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Margaret Quinn   April 1, 2016

Crying as an Independent Predictor of Treatment Outcome in Cognitive Behavioral Therapy (CBT), Regardless of Gender, Comorbid Anxiety, or Language / Culture

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Abstract

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The present study investigated the relationship between crying in the first few sessions of
Cognitive Behavioral Therapy (CBT) for treatment of depression and treatment outcome.
Gender, comorbid anxiety severity at baseline, and language / culture were each investigated
as moderators of crying, while crying was tested as a mediator between initial and final severity
of depression. While it was found that female gender and presence of a comorbid anxiety
disorder each were independently significantly associated with an increased likelihood to cry,
results showed that crying serves as an independent predictor of treatment outcome in CBT,
regardless of gender, comorbid anxiety severity at baseline, and language / culture. Those who
cried in the first few sessions of CBT were significantly more likely to experience poorer
outcomes after acute treatment; this novel finding holds important clinical implications for CBT
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Crying as an Independent Predictor of Treatment Outcome in Cognitive Behavioral Therapy

(CBT), Regardless of Gender, Comorbid Anxiety, or Language / Culture

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Abstract

The present study investigated the relationship between crying in the first few sessions of Cognitive Behavioral Therapy (CBT) for treatment of depression and outcome of that treatment. Gender, comorbid anxiety severity at baseline, and language / culture were each investigated as moderators of crying, while crying was tested as a mediator between initial and final severity of depression. It was found that female gender and presence of a comorbid anxiety disorder each was independently and significantly associated with an increased likelihood to cry. Results showed that crying serves as an independent predictor of treatment outcome in CBT, regardless of gender, comorbid anxiety severity at baseline, and language / culture. Those who cried in the first few sessions of CBT were significantly more likely to experience poorer outcomes after acute treatment; this novel finding holds important clinical implications for CBT practitioners.

Introduction

Clinicians have often described excessive crying in their reports of psychopathology. Recent neurobiology findings regarding depression, specifically, suggest that depression lowers the crying threshold (Chentsova-Dutton et al., 2007; Rottenberg, Gross, Wilhelm, Najmi, & Gotlib, 2002; Vingerhoets, Rottenberg, Cevaal, & Nelson, 2007). Multiple depression rating scales and interviews include crying as reflective of greater severity, though many clinicians also describe inability to cry in individuals experiencing more severe depressive episodes (Beck, 1961; Chentsova-Dutton et al., 2007; Hamilton, 1986; Rottenberg et al., 2002; Vingerhoets et al, 2007).

Disagreement exists in the extant literature in that some clinicians and laypeople conceptualize crying as a self-soothing behavior, yet others understand crying to be a signal of distress (Hendriks, Rottenberg, & Vingerhoets, 2007). One study found that non-psychotic individuals who underwent psychodynamic-interpersonal psychotherapy but had no DSM diagnosis experienced crying as cathartic if their therapist provided them with the skills and tools to successfully experience and regulate their emotions during and after crying (Robinson, Hill, & Kivlighan, 2015). This successful patient-therapist interaction was associated with a slight positive increase in an individual's reported affective state at the end of a therapy session (Robinson, Hill, & Kivlighan, 2015). Based on this study, it would seem that the self-soothing model of crying might be accurate; however, this study and broader conceptualizations of crying have mostly been studied among individuals who were not diagnosed with Major Depressive Disorder (MDD).

Individuals with MDD and anxiety disorders appear less likely to experience the mood benefits that non-depressed individuals experience after crying (Rottenberg, Bylsma, & Vingerhoets, 2008). As such, crying in the first few sessions of Cognitive Behavioral Therapy (CBT) for treatment of MDD might not provide catharsis for a depressed and anxious individual. At this early stage of a course of CBT, the participant has not yet fully acquired the tools or skills to regulate their negative or dysfunctional automatic thoughts, which is a necessary component to experiencing crying as a cathartic phenomenon (Robinson, Hill, & Kivlighan, 2015). Crying in therapy sessions is significantly negatively associated with participants' overall experience of the session; namely, participants who cry in session are more likely to view the session as negative (Capps, Fiori, Mullin, & Hilsenroth, 2015).

Most extant research on crying has been conducted in a non-clinical setting, and many of those studies have used the research methodology of showing positive or negative videos to participants in order to assess whether or not such stimuli elicit crying (Beck, 1961; Chentsova-Dutton et al., 2007; Choti, Martson, Holston, & Hart, 1987; Myers et al., 2002; Rottenberg et al., 2002; Tsai, Pole, Levenson, & Munoz, 2003; Vingerhoets et al, 2007). Although this method can serve as a valuable analogue, it lacks an organic element inherent in the stimuli that invoke crying in the real world. Evaluating crying behavior in a clinical setting would produce findings more applicable to treatment of MDD (Chentsova-Dutton et al., 2007; Myers et al., 2002; Rottenberg et al., 2002; Tsai et al., 2003; Vingerhoets et al, 2007).

