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Telepsychotherapy for Trichotillomania: A Randomized Controlled Trial of
ACT-Enhanced Behavior Therapy

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Abstract

Despite its prevalence, quality treatment for trichotillomania is often difficult to find. The use of telepsychology has been an effective method for disseminating treatment services for a variety of mental health conditions. However, no research has examined the use of telepsychology to treat trichotillomania. This randomized controlled trial used Acceptance and Commitment Therapy Enhanced Behavior Therapy delivered by way of telepsychology to treat trichotillomania in adults. The study compared an active treatment condition ($n = 12$) to a delayed treatment waitlist control condition ($n = 10$). Results showed significant reductions in hair pulling severity from pre- to post-treatment compared to the waitlist condition. The 22 participants all received treatment and were combined to examine overall treatment effects from pre-treatment to a 12-week follow-up. The effect of treatment on hair pulling severity remained significant at follow-up. Measures of psychological flexibility and perceived shame also saw significant improvement. Quality of life, however, did not improve over the course of treatment. The findings demonstrate that telepsychology is a viable option to disseminate treatment for trichotillomania.

Keywords: telepsychology, telehealth, trichotillomania, acceptance and commitment therapy, habit reversal training, randomized controlled trial

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Telepsychotherapy for Trichotillomania: A Randomized Controlled Trial of ACT Enhanced Behavior Therapy

Trichotillomania is characterized by repetitive hair pulling that leads to noticeable hair loss and causes significant distress and social or functional impairment (American Psychiatric Association, 2013). The dysfunctional effects of trichotillomania may include significant social interference, such as the inability to maintain close relationships with others; occupational interference, such as avoiding job interviews or position advancement; academic functioning, such as missing school or having difficulties studying due to pulling; and affective disturbances, such as depression, anxiety, or stress (Grant et al., 2017; Wetterneck, Woods, Norberg, & Begotka, 2006; Woods et al., 2006a). Additionally, those with trichotillomania generally have lower overall quality of life compared to healthy controls (Odlaug, Kim, & Grant, 2010).

The best estimates of the prevalence of trichotillomania range from 0.6% to 3.4% among adults, dependent on how restrictively one defines the disorder (Christenson, Pyle, & Mitchell, 1991; Duke, Keeley, Geffken, & Storch, 2010; Stanley, Borden, Bell, & Wagner, 1994). Despite its prevalence, trichotillomania continues to be misunderstood by many mental health professionals. For example, a survey of over 500 psychologists and physicians in the United States found that professionals are relatively uninformed about trichotillomania and its treatment (Marcks, Wetterneck, & Woods, 2006). Additionally, the majority of the professionals surveyed did not have referral resources to direct those with trichotillomania to find quality help.

Thus, finding quality treatment for trichotillomania may be impossible depending on location. The United States Department of Health and Human Services (2014) estimated that there are approximately 4,000 Mental Health Professional Shortage Areas in the United States that include 96.5 million people who do not have access to adequate mental health services. This

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lack of adequate mental health care presents a significant problem for those seeking treatment for trichotillomania. The problem of providing care to those without access and the low number of trained providers for trichotillomania can potentially be addressed through the use of technology and telepsychotherapy.

The use of telepsychotherapy has been shown to be an effective method of treating a wide variety of mental health conditions including, post-traumatic stress disorder (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011), schizophrenia (Rotondi et al., 2005), alcohol abuse (Frueh, Henderson, & Myrick, 2005), insomnia (Lichstein et al., 2013), Tourette's syndrome (Himle, Olufs, Himle, Tucker, & Woods, 2010), agoraphobia (Alcañiz et al., 2003), and eating disorders (Shingleton, Richards, & Thompson-Brenner, 2013). However, no research has been conducted on the effectiveness of telehealth to treat trichotillomania.

Telepsychology refers to a type of telehealth that consists of the delivery of traditional psychological services by way of technology-assisted means (Nelson, Bui, & Velasquez, 2011). Telepsychology services might enable those with debilitating levels of anxiety, depression, or shame, who might not be willing to attend a traditional therapy session, to receive treatment from the safety and convenience of their own homes (Hedman et al., 2011; Maheu, Pulier, McMenamin, & Posen, 2012). Additionally, the format allows therapists to provide services to underserved areas and populations where access to quality care for less understood conditions, such as trichotillomania, might be difficult to obtain.

While no study has tested the use of telepsychology for treating trichotillomania, research is growing with regard to treatments delivered by way of traditional face-to-face methods. Habit reversal training is the most extensively researched of these treatments. Over 30 controlled trials have been performed that examined habit reversal training for multiple disorders with both

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children and adults (Twohig, Bluett, Morrison, & Woidneck, 2014). Despite this, habit reversal training often fails to adequately target internal states associated with some pulling behavior. This has lead researchers to modify habit reversal training in attempts to better target issues such as anxiety, distress, and lack of motivation that are often present in trichotillomania. These modifications have included addition of traditional cognitive behavior therapy techniques (Lerner, Franklin, Meadows, Hembree, & Foa, 1999; Rangaswami, 1997), dialectical behavior therapy (DBT; Keuthen et al., 2012), metacognitive therapy (Shareh, 2017), and acceptance and commitment therapy (ACT; Twohig & Woods, 2004). While limited, the research on ACT as a treatment for trichotillomania is promising.

ACT has been examined as a stand-alone treatment for trichotillomania and related disorders. These include two small multiple-baseline across participants design studies (Crosby, Dehlin, Mitchell, & Twohig, 2012; Twohig, Hayes, & Masuda, 2006) and a randomized controlled trial treating adolescents and adults (Lee et al., in press). These studies provide evidence for ACT as a stand-alone treatment for trichotillomania. More research has examined ACT as an enhancement to habit reversal techniques. ACT-enhanced Behavior Therapy was developed to target overt, automatic pulling through the use of behavioral techniques like habit reversal training and covert, internal experiences that lead to focused pulling through the use of ACT (Woods & Twohig, 2008a). An initial pilot study examined the use of an ACT-enhanced behavior therapy protocol on six adults with trichotillomania utilizing a multiple-baseline across participants design (Twohig & Woods, 2004). Four of the six participants reduced their hair pulling behavior significantly and three were able to maintain their gains at three-month follow-up. Next, a follow-up RCT was performed with a larger sample size of 25, that also found significant reductions in hair pulling (Woods, Wetterneck, & Flessner, 2006b). Another study

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examined ACT-enhanced behavior therapy with regard to the sequence in which the two types of therapy (i.e., ACT and habit reversal training) are presented with five participants with trichotillomania or skin picking (Flessner, Busch, Heideman, & Woods, 2008). The researchers found that participants responded best when both ACT and habit reversal training were utilized, but no differences were seen as a result of sequencing. Finally, a recent RCT including 85 participants found that an ACT-enhanced behavior therapy condition significantly outperformed a psychoeducation and supportive therapy condition at post-treatment; however, this finding was not maintained at a three-month follow-up (Woods et al., 2018). In summary, there is good support for ACT-enhanced behavior therapy as a treatment for trichotillomania, making it a good candidate for evaluation in a telepsychotherapy format.

