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# Treatment Engagement and Effectiveness Using an Internet-Delivered Cognitive Behavioral Therapy at a University Counseling Center

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# Treatment Engagement and Efficacy Using an Internet-Delivered Cognitive Behavioral Therapy Program at a University Counseling Center

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A thesis submitted to the faculty of
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Master of Science

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ABSTRACT

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Mental health disorders are a leading cause of disability and mortality worldwide. Mental health services do not meet demand due to accessibility issues, financial burden, and increasing needs. Technology can provide affordable, accessible mental health care and some research suggests internet-delivered Cognitive Behavior Therapy (iCBT) may be an effective treatment. In iCBTs, participants typically complete Cognitive Behavior Therapy modules and videos and are supported by a therapist. Advantages of iCBT over face-to-face therapy include lower cost, no travel time, easy access, no waitlists, and trackable progress. To our knowledge there have been no naturalistic studies of iCBT programs. Therefore, this study will evaluate the usage and effectiveness of one iCBT program, SilverCloud, in a university counseling center. Participants (N=5568) were students at a large, private western university. Participants were either self-referred to the program, chose to enroll at intake as a standalone intervention, or were referred by their treating clinician as an adjunct to regular treatment. We compared the outcomes and usage of participants using SilverCloud concurrently with psychotherapy to participants using SilverCloud alone, and participants in psychotherapy alone.

Keywords: Cognitive Behavior Therapy, Internet-Delivered Cognitive Behavior Therapy, naturalistic psychotherapy

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Mental health disorders such as depression and anxiety are some of the leading causes of disability and mortality worldwide and in those 18-24-year-old (Gore et al., 2011; Whiteford et al., 2013). The number of students seeking mental health services on college campuses has risen significantly in the last decade (Xiao et al., 2017). The most common presenting concerns in college counseling centers are anxiety, depression, and stress (Pérez-Rojas et al., 2017). University counseling centers (UCCs) are frequently overwhelmed as the demand for services and severity of mental health disorders rise (Xiao et al., 2017). This is often manifested by lengthy waitlists, session limits, and referring students to other clinics (Gallagher, 2014; Xiao et al., 2017). Faced with limited resources and rising demand, UCCs are increasingly searching for alternative methods of psychotherapy delivery to maximize the services offered. Many counseling centers are adopting stepped-care models that include some kind of technology or web-based intervention (Stallman et al., 2019). This paper examines the usage and efficacy of an online therapy platform at a large UCC.

UCCs are using technology as a tool to quickly disseminate mental health services. Psychotherapy can be delivered using various forms of technology which include websites, video conferencing, computer-administered psychotherapy, and texting apps in addition to face-to-face therapy (Backhaus et al., 2012; Bauer & Moessner, 2013; Lindsay et al., 2015; Khatri et al., 2013; Richards et al., 2016). Despite the growing modes of communication that increase the possibility of online-delivered therapy, clients and therapists alike might express reservation toward implementing technology into what has traditionally been a direct and personal process. However, there is increasing support that internet-delivered therapy may be comparable to face-

to-face therapy (Barak, et al., 2008; Richards et al., 2016). Additionally, many young adults report that face to face psychotherapy is not their preference and that online treatments are more accessible and desirable (Brown, 2018). Further, these programs have shown promising outcomes in reducing psychological distress and promoting recovery from mental health disorders (Kumar et al., 2017; Stallman et al., 2019).

In addition to reducing psychological distress, technology and web-based programs have several other advantages over face-to-face therapy including: 1) ease of access, 2) ability of the client to self-pace, 3) elimination of travel barriers, 4) decreased cost, 5) anonymity, 6) shorter to no wait-times, and 7) easy progress tracking (Andersson & Titov, 2014; Richards et al., 2016). Most online therapy platforms use a cognitive behavioral therapy (CBT) method to teach therapy skills and principles (e.g., Alberts et al., 2018; Andersson, 2009).

Although there are many promising aspects of using online therapy platforms, there are also some problematic features. These programs have less therapist-involvement and may not be suited to treat complex cases (e.g., personality disorders, suicidality; Andersson & Titov, 2014). Additionally, attrition (i.e., participants signing up and using very little of the program) is a significant problem with online programs. For example, in one study 641 participants were recruited and expressed interest in using an online therapy platform, but only 281 participants actually completed the program (Richards et al., 2016). That being said, attrition is not unique to internet-delivered CBT (iCBT); attrition is also an issue in traditional, in-person therapy. For example, the Center for Collegiate Mental Health, a large research practice network of college counseling centers, reported that the modal number of sessions in UCCs is one session (CCMH, 2017). While it is a possibility that attrition in both online therapy and in-person therapy indicates that individuals who do not need therapy are self-selecting out, it is also possible that

there is something problematic in the process or delivery of internet-delivered or in-person therapy that is getting in the way of individuals who need care from receiving help.

User experience studies have identified components that can increase engagement and improve satisfaction with online interventions. These factors include having an online, well-trained therapist-supporter; using evidence-based therapies; ensuring anonymity; having the ability to self-administer at one's own pace; and using engaging and easy to use content (Eells et al., 2014; Richards et al., 2016).

SilverCloud is an online self-paced program that includes the aforementioned components and follows an iCBT model. The program can be completed in a linear or non-linear manner, which allows users to customize their treatment. SilverCloud includes bi-weekly reviews by a trained supporter, who provides feedback about usage and monitors suicidality, and provides encouragement, and recommendations. Psychoeducational tools are administered in various ways (e.g. videos, quizzes, articles etc.) to facilitate learning. At UCCs, SilverCloud users tend to improve more quickly than those on a waitlist (Richards et al., 2016; Sharry et al., 2013). SilverCloud has also been used successfully among adults in primary care and mental health settings (Morrison et al., 2014).