Crying in the first few sessions of therapy for MDD has never been studied as a predictor of treatment outcome. In other words, if crying in the first few sessions were associated with not achieving remission of the current depressive episode, as the literature suggests, then crying

could serve as an easily observable clinical predictor of treatment outcome (Beck, 1961; Chentsova-Dutton et al., 2007; Hamilton, 1986; Rottenberg et al., 2002; Vingerhoets et al, 2007).

Several demographic variables associated with crying require further study, but some have been identified in the extant literature. For example, the majority of past research on crying has been conducted with non-Latino white samples, and has not taken into account cultural differences in expression of emotion (Azocar, Areán, Miranda, & Muñoz, 2001; Chentsova-Dutton et al., 2007; Choti et al., 1987; Ishikawa et al., 2014; Myers et al., 2002; Rottenberg et al., 2002; Trachsel, Gurtner, Nel, & Holtforth, 2010; Vingerhoets et al, 2007). Thus far, crying has been documented as a gendered behavior (Choti et al., 1987; Kerr & Kerr, 2001; Myers et al., 2002; Romans & Clarkson, 2008): women are more likely to cry than are men, are thought to have more vigorous crying episodes, and are also more likely to have MDD at some point in their lifetimes (Choti et al., 1987; Romans & Clarkson, 2008). In addition to culture and gender, anxiety also affects crying behavior. The extant literature supports that individuals with anxiety disorders are less likely to experience the mood benefits that non-depressed individuals experience after crying (Rottenberg, Bylsma, & Vingerhoets, 2008).

Beyond gender and anxiety, the current study aimed to investigate associations between crying and culture, specifically Hispanic / Latino and non-Latino American culture, in the context a depressive episode. MDD is a psychiatric disorder that is prevalent across cultures, produces symptoms that are known to vary from one culture to another, and is considered by some psychologists to be a disorder of emotion regulation (Chentsova-Dutton et al., 2007; Rottenberg et al., 2002). Most previous research has focused on the crying behavior of non-Latino Americans, which may not generalize to other populations because symptoms of

depression vary cross-culturally (Aponte-Rivera et al., 2014; Azocar et al., 2001; Bauer, Chen, & Alegría, 2012; Canino, Rubio-Stipec, Canino, & Escobar, 1992; Kerr & Kerr, 2001; Liebowitz et al., 1994). By the year 2060, an estimated 30 percent of the U.S. population will be Hispanic / Latino; thus, much more needs to be understood about depression symptomatology in this specific minority group (Ishikawa et al., 2014; Liebowitz et al., 1994; Tsai et al., 2003). Although little research has been conducted on this topic, extant data for minority populations and crying behavior seem supportive of the idea that Hispanics / Latinos are more likely than Non-Latino Americans to report increased rates of crying while experiencing a depressive episode. A study that compared differences in the results of the Beck Depression Inventory (BDI) administered to Spanish speakers versus English speakers found that Spanish-speakers living in the U.S. were more likely to endorse crying than were English-speakers living in the U.S. (Azocar et al., 2001). However, Hispanics / Latinos have been shown to experience more severe levels of depression than both African-Americans and Non-Hispanic Caucasians, even when controlling for education, employment, and marital status (Myers et al., 2002). Within less-educated, immigrant, and monolingual Spanish speakers, depression is often even more severe (Myers et al., 2002). As noted earlier, individuals who are experiencing more severe depressive episodes often endorse an inability to cry, but the majority of the support for that finding comes from clinical interactions with non-Latino Americans (Beck, 1961; Chentsova-Dutton et al., 2007; Hamilton, 1986; Rottenberg et al., 2002; Vingerhoets et al, 2007). As such, more research is needed to understand if this finding holds true for Hispanics / Latinos, or if Hispanics / Latinos are more indeed more likely to cry in therapy regardless of episode severity as Azocar and colleagues' (2001) study suggests (Aponte-Rivera et al., 2014).

Previous meta-analyses and individual studies have looked at clinical intervention outcomes via depression inventories that are widely used in clinical practice such as the Hamilton Rating Scale for Depression (HAM-D) and the BDI. They have shown that the baseline severity of the present depressive episode as measured through these inventories is significantly correlated with the final severity of depressive symptoms as measured by those same inventories at the end of treatment (Bower et al., 2013; Lewis, Simons, & Kim, 2012).

