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Therapist-Assisted, Online (TAO) Intervention for Anxiety in College Students: TAO Outperformed Treatment as Usual

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How can time spent conducting individual psychotherapy go farther? How can psychotherapy make effective use of ubiquitous smartphones, tablets, and laptop computers? Traditional hour-long, face-to-face therapy is effective, but it cannot meet the demand in many mental health sectors and fails to capitalize on emergent communication tools. There is a need for new treatments that are effective but more efficient. Individual treatment that uses online components to reduce, not eliminate, direct contact with the psychotherapist was first used and proven effective in several other countries. It now is being implemented and researched in the United States. This article details the structure, content, and effectiveness of Therapist Assisted Online (TAO) psychotherapy, a 7-week individual treatment for anxiety that uses online tools to keep client engagement and therapeutic intensity high, with a fraction of the therapist time of conventional therapy. TAO treatment pairs online educational materials with brief therapist contact through phone, chat, or video conferencing. This treatment combines 4 tools associated with improved outcomes: text-message reminders, homework on mobile devices, video conference sessions, and weekly progress measures completed by and reviewed with the client. In research conducted at a large university counseling center, TAO clients had greater reductions in anxiety and greater improvement in global mental health, life functioning, and their sense of well-being than treatment-as-usual clients. Although not all anxiety clients are suitable candidates, TAO can treat many clients for whom treatment as usual is not ideal or practical, without fear that client welfare or therapy effectiveness are affected.

Keywords: computer-assisted psychotherapy, affordable psychotherapy, affordable anxiety treatment, Therapist Assisted Online treatment, brief therapist contact

There is currently an urgent need for psychotherapeutic interventions that use less therapist time, with the same or better outcomes than with traditional face-to-face therapy (e.g., Abelson, 2013; American Public Health Association, 2014). Each year 18% of adults in the United States have an anxiety or mood disorder, amounting to more than 41 million people, but only 15 million or 37% receive any treatment (Berger et al., 2011). Anxiety and mood disorders are among the top 10 most costly medical conditions (Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Carlbring et al., 2007; Newman, Szkodny, Llera, & Przeworski, 2011). Total expenses are approximately $42 billion each year and outpatient visits cost $10.5 billion per year.

Insurance companies struggle to reimburse this expensive treatment in the face of ever-increasing demand. Reimbursement rates have been cut in the past 15 years, making it more difficult to maintain a reasonable income level when practitioners consider their time, overhead, and staff costs. Moreover, availability of qualified mental health providers varies by geographical location and community. Even within the same state, appealing and affluent urban areas often have sufficient numbers of mental health pro-

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viders whereas other areas have too few. Traditional psychotherapy is disproportionately accessible to White, urban, and affluent Americans, leaving most of the population with few practical options for treatment (Hauenstein et al., 2007; McGuire & Miranda, 2008).

Traditional strategies to stretch services produce suboptimal outcomes. Such strategies include wait lists, strict session limits, referring clients with more serious problems to less expensive sources of treatment, and extending the time between sessions beyond once a week (Barr, Krylowicz, Reetz, Mistler, & Rando, 2011; Bushong, 2009; Gallagher, 2011). Starting in other countries, most notably Australia, Ireland, the Netherlands, the United Kingdom, and Sweden, so-called low-intensity (defined as reduced direct therapist contact) online treatment has already been developed, implemented, and investigated. In the United States, where 55% of citizens own smartphones, 35% own tablet computers (Moscaritolo, 2013), and 81% regularly use laptops or desktop computers (Fox & Rainie, 2014), therapy that pairs online educational interventions with brief therapist contact has also been shown to be effective (Eells, Barrett, Wright, & Thase, 2014).

These new treatments typically involve brief (15–20 min) individual contact with therapists via phone, video conferencing, or online chat (either synchronous or asynchronous). Bennett-Levy et al. (2010) have observed that,

> The primary purpose of low intensity CBT interventions is to increase access to evidence-based psychological therapies in order to enhance mental health and well-being on a community-wide basis, using the minimum level of intervention necessary to create the maximum gain. Low intensity CBT interventions mainly have been developed to treat clients with mild to moderate psychological disorders, enabling high intensity (traditional psychotherapy) to be reserved for clients with more severe disorders. (p. 8)

These sessions are typically paired with educational materials online or in print.

Randomized controlled trials (RCTs), meta-analyses, and other investigations that support the efficacy of low-intensity, online treatment for clients with anxiety disorders and depression have been internationally widely published (e.g., Andrews et al., 2010; Cape, Whittington, Buszewicz, Wallace, & Underwood, 2010; Carlbring et al., 2007; Cavanagh & Shapiro, 2004; Durham et al., 2005; Griffiths, Farrer, & Christensen, 2010; Klein, Richards, & Austin, 2006; Perini, Titov, & Andrews, 2009; Richardson, Stallard, & Velleman, 2010; Robinson et al., 2010; Titov, Andrews, Choi, Schwencke, & Mahoney, 2008). For example, a meta-analysis of 22 RCTs of low-intensity cognitive–behavioral therapy (CBT) for depression, panic, social phobia, and generalized anxiety disorders documented treatment benefits for all of these disorders. Therapy completion rates were as high as, sometimes higher than, rates for face-to-face treatment and relapse rates were low. In addition, positive gains were evident even at 1-year follow-ups. High adherence rates were attributed to high privacy and convenience and low cost. In short, low-intensity online treatment can be as effective as face-to-face treatment (Andrews et al., 2010).

Despite this research conducted internationally, low-intensity, online treatment is new to the United States. Travers and Benton (2014) surveyed college students at a large, southern, U.S. university regarding their receptivity to low-intensity, online treatment for anxiety. Travers and Benton presented descriptions of three kinds of therapy: face-to-face individual therapy; group psychotherapy; and low-intensity, high-engagement online therapy. They then asked students about their receptivity to each type of therapy and the acceptability to each kind of therapy. Sixteen percent of all respondents, as well as 31% of respondents who had sought treatment in the past, indicated high levels of receptivity to this approach. It is interesting to note that most respondents said they would prefer therapist contact via video conferencing to live electronic chat or contact over the phone.