The research on SilverCloud and other online therapy interventions is limited in three important ways. First, the majority of research has been done in randomized, highly controlled settings and thus is not necessarily an adequate representation of how participants will use treatment (Weisz et al., 1995). Our study, therefore, investigated the usage and efficacy of SilverCloud as part of routine clinical care in a UCC. Second, due to high rates of drop-out, studies evaluating online therapy platforms often have small sample sizes leading to low power for comparisons with other treatments and imprecise estimates (cf. Gelman & Carlin, 2014). One

study found that the sample size required for sufficient power (.80) to detect a significant difference between two different online therapy programs would be around 744 participants (Stallman et al., 2019). Our study also examined the differences between active treatments (i.e., SilverCloud only vs. SilverCloud and Psychotherapy vs. Psychotherapy only) and has much larger sample size of 5,568 participants who not only enrolled but also provided data (see figure 1 to see where our sample fits compared to other similar studies).

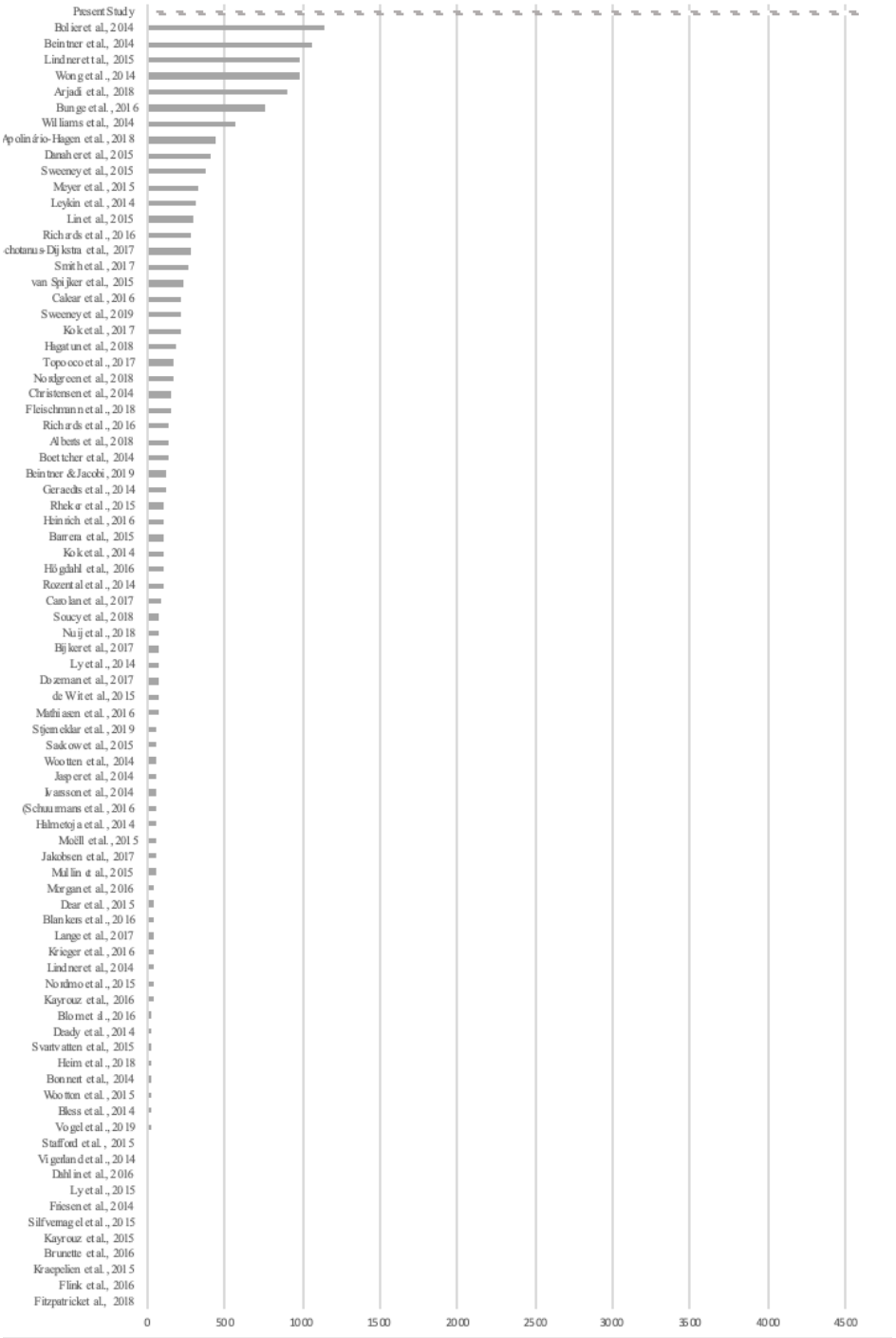


*Figure 1.* Sample Sizes of Studies Using Internet Interventions.

*Note:* This includes the sample size of all studies investigating internet interventions for mental health from the first edition of the journal of internet interventions through January 2019. *See the Appendix for a complete list of references for this figure*

Finally, many studies either do not examine the relationship between usage and outcome or use only self-report measures to examine the usage of internet-delivered therapy programs (e.g., DaPonte et al., 2018; Kladnitski et al., 2018). Self-report of technology use, though correlated with actual use, is often inaccurate (Scharkow, 2016). Further, most studies examining online interventions give little attention to the fact that most people use a small proportion of the program and drop out shortly after signing up (e.g., Richards et al., 2016). Low program usage and high treatment dropout may mean that the results of online therapy are more nuanced and less promising than previously reported. This study will, therefore, investigate the efficacy and usage of SilverCloud as part of routine clinical care in a UCC using computer-generated usage data and self-reported distress.

In sum, the primary aim of the present study was to explore the effectiveness and utilization of an online, therapy platform as part of routine clinical care at a UCC. We hypothesized that those using SilverCloud as a standalone treatment will have similar treatment gains as those who are concurrently in psychotherapy and those in psychotherapy only. Additionally, we hypothesized that, though there will be high rates of treatment drop out (i.e., participants signing up and not using the program) and low rates of usage, there will be a trend that the more participants use SilverCloud, the more treatment gains they will have regardless of whether they are attending psychotherapy concurrently.