At this time, no research has examined treatment of trichotillomania using telepsychology. While treatment for trichotillomania has improved over time, access to providers who are familiar with trichotillomania and its treatment has not. Telepsychology appears to be a promising component to the solution of this problem. The current study is an attempt to examine the feasibility of delivering ACT-enhanced behavior therapy as a treatment for trichotillomania by way of telepsychology through the use of a randomized controlled trial. We predicted that treatment would significantly improve hair pulling severity and quality of life compared to the waitlist condition. Additionally, we predicted that psychological flexibility and shame, variables that have previously been shown to be related to trichotillomania, would improve over the course of treatment. Finally, we explored how telepsychology might affect working alliance and treatment satisfaction.

Method

Participants

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Participants were recruited from multiple university campuses and mental health providers as well as via advertising on the internet. To be included in the study, participants were required to: (a) meet the DSM-5 criteria for trichotillomania; (b) be seeking treatment primarily for trichotillomania-related concerns; (c) be at least 18 years old; (d) reside in Utah; and (e) be a fluent English speaker. Participants were excluded from the study if they: (a) were currently receiving psychotherapy; (b) had started or changed psychotropic medication in the past 30 days; or (c) were planning to start or change psychotropic medication during the course of the current study.

The majority of participants were women (86.4%), heterosexual (81.8%), and White (95.5%). On average, participants were 32.5 ($SD = 8.3$) years old. Education varied among participants with highest completion levels as follows: high school (13.6%), some college (31.8%), bachelor's degree (27.3%), and graduate degree (27.3%). Results of a diagnostic interview indicated that seven (31.8%) participants met criteria for a comorbid psychological disorder: persistent depressive disorder (18.2%), generalized anxiety disorder (13.6%), and major depressive disorder (9.1%). Six met criteria for a single comorbid diagnosis and one met criteria for four comorbid diagnoses. Additionally, six (27.3%) reported being on a stable dose of an antidepressant and one (4.5%) reported being on a stable dose of a stimulant. On average, participants reported that hair pulling had been a significant problem for 16.3 ($SD = 9.7$, range = 22–51) years. Moreover, 11 (50.0%) participants had previously sought individual therapy and two (9.1%) had previously used self-help books as treatment for trichotillomania. Detailed information regarding what type of prior treatment was not gathered. See Table 1 for demographic data by condition.

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A power analysis was conducted using G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007) in order to determine the number of participants to include in the study. A past trial of ACT-enhanced behavior therapy for trichotillomania resulted in a large effect size ($d = .81$; Woods et al., 2006b). Therefore, a power analysis was performed using this same effect size, with alpha set at .05 and power at .80 specifying a sample of 24. At the conclusion of the recruitment period, 28 individuals were assessed for eligibility and 22 met requirements and participated in the study. See Figure 1 for a participant flowchart.

Procedures

The current study was approved by a university internal review board. The effect of treatment was assessed through a randomized controlled trial. Participants were randomized into either a treatment or delayed treatment waitlist control group following the baseline assessment during the intake process. An online random number generator was used to create a list of participant identifiers that were randomly assigned to one of two equally sized groups. Following the intake session, participants were given the next available identifier and assigned to the corresponding group. The intake session consisted of gathering consent and information about hair pulling and completing an assessment battery. Participants placed in the treatment group completed this pretreatment assessment, tracked their baseline hair pulling for one week, and then began the 12-week treatment. Participants in the delayed treatment waitlist group completed the same pretreatment assessment, tracked their baseline hair pulling for one week, and then began treatment after 12 weeks had elapsed and they had completed a post-waitlist assessment. All participants were also given an assessment following their fifth treatment session, final treatment session, and 12 weeks following treatment.

Telepsychology Procedures

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All treatment sessions, including intake, utilized telepsychology procedures. Thus, participants received all treatment in their homes while therapists were located in a private room in a university clinic. A HIPAA approved video conferencing software (VSee) was utilized. All sessions were recorded and saved to a HIPAA compliant server. All assessments were completed using online survey software (Qualtrics).

Treatment

Treatment consisted of a protocol (see Table 2 for an overview) that took place over 10 individual weekly one-hour sessions. Of the participants who completed all 10 sessions, the average treatment length was 12.7 weeks; flexibility allowed the treatment provider to accommodate for scheduling conflicts or other participant needs. The protocol closely followed an empirically supported acceptance and commitment therapy-enhanced behavior therapy treatment manual (Woods & Twohig, 2008b). The manual blends traditional habit reversal training techniques with more contemporary behavior therapy elements from ACT that employ techniques to change the function of the urges to pull as well as the associated cognitions. The first and second author, advanced graduate students, conducted the treatment for 15 and 7 of the participants, respectively. Both therapists were supervised by the fifth author, a licensed psychologist who co-authored the treatment manual on which the study treatment was based.

Measures

The Miniature International Neuropsychiatric Interview (MINI; Sheehan et al., 1998). The MINI is a short, structured diagnostic interview assessing for Axis I symptoms as outlined by the Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition (DSM-IV; American Psychiatric Association, 2000). It has been validated in numerous studies and is

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considered to be a more time-efficient alternative to longer structured measures (Sheehan et al., 1998).

