Clinical Psychology & Psychotherapy

A proof-of-concept pilot randomized comparative trial of brief Internet-based compassionate mind training and cognitive-behavioral therapy for perinatal and intending to become pregnant women

Journal:	*Clinical Psychology & Psychotherapy*
Manuscript ID	CPP-1649.R2
Wiley - Manuscript type:	Research Article
Date Submitted by the Author:	20-Jan-2018
Complete List of Authors:	Kelman, Alex; Palo Alto University Evare, Benjamin; Palo Alto University Barrera, Alinne; Palo Alto University; Institute for International Internet Interventions for Health (i4health) Muñoz, Ricardo; Palo Alto University; Institute for International Internet Interventions for Health (i4health) Gilbert, Paul; University of Derby , Centre for Compassion Research and Training; Compassionate Mind Foundation
Keywords:	Perinatal Depression, Comparative trial, Internet-based interventions, Amazon Mechanical Turk

SCHOLARONE™
Manuscripts

A proof-of-concept pilot randomized comparative trial of brief Internet-based compassionate mind training and cognitive-behavioral therapy for perinatal and intending to become pregnant women

Alex R Kelman, PhD[1], Benjamin S Evare, PhD[1], Alinne Z Barrera, PhD[1, 2], Ricardo F Muñoz, PhD[1, 2], Paul Gilbert, PhD[3, 4]

1. Palo Alto University

(1791 Arastradero Road Palo Alto CA, 94304 USA)

2. Institute for International Internet Interventions for Health (i4health)

(1791 Arastradero Road Palo Alto CA, 94304 USA)

3. University of Derby

(Kedleston Road, Derby, DE22 1GB United Kingdom)

4. Compassionate Mind Foundation

(Office 29, Riverside Chambers, 1 Full Street, Derby DE1 A3F, United Kingdom)

Corresponding Author: Alex R Kelman, PhD, University of Southern California, University Center for Excellence in Developmental Disabilities, Children's Hospital Los Angeles, 4650 Sunset Boulevard MS 53 Los Angeles, CA 90027, akelman@chla.usc.edu, 650-396-9349

For Peer Review

Abstract

Objective: Depression is a prevalent and costly mental health problem that affects women as well as their larger communities, with substantial impacts on mother and infant during childbearing years. Face-to-face care has not adequately addressed this global concern due to difficulties in scaling these resources. Internet interventions, which can provide psychological tools to those lacking adequate access, show promise in filling this void.

Method: We conducted a two-condition proof-of-concept pilot randomized trial comparing brief Internet-based Cognitive Behavioral Therapy (CBT) and brief Internet-based Compassionate Mind Training (CMT) for women who are currently pregnant, became pregnant within the last year, and intend to become pregnant in the future.

Results: We found that, while CMT and CBT demonstrated near equivalence in improving affect, self-reassurance, self-criticism, and self-compassion, CMT showed superiority to CBT in reducing depression and anxiety symptoms.

Conclusion: These findings provide a compelling initial argument for the use of CMT as an avenue for addressing problems associated with negative affect. Implications, limitations, and future directions along this line of research will also be discussed.

Trial Registration: ClinicalTrials.gov NCT02469324

Short Title: Comparative Internet-based Depression Trial

Keywords: Perinatal depression; Comparative trial; Internet-based interventions; Amazon Mechanical Turk

Key Practitioner Message:

- Currently, there is a dearth of psychological resources available to a global population of women in the perinatal period as well as women intending to become pregnant in the future.
- Since in-person providers cannot meet the need, automated Internet-based interventions can provide resources at low cost to women who would otherwise lack access.
- The current trial demonstrates the need to further assess the utility of compassion and meditation-based resources in online care of perinatal and intending to become pregnant women.

For Peer Review

Introduction

Postpartum Depression (PPD) is a global health concern that can have profoundly negative effects on the mother and her infant. This disorder is estimated to affect 13 to 19% of new mothers in the United States (O'Hara & McCabe, 2013), and when assessing the impacts of PPD on an international scale, the global prevalence of this disorder is estimated to be as low as 1.9 and as high as 82% in developed nations and 5.2 to 74% in developing nations (Norhayati, Hazlina, Asrenee, & Emilin, 2015). Halbreich and Karkun (2006) have suggested this high degree of variability may be attributable to differences in stigma, reporting style, socioeconomic differences, and variation in biological vulnerabilities. The high variability of these statistics may additionally suggest a lack of adequate consistency in definition as well as unreliable screening tools to assess those in need of resources.

Undiagnosed and untreated mental health conditions have fiscal and health implications for the community and family members as well. There is evidence to suggest that the majority of individuals with mental health conditions do not seek care from healthcare providers, an issue that is even more ubiquitous in less developed parts of the world (Wang et al., 2007). While the human costs of untreated mental health issues are pervasive, there are substantial financial costs as well. Estimates place costs of psychological disorders upwards of $150 billion dollars in the United States alone, including both the direct and indirect costs (US Department of Health, 2010). In regards to PPD specifically, male partners of women with PPD are themselves more likely to develop depression following childbirth (Paulson and Bazemore, 2010). With some evidence for higher rates of PPD in lower incomes areas (Yonkers, 2001), it is also possible that areas without access to other resources may be further impacted by inadequate diagnostic, prevention, and treatment resources for women with PPD.

Several therapeutic treatments have been tested for use with PPD populations. Perveen et al.'s (2013) systematic review included five randomized controlled trials (RCTs) comparing cognitive-behavioral therapy (CBT) and standard care. The authors found that two of five trials showed CBT to be superior to standard care. When the results were pooled, CBT demonstrated statistically significant reductions in relapse risk (Perveen, Mahmood, Gosadi, Mehraj, & Sheikh, 2013). Also, Interpersonal Psychotherapy (IPT), which focuses on resolution interpersonal disputes in order to lower depression symptomology, shows promise in the treatment of PPD (O'Hara, Stuart, Gorman, & Wenzel, 2000; O'Hara, 2009; Spinelli et al., 2013). Pharmacotherapy, often the frontline treatment for physicians, has shown mixed results in treating PPD (Misri et al., 2004; O'Hara & McCabe, 2013; Wisner et al., 2006). The possibility that antidepressant medication could affect the mother's milk during lactation is a complicating factor as well.

In addition to treatment studies, Clatworthy (2012) conducted a review of current preventative interventions finding that six of 11 studies showed significant reductions in PPD (Clatworthy, 2012). The authors concluded this represented evidence of the effectiveness for PPD prevention, which is inconsistent with a prior Cochrane review that found no effect of PPD prevention programs (Dennis, 2005). While women can seek in-person care to address PPD, many women across the world do not have access to in-person care providers. As such, novel methods of reaching women who are at risk or have developed PPD are currently being investigated as both adjuncts to and replacements for current face-to-face resources.

Internet interventions, which are a means of providing psychological services to individuals from around the world, show promise in helping to change behavior and alleviate mental health symptoms (Griffiths & Christensen, 2006; Muñoz et al., 2009). As there is

For Peer Review

currently a lack of mental health clinicians worldwide (Muñoz, 2010), Internet interventions may provide aid to those who otherwise would not have access to psychological resources (Griffiths & Christensen, 2006). From a cost standpoint, nonconsumable, or reusable interventions, are fully automated and result in marginal cost per additional participant. Consumable interventions, including face-to-face care, remains as expensive in terms of provider time no matter how many people are treated, thus limiting access to care (Muñoz, 2010). Additionally, Kraut et al. (2004) argue that Internet-based research is no more risky than face-to-face care; though different ethical considerations must be taken into account (Kraut et al., 2004).