Development of Therapist Assisted Online Treatment

Energized by Travers and Benton's (2014) findings, a team of researchers and practitioners developed the materials and platform for Therapist Assisted Online (TAO) treatment for anxiety. TAO treatment for anxiety is based on behavioral theories and includes factors associated with improved psychotherapy outcomes. TAO treatment includes several tools to increase daily client engagement while decreasing client time with a therapist. These tools include (a) interactive online educational modules that are based on CBT, mindfulness, and exposure; (b) a weekly, 10- to 12-min video conference with a therapist; (c) three weekly text messages for support and encouragement; (d) daily homework that clients can complete on a smartphone or tablet; and (e) completion of a standard, weekly progress measure to assess mental health changes over time. The content, design, and components in TAO are based on factors associated with effective therapy, as outlined in the sections Selection of TAO Components, Client Compliance and Engagement, and TAO's Seven Modules. The interactive online educational modules presented the content. Clients responded to interactive exercises that asked the clients to apply the content to their own lives and to examine their own behaviors. Therapists could view dashboard screens that summarized each client's activities during the week, and they could view each week's Behavioral Health Measure (BHM)-20 scores. Clients were aware that their therapists could see what activities they had completed during the week. This accountability likely encouraged clients to complete more of the module content and daily monitoring logs (Detweiler & Whisman, 1999). Text messages were personalized with the name of each client and began with a pleasantry such as "Hi, Geoff, hope you are having a nice day, don't forget to do your monitoring log today." Reminders about completing modules, completing logs, and remembering to attend video conference sessions were sent 3 times per week. Therapists could view the results of the BHM-20 each week before the video conference session with their clients and track symptom changes over time.

Therapeutic Alliance: Quality Over Quantity

In 2006, the American Psychological Association's task force on evidence-based practice (EBP) defined EBP as "the integration of the best available research with clinical expertise in the context of client characteristics culture, and preferences" (p. 280). The task force further indicated that the alliance between the client and the therapist has been repeatedly demonstrated to be among the most powerful factors in behavior change. In addition, the length of the relationship has no appreciable impact on the strength of the alliance. In TAO, the therapeutic relationship serves as the foundation on which the content and tools of therapy are built.

Selection of TAO Components

Most standard interventions outperform placebos, but only a few studies provide clear evidence that one particular standard intervention outperformed others (e.g., Duncan, 2010). For instance, dialectical behavior therapy (DBT; Linehan, 1993) is widely cited as the best intervention for borderline personality disorder. However, a recent meta-analysis completed by Panos, Jackson, Hasan, and Panos (2014) on the efficacy of DBT for borderline personality disorder found that DBT was not significantly different from treatment as usual in reducing depression symptoms in three RCTs. DBT was only marginally better than treatment as usual in reducing attrition during treatment in five RCTs. Therefore, instead of selecting interventions because they were demonstrably better than others, we selected standard interventions based on whether they had strong educational components that make them especially conducive to online delivery. Examples of psychotherapy approaches with strong educational components include CBT, acceptance and commitment therapy, DBT, exposure, mindfulness-based cognitive therapy, systematic desensitization, and solution-focused therapy. TAO's anxiety treatment is largely cognitive–behavioral, with the inclusion of exposure, systematic desensitization, and mindfulness.

Measuring Outcomes

The systematic evaluation of client progress in treatment is a powerful factor in improving therapeutic outcomes. Lambert (2010) found that measuring ongoing responses to treatment and providing feedback to the therapist and the client significantly improved client outcomes even when all other aspects of treatment were controlled for. TAO includes a weekly monitoring instrument, the BHM-20 (Kopta & Lowry, 2002), which is a brief, validated measure of changes in Global Mental Health (GMH) that includes Psychological Symptoms (SYM), Well-Being, and Life Functioning (LF). The BHM-20 has demonstrated adequate reliability and validity. Internal consistency reliability coefficients (coefficient ?) ranged from .89 to .90 for the GMH scale. The Well-Being scale ? coefficients ranged from .65 to .74, the Psychological Symptom scale ? coefficients ranged from .85 to .86, and the LF scale ? coefficients ranged from .72 to .77. Construct validity was assessed with discriminant function analyses using four samples: community adult outpatients, a nonclinical sample of adults, college student counseling clients, and a nonclinical sample of college students. Convergent validity was assessed by comparing the GMH scale to other measures, including the 32 item Behavior and Symptom Identification Scale (BASIS-32; Eisen, Wilcox, Leff, Schaefer, & Culhane, 1999), the Outcome Questionnaire–45 (OQ-45; Lambert & Finch, 1999), and the Symptom Checklist-R-90 (SCL-R-90; Derogatis & Savitz, 1999). The analyses showed high correlations between the GMH scale and the other measures of global mental health functioning, with correlations ranging from .81 to .85 (Kopta & Lowry, 2002). Weekly review of BHM-20 results provided the opportunity for the therapist and client to collaborate in tailoring treatment to the client's current needs and to shift treatment strategies when clients were not making adequate progress.

Client Compliance and Engagement

Noncompliance with treatment recommendations has a documented, direct, adverse impact on treatment outcomes for most health-care problems (Jin, Skylar, Min Sen Oh, & Chuen Li, 2008). Compliance with the recommended lifestyle changes common in psychotherapy has been estimated to be only 20–30% (DiMatteo, 1995). Text messaging is one of several tools that have been shown to improve client compliance by enhancing engagement in treatment. In a review of research on text messaging in behavioral interventions, Wei, Hollin, and Kachnowski (2011) reported that 10 of the 16 studies reviewed found greater behavioral improvement with text message reminders, and 4 of the remaining 6 found trends in that direction. TAO clients generally chose to receive personalized text message reminders about video conference sessions and reminders to complete homework and educational modules. Such personalized messages have been shown to be more effective than generic messages in promoting behavior change (Fry & Neff, 2009).