Massachusetts General Hospital Hair Pulling Scale (MGH-HPS; Keuthen, O'Sullivan, Ricciardi, & Shera, 1995a). The MGH-HPS is a seven-item self-report measure that assesses urges to pull hair, actual pulling behavior, and the distress caused from pulling. Individual items are rated from 0 to 4 and are then summed into a 0 to 28 point total score, with higher scores indicating a higher degree of hair pulling severity. Score reductions of seven points or more are considered to be indicative of clinically significant treatment response and disorder remission (Houghton et al., 2015). The MGH-HPS displays good internal consistency ($\alpha = .89$; Keuthen et al., 1995a), test-retest reliability ($r = .97$), and convergent and divergent validity (O'Sullivan et al., 1995). The MGH-HPS demonstrated acceptable internal consistency in the current sample ($\alpha = .75$).

Quality of Life Scale (QOLS; Burckhardt, Woods, Schultz, & Ziebarth, 1989). The QOLS is a 16-item self-report scale that measures several aspects of functional status including, relationships, employment, health, and recreation. Items are rated on a seven-point Likert-type scale that asks how satisfied the respondent is in these areas (1 = *terrible* to 7 = *delighted*). Scores are then summed into a 16 to 112 point total score, with higher scores indicating greater quality of life. The average total score for healthy populations is approximately 90 (Burckhardt & Anderson, 2003). Score increases of seven to eight points generally indicate clinically significant improvement (Burckhardt & Anderson, 2003). The QOLS has demonstrated good internal consistency ($\alpha = .82$ to $.92$) and test-retest reliability ($r = .78$ to $.84$; Burckhardt & Anderson, 2003), as well as good convergent and divergent validity (Burckhardt, Anderson,

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Archenholtz, & Hägg, 2003). The QOLS demonstrated good internal consistency in the current sample ($\alpha = .86$).

Acceptance and Action Questionnaire for Trichotillomania (AAQ-TTM; Houghton et al., 2014). The AAQ-TTM is a nine-item self-report measure of psychological inflexibility, specifically designed for trichotillomania populations. Items are rated on a seven-point Likert-type scale (1 = *never true* to 7 = *always true*) that are then summed into a 7 to 63 point total score, with higher scores indicating greater levels of psychological inflexibility. The AAQ-TTM has demonstrated good internal consistency ($\alpha = .84$; Houghton et al., 2014). It also demonstrated good convergent and divergent validity as well as incremental validity over the Acceptance and Action Questionnaire-II (Bond et al., 2011) from which it is based. The AAQ-TTM demonstrated questionable internal consistency in the current sample ($\alpha = .64$); it is worth noting this improved to .85 at posttreatment.

Experience of Shame Scale (ESS; Andrews, Qian, & Valentine, 2002). The ESS is a 25-item measure of shame. Past and current experiences, cognitions, and behaviors related to shame are measured on a four-point Likert-type scale (1 = *Not at all* to 4 = *Very much*) that are then summed into a 25 to 100 point total score. The original validation study that included 163 undergraduate university students found a mean total score of 55.58 (13.95). The ESS has demonstrated excellent internal consistency ($\alpha = .92$) and test retest reliability ($r = .83$) as well as convergent and divergent validity (Andrews et al., 2002). The ESS demonstrated excellent internal consistency in the current sample ($\alpha = .95$).

Working Alliance Inventory – Short Revised (WAI-SR; Hatcher & Gillaspay, 2006). The WAI-SR is a 12-item self-report measure of perceived therapeutic alliance. The measure consists of three factors: (a) goal agreement, agreement between the therapist and client

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regarding the goals of treatment; (b) task agreement, agreement on how to achieve these goals; (c) and bond, the relationship and alliance between the therapist and client. Items are rated on a five-point Likert-type scale (1 = *seldom* to 5 = *always*) that are then averaged into a 1 to 5 point total score, with higher scores indicating greater levels of therapeutic alliance. The WAI-SR has demonstrated good test-retest reliability ($r = .85-.93$) and convergent and divergent validity (Hatcher & Gillaspay, 2006). The WAI-SR demonstrated excellent internal consistency in the current sample ($\alpha = .98$).

Client Satisfaction Questionnaire–8 (CSQ-8; Attkisson & Zwick, 1982). The CSQ-8 is an eight-item version of the original Client Satisfaction Questionnaire (Larsen, Attkisson, Hargreaves, & Nguyen, 1979). It is a single factor self-report measure of client satisfaction of treatment. Items are rated on a four-point Likert-type scale where 1 indicates a low degree of satisfaction and 4 indicates high satisfaction. Scores are summed into an 8 to 32 point total score with high scores indicating greater levels of treatment satisfaction. The CSQ-8 has demonstrated good internal consistency ($\alpha = .84-.93$) as well as convergent and divergent validity. The CSQ-8 demonstrated excellent internal consistency in the current sample ($\alpha = .98$).

Data Analytic Procedures

An intent-to-treat approach was taken for all analyses such that all collected data were used, including dropouts. Data were analyzed using R statistical software (R Development Core Team, 2016) and the following packages: *car* (Fox & Weisberg, 2011), *lme4* (Bates, Maechler, Bolker, & Walker, 2015), *psy* (Falissard, 2012), *psych* (Revelle, 2017), *tidyverse* (Wickham, 2017), and *jmv* (Selker, Love, & Dropmann, 2017).

Results

Treatment Adherence

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All sessions were video and audio recorded using the built-in recording function in VSee. Twenty percent of all sessions were viewed and scored for the quantity and quality of the coverage of each treatment component using a standardized treatment integrity scoring system used in previous ACT research (Crosby & Twohig, 2016; Twohig & Crosby, 2010). Two sessions from each 10-session treatment were systematically chosen such that each session number was reviewed approximately five times. A graduate assistant reviewer who did not provide treatment scored each of the 48 selected sessions. This reviewer had received coding training for a previous project and scored reliably (above .90) with the author in the previous project.