Currently, CBT for depression is the most commonly researched type of Internet intervention. A review by Griffiths et al. (2010) demonstrated that six out of the eight CBT trials analyzed demonstrated positive effects, with a purely psychoeducational CBT intervention yielding significantly better results than an attentional control (Griffiths, Farrer, & Christensen, 2010). Effect sizes in prior Internet trials ranged from small to medium, with clinically depressed participants showing effects from .42 to .65, while participants in prevention trials (i.e. not necessarily clinical populations) have demonstrated effect sizes ranging from .30 to .53 (Griffiths et al., 2010). Additionally, twenty studies on guided-CBT interventions for common mental disorders have demonstrated overall comparable outcomes to in-person CBT (Andersson, Carlbring, Ljótsson, & Hedman, 2013), and no evidence of harm (Ebert et al., 2016). The research suggests that there is value for some form of therapist support, since unguided interventions tend to lead to higher levels of dropout and smaller effect sizes (Andersson et al., 2013). Many of the guided-CBT interventions reviewed have text materials, with some also including video and audio.

Research supporting the utility of Internet interventions for PPD prevention and treatment is more limited. Several trials have demonstrated preliminary effectiveness for prevention of PPD (e.g. Barrera, Wickham, & Muñoz, 2015; Haga, Drozd, Brendryen, & Slinning, 2013; Jones, Griffiths, Christensen, Ellwood, Bennett, & Bennett, 2013) as well as treatment (e.g. Danaher et al., 2012; O'Mahen et al., 2013a; O'Mahen et al., 2013b). However, additional trials are necessary to better understand both the utility and limitations of Internet interventions for women in the perinatal period who either have or may be at risk of developing PPD. Further, as Internet interventions will ultimately reach a global population, research into various types of PPD prevention and treatment interventions will augment utility for a diverse group of women across the world.

Moreover, research suggests the feasibility of preventing depression through psychological intervention (Cuijpers, van Straten, Smit, Mihalopoulos, & Beekman, 2008) and pregnancy is a risk factor for developing depression. As such, offering tools to women at all stages of the pregnancy process, including those contemplating becoming pregnant, may help reduce suffering before it begins. Until recently the primary downside of prevention programs for depression has been cost. With the advent of Internet interventions, we are able to offer prevention programs that can be scaled at minimal cost (Lintvedt et al., 2013). Thus, inclusion of diverse samples with respect to pregnancy status allows examination of the overall effects for perinatal women as well as women who may later enter into motherhood.

Several emerging psychotherapies are increasingly rooted in the scientific understanding of evolved psychological processes that underpin emotion regulation through the gaining and maintaining of supportive intra and interpersonal relationships (Gilbert, 2000, 2015; Keltner, Kogan, Piff, & Saturn, 2014; Porges, 2007) and their interactions (Hermanto, Zuroff, Kopala-Sibley, Kelly, Matos, & Gilbert, 2016). There is now very good evidence that social and

For Peer Review

affiliative behavior have a range of physiological effects (Brown & Brown, 2015; Keltner et al., 2014) and practicing one aspect of affiliative behaviors such as compassion, changes physiological systems (Klimecki, Leiberg, Ricard, & Singer, 2014). There are a number of interventions and well-being practices that focus on harnessing and developing compassion as a therapeutic target with promising effects (Kirby, 2016). As noted by Kirby (2016), Compassion Focused Therapy (CFT; Gilbert, 2000, 2010 a, b) is based on evolutionary insights into brain functioning with a particular focus on the critical importance of developing affiliative and prosocial relationships with both oneself and others (Gilbert, 2010a, 2010b, 2015; Porges, 2007). CFT utilizes a range of personal breathing, visualization, and behavioral practices that seek to stimulate a range of affiliative processing systems and reduce the negative self-directed emotions that are commonly set within self-criticism. These practices are called 'Compassionate Mind Training' (CMT) and are derived from both established contemplative traditions and the scientific study of these processes (Gilbert 2010a, 2015).

The CFT model communicates the roles of one's motivation and affiliative processes in the regulation of threat and other emotions. Further, this approach denotes how one can cultivate these motivations and affiliative processes through addressing issues of self-criticism and shame as well as engaging in affiliation building exercises and the cultivation of compassion. Since depression is highly related to self-critical issues with oneself and sometimes non-affiliative relations with others and self, it is critical to help mothers and their babies to build more intra and inter affiliative relationships (Cree, 2010). There is good evidence that the woman's preparations, both psychological and practical, before birth has an impact on subsequent adjustment (Mercer, 2004). The key psychological changes for the woman is to become a care provider and CMT is an intervention that specifically focuses on the cultivation of caring motivation (Gilbert, 2010b, 2016). In addition, the myelinated vagus nerve of the parasympathetic system is known to be linked to caring and affiliative behavior (Kogan, Oveis, Carr et al., 2014) and recent research has shown that CMT significantly improves an indicator of vagal tone, called heart rate variability (Matos, Duarte, Duarte et al., 2017). While oxytocin is a salient hormone that helps infant mother bonding, high self-criticism can interfere with the effects of oxytocin (Rockliff, Karl, McEwan, Gilbert, Matos, & Gilbert, 2011). CMT specifically addresses self-criticism (Leaviss, & Uttley, 2015). Indeed, self-criticism and shame and self-doubt pre-birth are known predictors of subsequent birth difficulty (Dunford & Granger, 2017). CMT was specifically designed to address shame and self-criticism (Gilbert 2010). Hence, there are a number of psychological and physiological reasons for investigating the impact of a specific affiliation-based training on the process of adapting to childbirth.

While research on CMT for PPD is currently in its infancy, the firm grounding of CMT in both attachment as well as neurophysiological processes suggests it could be of significant benefit to women and their babies. As such, the aim of this paper is to compare a CMT course for perinatal and intending to become pregnant women to a CBT course, which is the theoretical orientation that serves as the current gold standard for Internet-based PPD care. The current outcome paper is a follow-up to a protocol manuscript introducing the structure of this pilot randomized trial (Kelman et al., 2016).

The goal of the current study is to examine possible differences between CBT and CMT on a range of outcomes amongst perinatal and intending to become pregnant women. At the broadest level, we expected that CMT and CBT would produce similar reductions on depression, anxiety, and affect while those in the CMT group would show greater improvements on measures of self-compassion and fears of compassion relative to the CBT group. We also

hypothesized that participants in the CMT group would report greater increases in self-reassurance and decreases in inadequate self-criticism and hated self-criticism relative to the CBT condition after a 45-minute didactic course. We predicted that after the 45-minute didactic, both groups would see near equivalent affect improvements. Following completion of the entire two-week course, participants assigned to the CMT condition would report increases in self-compassion relative to those assigned to the CBT condition. Further, following completion of the entire two-week course, participants would see near equivalent reductions in depression and anxiety in the CMT and CBT conditions. To the best of our knowledge, this is the first study to adapt CMT to an online format and to examine it among women and relative to CBT.

Methods

Participants

One hundred fifty-three participants were screened for eligibility, of whom 148 gave consent and completed demographics and baseline measures. Of the consenting participants, 25 were not eligible to participate due to being male, not pregnant and not considering becoming pregnant, completing the course more than one time, or completing the didactic in less than 10 minutes. The participants who completed the course in less than 10 minutes were excluded, as the research team determined that meaningfully engagement in both conditions was not feasible in less than 10 minutes. The remaining women (n=123) were then randomized into either Internet-based CMT (n=61) or Internet-based CBT (n=62). 84 completed two-week follow-up measures for either Internet-based CMT (n=41) and Internet-based CBT (n =43). Participant attrition at each phase of the study is depicted in Figure 1.

Both groups had participants that represent outliers in terms of their time to complete the intervention, with some participants taking several days to complete the didactic. We considered it almost certain that some of the participants who had taken longer to complete left their Internet browser open without meaningfully engaging in the content continuously. Therefore, we did not include a description of mean times for completion given the skewed nature of the data. However, modal number of minutes to completion of the didactic portion of the course for the CMT participants was 25.53 and 23.68 for CBT participants.

