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Engagement and premature dropout among Latinx and non-Latinx White patients in a cognitive-behavioral intervention for anxiety

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Engagement and premature dropout among Latinx and non-Latinx White patients in a cognitive-behavioral intervention for anxiety

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in Psychology

by

Emily Lynn Escovar

2019

ABSTRACT OF THE DISSERTATION

Engagement and premature dropout among Latinx and non-Latinx White patients in a cognitive-behavioral intervention for anxiety

by

Emily Lynn Escovar
Doctor of Philosophy in Psychology
University of California, Los Angeles, 2019
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Previous research suggests that there are disparities in mental health service use, and specifically treatment engagement, between Latinx and their non-Latinx counterparts. These disparities in engagement include not only service use (typically defined as past-six month, or past-year service use), but continued participation in psychotherapy following the initial uptake of services, including premature dropout. Although a number of factors have been shown to influence Latinx service use, there is a dearth of research on reasons for ethnic disparities in premature dropout. This dissertation examines reasons for differential premature dropout in a sample of 96 Latinx and 257 non-Latinx White patients receiving cognitive-behavioral therapy for anxiety disorders in primary care. Study 1 utilized Andersen's Behavioral Model of Health Service Use as a theoretical framework to examine whether individual level pretreatment factors mediate the relationship between ethnicity and premature dropout. Most individual level factors did not explain ethnic disparities in premature dropout, with the exception of low levels of social

support and high levels of somatization. Studies 2 and 3 aimed to examine the predictive power of time-varying treatment-specific factors. Study 2 examined the extent to which patient understanding of CBT principles early in treatment explains the relationship between ethnicity and therapeutic engagement. Early CBT understanding mediated the relationship between ethnicity and premature dropout. Early CBT understanding was also associated with other engagement outcomes, including homework adherence, and patient commitment to therapy in the whole sample. Study 3 examined whether anxiety severity and rate of anxiety symptom change over the course of treatment differentially influenced time to dropout between Latinx and non-Latinx White patients. Change in symptoms throughout treatment and their interaction with baseline symptom severity did not explain ethnic differences in time to dropout. Overall, individual characteristics and symptom levels at pretreatment and over the course of treatment did not explain ethnic disparities in premature dropout, with the potential exception of social support and somatization. However, early patient understanding of CBT principles may be an important and understudied factor in predicting premature dropout. Results from this dissertation highlight a need for the measurement and examination of broader cultural and environmental factors in understanding Latinx engagement in psychosocial interventions.

The dissertation of Emily Lynn Escovar is approved.

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2019

DEDICATION

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GENERAL INTRODUCTION

Lack of engagement in mental health treatment represents a substantial barrier to the effectiveness of interventions (Barrett et al., 2008; Swift & Greenberg, 2012). Latinx patients tend to have less favorable engagement outcomes, including fewer sessions attended, and higher rates of premature dropout (Chavira et al., 2014; Interian, Lewis-Fernandez, & Dixon, 2013; La Roche, 2002), which can have negative effects on clinical outcomes in adults with anxiety disorders (Glenn et al., 2013). High dropout rates suggest that mental health services often do not meet the initial needs of many Latinx patients, particularly low-income Latinx, who express a wish to receive services (Walitzer, Dermen, & Connors, 1999). Despite this, there is a dearth of literature examining reasons for lower engagement and premature dropout among Latinx patients with mental health problems. This is likely due to the fact that most randomized controlled trials for adults have only small samples of Latinx (Miranda et al., 2005), despite the large population of Latinx in the United States (United States Census Bureau, 2010). Even when ethnic minorities are included in samples, information regarding possible ethnic differences in response to treatment or engagement variables are rarely provided (Horrell, 2008). Thus, there is limited research on reasons for engagement and dropout from psychotherapy in Latinx populations.

What is Engagement?

Engagement is typically defined as the extent to which a patient participates in treatment, beginning with the decision to seek care (i.e., initial treatment uptake), followed by a series of decisions to remain in therapy (i.e., therapeutic engagement; Holdsworth, Bowen, Brown, & Howat, 2014; Interian et al., 2013). Many studies discuss engagement in the context of initial treatment uptake and service utilization (e.g., Alegría et al., 2007; Cabassa, Zayas, & Hansen, 2006; Ishikawa et al., 2014). Studies on initial treatment uptake examine whether or not

individuals begin treatment with a mental health provider following a treatment referral, typically by a primary care provider (Ishikawa et al., 2014). Service utilization, more broadly, is often defined as past-six month, or past-year service use (Alegría et al., 2007; Cabassa et al., 2006) and is operationalized as a self-reported retrospective measure whether a person had a visit to a mental health or allied provider (Cabassa et al., 2006) or as a continuous variable measuring frequency of services over a period of time (e.g., Alegría et al., 1991; K. B. Wells, Hough, Golding, Burnam, & Karno, 1987; Young, Klap, Sherbourne, & Wells, 2001). Alternatively, *therapeutic engagement* is defined as the extent to which a patient participates in treatment and is differentiated from the more general *engagement* term, which often encompasses not only participation over the course of therapy, but service utilization and uptake of services. Engagement over the course of therapy (i.e., therapeutic engagement) has been operationalized as premature dropout, attendance, homework adherence and patient involvement or commitment to the therapeutic process and goals (for a review see Holdsworth et al., 2014).