For every coded session, HRT consistent (i.e., awareness training, competing response training, and contingency management), ACT consistent (i.e., acceptance, defusion, self as context, present moment awareness, values clarification, and committed action), and ACT inconsistent (i.e., cognitive challenging, experiential avoidant change strategies, and thoughts and feelings cause action) behaviors were rated on a five-point Likert-type scale (1 = *the variable was never explicitly covered* to 5 = *the variable occurred with high frequency and was covered in a very in-depth manner*). Additionally, therapist adherence to the treatment model and therapist competency were rated on the same scale. Means for each process were calculated in order to give an overview of how often each process was targeted over the course of treatment on average. This method was necessary due to the flexible nature of the treatment manual that allowed for processes to be covered for different periods and out of order as deemed necessary by the therapist and supervisor. The average score for each HRT process over the 10 sessions are as follows: awareness training ($M = 2.10$, $SD = 1.07$), competing response training ($M = 1.90$, $SD = 1.09$), and contingency management ($M = 1.76$, $SD = 1.30$). The average score for each ACT

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process are as follows: acceptance ($M = 2.98$, $SD = 1.25$), defusion ($M = 2.49$, $SD = 1.38$), contact with the present moment ($M = 1.98$, $SD = 1.08$), self as context ($M = 1.27$, $SD = 0.74$), values ($M = 1.95$, $SD = 1.22$), and committed action ($M = 2.78$, $SD = 0.76$). Of note, each process was rated “5” for at least one session, indicating that each process was covered in an in-depth manner. Moreover, therapist adherence to the treatment model and therapist competency were rated highly ($M = 4.00$, $SD = 0.67$) and ($M = 4.20$, $SD = 0.51$), respectively. Finally, all ACT inconsistent processes were rated “1” for every session, indicating that they were not present. In summary, treatment adherence and therapist competency were highly rated. Moreover, it appears that each process was thoroughly covered during at least one session and acceptance, defusion, and committed action were on average covered more often than other processes. Of note, no significant differences were found between participants assigned to the two therapists on pre-post changes on any outcome variables, suggesting both therapists were equally effective.

Differences Between Conditions

Descriptive statistics, including demographic information and means for each of the measures at the various treatment stages were calculated for both the experimental and control groups. Comparisons were then made between the groups, using Welch’s t-tests and Pearson’s chi-squared tests to ensure that groups were similar at the beginning of the study with regard to demographic, dependent, and independent variables. Internal consistency of each of the identified measures was computed to establish scale reliability. No significant differences between treatment and waitlist conditions were found for any variables at intake ($ps > .05$), thus indicating that the groups were similar upon entering the study. See Table 1 for complete comparison data.

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Condition Comparison Summary

The primary outcomes of interest were the severity of trichotillomania symptoms (as measured by the MGH-HPS) and quality of life (as measured by the QOLS). ANCOVAs were used to assess the effect of the treatment condition on post-treatment trichotillomania symptom severity and quality of life after controlling for pre-treatment levels compared to the waitlist condition. Mid-treatment assessments were only gathered from the treatment group; therefore, mid-treatment scores are only included in the combined group analysis. Post-treatment scores were entered as a dependent variable, treatment condition was entered as an independent variable, and pre-treatment scores were entered as a covariate. Effect sizes are reported using ω^2 , as it produces less biased and more conservative effect sizes compared to η^2 , especially in small samples (Albers & Lakens, 2017). ω^2 can be interpreted using the same rough criteria as η^2 (i.e., small = 0.01, medium = 0.06, large = 0.14). Post hoc analyses were performed with a Bonferroni adjustment.

Table 3 summarizes outcome variable means and standard deviations for the treatment and waitlist groups at time 1 (pre-treatment and pre-waitlist) and time 2 (post-treatment and post-waitlist).

Effects on Hair Pulling Severity

After adjusting for pre-treatment MGH-HPS scores, there was a statistically significant difference in post-treatment scores between conditions, $F(1, 18) = 19.627, p < .001, \omega^2 = .473$. MGH-HPS scores were statistically significantly greater in the waitlist condition (18.10 ± 4.52) compared to the treatment condition (9.00 ± 5.00), a mean difference of 9.32 ($p < .001$). The treatment group displayed a 42.2% decrease in MGH-HPS scores, while the waitlist group displayed a 17.7% increase from time 1 to time 2. Seven of the 12 (58.3%) treatment completers

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saw MGH-HPS score reductions of seven points or greater, indicating clinically significant improvement. These findings indicate that, on average, treatment had a significant, large effect on hair pulling severity.

Effects on Quality of Life

After adjusting for pre-treatment QOLS scores, there was no statistically significant difference in post-treatment scores between conditions, $F(1, 18) = 1.910, p = .183, \omega^2 = .032$. On average, the treatment groups displayed an 8.0% increase and the waitlist showed a 2.3% decrease in QOLS scores, indicating a slight improvement in quality of life from pre- to post-treatment. This improvement was a nonsignificant change compared to the waitlist group.

Effects on Psychological Flexibility

After adjusting for pre-treatment AAQ-TTM scores, there was no statistically significant difference in post-treatment scores between conditions, $F(1, 18) = 3.790, p = .068, \omega^2 = .064$. On average, the treatment groups displayed a 19.6% decrease in AAQ-TTM scores, indicating improved trichotillomania-related psychological flexibility from pre- to post-treatment. This improvement was a nonsignificant change compared to the waitlist group which displayed a 3.4% decrease in scores. Of note, changes in psychological flexibility from pre- to post-treatment were significantly correlated with changes in trichotillomania severity ($r = .55, p = .016$). While this relationship is of interest, further studies with larger samples are needed to examine potential mediational effects of psychological flexibility on trichotillomania outcomes.

Effects on Shame

After adjusting for pre-treatment ESS scores, there was no statistically significant difference in post-treatment scores between conditions, $F(1, 18) = 3.360, p = .084, \omega^2 = .032$. On average, the treatment groups displayed an 8.3% decrease in ESS scores, indicating a slight

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improvement in overall experienced shame from pre- to post-treatment. This improvement was a nonsignificant change compared to the waitlist group which displayed a 5.6% increase in scores.

Combined Follow-up Analysis

Because both conditions eventually received treatment, data from all participants was then combined. Mixed model repeated measures analyses were used to assess outcome across pre-treatment, mid-point, post-treatment, and three-month follow-up. This method allows all available data to be used to model change over time, even when there is missing data.

Participants were specified in the model as a random factor to control for interclass correlations and time was specified as a fixed factor. Using chi-square tests on the log-likelihood values, this model was compared to an intercept only model (excluding the time variable) and a model that allowed for slopes to vary by participant. The model-fit was significantly better than the intercept only model ($ps < .01$ and was not significantly improved by adding random slopes ($ps > .10$) for all variables. Therefore, the original random intercept, fixed slopes model was retained and utilized in all mixed model analyses. See Table 4 for a summary of outcome variable means and standard deviations at each time point and Table 5 for results of the mixed models repeated measures analyses.