## Method

### Participant Characteristics

Our sample consists of 5,568 students aged 18 and older at a large, private western university. Specifically, 1,247 participants signed up to use SilverCloud as a standalone

treatment (SC-ONLY), 527 signed up[1] to use SilverCloud concurrently with therapy (SC+TX), and 3,794 participants used therapy as a standalone treatment (TX-ONLY). We defined those who were in therapy concurrently as those who had an intake and at least one additional therapy session at the counseling center within 90 days of using SilverCloud. This is similar to what other researchers have done with naturalistic data sets (see Wampold & Brown, 2005).

SilverCloud does not require demographic information[2]; therefore, we only have demographic information for TX-only and SC+TX. Participants in SC +TX were 70.04% female and had an average age of 22.11 years (*SD*=3.16; Range: 18-45). Participants in TX-only were 58.17% female and had an average age of 22.62 (*SD*=3.21; Range: 18-62). Participants were predominately white/Caucasian.

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[1] "Signed up" means that they signed up for SilverCloud. However, they may not have completed the program.

[2] This is often seen a benefit of SilverCloud because it allows users to remain anonymous.

Table 1.

*Demographics*

| | TX-ONLY | SC+TX |
|---|---|---|
| Age | 22.62 (3.21) | 21.12 (3.16) |
| Gender | | |
| Male | 41.83% | 29.96% |
| Female | 68.17% | 70.04% |
| Not Specified | 0% | 0% |
| Race/Ethnicity | | |
| White | 83.84% | 86.31% |
| African American/Black | .90% | .72% |
| Asian | 3.81% | 3.18% |
| Hispanic | 6.04% | 5.18% |
| Native Hawaiian or Pacific Islander | 1.09% | 1.11% |
| Multi-Racial | 3.21% | 3.11% |
| Other | .61% | .16% |
| Religion | | |
| Christian | 91.70% | 90.73% |
| Other | 8.30% | 9.27% |

*Note*: This table only includes demographic information for those in therapy (i.e., SilverCloud concurrently with therapy or therapy as a standalone treatment) because demographics were not collected for those who participated in SilverCloud as a standalone.

Because participants in the SC-ONLY condition were from the same university as other participants, it is likely that the SC-ONLY participants are demographically similar to the other participants. In this study, those in SC+TX tended to have slightly higher PHQ-9 scores as compared to those in SC-ONLY ($M_{SC+TX}$= 11.5; $M_{SC-ONLY}$= 10.48; F(1, 2585) = 25.45, $p$ <. 05, 95% CI [.63, 1.43]). This was also true for GAD-7 scores ($M_{SC+TX}$= 10.18; $M_{SC-ONLY}$= 9.55; F(1, 2581)= 9.96, $p$ <. 05, 95% CI [.24, 1.02]). Likewise, participants in SC+TX had slightly higher OQ-45 scores than those in TX+ONLY ($M_{SC+TX}$=68.02; $M_{TX-ONLY}$ =74.39; F(1, 4556)=44.05, $p$<.001, 95% CI [-8.25, -4.49). Notably, the difference in distress levels seen in those who were in SC+TX compared to either TX-ONLY or SC-ONLY as measured by the PHQ-9, GAD-7, and

OQ-45 were small ($d_{PHQ-9}$=.20, 95% CI [.12, .27]*) ;* $d_{GAD-7}$= .12, 95% CI [.05, .20]*)*; $d_{OQ-45}$=.30, 95% CI [.21, .39]*).*

**Sampling Procedures**

This study used archival data from Brigham Young University's (BYU) UCC. Participants were included in this analysis from October 2015, the introduction of SilverCloud at the university, to January 2019. Participants were eligible as long as they had a valid student identification number and were over the age of 18. BYU's UCC recruited SilverCloud users via flyers, information on the UCC's website, and therapist referrals. If a SilverCloud user expressed high levels of distress, they were also referred to the UCC, but were still allowed to participate in the study.

**SilverCloud.** SilverCloud participants completed an iCBT program as a standalone treatment or in addition to traditional psychotherapy. SilverCloud asks its users to self-refer into one of four programs: depression (N=833), anxiety (N=678), stress (N=445), and body image (90). Participants completed SilverCloud on their personal computers or smart devices. Using SilverCloud, participants completed modules, watch videos, used tools, and completed quizzes that teach basic cognitive behavioral therapy skills related to specific issues, body image, stress, depression, or anxiety. The SilverCloud content can be completed in any order. Participants were allowed to use SilverCloud for as long or as short as they wished. The average length of treatment was 89.64 days (*SD*= 67.87; range = 4-475) for SC-ONLY and 96.09 days (*SD*= 133.44; range 3-1036) for SC+TX. Every two weeks, SilverCloud participants were sent the Patient Health Questionnaire-9 (PHQ-9) as well as the General Anxiety Disorder-7 Questionnaire (GAD-7). Usage data will be reported in the result sections.

Trained supporters used these measures as well as usage data to monitor participants' progress bi-weekly. Supporters communicated with participants on a bi-weekly basis to discuss progress and suggest relevant tools and resources. If participants did not use SilverCloud for a two-week period, they were sent a message from the supporter asking if they would like to pause or end the program. If there was no response in a month, the participants' SilverCloud treatment was ended. However, participants were allowed to restart SilverCloud at any time. Many participants used SilverCloud for multiple courses of therapy. If individuals participated in SilverCloud for more than one distinct course of therapy, we only included their first course of therapy. Courses of SilverCloud therapy were considered different if there were gaps between visits that were greater than 90 days.

**Psychotherapy Participants.** Individuals receiving psychotherapy as either a standalone or in addition to SilverCloud, received psychotherapy from one of 98 clinicians (mix of licensed therapists and trainees). In our analyses, we only included individuals in group therapy (N=43), individual therapy (N= 3265), couples therapy (N=327), and a combination of therapy type (N=686). We did not include those attending supportive therapies such as biofeedback. Each therapist had an average of 49 different clients during the three-year period. Therapy typically occurred weekly on average of 5-10 sessions per semester ($M$= 5.10; $SD$=5.10; range = 2-74). If individuals participated in multiple courses of therapy we only included their first course of therapy. Courses of therapy were considered different if there were gaps between visits that were greater than 90 days. Individuals were asked to complete the OQ-45 before each therapy session. 11% of therapy participants in this study missed one or more OQ's. Psychotherapy was considered concurrent with SilverCloud if participants had a therapy intake plus one additional session within 90 days of using SilverCloud.