The present study aimed to investigate the relationship between crying in therapy sessions and achieving remission, and to evaluate the relationships between crying and the demographic variables of culture, comorbid anxiety, gender (Aponte−Rivera et al., 2014). Associations between crying in the first few sessions of CBT and success of treatment for depression were explored. It was hypothesized that crying behavior in the first few sessions of treatment would have a clinically predictive effect for treatment outcome. Crying has not been linked to distress reduction in depressed individuals, and crying in therapy has been associated with a negative experience of the therapy session (Capps et al., 2015; Rottenberg, Bylsma, & Vingerhoets, 2008). As a result, it was hypothesized that those who cry in therapy may associate negative experiences with CBT in early sessions and, therefore, be less likely to achieve remission through the treatment due to their experience of crying in therapy (Capps et al., 2015; Rottenberg, Bylsma, & Vingerhoets, 2008; Rottenberg et al., 2002; Vingerhoets et al., 2007).

Null Hypotheses

$H_0 1$: Crying in either session 2 or 3 is not significantly associated with a worse final severity of depression as measured by the HAM-D at week 12.

$H_0$2: Language does not moderate the relationship between baseline severity and crying, in a model in which crying mediates the relationship between baseline depression severity and final depression severity at week 12.

$H_0$3: Severity of anxiety at baseline as measured by the Hamilton Rating Scale for Anxiety (HAM-A) does not moderate the relationship between baseline severity and crying, in a model in which crying mediates the relationship between baseline depression severity and final depression severity at week 12.

$H_0$4: Gender does not moderate the relationship between baseline severity and crying, in a model in which crying mediates the relationship between baseline depression severity and final depression severity at week 12.

Methods

PReDICT Study

Participants in this study represent a subset of 70 of the 344 treatment-naive patients who participated in the Emory study titled Predictors of Remission in Depression to Individual and Combined Treatments (PReDICT) (Dunlop et al., 2012). In PReDICT, participants were randomized on a 1:1:1 basis to the following 12-week treatments: 16 sessions of CBT; 30–60 mg/d of duloxetine; or 10–20 mg/d of escitalopram (Dunlop et al., 2012).

Within PReDICT, before randomization, patients underwent resting state functional magnetic resonance imaging (fMRI), tests for immune markers, analysis of DNA and gene expression products, and dexamethasone-corticotropin-releasing hormone (Dex/CRH) testing (Dunlop et al., 2012). Participants also completed personality assessments shortly before or after randomization. The biological measures (fMRI, immune markers, and gene expression products)

were assessed once again at an early time-point in treatment. At completion of 12 weeks of

treatment, participants underwent another Dex/CRH test. At this time, participants who had

remitted were then eligible to enter a 21-month follow-up phase, which included quarterly visits

to monitor for recurrence. Participants who did not remit after 12 weeks of treatment were

offered participation in a second 12-week course of treatment, during which they underwent a

combined treatment regimen of antidepressant medication and CBT (for details see Dunlop et al.,

2012).

The inclusion and exclusion criteria for the present study, taken directly from the criteria

written for the PReDICT study, were as follows.

Inclusion criteria: male or female outpatients aged between 18 and 65 years old;

primary psychiatric diagnosis of DSM-IV-defined major depressive disorder; total HAM-D-17

score ≥ 18 at screening visit, and ≥ 15 at randomization visit; never previously treated for MDD or

dysthymia, which was defined as: four or more consecutive weeks of an antidepressant at

minimally effective dose, or four or more sessions of an established structured psychotherapy for

depression, i.e. CBT, BT, IPT, or behavioral marital therapy; able to independently understand

and provide written informed consent; able to communicate fluently in either English or Spanish.

Exclusion criteria: current DSM-IV defined psychotic disorder, eating disorder,

dissociative disorder, obsessive compulsive disorder, or dementia; any current primary DSM-IV

disorder other than major depressive disorder; lifetime history of DSM-IV defined bipolar

disorder or schizophrenia; current clinically important suicidal ideation requiring rapid initiation

of treatment; meeting DSM-IV criteria for alcohol or drug dependence within 12 months, or

substance abuse within 3 months of randomization visit (excluding nicotine and caffeine); urine

drug screen positive for drugs of abuse at screening visit; any lifetime prior exposure to

citalopram, escitalopram, or duloxetine; any lifetime adequate medication treatment ($\geq$4 weeks at

minimal effective dose) for major depression or dysthymia; any lifetime prior treatment with four

or more sessions of an established structured psychotherapy for depression, i.e. CBT, BT, IPT, or

behavioral marital therapy; treatment with any dose (including less than minimally effective

dose) of an antidepressant for any reason for $\geq$4 weeks for during the current episode; use of any

psychotropic medication (except hypnotics) within 1 week of the screening visit; any use of

fluoxetine within 8 weeks of the screening visit; need for concurrent neuroleptic or mood

stabilizer therapy; currently pregnant or breast-feeding women; any current acute or chronic

medical disorder that would likely affect or preclude completion of the study; clinically

important neurological, inflammatory, autoimmune, endocrine, or other medical illness that

could interfere with the conduct of the study or interfere with interpretation of study results,

including clinically important abnormal screening laboratory results; medical contraindications

which would preclude treatment with escitalopram or duloxetine; presence of any factors that

would likely prevent the patient from completing 12 weeks of the study; contraindications for

MRI, such as pacemaker, aneurysm clips, or other implants; unlikely to comply with the study

protocol, as judged by a study psychiatrist.