Positive process accountability is also a factor in improving client engagement. For TAO to be optimally effective, homework and practicing new behaviors are essential. Anxiety disorders tend to produce overlearned responses that automatically happen. When clients receive supportive or encouraging feedback regarding their involvement in client-controlled treatment activities, outcomes improve (Mohr, Cuijpers, & Lehman, 2011). TAO clients are made aware that their counselors can view clients' weekly progress in completing educational modules and homework. TAO psychotherapists are trained to take a positive, encouraging approach when discussing client progress on treatment assignments.

TAO's Seven Modules

TAO treatment for anxiety consists of seven modules completed by the client, coupled with a weekly 10- to 12-min video conference with a counselor and a smartphone application as well as homework and reminders. Clients complete homework that evolves across the weeks. Each week builds from the one before it, starting with a client learning to observe his or her own anxiety, working on living day to day, and then working on facing his or her fears until all of the steps can be put together. In Module 1, clients monitor when, where, how often, and how intensely they experience anxiety. In Module 2, they use a relaxation technique in response to anxious feelings and record their anxiety level before and after each exercise. In Module 3, they begin writing thought logs and practicing challenging unhelpful cognitions. The next three modules cover mindfulness and staying in the moment (Module 4); facing your fears through exposure (Module 5); improving lifestyle factors such as exercise, sleep, alcohol, caffeine, and drug use (Module 6); and the last module (Module 7) summarizes what has been learned so far.

Technical Features

TAO includes secure, Health Insurance Portability and Accountability Act (HIPAA) compliant, video conferencing for client sessions and encrypted text messaging for communicating with clients between sessions. The TAO system is built upon the Moodle (Dougiamas & Taylor, 2003) learning management sys-

tem (LMS), an open-source platform that is used extensively throughout the world. The Moodle LMS controls enrollment, administration, and the delivery of materials to system users, and it maintains substantial data that can be mined and used to improve the quality of the student experience. These data mining and quality improvement functions were cited by Eells et al. (2014, p. 192) as one of the major advantages of computer-assisted psychotherapy over other forms of psychotherapy.

A Study Comparing TAO to Treatment as Usual

Our study assessed whether TAO would be as effective as traditional therapy. TAO differs from traditional therapy in two basic ways. First, TAO increases client engagement with the treatment materials by the use of daily homework, online educational modules, outcome measures, and accountability, all within the context of a therapeutic relationship. Second, TAO involves only brief psychotherapist direct contact (10–15 min sessions), in contrast to traditional face-to-face therapy.

Clients

One hundred four counseling center clients were asked to participate in TAO, of who 97 self-selected for treatment in TAO, with 72 participating in research (see Figure 1 for details). Potential TAO participants were screened through the counseling center. Potential participants who fit the following criteria were screened out of TAO and referred for face-to-face counseling (n = 3): (a) active, serious suicidal ideation; (b) active, serious substance dependence; (c) discomfort with technology; and (d) severe symptoms and psychopathology that would best be treated face to face. The average age of the final sample of 72 TAO participants was 21.72 years (SD = 4.46). Most TAO participants identified as White (n = 53; 73%), followed by Asian (n = 7; 10%), and Black (n = 5; 7%); most participants identified as non-Hispanic (n = 55; 77%). Most TAO participants were undergraduate students (n = 53; 73%) whereas 28% were graduate or professional degree students (n = 19). In terms of gender identity and sexual orientation, 24% of TAO participants identified as male (n = 17) and 72% identified as female (n = 52); TAO participants were predominantly heterosexual (n = 53; 87%). Twenty-four TAO clients were not included in the study because they elected not to participate in the research or were distance learning students and therefore not allowed to participate as a condition of institutional review board approval (see Figure 1 for the flow of participants through each stage of research).

TAO clients were compared with 1,169 treatment-as-usual clients who at Session 1 also reported moderate or greater levels of anxiety but who were not offered TAO because of limited capacity

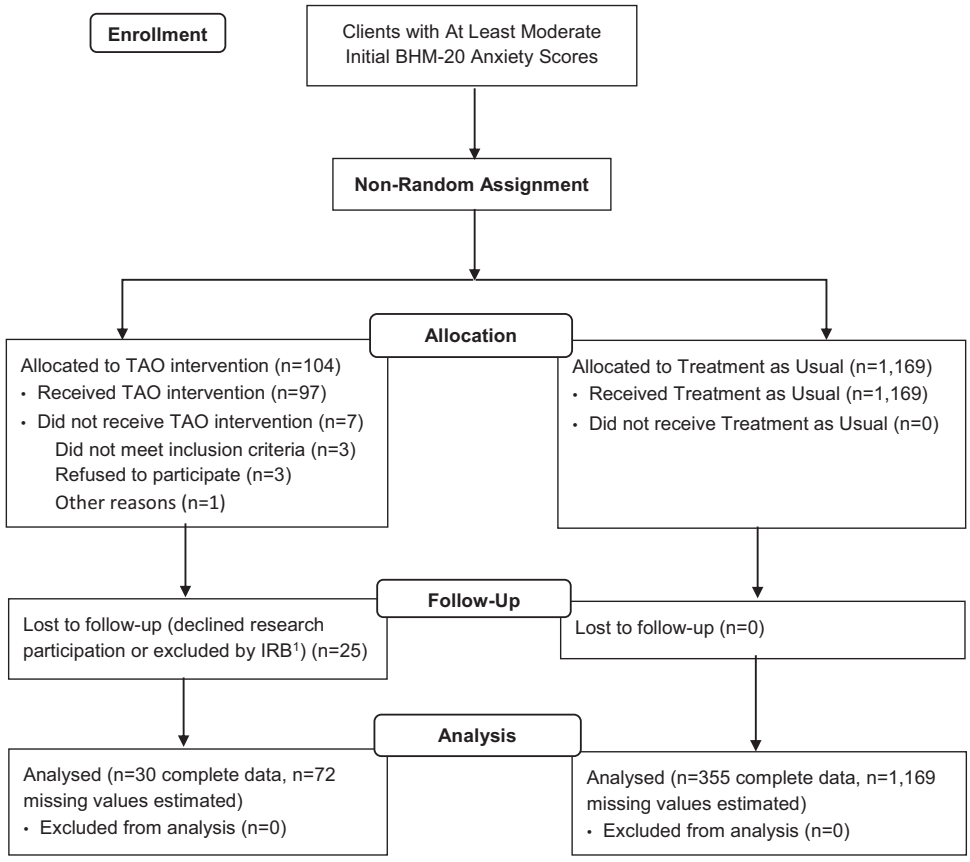

Figure 1. Flow of participants through each stage of this quasi-experiment. This flowchart is an adaptation of the flowchart offered by the CONSORT group (Moher, Schulz, Altman, & CONSORT Grp., 2001). The institutional review board disallowed inclusion of distance learners.