## Measures

**Generalized Anxiety Disorder-7 (GAD-7).** The GAD-7 is a seven-item self-report scale that measures symptoms and severity of generalized anxiety. Participants are asked to rate how greatly different symptoms of anxiety (i.e. feeling nervous, restless etc.) have bothered them in the last two weeks. These items are rated on a scale ranging from 0 (not at all sure) to 3 (nearly every day). Scores range from 0-21, with higher scores indicating increased anxiety. One study of the GAD-7, with a large and diverse sample (N= 2,739), reported an internal consistency coefficient of 0.92 and a test-retest coefficient of 0.83 (Spitzer et al., 2006). Additionally, factor analysis evidence suggests that the GAD-7 is measuring a unitary, one-dimensional factor (Dear et al., 2011; Löwe et al., 2008; Spitzer et al., 2006). The GAD-7 has good sensitivity and specificity for generalized anxiety disorder. Using the cut-point scores, its sensitivity and specificity are 89% and 82%, respectively (Spitzer et al., 2006). Though originally developed to assess generalized anxiety disorder, the GAD-7 also has good sensitivity and specificity for other anxiety disorders (e.g. panic disorder, social anxiety disorder; Kroenke et al., 2007). Construct validity has been demonstrated by showing that increasing scores were associated with multiple domains of functional impairment, suggesting that the GAD-7 is a helpful gauge of the severity of anxiety symptoms (Spitzer et al., 2006). In addition to clinical populations, the GAD-7 has also been used reliably in the general population to assess for anxiety symptoms and disorders (Löwe et al., 2008).

**Patient Health Questionnaire-9 (PHQ-9).** The PHQ-9 is a nine-item self-report scale that measures symptoms and severity of depression (Kroenke et al., 2001). Participants are asked to rate how greatly different symptoms of depression (i.e. feeling down, depressed and hopeless, lack of appetite etc.) have bothered them in the last two weeks. These items are rated on a scale

ranging from 0 (not at all sure) to 3 (nearly every day). Scores range from 0-27 with higher scores indicating more depressive symptoms. The PHQ-9 has demonstrated good internal consistency with Cronbach's ∝ values above .80 (Kroenke et al., 2001; Kroenke et al., 2010). Additionally, this evidence of reliability has held up among racially diverse and multicultural groups (Huang et al., 2006; Keum et al., 2018). There is significant criterion-related evidence for validity: higher PHQ-9 scores are associated with worse psychological functioning, symptom-related difficulties, alcohol usage and health care usage (Kroenke et al., 2001; Keum et al., 2018). Additionally, PHQ-9 scores are correlated with other common measures of depression such as the Beck Depression Inventory (BDI-II) and the PHQ-9 has been used alongside it to create the PROMIS depression metric (Choi et al., 2014). The PHQ-9 has good sensitivity and specificity for depressive symptoms. Using the cut point scores, its sensitivity and specificity are 99% and 91%, respectively (Kroenke et al., 2001). In addition to the strong psychometric properties within a clinical population, there is also evidence of the reliability, validity and the unidimensional factor structure of the PHQ-9 to assess depressive symptoms in the general population (Kocalevent et al., 2013).

**Outcome-Questionnaire-45 (OQ-45).** The OQ-45 is a 45-question self-report measure used to monitor treatment outcomes and has three subscales: symptom distress, interpersonal relations, and social role (Lambert et al., 1996). They are scored on a five-point Likert scale ranging from "never" to "almost always." OQ-scores range from 0-180, with higher scores indicating more distress. Normative data was collected in a variety of settings including non-patient, outpatient, and inpatient populations (Lambert et al., 2015). The OQ-45 clinical cut-point of 63 has been empirically supported through clinical trials and is considered to be within a standard deviation of the normal population (Hansen et al., 2003). In inpatient, outpatient, and

non-patient populations, the OQ-45 has demonstrated good internal consistency with a 0.93 Cronbach's ∝ value (Lambert et al., 2013). Likewise, in our sample the internal consistency was also good (∝ = 0.93). Additionally, the three-week test-retest reliability for the OQ-45 is 0.84 for the total OQ score (Lambert et al., 2013). These results have been replicated among racially and ethnically diverse populations (Lambert et al., 2015). The OQ-45 has been correlated with many other measures of distress as well as diagnostic measures (e.g. Beck Depression Inventory, Minnesota Multiphasic Personality Inventory; Lambert, 2015). Similarly, in our sample, as we expected, higher OQ-45 scores had moderate, positive correlations with GAD-7 and PHQ-9 scores indicating that they are all measuring similar but distinct forms of distress.

**Program Usage.** In order to measure program usage, we reviewed several of SilverCloud's program analytics. Specifically, we used the number of pages viewed and tools used by participants. These measures quantify usage from two similar but different standpoints: how often participants look at content versus how often participants actively use the embedded tools.

## Statistical Analysis

**Outcome.** Because only two data points were available for the SC-ONLY group, we used an ordinary least squares regression model with clustered, robust standard errors to estimate treatment differences (i.e., SC-ONLY, SC+TX, and TX-ONLY). The robust standard errors allowed us to take into account the fact that there may be an effect of participants seeing the same therapist (McNeish, 2014). All models were estimated with the *regress* command and the *vce(cluster)* option command in Stata 15 (StataCorp, 2017).