Participants

The sample used in this study comprised 70 participants who met inclusion criteria for

PReDICT and who received CBT as a part of the PReDICT study (Dunlop et al., 2012). See

Appendix A for a flowchart of participant selection. Specifically, the participants for this study

consisted of 58 PReDICT participants who received therapy in English and 12 PReDICT

participants who received therapy in Spanish (Aponte-Rivera et al., 2014). Appendix B presents

all pertinent participant demographic data.

Measures

      HAM-D The HAM-D was administered at baseline and at weeks 10 and 12 when it was

used to assess remission. A person who scored between 0 through 7 at both weeks 10 and 12 was

considered a "remitter" (Hamilton, 1986). A person who scored 8 and above at either week 10 or

12 was considered a "non-remitter."

      HAM-A The HAM-A was administered at baseline to assess level of anxiety. The

HAM-A defines scores between 0 to 17 as none to mild anxiety, between 18 to 24 as mild to

moderate anxiety severity, and between 25 to 30 as moderate to severe anxiety.

      BDI The BDI was also administered at baseline and week 12 of CBT. It was included as

a self-report measure to compliment HAM-D data. The BDI defines scores between 0 and 13 as

not depressed, 14 and 19 as mildly depressed, 20 to 28 as moderately depressed, and 29 to 63 as

severely depressed.

Treatment

      CBT: PReDICT employed CBT due to its demonstrated efficacy in the extant literature

for treating depression at varying levels of severity and chronicity, as well as for its manualized

and organized nature. External competency ratings of CBT assured that all participants received

the same well-structured treatment. CBT aims to treat depression by first addressing participants'

distorted automatic thoughts, and progresses to addressing participants' erroneous cognitive

processes such as selective abstraction and overgeneralization, and ultimately their underlying

distorted schema (Beck, Rush, Shaw, & Emery, 1979). In doing so, CBT assumes that these

cognitive distortions perpetuate depressive affect. After first becoming aware of their automatic

thoughts, participants then learn ways to evaluate how accurate these automatic thoughts are,

slowly changing their underlying cognitive processes to make them more adaptive (Beck et al.,

1979). Moving from awareness, to evaluation, to modification of cognitive processes is a vital

component of symptom resolution in CBT. PReDICT used a course of 12 weeks (16 one-hour

sessions) of CBT, which represents the average length of treatment via CBT in most depression

trials; CBT was provided by doctoral and masters-level practitioners who were trained in the

specific CBT protocol for the PReDICT study. During the first four weeks of CBT, participants

attended two sessions per week; during the remaining eight weeks of CBT, participants attended

one session per week. Sessions 1-4 aimed to establish a therapeutic relationship between

participant and therapist, educate the participant about CBT, set goals for therapy, and engage in

behavioral activities. Sessions 5-8 focused on teaching the patient to learn the relationship

between automatic self-statements and feeling states and how to modify those self-statements.

Sessions 8-12 aimed to identify the underlying dysfunctional cognitive processes and schema the

participant employed, and to practice skills to respond to these depressogenic processes and

schema. Sessions 13 to 16 aimed to teach the participant self-therapy techniques and ways to

identify situations that could induce relapse, preparing the participant for the termination of

treatment.

Attendance was tracked for each participant, and participants who completed at least

twelve sessions were considered to have completed treatment via CBT in the PReDICT study

(Dunlop et al., 2012). After week 12, participants who had remitted could receive up to one

booster session per month for the first three months post-CBT, and in the second year of

follow-up, could receive three more booster sessions spaced at least a month apart. Participants

could also take part in one crisis session during each of the two years of follow-up. All CBT

sessions were at least audio recorded, though not all participants consented to video recording;

some participants consented to video recording given that their faces were not visible on the

DVD. An off-site expert in CBT at Beck's Institute of Cognitive Therapy rated randomly

selected sessions to ensure that all therapists were competent in Beck's version of CBT.

Selection of DVDs

DVDs included in the study consisted of sessions two and three of CBT of participants in

the PReDICT. Some DVDs were not included because participants were out of the visual range

of the camera, the DVD was scratched or damaged, or the DVD contained only audio rather than

audio and video. Some participants were randomized and dropped out prior to having recorded a

sessions, or after the first or second session of CBT. Some participants did not attend either

session two or three. Overall, DVDs were coded for 70 of the 115 participants randomized to

CBT in the PReDICT study. Due to DVDs not being included for the reasons listed above and

participant attrition, not all participants had both sessions two and three rated; some participants

only had one of the two sessions available. Overall, 97 individual CBT sessions were rated for

the possible 180 in English and 15 individual CBT sessions were rated of the possible 21 in

Spanish.