Effects on Hair Pulling Severity

Significant improvements on MGH-HPS scores were observed from pre- to post-treatment, slope estimate = -6.13, $SE = 1.30$, $t(58.48) = -4.72$, $p < .001$. On average, scores decreased 39.4% from pre- post-treatment with 12 (60.0%) participants demonstrating reductions of seven points or greater, indicating clinically significant reductions in hair pulling severity. This percentage decreased to 26.3% at follow-up with seven (36.8%) maintaining clinically significant score reductions three months following treatment. On average, the score increases

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from post-treatment to follow-up were nonsignificant, slope estimate = -1.95, $SE = 1.34$, $t(57.19) = 1.45$, $p = .152$.

Effects on Quality of Life

QOLS scores did not significantly change from pre- to post-treatment, slope estimate = 5.58, $SE = 3.36$, $t(57.92) = 1.66$, $p = .103$. On average, scores increased 6.9% from pre- to post-treatment with 11 (55.0%) participants demonstrating increases of seven points or greater, indicating clinically significant increases in quality of life. This percentage decreased to 3.4% at follow-up, with seven (36.8%) participants demonstrating clinically significant score increases three months following treatment. On average, the score decreases from post-treatment to follow-up were nonsignificant, slope estimate = 3.20, $SE = 3.45$, $t(56.48) = 0.93$, $p = .358$.

Effects on Psychological Flexibility

Significant improvements on AAQ-TTM scores were observed from pre- to post-treatment, slope estimate = -11.78, $SE = 2.01$, $t(55.85) = -5.85$, $p < .001$. On average, scores decreased 28.1% from pre- to post-treatment and remained relatively stable through follow-up with a 26.5% decrease from pre-treatment to follow-up. On average, the score increases from post-treatment to follow-up were nonsignificant, slope estimate = 1.01, $SE = 2.06$, $t(54.58) = 0.49$, $p = .627$.

Effects on Shame

ESS scores decreased nonsignificantly from pre- to post-treatment, slope estimate = -2.54, $SE = 2.54$, $t(56.37) = -1.00$, $p = .321$. Scores decreased only 3.1% from pre- to post-treatment. However, at follow-up this change was 18.2% from pre-treatment. On average, participants demonstrated a significant decrease in scores from post-treatment to follow-up, slope estimate = -8.50, $SE = 2.55$, $t(55.17) = -3.33$, $p = .002$. In addition, the score began above the

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norm from the original validation study (+4.61) and decreased below it at follow-up (-6.32), indicating meaningful changes in shame from pre-treatment to follow-up.

Telehealth Factors

At intake, participants were asked questions related to their reasons for seeking treatment and whether the telehealth aspect of the treatment interested them. Forty percent of the participants reported that they would not have been seeking treatment if it were not provided over the internet. Moreover, 59.1% said that they were unable to find treatment for trichotillomania where they lived. Thus, telehealth was the only feasible treatment option for over half of the participants. Additionally, 50.0% reported that their busy schedule prohibited them from seeking face-to-face therapy.

Working Alliance and Treatment Satisfaction

Participants were assessed for therapist-client working alliance following session five (mid-treatment) and at post-treatment. For comparison, the mean WAI-SR scores at pre-treatment (goal = 4.6, task = 3.9, bond = 4.6, total = 4.4) and at post-treatment (goal = 4.6, task = 4.4, bond = 4.5, total = 4.5) were all higher than the mean scores (goal = 4.0, task = 3.4, bond = 4.0, total = 3.8) gathered in the original development of the measure (Munder, Wilmers, Leonhart, Linster, & Barth, 2010), indicating very good levels of perceived therapeutic alliance. This is important as therapy was delivered via telehealth.

Participants were assessed for their satisfaction with treatment following session five (mid-treatment), at post-treatment, and at follow-up. CSQ-8 scores were 3.65, 3.71, and 3.65, respectively. No norms exist for the CSQ-8 to compare to the current sample, although an original psychometric analysis of the measure reported mean scores of 3.02 from a sample of 45

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community mental health center patients (Attkisson & Zwick, 1982). Overall, scores indicated a high level of treatment satisfaction.

Discussion

The current study examined whether ACT-enhanced behavior therapy could be successfully delivered by way of telepsychology. The primary dependent measures were hair pulling severity and quality of life. On average, participants in the treatment condition reported significant, large reductions in hair pulling severity from pre- to post-treatment, compared to those in the waitlist condition. However, reported quality of life did not improve in the same manner, with only small, nonsignificant increases from pre- to post-treatment compared to the waitlist condition.

Once the treatment and waitlist groups were combined and three-month follow-up data were examined, the story of these outcomes shifts. As is typical for trichotillomania, rates of symptom severity slightly, but not statistically significantly, increased on average following treatment. Hair pulling severity rates at follow-up were still significantly lower than at the beginning of treatment, but they were not as low as they were at post-treatment. Overall, these rates of improvement are comparable to other ACT-enhanced behavior therapy trials. For example, one trial found 44.8% and 24.0% decreases in MGH-HPS scores post-treatment and follow-up, respectively, compared to 39.4% and 26.3% in the current trial (Woods et al., 2006b).

Quality of life did not significantly change on average over the course of treatment. Many participants did see clinically significant rates of improvement in quality of life, however nearly half (45.0%) did not see this level of improvement at post-treatment and nearly two thirds (63.2%) did not at follow-up. Multiple factors may contribute to this unexpected outcome. There is the possibility that treatment for trichotillomania does not impact quality of life. Yet,

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improvements in a behavior that is so often distressing and debilitating leads one to suspect that quality of life would improve as this behavior also improves. Perhaps the broad measure of quality of life used did not adequately capture trichotillomania-specific meaningful improvements in participant's lives as their hair pulling behavior decreased and their ability to cope with their urges increased. It is also possible that participants did not adequately learn to engage in behaviors related to quality of life over the course of treatment, such that they may have reduced hair pulling behavior, but not replaced this with meaningful behavior. If this is the case, future treatment research might examine ways to better increase values-consistent behavior while still improving hair pulling severity. Finally, participants may simply require more time to increase behaviors that improve their quality of life broadly. Research that examines these constructs beyond a three-month follow-up period is needed.

On average, participants in the treatment condition did not report improved levels of trichotillomania-related psychological flexibility or shame from pre- to post-treatment compared to the waitlist condition. However, both constructs saw improvement in the desired direction on average. Moreover, once the conditions were combined, psychological flexibility and shame saw statistically significant improvements from pre-treatment to follow-up.