***Outcome Questionnaire-45.*** The regression model used to determine whether change in OQ-45 score varies as a function of whether someone is receiving SC+TX or TX-ONLY is as follows:

$$last\_oq = b_0 + b_1 \text{tx} + b_2\, first_{oq} + \text{e}$$

$$e \sim N(0, \sigma_e^2)$$

In this model, the variables $first\_oq$ and $last\_oq$ represent the participants' first and last OQ-45 score, respectively. The variable $tx$ represents the treatment type participants are in (SilverCloud in addition to psychotherapy vs. psychotherapy only; we will call these group one and group two, respectively). It is a categorical variable and is dummy coded, where "0" is SilverCloud in addition to psychotherapy and "1" is psychotherapy alone. The variable $last\_oq$ is each participants' last OQ-45 score for person; $b_0$ is the intercept; $b_1$ is difference in last OQ-45 score for those in group one versus those in group two, holding constant first OQ-45 score; $b_2$ is the difference in last OQ-45 score for every one-unit increase in first OQ-45 score, holding constant all other variables; $e$ is the residual and is assumed to be normally distributed with a mean of 0 and unknown variance ($\sigma^2$). This model was used as a base model and we created a model similar to the one above but containing race, gender, and primary concern as covariates to see whether the relationships held.

***Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7.*** We used regression models similar to the ones above to determine whether the rates of change (i.e. PHQ-9 and GAD-7 scores) vary as a function of SC+TX and SC-ONLY. We considered treatment types as a categorical variable and coded those who were in SC+TX with psychotherapy as a one and those who were in SC-ONLY as zero.

**Usage.** We used linear regression to model how outcome (i.e., change in PHQ-9 and GAD-7) was associated with how often participants used SilverCloud (i.e., pages viewed, and tools used). The regression model is as follows:

$$outcome_{final} = b_0 + b_1 pages\_viewed + b_2 tools\_used + b_3 outcome\_first + b_4 tx + e$$

$$e \sim N(0, \sigma_e^2)$$

We estimated separate models for final PHQ-9 and GAD-7; $b_0$ is the intercept; $b_1$ is the difference in final outcome score for every one unit difference in pages viewed, holding all other variables constant; $b_2$ is the difference in final outcome score for every additional tool used, holding all other variables constant; $b_3$ is the difference in final outcome score for every one unit difference in initial outcome measure score, holding all other variables constant; $b_4$ is the difference in final outcome measure score for those who are using SilverCloud as a standalone treatment compared to those using SilverCloud alongside psychotherapy, holding all other variables constant; and e is the residual and is assumed to be normally distributed, with a mean of 0 and an unknown variance.

**Power Calculations**

Given that the data were archival, we performed detectable difference calculations to estimate what size of effects we could detect with our sample size and various levels of power. The effect size of most internet-delivered therapies compared to controls is estimated to be similar to traditional psychotherapy between $d$ = .6 and $d$ = 1.52 (Andersson, 2009; Andersson, 2018). In this study, we compared the use of SilverCloud as a standalone treatment to various combinations of psychotherapy with and without psychotherapy and thus we expect the effect size to be smaller than those typically reported in the literature. To compute the detectable

difference for our regression models examining treatment effects, we used the *power twomeans* command in Stata.

**SilverCloud.** The detectable difference for models examining treatment effects (SC-ONLY vs. SC+TX) was $d = 0.18$, assuming a sample size 968, 80% power, and $\propto = 0.05$. See table 2 below for these power calculations.

Table 2.

*Detectable Difference Calculations for SC + TX vs SC-ONLY ($\propto$ =.05; N=968; SD=1)*

| *Power* | Effect Size (d) |
|---|---|
| *.80* | .18 |
| *.85* | .19 |
| *.90* | .21 |
| *.95* | .23 |

**Psychotherapy.** The detectable difference for models examining treatment effects (TX-ONLY vs. SC+TX) was $d = 0.10$, assuming a sample size 3800, 80% power, and $\propto = 0.05$. See table 3 below for these power calculations.

Table 3.

*Detectable Difference Calculations for SC+ TX vs. TX-ONLY ($\alpha$ =.05; N=3800; SD=1)*

| Power | Effect Size (d) |
|---|---|
| .80 | .09 |
| .85 | .10 |
| .90 | .11 |
| .95 | .12 |

**Missing Data**

Many participants did not complete one or more measures. Specifically, 11% of people in TX-ONLY or SC+TX were missing at least one OQ-45. Further, 43% of those in SC-ONLY or SC+TX were missing at least one PHQ-9 or GAD-7. We created a correlation matrix to examine the pattern of missing data. See table 4 below.

Table 4.

*Pairwise Correlations of Missing Data*

| | Miss First PHQ-9 | Miss Last PHQ-9 | Miss First GAD-7 | Miss Last GAD-7 | Miss First OQ-45 | Miss Last OQ-45 |
|---|---|---|---|---|---|---|
| First PHQ-9 | - | - | - | - | .06* | .06* |
| Last PHQ-9 | - | - | - | - | .08* | .08* |
| First GAD-7 | - | - | - | - | .09* | .09* |
| Last GAD-7 | - | - | - | - | .06 | .06* |
| First OQ-45 | .03 | .00 | .02 | .00 | - | - |
| Last OQ-45 | .05 | .00 | .06 | .01 | - | - |
| Pages Viewed | -.02 | -.48* | -.02 | -.49* | .03 | .03 |
| Tools Used | -.02 | -.45* | -.02 | -.45* | .05 | .05 |
| SilverCloud Program | 0.00 | .03 | .00 | .03 | .05 | .05 |
| Race | .01 | -.11* | .00 | -.11* | .00 | .00 |
| Gender | .01 | -.05* | .02 | -.05* | .11* | .11* |

*Note:* * shows significance at the .05 level

We determined that the missing data were not meaningfully correlated with any outcome variables, which is consistent with data missing at random. Notably, participants who were

missing their last PHQ-9 and GAD-7 scores had a significantly lower number of tools used and pages viewed. This is consistent with the way that the data was collected (i.e., participants only received follow-up measures if they logged in and were completing the measures). If participants were not engaged in the program, they completed fewer measures. Though it makes intuitive sense that those who use less of the program would be more likely to have missing outcome measures, it does limit our conclusions about participants who did not use as much of the SilverCloud program because we do not have their final outcome data.