Rating of DVDs

Two undergraduate students from Emory University were trained and independently

coded DVDs of CBT sessions for crying behavior. In order to practice rating DVDs and to

become reliable raters, the students utilized session four of CBT that were highly similar in

content to sessions two and three that were rated in the study. Raters first practiced together, and then separately, to ensure that they similarly coded the content of the same sessions. Once inter-rater reliability ($\kappa = 0.482$, 95% CI, 0.363 to 0.601, $p = 0.000$) was established for crying behavior, raters individually coded the DVDs of sessions two and three to they had been randomly assigned.

For each rater, coding a session entailed watching the content of the DVD and completing two forms detailing crying behavior while watching the DVD. The first crying behavior form included the patient's and therapist's initials, the session number (two or three), whether or not a patient cried in the session, the total duration in seconds of crying, and the number of different crying episodes in the session. If the patient cried, the raters also completed a subsection of the first form for each crying episode; this rating contained the duration of that episode in seconds and the theme of the crying episode, coded as loss, failure, overwhelmed, anger, mixture, or other. If the patient cried, the raters also completed a second form to indicated the presence of specific crying behaviors, including visible tears, saying one is crying, wiping the face / using a tissue on the face, sniffling / blowing nose, hiding the face in hands, forcing eyes shut, tilting head up to hold back tears, and deep inhalation.

Selection of CBT Sessions for Analysis

If participants had recorded DVDs of both therapy sessions two and three, and crying was present in both sessions, then one of the two sessions was randomly selected for analysis. If participants had DVDs of both therapy sessions two and three, and crying was present in only one of the two sessions, then the session in which crying was present was chosen for analysis. If participants had DVDs of both therapy sessions two and three, and crying was present in neither

of the sessions, then one of the two sessions was randomly selected for analysis. If participants

had recorded DVDs of only either session two or session three, then whichever session was

recorded was the session that was selected for analysis. DVD selection was conducted in this

fashion so that each participant only had one session analyzed. For 35.% of participants, crying

was present in either one of the two sessions or both sessions two and three; these participants

were classified as "criers" for analyses.

Statistical Analysis

In the present study, videos of Cognitive Behavioral Therapy (CBT) sessions two and

three from PReDICT were independently scored by two trained raters for presence of crying and

crying duration. A correlational, between-subjects, longitudinal design attempted to determine

whether participants who cried in sessions two or three of CBT were less likely to remit by week

twelve of treatment than those who did not cry. Language (Spanish or English), HAM-A severity

at baseline, and gender were examined as moderators. Presence of crying (cried or did not cry in

either sessions two or three or both) was examined as a mediator. Remission at week twelve of

CBT (remitted or did not remit) was examined as the dependent variable. The present study

investigated the moderating role of culture, gender, and presence of an anxiety disorder on

treatment success while evaluating the mediating effects of crying on treatment outcome.

Data Analytics Plan

Models 1, 2, and 3, represented in Appendices C, D, and E, respectively, were developed

and tested individually. Statistical significance was defined for each model at $p < 0.05$. Culture /

ethnicity, HAM-A severity at baseline, and gender were each hypothesized to serve separately as

moderators on the relationship between baseline severity of depression and crying, and crying

was hypothesized to mediate the relationship between baseline severity of depression and final

severity of depression. These moderated mediation models were each tested separately using

PROCESS, a macro for IBM SPSS (Hayes 2013). Models were assessed for goodness of fit by

assessing the r^2 values, F statistics, and p-values that their tests produced.

Results

Drop-outs

The following models were only tested with the data of the 54 (77.1 %) participants who

completed the course of CBT; 16 (22.9 %) participants dropped out before finishing the course of

treatment and drop-outs were not included in the tests of $H_0 1$, $H_0 2$, $H_0 3$, and $H_0 4$. Repeated linear

regression was conducting using bootstrapping in PROCESS to conduct the following analyses.

Participant Characteristics

See Appendix B for overall descriptive characteristics of all criers and non-criers

(including both dropouts and completers) such as participant race, marital status, gender, and

HAM-D scores at baseline and the last visit they attended. Overall, on average the number of

crying events present in a session were (M = .59, SD = .99), and the number of seconds

participants cried for were (M = 124.47, SD = 282.89). For non-dropouts who completed the full

course of treatment, HAM-D at week 12 was (M = 12.62, SD = 7.80) for criers and HAM-D at

week 12 was (M = 6.76, SD = 5.93) for non-criers. Appendix B includes HAM-D means for all

criers and non-criers (including both dropouts and completers) at their final visit, which was

either week 12 or the final session the participant attended before dropping out.