in the TAO treatment. The average age of treatment-as-usual participants was 21.61 years ($SD = 4.63$). Most treatment-as-usual participants identified as White ($n = 794$; 68%), followed by Black ($n = 134$; 11.5%), and Asian ($n = 130$; 11%); most participants identified as non-Hispanic ($n = 911$; 78%). Most treatment-as-usual participants were undergraduate students ($n = 911$; 78%) whereas 22% were graduate or professional students ($n = 257$). In terms of gender identity and sexual orientation, 32% of TAO participants identified as male ($n = 374$) and 63% identified as female ($n = 736$); TAO participants were predominantly heterosexual ($n = 970$; 83%). All treatment-as-usual participants underwent standard, face-to-face individual psychotherapy. Of particular note, no significant demographic differences were found when comparing TAO and treatment-as-usual participants (all $p > .05$).

Procedure

All clients completed online intake forms and were scheduled for initial triage, during which a therapist briefly explored client concerns and discussed treatment options. For clients presenting with anxiety concerns, several treatment options were offered, including face-to-face individual psychotherapy and TAO. All clients were initially assigned to their treatment of choice. Those selecting TAO were scheduled for a screening session to ensure that anxiety was a primary presenting concern and that TAO would meet their treatment needs. Individuals were also screened out of TAO if they reported active substance abuse problems and/or recent suicide attempts. For the very few clients reporting these concerns, alternative treatment options were provided. Risk management during treatment was handled in several ways. All clients in the study lived within 50 mi of campus, and the counseling service provided 24-hr, 7-day-per-week afterhours and emergency phone contact for all clients either in individual therapy or TAO. The TAO login page included the crisis contact information; in addition, the BHM-20 was checked weekly and any student who was deteriorating was called by their therapist. Three clients over the year showed some deterioration while in TAO and were contacted. Two clients were transferred to face-to-face therapy but elected to continue to use the online education resources. All counselors who were delivering TAO treatment received 6 hr of training on ethics and online psychotherapy, clinical issues with online therapy, and providing low-intensity/high-engagement treatment. Client familiarity with technology and access to a video-capable computer or mobile device were also confirmed. Cultural appropriateness for online treatment was also assessed for each client. To comply with state laws, TAO clients had to reside within the state of Florida during treatment. TAO security and privacy included authentication, password protection, and encryption of databases in motion and at rest. Clients outside of a 50-mi radius of the research site were required to provide releases for a personal, medical, and crisis contact in the event of an emergency. Clients meeting these criteria reviewed and signed an informed consent to participate in treatment. Informed consent included privacy and confidentiality, privacy practices, and limits to any security system. Orientation included discussing all plans for alternative procedures in case of equipment failure with the video conferencing tool. The backup plan was to use telephones for contact. Upon signing the consent document, they were enrolled in the TAO program and began a three-part orientation. Clients were first given access and asked to log in to a secure web portal that served as the TAO treatment platform. Once they successfully accessed the platform, they were instructed to complete a video orientation addressing key aspects of the TAO treatment, including treatment session review, monitoring log utilization, mood survey completion, and text reminders. Clients were also given the opportunity to test the secure video conferencing software that served as a point of contact with treatment providers. Once clients endorsed familiarity with the software, they received an email with instructions for attending their weekly video conference and a secure web-link accessible only by the treatment provider and client at the agreed-upon time. The final part of the orientation process included introducing clients to the text-based treatment reminder system. Clients were informed that as part of their treatment they would have the opportunity to receive multiple weekly text reminders to facilitate treatment engagement and virtually all TAO clients took that opportunity. Consenting clients were enrolled in this system. At the conclusion of the screening process, clients were asked to complete all weekly treatment activities before their weekly video conference with their treatment provider. These weekly activities included reviewing the interactive learning modules, completing treatment homework through the website or the TAO mobile app, providing programmatic feedback, and completing the BHM-20 before each individual session. TAO and treatment-as-usual participants were instructed to complete the BHM-20 each week.

BHM-20

Outcome was assessed using the BHM-20 (Kopta & Lowry, 2002). The BHM-20 was digitally administered. It takes most clients approximately 90 s to complete. Items from the three primary subscales are averaged to produce an overall scale of GMH, with higher scores indicating better mental health. The BHM-20 is composed of three primary subscales, which are SYM (in this case, anxiety), Well-Being, and LF. These subscales are designed to assess the three phases of outcome proposed in the phase model (Howard, Lueger, Maling, & Martinovich, 1993). Similar to the GMH scale, these subscales are scored by averaging the items, with higher scores indicating better functioning.

The SYM scale includes 13 items measuring common symptoms that clients present with to psychotherapy (e.g., anxiety, depression, panic, mood swings, eating problems, and alcohol- or drug-use problems). Likewise, clients responded to the items on a 5-point Likert scale ranging from 0 (*almost always*) to 4 (*never*). The items on the SYM scale are used to generate subscales, comprising two, three, or four items. This study specifically evaluated only the anxiety (ANX) subscale of SYM. The Well-Being scale comprises three items that measure distress, life satisfaction, and level of energy and motivation. Clients responded to items on a 5-point (0–4) Likert scale, with higher scores indicating greater well-being. The LF scale asks respondents to indicate "How have you been getting along in the following areas of your life?" over the past 2 weeks. The four items cover intimate relationships, social relationships, work and/or school, and life enjoyment (such as recreation and leisure activities). Clients responded to the items on a 5-point Likert scale ranging from 0 (*terrible*) to 4 (*very well*). Research has demonstrated that the BHM-20 has good reliability

and construct validity, and it discriminates client from nonclient samples (Kopta & Lowry, 2002).