## Results

### Descriptive Data

Participants using SC-ONLY and SC+TX logged in an average of 6.93 times (*SD*= 11.14; Range: 1-285) and used the program for an average of 85.44 days (*SD*=106.08; Range: 1-1142). On average, SC-ONLY and SC+TX participants used only about 15% of the program or viewed an average of 16.27 pages (SD= 17.72; Range 0-101) and used an average of 3.88 tools (*SD*=4.98; Range 0-41). SilverCloud usage did not significantly differ by treatment type ($p$=.93, 95% CI [-.52, .47], robust SE= .25) or SilverCloud program type *(*$p_{anxiety}$= .23, 95% CI[-.18, .76], *robust* $SE_{anxiety}$ = .24*;* $p_{stress}$ = .42*,* 95%CI[.02,.84], robust $SE_{stress}$ =.21; $p_{body\_image}$ = *.45, 95% CI[-.93, .87],* robust $SE_{body\_image}$ =.45*).*

SC+TX and TX-ONLY had a mean decrease of 7.50 points on the OQ-45 (*SD*=16.15). The SC-ONLY and SC+TX groups experienced an average decrease of 1.86 points on the PHQ-9 (*SD* = 4.86) and 1.90 on the GAD-7 (*SD* = 4.27). TX-ONLY and SC+TX participants attended an average of 5 sessions (*SD*=5.10; Range: 2-74). TX-ONLY participants only remained in treatment for an average of 82.59 days (*SD*= 111.81; Range: 1-1142). SC+TX participants remained in treatment for an average of 96.09 days (*SD*=133.04; Range: 13-1036; see Table 5).

Table 5.

*Usage Data*

| | SC-ONLY | SC+TX | TX-ONLY |
|---|---|---|---|
| Number Signed Up | 1247 | 527 | 3794 |
| Number of participants who completed pre and post GAD-7 and PHQ-9 | 661 | 307 | - |
| Number of participants who completed pre and post OQ-45 | - | 506 | 3406 |
| Number of Tools Used | 3.89(3.89) | 3.88(4.99) | - |
| Number of Pages Viewed | 16.21(17.62) | 16.38(17.96) | - |
| Number of Logins | 6.99(12.27) | 6.80(7.87) | - |
| Treatment Length (days) | 89.64(67.87) | 96.09(133.44) | - |
| Number of Therapy Visits | - | 5.62(4.89) | 5.02(4.85) |

Intraclass correlations indicated that less than 1% of the variance in final OQ-45 score is associated with therapists (95% CI[.00, .02]).

**Outcome**

**SilverCloud alone vs. SilverCloud and Psychotherapy.** Participants using SC-ONLY vs. those using SC+TX did not have significantly different treatment outcomes as measured by the PHQ-9 ($p$=.39; 95% CI[-.26, .67]) or the GAD-7 ($p$=.15; 95% [-.12, .80]; see Table 6).

Table 6.

*Regression Analyses for Predicting Treatment Outcomes for SilverCloud Participants (N = 968)*

| | GAD-7 Final Score | | PHQ-9 Final Score | |
|---|---|---|---|---|
| Variable | β | *95% CI* | β | *95% CI* |
| Therapy Type | | | | |
| *SC+TX*[a] | .34 | [-.12, .80] | .20 | [-.26, .67] |
| Baseline Score | .68** | [.65, .71] | .65** | [.59, .70] |
| SilverCloud Program[b] | | | | |
| *Anxiety* | .04 | [-.40, .47] | .23 | [-.21, .67] |
| *Stress* | .21 | [-.10, .60] | .28 | [-.27, .83] |
| *Body Image* | .35 | [-.17, .88] | -1.42** | [-1.91, -.94] |
| $R^2$ | .46 | | .38 | |

*Note:* * indicates p <.05 and ** indicates p < .001.
[a]Comparing to SC-ONLY [b]Comparing to Depression

**Psychotherapy Alone vs. SilverCloud and Psychotherapy.** Participants in SC+TX had better outcomes than those in TX-ONLY as measured by the OQ-45 ($p$=.04; 95% CI: [.08, -3.59]; see table 7) when controlling for therapy type and presenting concern.

Table 7.

*Regression Analyses for Predicting Treatment Outcomes for Therapy Participants (N = 3,912)*

| | OQ-45 Final Score | |
|---|---|---|
| Variable | β | *95% C I* |
| Therapy Type | | |
| *TX-ONLY* [a] | 1.83* | [.08, 3.59] |
| Initial OQ-45 Score | .74** | [.72, .76] |
| Presenting Concern[b] | | |
| *Depression* | -1.89* | [-3.62, -.16] |
| *Stress* | .03 | [-2.38, 2.42] |
| *Body Image* | .75 | [-3.27, 4.77] |
| *Other* | -.88 | [-2.61, .85] |
| Therapy Type[c] | | |
| *Couple* | -3.8 | [-16.70, 9.07] |
| *Group* | .52 | [-1.77, 2.81] |
| *Combination* | -.64 | [-2.53, 1.25] |
| $R^2$ | .49 | |

*Note:* * indicates p <.05 and ** indicates p < .01.
[a]Compared to SC+TX [b]Compared [c]Compared to individual

Notably, the difference in outcome was only two points on the OQ-45, which is a .08 standard deviation difference on the OQ-45. This relationship held even when controlling for race, gender, and treatment length (see table 8).

Table 8.