As shown in Appendix B, in regards to current depressive episode duration, HAM-D at

baseline, BDI at baseline, HAM-A at baseline, QIDS-SR at baseline, race, ethnicity, dropout,

language of treatment, marital status, number of previous suicide attempts, employment status, and number of previous depressive episodes, criers did not significantly differ from non-criers. As noted in the table in Appendix B, the only two variables in which criers and non-criers differed significantly were presence of a current anxiety disorder ($X^2 = 4.593$, $p = 0.032$), and gender ($X^2 = 9.333$, $p = 0.002$).

Test of $H_0 1$

When tested, null hypothesis $H_0 1$ was rejected ($t = 2.357$, $p = 0.029$). Crying in either session 2 or 3, or both, was significantly associated with a higher final score on the HAM-D at the culmination of treatment. For criers who completed the full course of CBT, ($M = 14.28$, $SD = 8.178$) of HAM-D scores at week 12, for non-criers who completed the full course of CBT, ($M = 9.82$, $SD = 7.539$) of HAM-D scores at week 12.

Test of Model 1

When tested, model 1 (shown in Appendix C) failed to reject null hypothesis $H_0 2$ ($r^2 = 0.064$, $F = 1.1348$, $p = 0.34$).

Test of Model 2

When tested, model 2 (shown in Appendix D) failed to reject null hypothesis $H_0 3$ ($r^2 = 0.041$, $F = 0.704$, $p = 0.55$).

Test of Model 3

When tested, model 3 (shown in Appendix E) failed to reject null hypothesis $H_0 4$ ($r^2 = 0.0922$, $F = 1.69$, $p = 0.18$).

Although tests of all three models failed to reject their respective null hypotheses, when moderators were removed from the analysis, crying mediated the relationship between

depression severity at baseline and depression severity at week twelve; this model's ability to predict outcome was significant ($r^2 = 0.133$, $F = 3.898$, $p = 0.0266$).

Discussion

This analysis found that crying early in the course of CBT treatment for major depression predicted poorer outcomes after acute treatment. The finding that crying is a predictor of outcome to CBT treatment has not previously been evaluated; this novel finding suggests that independent of gender, culture, and level of anxiety, crying in sessions 2 or 3 CBT predicts treatment outcome. Investigators have studied which stimuli induce crying by showing positive and negative video stimuli to participants in an attempt to evoke tearful reactions. The methodology behind these studies, however, produces crying in a contrived way, and there is a lack of investigations of how crying relates to other variables in a clinical setting. The results of the present study demonstrated that crying can independently serve as an easily observable clinical predictor of treatment outcome in CBT (Beck, 1961; Chentsova-Dutton et al., 2007; Hamilton, 1986; Rottenberg et al., 2002; Vingerhoets et al, 2007).

After testing potential moderators of gender, language, and anxiety, none significantly mediated the association between crying and outcome. Model 1 tested the moderating effect of language on crying with crying mediating the relationship between initial and final depression severity. Model 2 tested the moderating effect of HAM-A scores on crying with crying mediating the relationship between initial and final depression severity. Model 3 tested the moderating effect of gender on crying with crying mediating the relationship between initial and final depression severity. Models 1, 2, and 3 all failed to reject their respective null hypotheses. However, the results of testing $H_0 1$ and the demographic portrait captured in Appendix B of

criers and non-criers have contributed to a greater understanding of the relationship between crying in therapy for treatment of depression and outcome than was previously available in the literature; this finding has important implications for the successful implementation of CBT treatment for depression.

Testing and rejecting H_01 demonstrated a significant association between crying in sessions 2 or 3 and treatment outcome as measured by the HAM-D, in that those who cry in therapy are more likely to have higher final HAM-D scores. This finding, if replicated, suggests that crying in the first few sessions of therapy is a valuable clinical predictor of treatment outcome in CBT for depression. Although CBT is highly effective for some depressed patients, it is clear that CBT will not relieve depression in all patients (Lewis, Simons, & Kim, 2012). As a result, discovering clinically relevant predictors like crying contributes to the extant literature by providing clinicians with an early distinguishing characteristic that may help gauge which individuals are likely to respond best to the treatment. For this reason, this association between poorer treatment outcomes and crying has the potential, if replicated, to save depressed individuals' time, money, and suffering.

Since participants who cry early in therapy are prone to worse outcomes within CBT treatment, it could be that aspects of treatment are not conducive to successfully processing and addressing crying as it occurs in the session. Alternatively, it could be that crying in therapy indicates some greater sense of distress that is not captured by current depression inventories. Therapists who respond to a crying episode unsuccessfully in the first few sessions could interfere with and negatively influence the therapist-participant alliance, which could lead to a worse treatment outcome (Beck et al., 1979; Flückiger et al., 2012). As with any therapeutic

intervention, the current data illustrate the importance of the therapist addressing the specific emotion expressed in the therapy situation. In addition to the way in which the therapist handles the participant crying in session, it could be that the presence of crying early in therapy affects treatment outcome. Participants who cry in the first few sessions of therapy are crying in front of a relative stranger, who they have only met once or at most twice before the session in which they cry. Transgressing societal norms of emotional expression in this way could be indicative of these participants experiencing a greater sense of distress than participants who do not cry in the first few sessions of therapy (Hendriks, Rottenberg, & Vingerhoets, 2007). Although investigating the relationship between crying in therapy and therapist-participant alliance and examining crying as a signal of greater distress were beyond the scope of the present study, future studies should aim to explore these relationships.