Of the 84 completers who returned for follow-up, 22.6% were between 18 to 25 years old, 61.9% between 26-34 years old, and 15.5% between 35 to 54 years old. Of the completers, 47.6% were currently pregnant, 13.1% were pregnant within the last year, and 39.3% were intending to become pregnant in the future. Seventy-eight percent (78.6%) of completers came from the US and 21.4% were from India. The majority of participants identified as European American/White (53.6%), with the next largest participant group identifying as Asian (28.6%), then African American (8.3%), Latino/a (6.0%), Other (2.4%), and Southeast Asian (1.2%). Furthermore, the majority of the sample was married (65.5%), heterosexual (88.1%), self-identified as “middle” socioeconomic status (63.1%), and lived in suburban neighborhoods (51.2%). The largest segment of the sample graduated college (41.7%) with the next largest group being individuals who completed some amount of college (26.2%).

Table 1 includes demographics and recruitment sources for all participants who completed the two-week follow-up (n=84). American participants made up a greater proportion of the CBT group when compared to the CMT group (p=.03).

Procedures

Recruitment for the current trial was conducted through the Amazon Mechanical Turk (MTurk) system and from professional networks, which included sending emails to clinical psychologists and psychology trainees asking them to forward to those who might be interested and may meet inclusion. Prospective participants were told through MTurk or email that the research team is 'conducting a brief two week study to learn about the therapeutic benefit of brief interventions for well-being…for women who are pregnant, interested in becoming pregnant in the future, or pregnant within the last year.' MTurk recruited participants were paid $2.50 total per participant in three rounds of recruitment and $5.00 total per participant in one round of recruitment. Payment was rendered to participants after they completed post baseline measures at two weeks and their participation code, which displayed after completing post baseline measures, was verified in the MTurk system. Recruitment for the trial began in April 2015 and was completed in September 2015. Eligibility criteria included proficiency in English, access to the Internet, being female (currently pregnant, pregnant within the last year, or intending to become pregnant in the future), and 18 years of age or older. Baseline depression status was not used to determine eligibility for entry into this proof-of-concept, pilot trial.

After providing Informed Consent (IC) and completing baseline measures to determine eligibility, participants were randomized to Internet-based CBT or Internet-based CMT. Each condition consisted of a 45-minute didactic course that introduced the course materials in order to provide a rationale for completing the follow-up materials. Follow-up materials were exercises for the CBT condition and audio meditations for the CMT condition. Participants received the follow-up materials through automatically generated emails that were sent based on the email address provided by participants. In the first email, which was triggered immediately following completion of the didactic course, participants were informed they would receive additional emails at day 4, day 7, and day 14.

In the day 14 email, participants were invited to click the link to a follow-up survey. In the follow-up survey, participants then completed the two-week follow-up measures. Additionally, participants were informed in this same email that they were able to keep and reuse materials they received during the course. All procedures for the current study were approved by the Palo Alto University Institutional Review Board.

Measures

Primary Outcome Measures. Depression and anxiety were the primary outcome measures of the present study. These constructs were assessed using the Patient Health Questionnaire-4 (PHQ-4; Löwe et al., 2010), which is a self-report measure that has two items to assess depression (PHQ-2) and two items to assess anxiety (Generalized Anxiety Disorder-2; GAD-2; Kroenke, Spitzer, Williams, & Löwe, 2009). From a general population sample, Cronbach's alpha was .78 for PHQ-2 and .75 for GAD-2 (Löwe et al., 2010). The PHQ-4 has been co-normed with the Structured Clinical Interview for DSM-IV Disorders (SCID-4). Results of this procedure showed that a scaled score of 3 on the PHQ-2 demonstrated sensitivity of 87% and specificity of 78% for Major Depressive Disorder (MDD). Furthermore, the PHQ-4 has shown comparable diagnostic abilities when compared to longer measures (Löwe, Kroenke, & Gräfe, 2005). In order to assess pre and post-course changes in depression and anxiety, participants completed the PHQ-4 before the didactic portion of the course and after finishing the post course measures at two weeks.

Secondary Outcome Measures. In order to assess shifts in hated self-criticism, inadequate self-criticism, and self-reassurance the Forms of Self-criticizing/Attacking and Self-Reassurance Scale (FSCRS) was employed (Gilbert, Clarke, Hempel, Miles, & Irons, 2004).

For Peer Review

Cronbach's alpha for inadequate self-criticism was at 0.90 and 0.86, each, for hated self-criticism and self-reassurance (Gilbert et al., 2004) in a sample of female college students. In order to assess pre and post-didactic shifts in these constructs, participants completed the FSCRS before and after the didactic portion of the course.

A Likert-scale item ('how would you rate your mood currently?') was used to assess current affect and was rated from 0-very bad to 7-very good. Participants completed the affect item pre-didactic and post-didactic.

Shifts in self-compassion were assessed using the Self-Compassion Scale – Short Form (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2010). This measure gauges the extent to which individuals are able to be self-compassionate when in situations of difficulty. The short form of the SCS has a near perfect correlation with the longer version of the measure at .97 and a Cronbach's alpha of .86 in the general population sample within the US (Raes et al., 2010). Participants completed the SCS-SF pre-didactic and after completion of post baseline measures at two weeks.

Internet Interventions

The CBT condition was based on standard cognitive-behavioral concepts of working with cognitions, behavioral activation, interpersonal effectiveness, and sleep hygiene. The Internet-based version of the materials used in this condition were adapted to match the length and depth of the CMT condition of the course. The original content was developed by the Institute for International Internet Interventions (i4health) as "micro-intervention" versions of CBT focused specifically on four brief, interactive lessons on 1) thoughts, 2) activities, 3) assertiveness, and 4) sleep. Participants were presented with the materials in follow-up emails during the two week course to practice concepts learned during the didactic portion of the course. Figure 2 is a visual depiction of the CBT condition to further illustrate the features of this condition.

The CMT condition included 1) finding ourselves here in the flow of life, 2) old brain, new brain, 3) the three circles of affect regulation and pregnancy, and 4) cultivating the compassionate self. Paul Gilbert, Ph.D., the founder of CFT and CMT, and Michelle Cree, M.S., who has expertise in CFT and CMT for PPD, developed both the overall structure as well as the audio meditations for the CMT condition. The CMT condition was built by Alex Kelman, PhD, PI on the present study, under the direction of Dr. Gilbert and Ms. Cree. Figure 3 is a visual depiction of the CMT condition to further illustrate the features of this condition.

Participants in both conditions were presented with the same 'thank you' letter at the end of the didactic that referenced pregnancy-specific information. The CMT condition contained minimal additional pregnancy-specific content in the third module beyond the CBT condition.

Data Analysis

An equivalence test was conducted to assess pre randomization equivalence of baseline measures for both the Internet-based CMT and Internet-based CBT conditions. A 2x2 mixed analysis of variance (ANOVA) was conducted for each measure at baseline and the two-week follow-up. The between subjects factor in the ANOVA was treatment condition (CBT vs. CMT) and the within subjects factor was assessment period (pre-treatment vs. post treatment) with the following outcome measures (affect, self-reassuring, hated self-criticism, inadequate self-criticism, self-compassion, depression, and anxiety). A main effect of time and a time by condition interaction were analyzed to determine if there were differences between Internet-based CMT and Internet-based CBT on each of the outcome measures. Additionally, parallel analyses using an estimator of complete information for all randomized participants were

For Peer Review

conducted. Since there were no significant differences between the completer and parallel analyses, this study only includes the completer analyses.

Results

We hypothesized that participants who were randomized to the Internet-based CMT condition would see greater increases in self-reassurance and decreases in inadequate self-criticism and hated self-criticism relative to those assigned to the Internet-based CBT condition. Course condition was entered as the between-subjects factor and assessment period was entered as the within-subjects factors and self-reassurance, inadequate self-criticism, and hated self-criticism as the dependent variables (DV). There was a main effect of time on self-reassurance $F(1,121) = 23.45$, $p < .001$, inadequate self-criticism $F(1,121) = 17.11$, $p < .001$, and hated self-criticism $F(1,121) = 14.81$, $p < .001$, indicating significant increases in self-reassurance and decreases in inadequate self-criticism and hated self-criticism. There was no main effect of treatment condition on self-reassurance $F(1,121) = .08$, $p = .77$, inadequate self-criticism $F(1,121) = .01$, $p = .91$, or hated self-criticism $F(1,121) = .02$, $p = .89$. Examination of the interaction terms showed no significant changes in self-reassurance $F(1,121) = 3.12$, $p = .08$, inadequate self-criticism $F(1,121) = .24$, $p = .63$, and hated self-criticism $F(1,121) = 1.29$, $p = .26$ across group and time, which indicates there were no significant differences between groups on the three subscales of the FSCRS.