TAO Outperformed Treatment as Usual

The TAO and treatment-as-usual samples had many missing data, which is typical in clinical outcome research with weekly measures. Therefore, data were analyzed using linear mixed-effects models (Gueorguieva & Krystal, 2004). The advantages of this approach over others are that it uses all available data from each participant, does not remove participants who have incomplete data, and does not substitute the last provided value for missing values, an approach that has been roundly criticized (e.g., Hamer & Simpson, 2009; Streiner & Geddes, 2001). Instead, linear mixed-effects models estimate parameters for missing values. A model was estimated for each of the four outcome measures (GMH, ANX, LF, and Well-Being). A compound symmetry covariance matrix was the estimation model because the study uses a split-plot design (one between-subject effect, one within-subject effect). We based our calculations of the magnitude of within-group and between-group effects on the pooled standard deviation. Data analyses were all performed using PASW (formerly SPSS), version 20.0. As fixed effects, we entered condition (TAO vs. treatment as usual), time (first through seventh session), and the interaction term into the model. Participants were entered as a random effect. Inspection of residual plots did not reveal any obvious deviations from homoscedasticity and normality.

Data analysis revealed a consistent pattern across the four outcome measures. In each case there was a significant main effect for condition, with TAO scores significantly greater than treatment-as-usual scores, as well as a significant main effect for time, with scores improving across time on all four outcome measures across the two conditions. These two main effects were qualified by a Condition ? Time interaction effect, again consistent across all four measures. Improvements across time were significantly greater for TAO than treatment-as-usual participants, except for LF, which was just shy of statistical significance (see Figure 2, a–d). The phase model described earlier suggests that life functioning is the final aspect to respond to psychotherapy, so there is little surprise that the LF interaction is smaller than the others. The size of these effects ranged from small (Cohen's *d* of 0.16) for LF, and for both GMH and Well-Being (both with a Cohen's *d* of 0.20), to medium for Anxiety (Cohen's *d* of 0.31). Cohen (1988) characterized effects of this magnitude as small to medium; however, the comparison is not with sham treatment or wait-list control group, but rather with treatment as usual, which, itself, was clearly effective. For example the time main effect for Global Mental Health, collapsing across both conditions, produced a Cohen's *d* of 0.78, which is a large effect. Therefore, both treatments are producing large improvements in GMH (with similar patterns for ANX, LF, and Well-Being). In addition to that large overall effect, there is a significant improvement for TAO.

We also analyzed the data using the Listwise Deletion Method, meaning that only participants with complete data were included for analysis. This resulted in a tremendous loss of participants (30 vs. 72 for TAO and 355 vs. 1,169 treatment as usual). Despite the loss of statistical power and the serious concerns about external generalizability raised by this approach, the overall findings were very similar to the results from the linear mixed-effects model, which lends credence to the notion that the findings were not an artifact of the analytic strategy.

Implications and Limitations

In this initial investigation, TAO outperformed traditional psychotherapy across 7 weeks using a host of outcome measures. Our data indicate that TAO was a highly effective treatment, with regard to symptom reduction, clients' sense of well-being, life functioning, and overall mental health. Coupled with being more available, affordable, convenient, and more relevant for clients in the digital age, TAO's effectiveness signals significant promise for this type of psychotherapeutic intervention for clients suffering from anxiety. An overburdened practitioner, clinical practice, or treatment center can adopt TAO as a viable and effective alternative to wait lists, to skipping weekly sessions, to outside referrals, and to self-help for their anxious clients without any loss in measured treatment outcomes and in fact with improved outcomes over standard care. Clients suffering from anxiety may be particularly benefitted by this approach because the regular and ongoing digital connection can assuage anxiety in a way that once-a-week contact cannot. For example, whenever a treatment-as-usual client becomes anxious, he or she can do a homework assignment or view a module, whereas in traditional therapy, that same client has to wait for the scheduled weekly appointment.

One concern practicing psychologists may have is whether they can bill for the brief individual sessions in TAO vs. traditional therapy as they can with the 60-min sessions in treatment as usual. Effective January 1, 2013, CPT code 90832 permits psychologists to bill for 16- to 37-min outpatient sessions (American Psychological Association Practice Organization, 2013; Good Practice: More Q&As, 2013). Another concern is affordability. TAO is affordable, approximately $10 per patient per week; therefore, the overall client health-care cost is within the financial grasp of all but the most financially distressed clients.

This approach has several advantages over traditional, face-to-face therapy. It frees up therapist time. It can be delivered at a much lower cost. It can increase access to treatment for populations who have historically had limited access to treatment. It allows for reminders and accountability to increase adherence and engagement. Resources can be made available to clients around the clock and 7 days per week. Online treatment also allows for information to be gathered from clients that can be used to assess treatment effectiveness from session to session and even intervention by intervention. This data collection capability allows for future advancements in individualizing and customizing treatments. Brief contact with a therapist also preserves the therapeutic relationship, thus combining the advantages of digital resources with the most important common factor in predicting client satisfaction.

Here are five additional practical implications for practitioners using TAO. First, practitioners will need to be or become comfortable with electronic platforms for delivering mental health services and will need to familiarize themselves with TAO in particular. Second, if they have not already done so, practitioners will need to become comfortable with having a somewhat reduced face-to-face role with clients and with an increased role of technology-based therapeutic intervention. Third, practitioners using TAO can diversify their practices to include clients who are not