Furthermore, the demographic description of criers and non-criers provided in Appendix B lends deeper insight into who cries and who does not cry. Individuals with a comorbid anxiety diagnosis are more likely to cry, and women are more likely to cry than are men. Despite these demographic characteristics, crying did not differentially predict outcome when the level of anxiety was used to predict of outcome. Furthermore, there were not gender did not predict treatment outcome. Crying could be seen as a greater transgression against societal norms for men than for women, when it is considered more "normal" for women to cry as versus men. However, this expected gender difference did not materialize, so it appears that societal norms of gendered behavior may be less relevant when depressed patients are expressing distress (Choti et al., 1987; Kerr & Kerr, 2001; Myers et al., 2002; Romans & Clarkson, 2008).

Similarly, although crying in therapy could represent a greater deviation from cultural norms for non-Hispanic / Latino Americans than it does for Hispanics / Latino Americans, the present findings suggest that cultural norms become less relevant when patients are depressed; this is potentially due to reduced emotion regulatory mechanisms. Without emotion regulation systems working well, the ability of a person to adhere to cultural norms is weakened, and the expected cultural differences were not exhibited in crying (Azocar et al., 2001; Hendriks, Rottenberg, & Vingerhoets, 2007).

Although it produced the aforementioned novel findings, there exist limitations of the present study. First, the sample size is only moderate, and it was particularly small for the Spanish-speaking sample. Nevertheless, the current study represents one of the largest analyses of videotaped CBT for depression conducted to date. Though a larger sample size and resultant greater power would have lent the ability to make comparisons between different English-speaking racial groups in the U.S., this was not the specific goal of the present study.

Despite the aforementioned limitations, the present study offers new findings regarding who cries in therapy for depression and who does not, and of how crying may relate to other demographic variables, such as gender, language, and comorbid anxiety. Future studies could build on the present study in order to build a broader empirical body of literature on crying, and to better inform clinicians and patients about the best treatment decisions possible to suit their individual needs.

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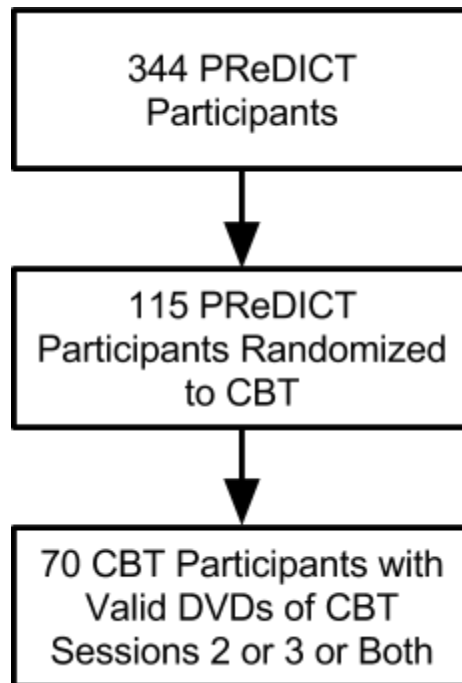
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Appendix A