*Regression Analyses for Predicting Treatment Outcome (OQ-45 final score) for Therapy Participants Controlling for Race and Gender (N = 3,800)*

| | β | *95% CI* |
|---|---|---|
| Therapy Type[a] | | |
| *TX-ONLY* | 2.09* | [.36, 3.82] |
| Initial OQ-45 Score | .76** | [.74, .78] |
| Presenting Concern[b] | | |
| *Depression* | -1.50 | [-3.13, .13] |
| *Stress* | -.07 | [ -2.42, 2.27] |
| *Body Image* | 1.04 | [-2.92, 4.99] |
| *Other* | -.63 | [-2.21, .95] |
| Therapy Type[b] | | |
| *Couple* | .49 | [-1.76, 2.74] |
| *Group* | -.44 | [-10.19, 9.30] |
| *Combination* | 1.23 | [-1.06, 3.53] |
| Gender(female)[c] | .23 | [-1.04, 1.51] |
| Race[d] | | |
| *American Indian or Alaskan Native* | 3.17 | [-3.73, 10.07] |
| *Asian* | -5.68 | [-10.83, -.52] |
| *Hispanic* | -4.76 | [-9.57, .05] |
| *Native Hawaiian* | -6.06 | [-13.10, .98] |
| *Multi-Racial* | -5.84 | [-10.98, -.69] |
| *White* | -4.78 | [-9,78, 22] |
| *Other* | -3.86 | [-4.43, 12.14] |
| $R^2$ | .52 | |

*Note:* * indicates p <.05 and ** indicates p < .001.
[a]Compared to SC+TX [b]Compared to individual [c]Compared to males [d]Compared to African Americans

**Usage and Outcome.** Outcome as measured by the PHQ-9 was not significantly related to usage as measured by pages viewed (*p*=.13; 95% CI [-.03, 0]) or tools used (*p*=.05, 95% CI [-.14, 0]). Similar results occurred for outcome as measured by the GAD-7 where the number of pages viewed (*p*=.27; 95%CI [-.024, .01]) was unrelated to outcome. Interestingly, the number of tools used was related to final GAD-7 score (*p*=.01; 95% CI [-.10,-.014]). However, given that

the usage variables explain less than 1% of the variance, it seems that SilverCloud usage is not a very good predictor of outcome. See table 9 for detailed results and see figure 2 for a visual representation of usage and outcome.

Table 9.

*Regression Analyses for Treatment Outcomes for SilverCloud Participants as a Function of Usage (N = 971)*

| | GAD-7 Final Score | | PHQ-9 Final Score | |
|---|---|---|---|---|
| Variable | β | *95% CI* | β | *95% CI* |
| Therapy Type | | | | |
| *SC+TX*[a] | .31 | [-.14, .76] | .15 | [-.29, .58] |
| Usage Variables | | | | |
| *Pages Viewed* | -.01 | [-.02, .01] | -.02 | [-.04, 0] |
| *Tools Used* | -.06* | [-.10, -.01] | -.07 | [-.13, 0] |
| Baseline Score | .69** | [.66, .71] | .65** | [.59, .70] |
| SilverCloud | | | | |
| Program[b] | | | | |
| *Anxiety* | .05 | [-.36, .47] | .28 | [-.15, .71] |
| *Stress* | .23 | [-.17, .63] | .35 | [-.16, .87] |
| *Body Image* | .42 | [-.20, 1.05] | -1.30** | [-1.84, -.77] |
| $R^2$ | .46 | | .39 | |

*Note:* * indicates p <.05 and ** indicates p < .001.

[a]Compared to SC-ONLY [b]Compared to Depression

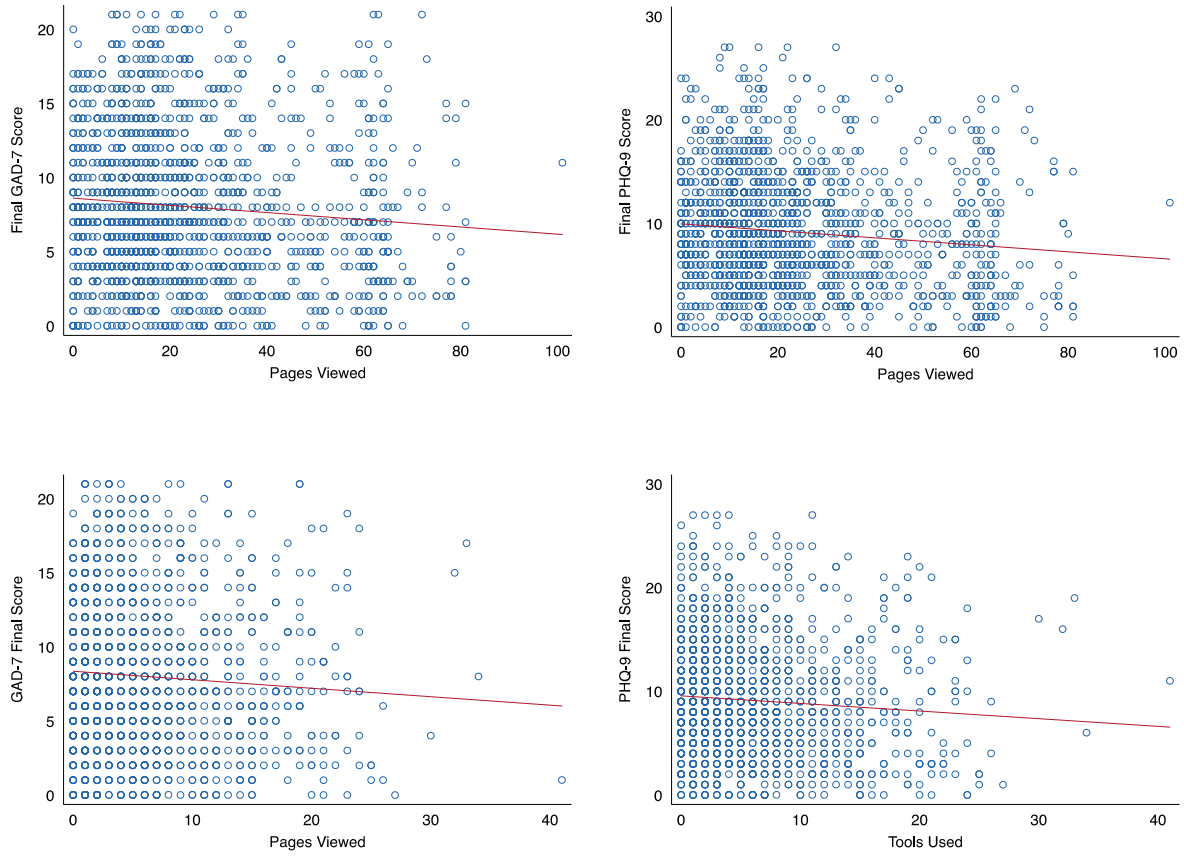


*Figure 2.* Treatment Outcome as a Function of SilverCloud Usage

## Discussion

The current study compared the outcome and usage of an internet-delivered treatment as both a standalone intervention and as an adjunct to psychotherapy to psychotherapy as a standalone treatment in a naturalistic setting. As expected usage of SilverCloud was low when it was used both as a standalone and as an adjunct to therapy. The fact that participants did not use most of the SilverCloud program is the norm and not the exception in research using internet-delivered interventions. For example, Dryman et al. (2017) found that less than 10% of users completed their program.