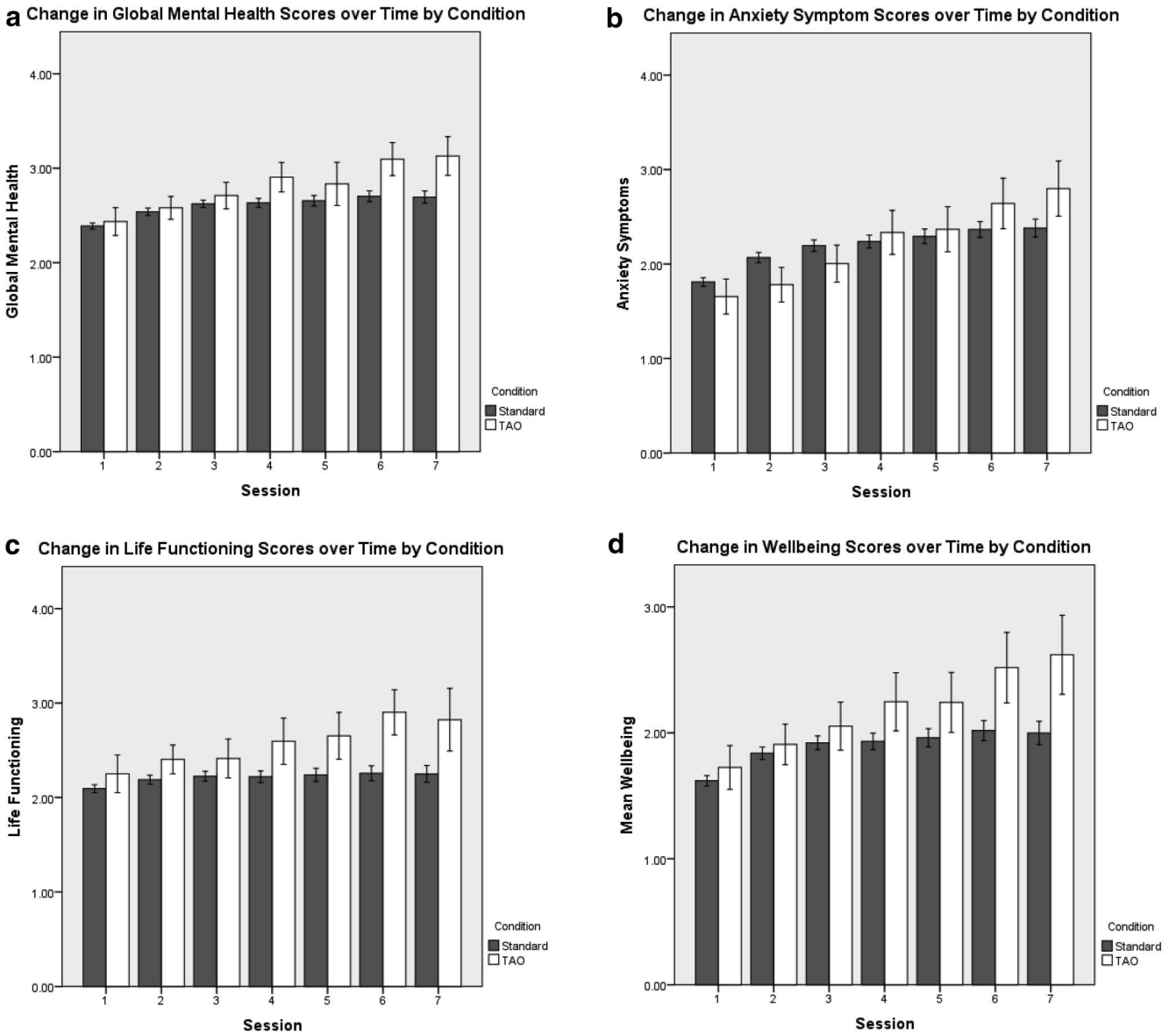

Figure 2. All four BHM-20 measures (Global Mental Health, Symptoms, Life Functioning, and Wellbeing) improved over time for standard treatment and improved significantly more for TAO than standard treatment.

available for traditional, weekly, 1-hr, face-to-face therapy. Fourth, by using TAO, practitioners can offer an approach to therapy that is appealing to clients who embrace digital technology. For example, younger people, people in technological fields, and people who are socially avoidant may find TAO more appealing than traditional therapy because of this digital delivery system. Finally, practitioners in areas where clients have to travel long distances for psychotherapy are likely to find that the demand for their services increases with the use of TAO.

One limitation is that because of institutional review board concerns, clients could not be randomly assigned to treatment. However, the benefits of not randomly assigning in this particular case may more than offset the costs. First, we conducted the study as part of a regular treatment center; therefore, our control group truly was a treatment-as-usual control, rather than the more contrived controls typically found in RCTs, in which the clinical trial frequently is separate from a regular treatment center. The improved quality of the control group is an advantage that a typical RCT does not have. Second, it is inappropriate and unethical to assign people to a partially electronic modality because not everyone has access to or comfort with smartphones, tablets, and/or computers. Third, on the other hand, if we restricted all study participants (treatment and control) to people who are comfortable with smartphones, tablets, and/or computers, then the control group could reasonably be challenged as not capturing the effect of treatment as usual because it eliminated the many clients who reside on the uncomputerized side of the digital divide or whose problems make them poor candidates for TAO. Fourth, the fact

that we collected data across seven different times allows readers to see that on the critical BHM-20 outcome criteria, TAO and treatment-as-usual participants started off the same and both groups improved across time. Only over time did the differences in response to treatment emerge. This pattern reduces concern that preexisting differences account for the effectiveness of treatment. Finally, this design is a good one for what this study addresses, which is as follows: among people who are good candidates for computer-assisted therapy, does this treatment produce results comparable to treatment as usual? In our view our design effectively addresses that question. In a future study, someone might want to ask "Focusing only on good candidates for computer-assisted therapy, does computer-assisted therapy perform as well as or better than treatment as usual?" However, that is a different question than ours and one we could easily imagine reviewers would view as artificially favoring TAO over treatment as usual because good candidates for computer assistance are likely to resent not receiving computer assistance.

The efficacy of TAO had not yet been established; therefore, a subset of clients was given the choice to participate in TAO treatment or standard treatment. Moreover, clients at higher risk of adverse outcomes were not given the choice to participate in TAO. The biggest concern about this limitation is that differences may, in part, result from a selection effect. Self-selection into TAO may have resulted in slightly higher initial levels of engagement in treatment. However, the differences between TAO and treatment as usual emerged gradually and systematically across seven sessions. Therefore, it is unlikely that self-selection could account for the clear treatment effects that emerged over time or the better eventual performance of TAO over treatment as usual. Moreover, demographic characteristics for the two samples did not differ, again consistent with the idea that selection effects are unlikely to explain treatment outcome differences.