Flowchart describing recruitment of study participants.

```
┌─────────────────────┐
│    344 PReDICT      │
│    Participants     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│    115 PReDICT      │
│ Participants        │
│ Randomized to CBT   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│ 70 CBT Participants │
│  with Valid DVDs    │
│   of CBT Sessions   │
│   2 or 3 or Both    │
└─────────────────────┘
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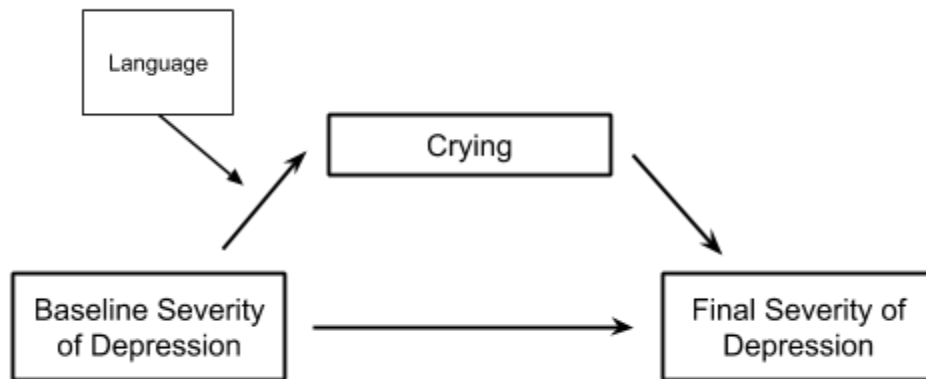
Appendix B

Participant demographic data, as separated by criers and non-criers.

Characteristic	Criers (N = 25)		Non-Criers (N = 45)			
	Mean	*SD*	*Mean*	*SD*	*t*	*p*
Age (years)	38.92	10.69	42.87	11.74	-1.391	0.169
Current Episode Duration (weeks)	108.00	130.42	153.44	287.57	-0.717	0.476
HAM-D at Baseline	20.08	3.70	18.89	3.28	1.392	0.168
HAM-D at Last Visit	14.28	8.178	9.82	7.539	2.357	0.021
BDI at Baseline	22.08	7.31	21.09	6.90	0.552	0.583
HAM-A at Baseline	16.83	5.47	15.33	4.42	1.235	0.221
QIDS-SR at Baseline	14.17	4.74	13.29	3.76	0.842	0.403
	N	*%*	*N*	*%*	*X^2*	*p*

Sex
    Male
    Female
	4
	21
		16%
		84%
			24
			21
				53.3%
				46.7%
					9.333	0.002

Race
    Caucasian
    Black
    Other
	14
	4
	7
		56%
		16%
		28%
			30
			3
			12
				66.7%
				6.7%
				26.6%
					3.293	0.655

Ethnicity
    Hispanic
    Non-Hispanic
	4
	21
		16%
		84%
			9
			36
				20%
				80%
					0.170	0.680

Dropout
    Dropped out before treatment completed
    Did not drop out
	4
	
	21
		16%
		
		84%
			12
			
			33
				26.7%
				
				73.3%
					1.04	0.31

Language of CBT
    Spanish
    English
	3
	22
		12%
		88%
			9
			36
				20%
				80%
					0.724	0.395

|					
Marital Status					
Divorced / Separated / Widowed	5	20%	7	15.6%	
Married / Living with Partner	10	40%	24	53.3%	4.85	0.434
Never Married	9	36%	14	31.1%		
No Data	1	4%				
Number of Previous Suicide Attempts					
None	22	88%	42	93.3%	0.402	0.526
1 or more	2	8%	2	4.5%		
No Data	1	4%	1	2.2%		
Employment Status					
Full Time	13	52%	23	51.1%		
Full Time Homemaker	2	8%	3	6.7%		
Part Time	2	8%	9	20%	2.287	0.891
Full Time Student	1	4%	2	4.4%		
Unemployed	4	16%	6	13.3%		
Other	1	4%	2	4.5%		
No Data	2	8%				
Current Anxiety Disorder					
Yes	15	60%	16	35.6%	4.593	0.032
No	9	36%	29	64.4%		
No Data	1	4%				
Number of Previous Depressive Episodes					
1	11	44%	22	48.9%	0.108	0.947
2	5	20%	8	17.8%		
3 or more	7	28%	13	28.9%		
No Data			2	4.4%		

Appendix C

Conceptual Model 1 of moderated mediation taking place with language moderating the

relationship between baseline severity and crying, and crying mediating the relationship between

baseline severity of depression and final severity of depression.

Appendix D

Conceptual Model 2 of moderated mediation taking place with HAM-A severity at baseline
moderating the relationship between baseline severity of depression and crying, and crying
mediating the relationship between baseline severity of depression and final severity of
depression.
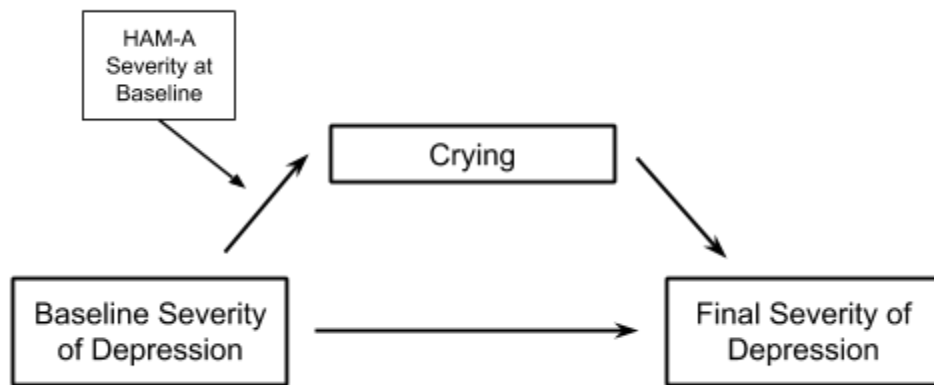
Appendix E

Conceptual Model 3 of moderated mediation taking place with gender moderating the

relationship between baseline severity and crying, and crying mediating the relationship between

baseline severity of depression and final severity of depression.