To determine whether participants in both conditions would see near equivalent affect improvements at post didactic, course condition was entered as the between-subjects factor and time as the within-subjects factor and affect as the DV. There was no main effect for time $F(1,121) = 1.67$, $p = .20$, no main effect for treatment condition $F(1,121) = .05$, $p = .82$, nor was there an interaction, indicating the course conditions did not significantly differ on their effects on affect $F(1,121) = 2.14$, $p = .15$.

To evaluate whether participants in the Internet-based CMT condition would see greater increases in self-compassion relative to the Internet-based CBT condition from pre- to post course at two weeks, course condition was entered as the between-subjects factor and assessment period was entered as the within-subjects factor and self-compassion as the DV. There was a main effect for time $F(1,82) = 31.11$, $p < .001$, such that participants increased on self-compassion. There was no main effect of treatment condition $F(1,82) = .01$, $p = .93$. Result of the interaction showed that groups did not significantly differ over time on self-compassion $F(1,82) = 3.69$, $p = .06$, though examination of means showed that CMT participants trended towards greater increases in self-compassion. Partial eta-squared ($\eta^2 = .04$) was of small to medium size.

To analyze whether participants in both conditions would see near equivalent reductions in depression and anxiety, course condition was entered as the between-subjects factor and assessment period was entered as the within-subjects factors with depression (PHQ-2) and anxiety (GAD-2) subscales of the PHQ-4 as the DVs. For depression, there was a main effect for time $F(1,82) = 10.78$, $p < .01$, such that depression decreased over time. There was no main effect of treatment condition on depression $F(1,82) = .39$, $p = .54$. Result of the interaction showed that groups significantly differed over time on depression $F(1,82) = 4.88$, $p = .03$, with the CMT condition showing greater reductions. There was a main effect of time on anxiety $F(1,82) = 21.28$, $p < .001$, with participants, as a whole, showing significant reductions. There was no main effect of treatment condition on anxiety $F(1,82) = .07$, $p = .79$. Results of the interaction demonstrated that groups significantly differed over time on anxiety $F(1,82) = 4.42$, p

For Peer Review

= .04, with the CMT group having significantly more reduced anxiety scores over time than the CBT group.

Means and standard deviations of both CBT and CMT groups at pre- and post course are presented in Table 2. The group means for both the CBT and CMT groups at both pre- and post course all fell in the normal range. No such cutoff scores have been established for the other outcomes measures. Because we wanted to assess the clinical utility of the course, we conducted a follow-up analysis restricting the sample to only those who demonstrated score elevations on either the PHQ-2 or the GAD-2 above 2, thereby restricting the sample to those who would screen positive on a brief screener of depression or anxiety, respectively (Kroenke, Spitzer, Williams, & Löwe, 2009). We then conducted two chi square tests of association. The first analysis looked at the relationship between group and depression at follow-up and the second looked at the relationship between group and anxiety at follow-up. We found that there was a significant association between group and depression status, such that, of those that screened for depression, those randomized to the CMT group were more likely to score below the cutoff at follow-up χ^2 (1, N = 27) = 5.04, p = .03. We found no evidence of a relationship between group and anxiety status amongst those who initially screened positive for anxiety χ^2 (1, N = 31) = 0.06, p = .81.

Further, we conducted an additional subgroup analysis of currently pregnant women, since our sample included women who were also outside of the perinatal period and thus our sample does not exclusively represent and provide information on currently pregnant women. Through this subgroup analysis, results demonstrated that CMT effects above and beyond CBT on depression scores maintained even among the pregnant subgroup (p = .05). However, when analyzing the pregnant subgroup, the anxiety scores were no longer significantly different between women in CMT relative to CBT (p = .09).

Analysis of differences between course condition at 2 weeks is presented in Table 3.

Discussion

Overall, results from this pilot RCT demonstrate that brief automated Internet-based CMT for pregnant, postpartum, and intending to become pregnant women may be a useful tool to help reduce symptoms of depression and anxiety. While CBT is presently the gold standard for depression, both as an Internet intervention and in person, the equivalence of CMT as compared to CBT on the constructs of self-reassurance, inadequate self-criticism, hated self-criticism, and self-compassion and the superior performance of CMT on reducing depression and anxiety scores suggests that CMT may provide some added utility beyond the current gold standard. Further, the subgroup analysis for women currently in the clinical range on the brief screeners of depression and anxiety demonstrated CMT utility above and beyond CBT for reducing depression but the findings did not hold for anxiety. This finding for depression provides evidence for plausible clinical utility of the CMT version of the course in reducing depression among women with clinical symptomatology. Additionally, given the depression findings held among the 40 women classified as currently pregnant, future directions in this research line, which will be discussed in the conclusion, will aim to further elucidate the effects of compassion treatments for depressive symptoms in a sample of currently pregnant women.

Given that CMT specifically targets compassion towards oneself and others, we were surprised to find that both conditions demonstrated near equivalent outcomes for self-compassion. Similarly, we did not expect CMT to further reduce symptoms of depression and anxiety relative to CBT among this sample of women. As CBT specifically targets processes

For Peer Review

thought to precede and maintain depression and anxiety, these results necessitate further inquiry in our theoretical understanding of negative affective problems. As suggested by the (neuro)physiological processes underpinning CMT, these results suggest that different mechanisms beyond cognitions and behavior may play a larger role than previously anticipated in mood symptomatology.

One possible explanation for these findings may relate to biases in perceived affective tone present in depressed and anxious individuals. Substantial literature has documented that depressed and anxious individuals show biases in noticing negative stimuli more quickly and interpreting ambiguous stimuli as more negative (Mogg, Bradley, & Williams, 1995). Given these biases, we believe that individuals who have self-critical tendencies likely exhibit a more negative "internal tone." This may then mean that resources that do not explicitly seek to generate a positive "internal tone" run the risk of using affectively neutral language that will be interpreted negatively by individuals prone to these biases. We would argue that compassion-based resources may more explicitly foster friendly/affiliative positive "internal tone," allowing individuals to experience a sense of security necessary to attempt further change.

Our finding that CMT produced greater reductions in depression and anxiety scores among the general sample and depression scores among the clinical and pregnant subsamples is consistent with prior literature that suggests that reduction of self-criticism is a significant predictor of treatment success with depressed patients (Rector, Bagby, Segal, Joffe, & Levitt, 2000). Interestingly, the same study found that CBT patients with high levels of self-criticism were more likely to react poorly to treatment. These findings suggest two important ideas. First, interrupting self-critical "internal tone" is crucial to mood change. Second, the "micro-intervention" version of CBT used in this study, perhaps due in part to its concise and pedagogical tone, may have inadvertently fostered critical or judgmental thoughts. In light of these findings, we would suggest that for many patients, especially when self-criticism is a central concern, delivering treatment imbued with a compassionate tone may improve outcomes.

While we have argued that increasing compassion may be an important pre-requisite for mood change, the question remains as to why a CMT course would not produce changes in compassion similar to those seen in depression and anxiety. Since many of the items on our measure of self-compassion tend to be more trait-based in nature (e.g. 'I try to be understanding and patient towards those aspects of my personality I don't like.'), it is feasible that this construct would not reasonably shift in a short period of time. However, we would argue that across time, repeated practice with fostering a more positive internal tone may produce changes in compassion that complement our findings with respect to depression and anxiety. Currently, an updated CMT course is being tested as a prevention of PPD intervention for women in their second and third trimesters who are at risk of developing depression following pregnancy. Results from this trial will provide information on the preventative effectiveness of the course as well as a more distal time point (between 3 and 6 months' post baseline depending on pregnancy status at baseline) to measure relevant constructs.