Although these results indicate that there are clients who are receptive to TAO, even more clients may become receptive to this treatment if they become more aware of it and its demonstrated effectiveness. In fact, it is likely that many people who are not comfortable coming to a counseling center or clinic may find TAO an appealing alternative. There is also a need to develop TAO for other presenting problems and disorders, such as depression.

References

Abelson, R. (2013, September 27). *Lacking rules, insurers balk at paying for intensive psychiatric care*. Retrieved from http://www.nytimes.com/2013/09/29/business/lacking-rules-insurers-balk-at-paying-for-intensive-psychiatric-care.html?pagewanted=all

American Psychological Association Practice Organization. (2013). *2013 Psychotherapy CPT Codes for Psychologists*. Retrieved from http://www.apapracticecentral.org/reimbursement/billing/psychotherapy-codes.pdf

American Public Health Association. (2014, November 18). *Removing barriers to mental health services for veterans*. Retrieved from http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2015/01/28/14/51/removing-barriers-to-mental-health-services-for-veterans

Andrews, G., Cuijpers, P., Craske, M. G., McEvoy, P., & Titov, N. (2010). Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: A meta-analysis. *PLoS ONE, 5,* e13196. http://dx.doi.org/10.1371/journal.pone.0013196

Barr, V., Krylowicz, B., Reetz, D., Mistler, B. J., & Rando, R. (2011). *The Association for University and College Counseling Center Directors annual survey*. Retrieved from http://www.aucccd.org/support/aucccd_directors_survey_monograph_2011.pdf

Bennett-Levy, J., Richards, D. A., Farrand, P., Christensen, H., Griffiths, K., Kavanagh, D., & Proudfoot, J. (2010). Low intensity CBT interventions: A revolution in mental health care. In J. Bennett-Levy, D. Richards, P. Farrand, H. Christensen, D. Kavanagh, B. Klein, . . . C. Williams (Eds.), *Oxford guide to low intensity CBT interventions* (pp. 3–18). Oxford, United Kingdom: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780199590117.003.0001

Berger, T., Caspar, F., Richardson, R., Kneubühler, B., Sutter, D., & Andersson, G. (2011). Internet-based treatment of social phobia: A randomized controlled trial comparing unguided with two types of guided self-help. *Behaviour Research and Therapy, 49,* 158–169. http://dx.doi.org/10.1016/j.brat.2010.12.007

Bushong, S. (2009). College counseling centers remain understaffed though demand is strong, survey finds. *Chronicle of Higher Education*. Retrieved from http://chronicle.com/daily/2009/03/13230n.htm

Cape, J., Whittington, C., Buszewicz, M., Wallace, P., & Underwood, L. (2010). Brief psychological therapies for anxiety and depression in primary care: Meta-analysis and meta-regression. *BMC Medicine, 8,* 38. http://dx.doi.org/10.1186/1741-7015-8-38

Carlbring, P., Gunnarsdóttir, M., Hedensjö, L., Andersson, G., Ekselius, L., & Furmark, T. (2007). Treatment of social phobia: Randomised trial of internet-delivered cognitive-behavioural therapy with telephone support. *The British Journal of Psychiatry, 190,* 123–128. http://dx.doi.org/10.1192/bjp.bp.105.020107

Cavanagh, K., & Shapiro, D. A. (2004). Computer treatment for common mental health problems. *Journal of Clinical Psychology, 60,* 239–251. http://dx.doi.org/10.1002/jclp.10261

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Derogatis, L. R., & Savitz, K. L. (1999). *The SCL-90-R, brief symptom inventory, and matching clinical rating scales* (pp. 679–724). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Detweiler, J. B., & Whisman, M. A. (1999). The role of homework assignments in cognitive therapy for depression: Potential methods for enhancing adherence. *Clinical Psychology: Science and Practice, 6,* 267–282. http://dx.doi.org/10.1093/clipsy/6.3.267

DiMatteo, M. R. (1995). Patient adherence to pharmacotherapy: The importance of effective communication. *Formulary, 30,* 596–598, 601, 602, 605.

Dougiamas, M., & Taylor, P. (2003). *Moodle: Using learning communities to create an open source course management system*. Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications.

Duncan, B. L. (2010). Saul Rosenzweig, the founder of the common factors. In B. Duncan, S. Miller, B. B. Wampold, & M. Hubble (Eds.), *The heart and soul of change: Delivering what works* (pp. 3–22). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/12075-000

Durham, R. C., Chambers, J. A., Power, K. G., Sharp, D. M., Macdonald, R. R., Major, K. A., . . . Gumley, A. I. (2005). Long-term outcome of cognitive behaviour therapy clinical trials in central Scotland. *Health Technology Assessment, 9,* 1–174. http://dx.doi.org/10.3310/hta9420

Eells, T. D., Barrett, M. S., Wright, J. H., & Thase, M. (2014). Computer-assisted cognitive-behavior therapy for depression. *Psychotherapy, 51,* 191–197. http://dx.doi.org/10.1037/a0032406

Eisen, S. V., Wilcox, M., Leff, H. S., Schaefer, E., & Culhane, M. A. (1999). Assessing behavioral health outcomes in outpatient programs: Reliability and validity of the BASIS-32. *The Journal of Behavioral Health Services & Research, 26,* 5–17. http://dx.doi.org/10.1007/BF02287790

Fox, S., & Rainie, L. (2014). The web at 25 in the US. *Pew Research Center's Internet & American Life Project, 5,* 25.

Fry, J. P., & Neff, R. A. (2009). Periodic prompts and reminders in health promotion and health behavior interventions: Systematic review. *Journal of Medical Internet Research, 11,* e16. http://dx.doi.org/10.2196/jmir.1138

Gallagher, R. P. (2011). *National Survey of Counseling Center Directors—2011*. Alexandra, VA: The International Association of Counseling Center Services, Inc.

