design of the coordinated anxiety learning and management (CALM) study: Innovations in collaborative care for anxiety disorders. *General Hospital Psychiatry, 29*, 379–387.

Taylor, C. B., & Luce, K. H. (2003). Computer- and Internet-based psychotherapy interventions. *Current Directions in Psychological Science, 12*, 18–22.

Titov, N. (2007). Status of computerized cognitive behavioural therapy for adults. *Australian and New Zealand Journal of Psychiatry, 41*, 95–114.

U.S. Department of Health and Human Services. (1999). *Mental health: A report of the surgeon general*. Washington, D.C. Retrieved from http://www.surgeongeneral.gov/library/mentalhealth/home.html.

Wright, J. H., Wright, A. S., Salmon, P., Beck, A. T., Kuykendall, J., Goldsmith, L. J., et al. (2002). Development and initial testing of a multimedia program for computer-assisted cognitive therapy. *American Journal of Psychotherapy, 56*, 76–86.

Young, K. S. (2005). An empirical examination of client attitudes towards online counseling. *CyberPsychology & Behavior, 8*, 172–177.