The pattern of improvement for shame is notable in that it remained relatively stable from pre- to post-treatment but saw a statistically significant reduction following treatment. The ESS demonstrates high levels of test-retest reliability over an 11-week period (.83), indicating that it is measuring a trait-like disposition rather than a transient affective state. Therefore, it might take some time before changes are demonstrated on this scale. Moreover, increased levels of psychological flexibility could potentially play a role. Andrews et al. (2002) hypothesized that shame may be part of a reciprocal interaction between dysfunctional, self-critical cognitions and

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self-evaluations that may amplify feelings of shame. As psychological flexibility increases, self-critical thoughts may not be as meaningful and result in fewer feelings of shame. Moreover, the experiences of shame might have less of an impact as one becomes more skilled at making space for these experiences and not over-identifying with them. In other words, successful practice of psychological flexibility means that shame can be present without having power over behavior.

The major purpose of the current study was to examine the feasibility of delivering treatment for trichotillomania through telepsychotherapy. Overall, it appears that ACT-enhanced behavior therapy can be successfully delivered using telepsychology methods. Findings from the current study are similar to ACT-enhanced behavior therapy trials delivered by way of more traditional face-to-face methods, providing further evidence for this treatment package. The findings included significant reductions in hair pulling severity over the course of treatment with similar levels of maintenance at follow-up to other trials.

In addition, participant ratings of treatment satisfaction and working alliance were high. Intuitively, one might suspect that telepsychology would involve a tradeoff between the technology and the therapist-participant relationship that might not favor these types of ratings. However, it appears that treatment satisfaction and working alliance were at least as high as similar face-to-face trials.

In part, the high treatment satisfaction ratings might be related to the unique qualities of telepsychology. The convenience of participating in therapy from home cannot be overstated. Multiple participants in the study reported being very time-constrained and appreciated the flexibility of telepsychology. Indeed, half of participants reported that their busy schedule kept them from attending face-to-face therapy. Another factor likely contributing to treatment satisfaction is telepsychology's ability to treat those who would otherwise be unable to find

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quality treatment. Half of participants reported having previously sought treatment for trichotillomania and nearly 60% reported that treatment for trichotillomania was not available near where they lived. Overall, it appears that the use of telepsychology in the current study led to individuals receiving treatment who otherwise would not have due to inconvenience, lack of availability, or lack of resources. Clearly, it addresses a crucial mental health disparity, and more effective means of dissemination need to be explored.

Shame is another factor that may have kept people from previously seeking treatment and that might have been mitigated by telepsychotherapy. Individuals with trichotillomania typically have elevated levels of shame related to their urges and pulling behaviors (Stemberger, Thomas, Mansueto, & Carter, 2000; Weingarden & Renshaw, 2015) and it appears that shame may be a barrier to treatment for some (Singh, Wetterneck, Williams, & Knott, 2016). On average, participants reported that trichotillomania had been a problem for over 16 years, yet half had not sought treatment. The convenience and discretion that telepsychology offers individuals who would perhaps otherwise be unwilling to seek therapy could be an important benefit of the method. Future research should examine the role of experiences such as shame, guilt, and embarrassment in seeking treatment and whether telepsychology improves rates of treatment seeking among these individuals.

Among these benefits, telepsychotherapy also introduces some difficulties to trichotillomania treatment. Real or perceived technical barriers may be intimidating to some as they begin treatment. Additionally, technical difficulties such as dropped connections and lag between the therapist and participant, can hinder treatment. Occasionally, the video conferencing software did not function properly or the internet connection would be very poor requiring the remainder of the session to be completed using the telephone. In total, 11 of the 197 (5.6%)

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sessions required some use of the telephone. Lag or dropped connections were a more common problem but did not severely negatively impact treatment.

There are limitations that should be accounted for when interpreting the findings of the current study. The participant sample was diverse in some respects, but not others. The ratio of male to female participants was typical of trichotillomania research, with women over-represented. The sample was somewhat diverse with regard to sexual orientation, education, marital status, income, and comorbid diagnoses, however, the vast majority (95.5%) of participants were White. Future treatment studies should attempt to target more ethnically and racially diverse populations. Very little trichotillomania research has examined non-White populations and this study, unfortunately, is no different. Additionally, while well powered to answer the main research question, the study was underpowered to sufficiently answer research questions related to processes such as psychological flexibility and shame. Larger treatment trials are needed to better examine processes of change in trichotillomania treatment. Moreover, all collected data were self-report and were not assessed by an independent evaluator. This might have led to imprecise evaluations of trichotillomania severity and overall treatment progress. Future research would benefit from including an independent evaluator who is blind to condition. One aspect of feasibility we failed to systematically assess for is the frequency of technical barriers/issues that clients encountered while participating in telepsychotherapy sessions. Future research should further examine relevant barriers and facilitators for clients receiving treatment in this format. Finally, in general, treatment for trichotillomania is still lacking. While this study demonstrated promising results for many participants, others simply did not respond to treatment as well as we would like. Telepsychology and ACT-enhanced behavior therapy appear promising

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as a treatment modality, yet further research is needed to better understand those who do not improve and to better tailor treatment to their needs.

These initial findings provide a foundation for future telepsychotherapy trichotillomania treatment. Trichotillomania remains a challenging disorder to treat. Quality treatment is difficult to find, shame and guilt often act as barriers to seeking treatment, and when treated, gains in symptom improvement are difficult to maintain. Telepsychotherapy has the potential to ameliorate each of these concerns. Modern technology provides the opportunity to rethink traditional treatment conventions, offering more individualized services to more people. Future research should explore this potential and expand on the foundation provided by this and other telepsychology-related research.