Those using SilverCloud had comparable outcomes to those using psychotherapy. After controlling for race, gender, and treatment length, those using SC+TX had slightly better

outcomes than those using TX-ONLY. Further, those using SC-ONLY and those using SC+TX did not have significantly different treatment outcomes. Notably, the differences between the groups were very small, only .08 of a standard deviation. Thus, all three treatments had comparable outcomes.

Though participants on average improved as a result of treatment, usage of SilverCloud was generally unrelated to treatment outcome. However, on one measure of outcome, GAD-7, and one measure of usage, tools used, there was a small relationship between outcome and usage. This relationship was so small that it accounted for only 1% of the variance in outcomes. The biggest predictor of treatment outcome was initial distress, which may indicate that regression to the mean, rather than usage of SilverCloud content, was the source of change. That said, given that outcome research suggests that internet-delivered therapies outperform waitlist controls, SilverCloud may produce change beyond regression to the mean. For example, some studies have shown that teaching specific CBT skills and using specific tools can be a useful part of internet-delivered therapy (Terides et al., 2018). Thus, it is possible that the number of tools used is a better predictor of outcome and perhaps there is a small, but significant relationship between tools used and outcome.

There is a myriad of possible reasons that usage of SilverCloud is not linked to outcome including unappealing SilverCloud content, low motivation to participate in treatment, and missing important components of traditional therapy. First, the content of SilverCloud is not particularly engaging. It has lengthy modules that are not personalized to participants' concerns. Further, though participants using SilverCloud were monitored by a trained supporter, the supporters provided very scripted and impersonal feedback. Participants did not receive much *personalized* feedback about their individual concerns. Thus, though it has some therapist

support, SilverCloud is really more a self-guided intervention than a therapist supported online intervention. Several meta-analyses show that self-guided web-based interventions have fewer promising results in terms of usage and outcome than therapist supported interventions where the therapist gives specific and personal feedback (Andersson & Cuijpers, 2009; Richards & Richardson, 2012). It is possible that increasing support, especially personalized support, during treatment would yield increased usage and better outcomes.

Second, participants using SilverCloud may not be motivated to participate in treatment. Brogan, Prochaska, and Prochaska (1999) found that treatment dropout was highly related to motivation to change and motivation to engage in psychotherapy. It could be that without a therapist to help monitor and offer engagement, participants who are not very motivated simply drop out.

Lastly, the SilverCloud intervention and internet-delivered therapies may be missing some of the key components of traditional psychotherapy. The contextual model of psychotherapy (Wampold & Imel, 2015) posits that psychotherapy for *bona fide* treatments depends on the initial therapeutic bond and operates via three paths: the real relationship, creation of expectation through explanation and treatment, and having shared tasks and goals in which the therapists uses their skills to help the client to engage in healthy behaviors. This results in symptom reduction and better quality of life. One could argue that online therapy is missing all or most of these components making the therapeutic experience in online therapy less reinforcing and effective, and therefore there is a very weak relationship between usage and outcome with SilverCloud.

## Limitations

This study had several limitations. First, the sample used in this study was very homogenous and may not be representative of other populations. A recent meta-analysis suggests that various demographic factors, such as race and socioeconomic status, can play a large role in treatment outcome (Karyotaki et al., 2015). Second, this study investigates just one online intervention. There are many other iCBT programs that may have more engaging and effective content thus yielding different outcomes. Third, our data was naturalistic and collected as part of routine clinical care at a college counseling center. Though naturalistic data may have better external validity due to the fact that it is collected during regular practice, participants at BYU's UCC did not have to pay for any services. Because there was no penalty for dropping out of SilverCloud or therapy for the participants in this study, there may have been an increase in attrition. Lastly, only two data points were available for SC-ONLY, so we matched the structure for the other groups (i.e., SC+TX and TX-ONLY). It is possible that those in TX-ONLY, SC+TX, and SC-ONLY experience similar outcomes, but have different trajectories over time. To better understand how online treatment works, detailed, longitudinal data would be needed to compare the outcome and trajectory of those in TX-ONLY, SC+TX, and SC-ONLY.

## Conclusions and Future Directions

Our results suggest that online therapy is a promising alternative or supplement to traditional psychotherapy. UCCs may consider using iCBT platforms as part of a stepped-care approach wherein individuals complete the iCBT program before entering traditional psychotherapy. Further, our results suggest that usage of online therapies is low and attrition rates are high. However, this is also the case in traditional psychotherapy where individuals attend very few sessions and do not complete therapist-assigned homework outside of session.

Future studies might monitor and compare usage variables in therapy, such as homework completion and engagement in treatment, to that of iCBT platforms. Additionally, more research is needed to investigate what content is best suited for internet-delivered therapies. It seems that most online therapy programs try to adapt standard psychotherapy to fit in online platforms. Future research may look to the literature about online courses to think about what makes engaging and useful online content. For example, Soffer and Cohen (2019) suggest that online courses have shorter, more engaging assignments, include timely feedback, allow trackable progress in real time, and include a variety of types of media to view. Future studies may also consider using a more heterogeneous and diverse sample, monitoring participants' usage session by session, and assessing motivation throughout treatment.

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## Appendix

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