Good Practice: More Q&As about the New Psychotherapy Codes. (2013, Dec. 21). Retrieved from http://www.apapracticecentral.org/good-practice/new-psychotherapy-codes.pdf

Griffiths, K. M., Farrer, L., & Christensen, H. (2010). The efficacy of internet interventions for depression and anxiety disorders: A review of randomised controlled trials. *The Medical Journal of Australia, 192*(11, Suppl.), S4–S11.

Gueorguieva, R., & Krystal, J. H. (2004). Move over ANOVA: Progress in analyzing repeated-measures data and its reflection in papers published in the Archives of General Psychiatry. *Archives of General Psychiatry, 61,* 310–317. http://dx.doi.org/10.1001/archpsyc.61.3.310

Hamer, R. M., & Simpson, P. M. (2009). Last observation carried forward versus mixed models in the analysis of psychiatric clinical trials. *The American Journal of Psychiatry, 166,* 639–641. http://dx.doi.org/10.1176/appi.ajp.2009.09040458

Hauenstein, E. J., Petterson, S., Rovnyak, V., Merwin, E., Heise, B., & Wagner, D. (2006). Rurality and mental health treatment. *Administration and Policy in Mental Health and Mental Health Services Research, 34,* 255–267. http://dx.doi.org/10.1007/s10488-006-0105-8

Howard, K. I., Lueger, R. J., Maling, M. S., & Martinovich, Z. (1993). A phase model of psychotherapy outcome: Causal mediation of change. *Journal of Consulting and Clinical Psychology, 61,* 678–685. http://dx.doi.org/10.1037/0022-006X.61.4.678

Jin, J., Sklar, G. E., Min Sen Oh, V., & Chuen Li, S. (2008). Factors affecting therapeutic compliance: A review from the patient's perspective. *Therapeutics and Clinical Risk Management, 4,* 269–286.

Klein, B., Richards, J. C., & Austin, D. W. (2006). Efficacy of internet therapy for panic disorder. *Journal of Behavior Therapy and Experimental Psychiatry, 37,* 213–238. http://dx.doi.org/10.1016/j.jbtep.2005.07.001

Kopta, S., & Lowry, J. (2002). Psychometric evaluation of the Behavioral Health Questionnaire-20: A brief instrument for assessing global mental health and the three phases of psychotherapy outcome. *Psychotherapy Research, 12,* 413–426. http://dx.doi.org/10.1093/ptr/12.4.413

Lambert, M. J. (2010). *Prevention of treatment failure: The use of measuring, monitoring, and feedback in clinical practice*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/12141-000

Lambert, M. J., & Finch, A. E. (1999). *The outcome questionnaire* (pp. 831–869). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford Press.

McGuire, T. G., & Miranda, J. (2008). New evidence regarding racial and ethnic disparities in mental health: Policy implications. *Health Affairs, 27,* 393–403. http://dx.doi.org/10.1377/hlthaff.27.2.393

Moher, D., Schulz, K. F., Altman, D. G., & CONSORT Grp. (2001). The CONSORT statement: Revised recommendations for improving the quality of reports of parallel-group randomised trials. *The Lancet, 357,* 1191–1194. http://dx.doi.org/10.1016/S0140-6736(00)04337-3

Mohr, D. C., Cuijpers, P., & Lehman, K. (2011). Supportive accountability: A model for providing human support to enhance adherence to eHealth interventions. *Journal of Medical Internet Research, 13,* e30. http://dx.doi.org/10.2196/jmir.1602

Moscaritolo, A. (2013). Survey: Thirty-five percent of Americans own a tablet. *PC Magazine*. Retrieved from http://www.pcmag.com/article2/0,2817,2425979,00.asp

Newman, M. G., Szkodny, L. E., Llera, S. J., & Przeworski, A. (2011). A review of technology-assisted self-help and minimal contact therapies for anxiety and depression: Is human contact necessary for therapeutic efficacy? *Clinical Psychology Review, 31,* 89–103. http://dx.doi.org/10.1016/j.cpr.2010.09.008

Panos, P. T., Jackson, J. W., Hasan, O., & Panos, A. (2014). Meta-analysis and systematic review assessing the efficacy of dialectical behavior therapy (DBT). *Research on Social Work Practice, 24,* 213–223. http://dx.doi.org/10.1177/1049731513503047

Perini, S., Titov, N., & Andrews, G. (2009). Clinician-assisted Internet-based treatment is effective for depression: Randomized controlled trial. *Australian and New Zealand Journal of Psychiatry, 43,* 571–578. http://dx.doi.org/10.1080/00048670902873722

Richardson, T., Stallard, P., & Velleman, S. (2010). Computerised cognitive behavioural therapy for the prevention and treatment of depression and anxiety in children and adolescents: A systematic review. *Clinical Child and Family Psychology Review, 13,* 275–290. http://dx.doi.org/10.1007/s10567-010-0069-9

Robinson, E., Titov, N., Andrews, G., McIntyre, K., Schwencke, G., & Solley, K. (2010). Internet treatment for generalized anxiety disorder: A randomized controlled trial comparing clinician vs. technician assistance. *PLoS ONE, 5,* e10942. http://dx.doi.org/10.1371/journal.pone.0010942

Streiner, D., & Geddes, J. (2001). Intention to treat analysis in clinical trials when there are missing data. *Evidence-Based Mental Health, 4,* 70–71. http://dx.doi.org/10.1136/ebmh.4.3.70

Titov, N., Andrews, G., Choi, I., Schwencke, G., & Mahoney, A. (2008). Shyness 3: Randomized controlled trial of guided versus unguided Internet-based CBT for social phobia. *Australian and New Zealand Journal of Psychiatry, 42,* 1030–1040. http://dx.doi.org/10.1080/00048670802512107

Travers, M. F., & Benton, S. A. (2014). The acceptability of therapist-assisted, internet-delivered treatment for college students. *Journal of College Student Psychotherapy, 28,* 35–46. http://dx.doi.org/10.1080/87568225.2014.854676

Wei, J., Hollin, I., & Kachnowski, S. (2011). A review of the use of mobile phone text messaging in clinical and healthy behaviour interventions. *Journal of Telemedicine and Telecare, 17,* 41–48. http://dx.doi.org/10.1258/jtt.2010.100322

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