Similar to our findings with self-compassion, we believe the lack of significant differences between groups in self-reassurance, inadequate self-criticism, and hated self-criticism may reflect an underlying durability of such constructs. The FSCRS, the scale used to measure these constructs, was given to participants before and after the 45-minute didactic portion of the course. Since many of the items on this measure tend to be more trait-based in nature (ex. 'I am easily disappointed in myself'), it is feasible that the constructs would not reasonably shift in a

For Peer Review

short period of time. As such, future trials may benefit from giving these measures over a longer period of time.

Conclusions

The most evident limitation of the current trial is the absence of a more distal time point for measurement of constructs. As we only collected at a two-week follow-up, we lack adequate information on the maintenance of change in constructs after this point. Since the ultimate goal of Internet interventions is to provide psychological tools to reduce suffering on a global scale, an understanding of the longer-term utility of resources is crucial. As mentioned previously, we plan to address this issue in the next iteration of the CMT course, in which we are collecting data exclusively with currently pregnant participants that we follow up to twelve weeks postpartum. The next step along this line of research will allow for a better understanding of CMT utility specifically for prevention of postpartum depression among currently pregnant women, something that we were unable to determine in this proof-of-concept pilot trial.

Another limitation of the current study is the fact that it does not directly test whether the intervention is effective in preventing PPD. This was partly due to the fact that, as a pilot study, all data was gathered within a two week timeframe and that such analysis was not possible. As such, we sought instead to demonstrate reductions in areas related to common PPD symptom domains. Our future work will seek to address this concern by employing a prevention model and testing its effectiveness in lowering rates of PPD. However, we felt presenting these findings represent an important step in providing initial evidence to the utility of CMT in affecting symptom areas common to PPD in the desired direction.

In regards to recruitment for this trial, MTurk, the Amazon recruitment engine, accounted for the largest proportion of completer participants (96.4%). Notably, the MTurk system includes a diverse group of workers from various backgrounds in several countries (Buhrmester, Kwang, & Gosling, 2011). Further, Internet-based trials often utilize novel recruitment means to attract a global sample of participants (e.g. Barrera, Kelman, & Muñoz, 2014). As the vast majority of MTurk workers come from the US and India (Mason & Suri, 2012), it is therefore unsurprising that all completer participants resided in these two countries. Since there is evidence to support the fact that workers in the MTurk system are more demographically diverse than standard college and Internet samples (Buhrmester et al., 2011), it is unlikely that our results are a function of something inherently different about a sample derived from MTurk relative to standard samples. However, a limitation to this method of recruitment is in relation to the number of completers in an MTurk sample, all of whom are incentivized through reimbursement, is likely much higher than what would occur among women in the general population seeking these resources.

As a result of the findings in this pilot trial, further investigation should be conducted into the use of Internet-based CMT for a global population of perinatal, postpartum, and intending to become pregnant women. This study provides initial evidence for the utility of compassion-based resources delivered in an automated, Internet-based format. There are several possible implications of this study that we hope will be further investigated. First, our study suggests initial indicators of CMT outperforming the gold standard. As such, there should be inquiry into what may account for this surprising finding to then elucidate mechanisms. Second, at present, there is a lack of adequate global resources for women who are pregnant, postpartum, and intending to become pregnant. Because this low-cost resource may provide additional utility beyond the gold standard, further inquiry is warranted to better understand Internet-based CMT as a psychological tool for this population. Finally, we would argue that furthering the study of

compassion-based resources that address a broader range of issues and populations merits continued study. CMT has shown promise in addressing a range of psychological issues, such as depression, anxiety, weight problems, and trauma. If these concepts are effective in highly deliverable formats, such as through the Internet and mobile apps, then mapping out potential within specific areas represents an important horizon within the field of psychology.

Declarations

All procedures for the current study were approved by the Palo Alto University Institutional Review Board. The datasets used during the current study are available from the corresponding author on reasonable request. Further, the authors declare that they have no competing interests.

The PI would like to acknowledge his research advisor, Alinne Barrera, Ph.D., who has provided guidance and support on this project and more broadly. Additionally, the PI is grateful for the financial support provided by the Campus Research Board at Palo Alto University and the Elton C and Joan R Waelde Meditation Fellowship. Through this support, the research team was able to recruit from an international sample on MTurk.

For Peer Review

References

Andersson, G., Carlbring, P., Ljótsson, B., & Hedman, E. (2013). Guided internet-based CBT for common mental disorders. *Journal of Contemporary Psychotherapy*, *43*(4), 223-233

Barrera, A. Z., Kelman, A. R., & Muñoz, R. F. (2014). Keywords to recruit Spanish-and English-speaking participants: evidence from an online postpartum depression randomized controlled trial. *Journal of medical Internet research*, *16*(1).

Barrera, A. Z., Wickham, R. E., & Muñoz, R. F. (2015). Online prevention of postpartum depression for Spanish-and English-speaking pregnant women: A pilot randomized controlled trial. *Internet interventions*, *2*(3), 257-265.

Brown, S. L., & Brown, R. M. (2015). Connecting prosocial behavior to improved physical health: Contributions from the neurobiology of parenting. *Neuroscience & Biobehavioral Reviews*, *55*, 1-17.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data?. *Perspectives on psychological science*, *6*(1), 3-5.

Clatworthy, J. (2012). The effectiveness of antenatal interventions to prevent postnatal depression in high-risk women. *Journal of affective disorders*, *137*(1), 25-34.

Cree, M. (2010). Compassion focused therapy with perinatal and mother-infant distress. *International Journal of Cognitive Therapy*, *3*(2), 159-171.

Cuijpers, P., van Straten, A., Smit, F., Mihalopoulos, C., & Beekman, A. (2008). Preventing the onset of depressive disorders: a meta-analytic review of psychological interventions. *American Journal of Psychiatry*, *165*(10), 1272-1280.

Danaher, B. G., Milgrom, J., Seeley, J. R., Stuart, S., Schembri, C., Tyler, M. S., ... & Lewinsohn, P. (2012). Web-based intervention for postpartum depression: Formative research and design of the MomMoodBooster program. *JMIR research protocols*, *1*(2).

Dennis, C. L. (2005). Psychosocial and psychological interventions for prevention of postnatal depression: systematic review. *Bmj*, *331*(7507), 15.

Dunford, E., & Granger, C. (2017). Maternal Guilt and Shame: Relationship to Postnatal Depression and Attitudes towards Help-Seeking. *Journal of Child and Family Studies*, *26*(6), 1692-1701.

Ebert, D. D., Donkin, L., Andersson, G., Andrews, G., Berger, T., Carlbring, P., ... & Kleiboer, A. (2016). Does Internet-based guided-self-help for depression cause harm? An individual participant data meta-analysis on deterioration rates and its moderators in randomized controlled trials. *Psychological medicine*, *46*(13), 2679-2693.

Gilbert, P. (2000). Social mentalities: Internal 'social' conflicts and the role of inner warmth

and compassion in cognitive therapy. *In, P. Gilbert & Bailey K.G (eds.) Genes on the Couch: Explorations in Evolutionary Psychotherapy* (p.118-150). Hove: Psychology Press.

Gilbert, P. (2010a). *Compassion focused therapy: The CBT distinctive features series*. London: Routledge.

Gilbert, P. (2010b). *The compassionate mind: A new approach to life's challenges*. New Harbinger Publications.

Gilbert, P. (2015). Affiliative and prosocial motives and emotions in mental health. *Dialogues in clinical neuroscience*, *17*(4), 381.

Gilbert, P., Clarke, M., Hempel, S., Miles, J. N., & Irons, C. (2004). Criticizing and reassuring oneself: An exploration of forms, styles and reasons in female students. *British Journal of Clinical Psychology*, *43*(1), 31-50.