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Table 1
Descriptive Statistics with Welch's t-Test or Pearson's Chi Squared Comparisons Between Groups

Variable	Treatment (n = 12)				Waitlist (n = 10)				t / X ²	p
	n	%	M	SD	n	%	M	SD		
Age			34.2	9.4			30.4	6.8	1.09	.29
Sex									.03	.87
Male	1	8.3			2	20.0				
Female	11	91.7			8	80.0				
Race/ethnicity									.01	.93
White	12	100			9	90.0				
Asian	-	-			1	10.0				
Hispanic or Latinx	1	8.3			-	-				
Education									2.99	.39
High school	3	25.0			-	-				
Some college	3	25.0			4	40.0				
Bachelor's degree	3	25.0			3	30.0				
Graduate degree	3	25.0			3	30.0				
MGH-HPS			15.6	5.2			14.9	3.0	.38	.71
QOLS			80.0	13.3			81.6	12.2	.29	.77
AAQ-TTM			40.2	8.2			41.3	8.2	.32	.75
ESS			59.4	19.0			61.1	14.1	.24	.81

Note. AAQ-TTM = Acceptance and Action Questionnaire for Trichotillomania; ESS = Experience of Shame Scale; MGH-HPS = Massachusetts General Hospital Hair Pulling Scale; QOLS = Quality of Life Scale.

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Table 2
ACT/HRT for Trichotillomania: Treatment Manual Outline

Session	Treatment Components	Exercises/Content
1	Informed Consent	<ul style="list-style-type: none"> • Discuss added risks of telepsychology (e.g., privacy/confidentiality issues)
	Psychoeducation and Treatment Overview	<ul style="list-style-type: none"> • Basics of trichotillomania, behavioral model, environmental triggers, emotional and cognitive factors related to pulling. • Brief overview of what is to be expected throughout treatment
	Stimulus Control Assessment	<ul style="list-style-type: none"> • <i>Stimulus Control Assessment Form</i> • Introduce self-monitoring. Assign homework to monitor hair pulling during the coming week
2	Habit Reversal Training	<ul style="list-style-type: none"> • Awareness training • Competing response training
	Stimulus Control	<ul style="list-style-type: none"> • <i>Stimulus Control Assignment Sheet</i> • Identify stimulus control techniques to be used in contexts where pulling is more likely to occur
3	Valuing	<ul style="list-style-type: none"> • Complete <i>How Has Fighting Your Urges Affected You</i> and <i>Writing Your Epitaph</i> forms • Discuss how attempts to control pulling have gotten in the way of valued living
4	Creative Hopelessness and the Control Agenda	<ul style="list-style-type: none"> • What is currently being done to control urges? • Do these strategies work in the short/long-term? • Costs associated with the current strategies • Two-Games/tug-o-war/digging hole metaphor • Homework: Assign <i>Paper in Shoe</i> exercise
5	Acceptance	<ul style="list-style-type: none"> • Examples of our inability to control bodily sensations, emotions, thoughts, and urges to pull • Discuss <i>Paper in Shoe</i> exercise • Willingness as an alternative to the control agenda
	Behavioral Commitments	<ul style="list-style-type: none"> • Develop behavioral commitment exercises to practice skills outside of session • Opportunities to follow values instead of controlling urges • Success is determined by whether task is completed, not by the levels of urges or distress • <i>Behavioral Commitment Worksheet</i>
6–7	Defusion	<ul style="list-style-type: none"> • Defusion exercises that undermine the literality of language and the negative effects due to this • Exercises are at the discretion of the therapist • Being Present • Tree-on-the-Road Metaphor • Acting without Reasons • Playing with Urges in a Different Way • Evaluation versus Description • The Pull of Your Mind

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	Behavioral Commitments	<ul style="list-style-type: none"> • Take Your Urges with You • Talking for the Client • Agree to engage in new behavior commitment exercise in addition to previous ones
8	Acceptance and Defusion as Skills	<ul style="list-style-type: none"> • In-session exposure exercises • Done in attempt to “make friends” or “get to know” the urges, not necessarily reduce them • During these exercises review acceptance, defusion, and values in the moment, as needed
	Behavioral Commitments	<ul style="list-style-type: none"> • Homework: Assign <i>Making Friends with Your Urges</i> worksheet • Agree to engage in new behavior commitment exercise in addition to previous ones
9	Practicing ACT Skills	<ul style="list-style-type: none"> • Continue in-session exposure exercises • Allow client to practice ACT skills
	Relapse Prevention	<ul style="list-style-type: none"> • Have client review therapy up to this point • Review important topics that have been discussed in past sessions
	Behavioral Commitments	<ul style="list-style-type: none"> • Agree to engage in new behavior commitment exercise in addition to previous ones
10	Review	<ul style="list-style-type: none"> • Review what has been learned throughout therapy • Review areas of importance for the client and clarify areas where the client might be confused
	Relapse Prevention	<ul style="list-style-type: none"> • Discuss lapse versus relapse • Vigilance in using habit reversal training • Mindful to not return to old agenda
	Celebrate Accomplishments	<ul style="list-style-type: none"> • Congratulate client on their progress • Answer any questions about future issues

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Table 3
Outcome Means and Standard Deviations at Times 1 and 2 By Condition with F and Effect Size Statistics for ANCOVA Comparisons Between Conditions at Time 2 Controlling for Differences at Time 1

Variable	Time 1				Time 2				F	ω^2	p
	Treatment (n = 12)		Waitlist (n = 10)		Treatment (n = 11)		Waitlist (n = 9)				
	M	SD	M	SD	M	SD	M	SD			
MGH-HPS	15.58	5.21	14.90	3.00	9.00	4.52	18.10	5.00	19.63	.473	<.001
QOLS	80.00	13.25	81.60	12.21	86.91	15.10	79.70	12.65	1.91	.032	.183
AAQ-TTM	40.17	8.16	41.30	8.21	32.30	10.86	39.90	10.90	3.79	.064	.068
ESS	59.36	18.98	61.10	14.09	54.45	19.69	64.70	17.52	3.36	.032	.084

Note. AAQ-TTM = Acceptance and Action Questionnaire for Trichotillomania; ESS = Experience of Shame Scale; MGH-HPS = Massachusetts General Hospital Hair Pulling Scale; QOLS = Quality of Life Scale.

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Table 4
Combined Outcome Means and Standard Deviations at Pre-, Mid-, and Post-Treatment and 3 Month Follow-Up

Variable	Pre-treatment (n = 22)		Mid-treatment (n = 20)		Post-treatment (n = 20)		Follow-up (n = 19)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
MGH-HPS	15.27	4.27	10.20	4.16	9.25	4.24	11.26	5.97
QOLS	80.73	12.51	85.50	12.94	86.70	16.47	83.71	19.06
AAQ-TTM	40.68	8.00	35.37	10.96	29.26	11.17	29.89	8.77
ESS	60.19	16.44	61.10	13.85	58.30	17.73	49.26	11.96

Note. AAQ-TTM = Acceptance and Action Questionnaire for Trichotillomania; ESS = Experience of Shame Scale; MGH-HPS = Massachusetts General Hospital Hair Pulling Scale; QOLS = Quality of Life Scale.