Griffiths, K. M., & Christensen, H. (2006). Review of randomised controlled trials of Internet interventions for mental disorders and related conditions. *Clinical Psychologist*, *10*(1), 16-29.

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

Haga, S. M., Drozd, F., Brendryen, H., & Slinning, K. (2013). Mamma mia: a feasibility study of a web-based intervention to reduce the risk of postpartum depression and enhance subjective well-being. *JMIR research protocols*, *2*(2).

Halbreich, U., & Karkun, S. (2006). Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. *Journal of affective disorders*, *91*(2), 97-111.

Hermanto, N., Zuroff, D. C., Kopala-Sibley, D. C., Kelly, A. C., Matos, M., Gilbert, P., & Koestner, R. (2016). Ability to receive compassion from others buffers the depressogenic effect of self-criticism: A cross-cultural multi-study analysis. *Personality and Individual Differences*, *98*, 324-332.

Jones, B. A., Griffiths, K. M., Christensen, H., Ellwood, D., Bennett, K., & Bennett, A. (2013). Online cognitive behaviour training for the prevention of postnatal depression in at-risk mothers: a randomised controlled trial protocol. *BMC psychiatry*, *13*(1), 265.

Kelman, A. R., Stanley, M. L., Barrera, A. Z., Cree, M., Heineberg, Y., & Gilbert, P. (2016). Comparing Brief Internet-Based Compassionate Mind Training and Cognitive Behavioral Therapy for Perinatal Women: Study Protocol for a Randomized Controlled Trial. *JMIR research protocols*, *5*(2).

For Peer Review

Keltner, D., Kogan, A., Piff, P. K., & Saturn, S. R. (2014). The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: Core processes from gene to meme. *Annual review of psychology*, *65*, 425-460.

Klimecki, O. M., Leiberg, S., Ricard, M., & Singer, T. (2013). Differential pattern of functional brain plasticity after compassion and empathy training. *Social cognitive and affective neuroscience*, *9*(6), 873-879.

Kogan, A., Oveis, C., Carr, E. W., Gruber, J., Mauss, I. B., Shallcross, A., ... & Keltner, D. (2014). Vagal activity is quadratically related to prosocial traits, prosocial emotions, and observer perceptions of prosociality. *Journal of Personality and Social Psychology*, *107*(6), 1051.

Kraut, R., Olson, J., Banaji, M., Bruckman, A., Cohen, J., & Couper, M. (2004). Psychological research online: report of Board of Scientific Affairs' Advisory Group on the Conduct of Research on the Internet. *American psychologist*, *59*(2), 105.

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ–4. *Psychosomatics*, *50*(6), 613-621.

Leaviss, J., & Uttley, L. (2015). Psychotherapeutic benefits of compassion-focused therapy: An early systematic review. *Psychological medicine*, *45*(5), 927-945.

Lintvedt, O. K., Griffiths, K. M., Sørensen, K., Østvik, A. R., Wang, C. E., Eisemann, M., & Waterloo, K. (2013). Evaluating the effectiveness and efficacy of unguided internet-based self-help intervention for the prevention of depression: a randomized controlled trial. *Clinical psychology & psychotherapy*, *20*(1), 10-27.

Löwe, B., Kroenke, K., & Gräfe, K. (2005). Detecting and monitoring depression with a two-item questionnaire (PHQ-2). *Journal of psychosomatic research*, *58*(2), 163-171.

Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., ... & Brähler, E. (2010). A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of affective disorders*, *122*(1), 86-95.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior research methods*, *44*(1), 1-23.

Matos, M., Duarte, C., Duarte, J., Pinto-Gouveia, J., Petrocchi, N., Basran, J., & Gilbert, P. (2017). Psychological and Physiological Effects of Compassionate Mind Training: a Pilot Randomised Controlled Study. *Mindfulness*, 1-14.

McEwan, K., & Gilbert, P. (2016). A pilot feasibility study exploring the practising of compassionate imagery exercises in a nonclinical population. *Psychology and Psychotherapy: Theory, Research and Practice*, *89*(2), 239-243.

For Peer Review

Misri, S., Reebye, P., Corral, M., & Mills, L. (2004). The use of paroxetine and cognitive-behavioral therapy in postpartum depression and anxiety: a randomized controlled trial. *The Journal of clinical psychiatry*.

Mogg, K., Bradley, B. P., & Williams, R. (1995). Attentional bias in anxiety and depression: The role of awareness. *British journal of clinical psychology*, *34*(1), 17-36.

Muñoz, R. F. (2010). Using evidence-based internet interventions to reduce health disparities worldwide. *Journal of medical Internet research*, *12*(5).

Muñoz, R. F., Barrera, A. Z., Delucchi, K., Penilla, C., Torres, L. D., & Pérez-Stable, E. J. (2009). International Spanish/English Internet smoking cessation trial yields 20% abstinence rates at 1 year. *Nicotine & tobacco research*, *11*(9), 1025-1034.

Norhayati, M. N., Hazlina, N. N., Asrenee, A. R., & Emilin, W. W. (2015). Magnitude and risk factors for postpartum symptoms: a literature review. *Journal of affective Disorders*, *175*, 34-52.
O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: current status and future directions. *Annual review of clinical psychology*, *9*, 379-407.

O'Hara, M. W., Stuart, S., Gorman, L. L., & Wenzel, A. (2000). Efficacy of interpersonal psychotherapy for postpartum depression. *Archives of general psychiatry*, *57*(11), 1039-1045.

O'Mahen, H. A., Richards, D. A., Woodford, J., Wilkinson, E., McGinley, J., Taylor, R. S., & Warren, F. C. (2014). Netmums: a phase II randomized controlled trial of a guided Internet behavioural activation treatment for postpartum depression. *Psychological medicine*, *44*(8), 1675-1689.

O'Mahen, H. A., Woodford, J., McGinley, J., Warren, F. C., Richards, D. A., Lynch, T. R., & Taylor, R. S. (2013). Internet-based behavioral activation—Treatment for postnatal depression (Netmums): A randomized controlled trial. *Journal of affective disorders*, *150*(3), 814-822.

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *Jama*, *303*(19), 1961-1969.

Perveen, T., Mahmood, S., Gosadi, I., Mehraj, J., & Sheikh, S. S. (2013). Long Term Effectiveness of Cognitive Behavior Therapy for Treatment of Postpartum Depression: A Systematic Review and Meta-analysis. *J Pioneer Med Sci Oct-Dec*, *3*(4), 198-204.

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the self-compassion scale. *Clinical psychology & psychotherapy*, *18*(3), 250-255.

Rector, N. A., Bagby, R. M., Segal, Z. V., Joffe, R. T., & Levitt, A. (2000). Self-criticism and dependency in depressed patients treated with cognitive therapy or pharmacotherapy. *Cognitive Therapy and Research*, *24*(5), 571-584.

For Peer Review

US Department of Health. (2010). *Healthy People 2010*.

Wang, P. S., Aguilar-Gaxiola, S., Alonso, J., Angermeyer, M. C., Borges, G., Bromet, E. J., ... & Haro, J. M. (2007). Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys. *The Lancet*, *370*(9590), 841-850.

Wisner, K. L., Hanusa, B. H., Perel, J. M., Peindl, K. S., Piontek, C. M., Sit, D. K., ... & Moses-Kolko, E. L. (2006). Postpartum depression: a randomized trial of sertraline versus nortriptyline. *Journal of clinical psychopharmacology*, *26*(4), 353-360.

Yonkers, K. A., Ramin, S. M., Rush, A. J., Navarrete, C. A., Carmody, T., March, D., ... & Leveno, K. J. (2001). Onset and persistence of postpartum depression in an inner-city maternal health clinic system. *American Journal of Psychiatry*, *158*(11), 1856-1863.

For Peer Review

Table 1

Completer Demographics

Demographic Variables	CMT (N=41) *n* (%)	CBT (N=43) *n* (%)	Both (N=84) *n* (%)	Difference *p*
Age				
18-25	6 (14.6)	13 (30.2)	19 (22.6)	.94
26-34	32 (78)	20 (46.5)	52 (61.9)	
35-54	3 (7.3)	10 (23.3)	13 (15.5)	
Ethnicity	4 (9.8)	3 (7.0)	7 (8.3)	
African American	16 (39.0)	8 (18.6)	24 (28.6)	
Asian	1 (2.4)	0 (0)	1 (1.2)	.20
Southeast Asian	18 (43.9)	27 (62.8)	45 (53.6)	
European American/White	1 (2.4)	4 (9.3)	5 (6.0)	
Latino/a	1 (2.4)	1 (2.3)	2 (2.4)	
Other				
Country	28 (68.3)	38 (88.4)	66 (78.6)	.03
United States	13 (31.7)	5 (11.6)	18 (21.4)	
India				
Marital Status				
Living with another	7 (17.1)	7 (16.3)	14 (16.7)	.51
Married	28 (68.3)	27 (62.8)	55 (65.5)	
Divorced	0 (0)	2 (4.7)	2 (2.4)	
Separated	1 (2.4)	0 (0)	1 (1.2)	
Single	5 (12.2)	7 (16.3)	12 (14.3)	
Sexual Orientation				
Heterosexual	36 (87.8)	38 (88.4)	74 (88.1)	.99
LGBTQ	3 (7.3)	3 (7.0)	6 (7.1)	
Neither describes me	2 (4.9)	2 (4.7)	4 (4.8)	
Area lived				
Urban	16 (39.0)	15 (34.9)	31 (36.9)	.26
Suburban	18 (43.9)	25 (58.1)	43 (51.2)	
Rural	7 (17.1)	3 (7.0)	10 (11.9)	
Socioeconomic Status				
Low	9 (22.0)	14 (32.6)	23 (27.4)	.55
Middle	29 (70.7)	24 (55.8)	53 (63.1)	
High	3 (7.3)	5 (11.6)	8 (9.5)	

Note. Recruitment source was not analyzed for significant differences. Significant at ** = $p < .01$ level

For Peer Review

Table 1 (continued)
Completer Demographics

Demographic Variables	CMT (N=41) *n* (%)	CBT (N=43) *n* (%)	Both (N=84) *n* (%)	Difference *p*
Highest Education				
High School	3 (7.3)	4 (9.3)	7 (8.3)	
Vocational/Technical	2 (4.9)	3 (7.0)	5 (6.0)	
Some College	11 (26.8)	11 (25.6)	22 (26.2)	.47
College Graduate	16 (39)	19 (44.2)	35 (41.7)	
Graduate Degree	9 (22)	6 (14.0)	15 (17.9)	
Pregnancy Status				
Currently pregnant	22 (53.7)	18 (41.9)	40 (47.6)	
Gave birth in past year	5 (12.2)	6 (14.0)	11 (13.1)	.55
Intending to become pregnant	14 (34.1)	19 (44.2)	33 (39.3)	
Recruitment Source				
Professional Networks	2 (4.9)	1 (2.3)	3 (3.6)	--
Amazon Mechanical Turk	39 (95.1)	42 (97.7)	81 (96.4)	

Note. Recruitment source was not analyzed for significant differences. Significant at ** = $p < .01$ level.

For Peer Review

Table 2

Means and Standard Deviations for Both CMT and CBT Completers

Measurement Time Measure	CMT Pre *M (SD)*	CMT Post *M (SD)*	CBT Pre *M (SD)*	CBT Post *M (SD)*
Post didactic	*n*=61	*n*=62	*n*=61	*n*=62
Self-reassurance	20.41 (.94)	22.56 (.95)	20.61 (.93)	21.61 (.95)
Hated SC	5.10 (.67)	4.03 (.64)	4.98 (.66)	4.40 (.64)
Inadequate SC	15.85 (1.24)	13.79 (1.20)	15.44 (1.23)	13.81 (1.19)
Affect	5.31 (.16)	5.57 (.17)	5.40 (.16)	5.39 (.17)
Post two-weeks	*n*=41	*n*=43	*n*=41	*n*=43
Self-compassion	37.49 (1.56)	42.83 (1.44)	39.02 (1.53)	41.63 (1.40)
Depression	2.02 (.30)	1.07 (.27)	1.42 (.29)	1.23 (.27)
Anxiety	2.24 (.32)	1.00 (.26)	1.95 (.31)	1.49 (.26)

Note. Post didactic is immediately following introduction of course materials. Follow-up at two weeks. Self-criticism (SC).

For Peer Review

Table 3

Differences between Conditions at Two-week follow-up

Variable	Mean Square	*F*	*p*
Post didactic			
Self-reassurance	20.25	3.12	.08
Hated self-criticism	3.62	1.29	.26
Inadequate self-criticism	2.93	.24	.63
Affect	1.19	2.14	.15
Post two-weeks			
Self-compassion	78.60	3.69	.06
Depression	6.14	4.88	.03*
Anxiety	6.37	4.42	.04*

Note. Significant at * = p < .05 level. Post didactic is immediately following introduction of course materials. Follow-up at two weeks.