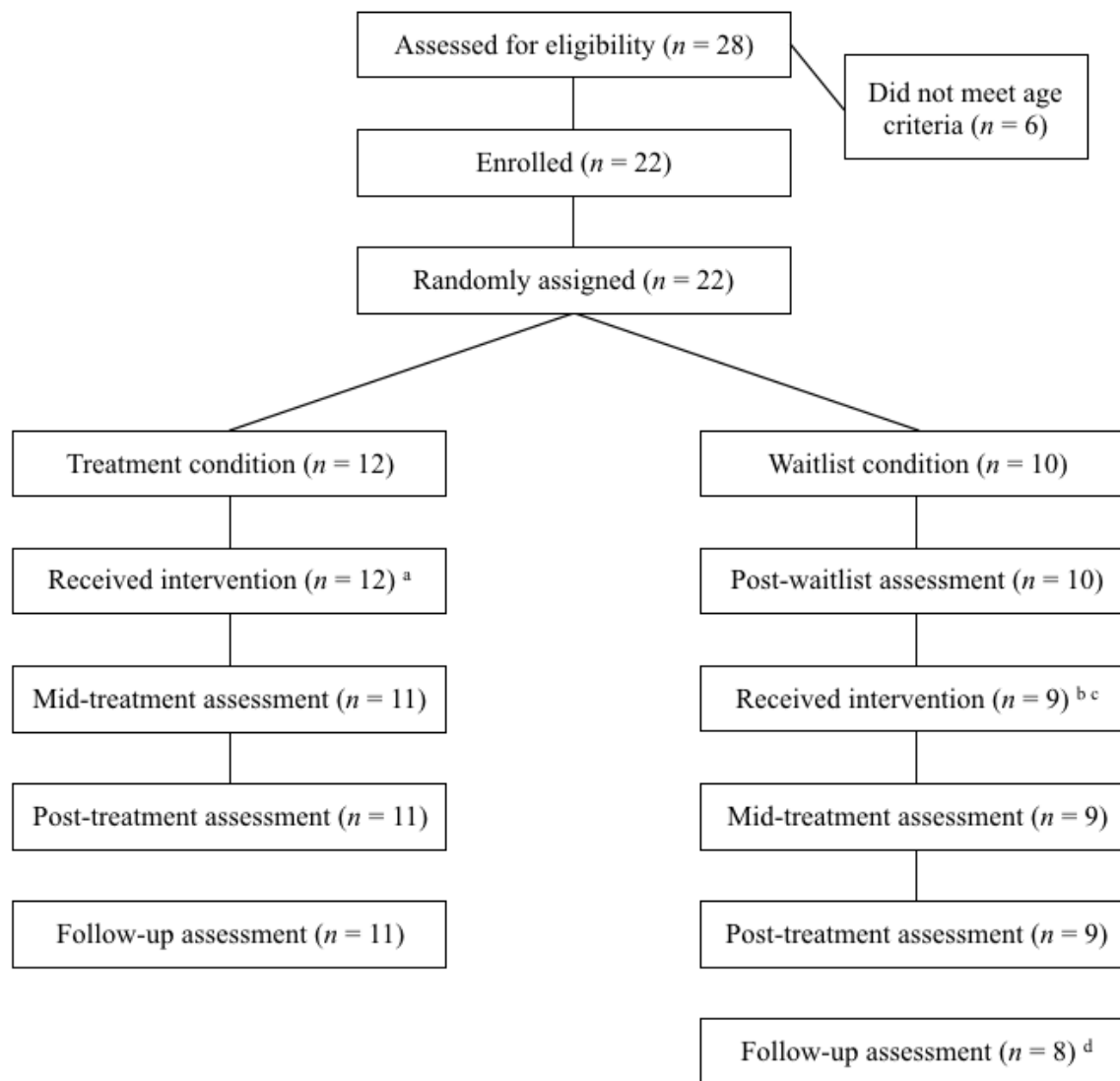
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Table 5
Mixed Models Repeated Measures Results for Changes Within Treatment

	Slope Estimate	Standard Error	df	<i>t</i> -value	<i>p</i>
MGH-HPS					
Pre to Mid	-5.18	1.30	58.48	-3.99	< .001
Pre to Post	-6.13	1.30	58.48	-4.72	< .001
Pre to Follow-up	-4.18	1.32	58.92	-3.17	.002
Post to Follow-up	1.95	1.34	57.19	1.45	.152
QOLS					
Pre to Mid	4.37	3.31	57.90	1.32	.192
Pre to Post	5.57	3.31	57.90	1.68	.098
Pre to Follow-up	2.48	3.37	58.06	0.74	.465
Post to Follow-up	3.09	3.40	56.46	0.91	.366
AAQ-TTM					
Pre to Mid	-5.33	2.01	55.85	-2.65	.010
Pre to Post	-11.78	2.01	55.85	-5.85	< .001
Pre to Follow-up	-10.77	2.01	55.85	-5.35	< .001
Post to Follow-up	1.01	2.06	54.48	0.49	.627
ESS					
Pre to Mid	0.26	2.54	56.37	0.10	.919
Pre to Post	-2.54	2.54	56.37	-1.00	.321
Pre to Follow-up	-11.04	2.58	56.44	-4.27	< .001
Post to Follow-up	-8.50	2.55	55.17	-3.33	.002

Note. AAQ-TTM = Acceptance and Action Questionnaire for Trichotillomania; ESS = Experience of Shame Scale; MGH-HPS = Massachusetts General Hospital Hair Pulling Scale; QOLS = Quality of Life Scale.

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^aOne participant dropped out of the intervention following session 5 with no explanation. This participant did not respond to contact attempts and did not complete the mid- and post-treatment and follow-up assessments. ^bOne participant did not respond to contact attempts following completion of the post-waitlist assessment. ^cTwo participants dropped out of the intervention following sessions 7 and 8. Both stated a lack of time to continue participation in the intervention. The first due to an injury in the family that needed to be cared for. The second due to starting a new job. Both completed the post-treatment assessment. ^dOne participant did not respond to contact attempts to complete the follow-up assessment.

Figure 1. Participant Flowchart