For Peer Review

Figure 1

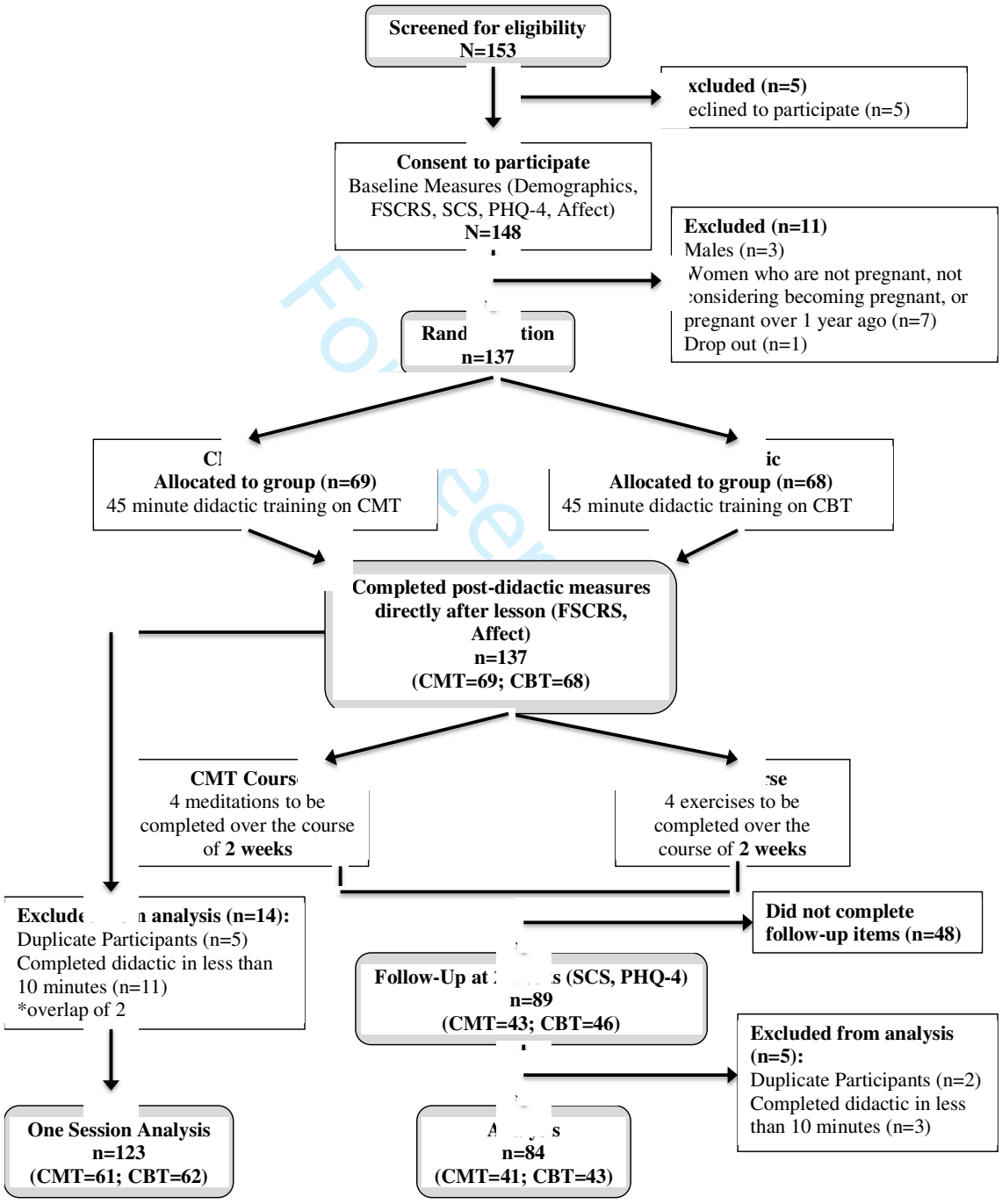
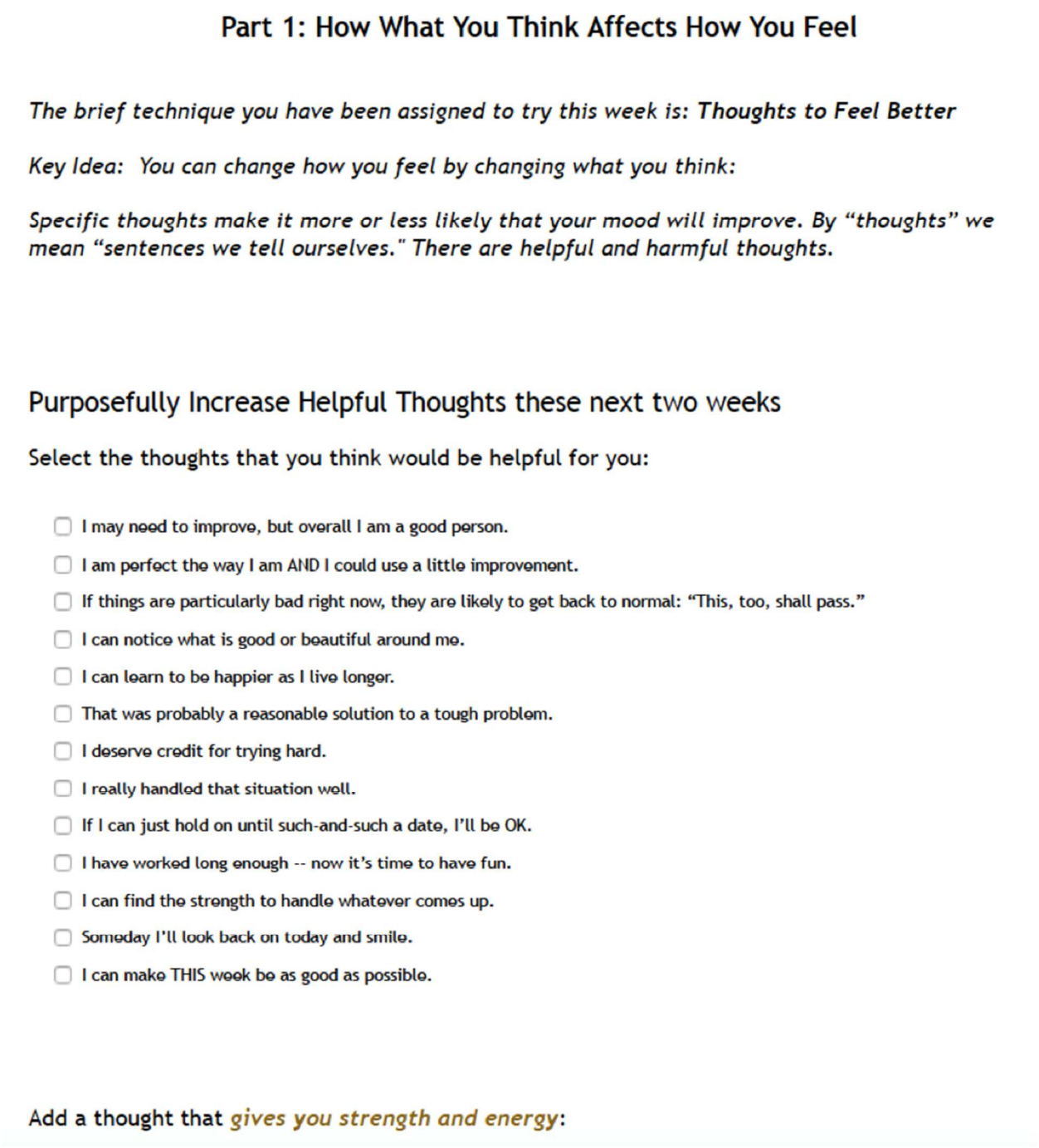

Screened for eligibility
N=153
xcluded (n=5)
eclined to participate (n=5)
Consent to participate
Baseline Measures (Demographics, FSCRS, SCS, PHQ-4, Affect)
N=148
Excluded (n=11)
Males (n=3)
Women who are not pregnant, not considering becoming pregnant, or pregnant over 1 year ago (n=7)
Drop out (n=1)
Rand tion
n=137
Cl
Allocated to group (n=69)
45 minute didactic training on CMT
ic
Allocated to group (n=68)
45 minute didactic training on CBT
Completed post-didactic measures directly after lesson (FSCRS, Affect)
n=137
(CMT=69; CBT=68)
CMT Cours
4 meditations to be completed over the course of 2 weeks
rse
4 exercises to be completed over the course of 2 weeks
Exclude n analysis (n=14):
Duplicate Participants (n=5)
Completed didactic in less than 10 minutes (n=11)
*overlap of 2
Did not complete follow-up items (n=48)
Follow-Up at s (SCS, PHQ-4)
n=89
(CMT=43; CBT=46)
Excluded from analysis (n=5):
Duplicate Participants (n=2)
Completed didactic in less than 10 minutes (n=3)
One Session Analysis
n=123
(CMT=61; CBT=62)
s
n=84
(CMT=41; CBT=43)

Figure 2



Part 1: How What You Think Affects How You Feel

The brief technique you have been assigned to try this week is: ***Thoughts to Feel Better***

Key Idea: You can change how you feel by changing what you think:

Specific thoughts make it more or less likely that your mood will improve. By "thoughts" we mean "sentences we tell ourselves." There are helpful and harmful thoughts.

Purposefully Increase Helpful Thoughts these next two weeks

Select the thoughts that you think would be helpful for you:

- ☐ I may need to improve, but overall I am a good person.
- ☐ I am perfect the way I am AND I could use a little improvement.
- ☐ If things are particularly bad right now, they are likely to get back to normal: "This, too, shall pass."
- ☐ I can notice what is good or beautiful around me.
- ☐ I can learn to be happier as I live longer.
- ☐ That was probably a reasonable solution to a tough problem.
- ☐ I deserve credit for trying hard.
- ☐ I really handled that situation well.
- ☐ If I can just hold on until such-and-such a date, I'll be OK.
- ☐ I have worked long enough -- now it's time to have fun.
- ☐ I can find the strength to handle whatever comes up.
- ☐ Someday I'll look back on today and smile.
- ☐ I can make THIS week be as good as possible.

Add a thought that *gives you strength and energy*:

Figure 3

Understanding Our Emotions
Part 2: Old Brain, New Brain

We are not the ones who design our brains, nor the desires, emotions, or motives that we have. As a result, the way our brains work is **not our fault.**

Old Brain
The old brain, which evolved millions of years ago, has one main goal - to keep us alive and to make sure we reproduce and pass our genes along. The old brain deals with our basic emotions of anger, disgust, anxiety, joy, and excitement.