Ethnic Disparities in Engagement

The U.S. Surgeon General's report on culture, race, and ethnicity in mental health (2001) described the mental health care system as less effective in engaging racial-ethnic minorities, including Latinx, in mental health services. For instance, racial-ethnic minorities are less likely to seek and to receive appropriate mental health services compared to non-Latinx Whites (Alegría et al., 2002; Wang et al., 2005), especially if they are less acculturated, recent immigrants, or monolingual Spanish-speakers (Alegría et al., 2007; Cabassa et al., 2006). Fewer than 1 in 11 Latinx individuals contact mental health care specialists and Latinx individuals tend to first seek services from primary care providers (Cabassa et al., 2006; United States Department of Health and Human Services, 2001; Vega, Kolody, & Aguilar-Gaxiola, 2001).

Such disparities persist even when patient characteristics, sociodemographic factors, or insurance availability are controlled (Vega et al., 2007). Even after Latinx enter treatment, they attend fewer treatment sessions (Chavira et al., 2014), and are less likely to adhere to psychotropic medication regimens (Diaz, Woods, & Rosenheck, 2005; Olfson, Marcus, Tedeschi, & Wan, 2006). Dropout after the first counseling session is common among Latinx patients, particularly those who are low-income (La Roche, 2002; Walitzer et al., 1999). Although racial-ethnic disparities in rate of treatment uptake and past-year service use are well-documented, reasons for disparities in engagement throughout the therapeutic process, and for dropout specifically, have not been extensively studied.

Operationalization of Premature Dropout

Dropout is a complex construct that has been operationalized in a number of different ways with varying terms to describe it, including *early withdrawal*, *premature termination*, *attrition*, and *dropout*. Needless to say, varying definitions of dropout considerably affect the calculation of dropout rates (Swift & Greenberg, 2012; Warnick, Gonzalez, Weersing, Scahill, & Woolston, 2012). Broadly, premature dropout can be defined as occurring when a patient stops the intervention without completing the recommended course of treatment or without gaining the full benefits that would have been available if the patient had continued to attend (Swift & Greenberg, 2012).

Within this definition, there are a number of ways to operationalize dropout (Hatchett & Park, 2003; Swift, Callahan, & Levine, 2009). Previous studies have used attendance at less than a specified number of sessions before terminating treatment, termination before lack of clinically significant change, and failure to complete the treatment protocol as indicators of premature dropout (Swift & Greenberg, 2012). Each of these methods for operationalizing dropout has its

benefits and shortcomings. For instance, attendance at a minimum number of sessions before terminating treatment has support from the dose-effect literature (Lambert, 2007) and is based on the idea that, given a particular treatment orientation and diagnosis, a minimum number of sessions is required for a patient to show improvement in therapy. This method does not involve measurement of symptom outcome or change and assumes lack of symptom improvement is associated with fewer sessions. Termination without symptom reduction can also be considered a form of premature dropout. This definition is intended to emphasize the importance of experiencing improvement before ending treatment; however, this method does not encapsulate all types of dropout since many interventions may end after a specified number of sessions (e.g., due to constraints imposed by insurance policies) or at the end of pre-specified treatment protocols. Thus, treatment may end without symptom improvement, but this is not necessarily synonymous with a patient's lack of engagement or intention to prematurely dropout. This view conflates symptom change with engagement and assumes the patient will not benefit from learned knowledge in the future, despite lack of symptom change in the present (Drieschner, Lammers, & van der Staak, 2004; Holdsworth et al., 2014). Nearly half of the studies in Swift and Greenberg's (2012) meta-analysis of 669 interventions used failure to complete the treatment protocol as the primary definition of premature dropout. This method has the benefit of adhering to a comprehensive definition of dropout: termination of treatment without completing the recommended course or without gaining the full benefits that would have been available (Swift & Greenberg, 2012).

Prevalence of Premature Dropout

In the meta-analysis by Swift and Greenberg (2012) which included mostly non-Latinx White samples, rates of dropout were estimated to be 19.7% for adult patients who started a

psychological or psychosocial intervention for a mental health concern (Swift & Greenberg, 2012). Similarly, data from the National Comorbidity Survey Replication estimated premature dropout from treatment to be 22.4% (Olfson et al., 2009). Other studies, including an earlier meta-analysis (Wierzbicki & Pekarik, 1993), have found attrition rates as high as 50% (Klein, Stone, Hicks, & Pritchard, 2003; Organista, Munoz, & Gonzalez, 1994; Piselli, Halgin, & Macewan, 2011). It is important to note that in Swift and Greenberg's meta-analysis, studies were found to be highly heterogeneous in their dropout estimates (ranging from 0% to 74.23%). Thus, their weighted mean dropout rate of 19.7% may not be an appropriate estimate for all samples and study contexts. Instead, rates of premature dropout clearly differ depending on important moderators, including provider experience, study type (i.e., efficacy or effectiveness trial), setting, and dropout definition (Swift & Greenberg, 2012). Most studies in the Swift and Greenberg meta-analysis examined cognitive-behavioral therapy (n = 439), and dropout rate did not differ by treatment orientation (Swift & Greenberg, 2012). While, some studies have reported minority status as a significant predictor of dropout (Organista et al., 1994; Wierzbicki & Pekarik, 1993), the meta analysis by Swift and Greenberg (2012) did not find racial-ethnic minority status predicted dropout. However, minority status was operationalized by percent of patients in the study who were not non-Latinx White, and most of the studies in the meta-analyses did not have sufficient samples of minority patients.

Prevalence of premature dropout among Latinx patients. Specific data on the prevalence rates of premature dropout in Latinx individuals are extremely limited. This is likely due to the fact that most trials do not include large enough samples of Latinx individuals to conduct separate ethnic analyses (Miranda et al., 2005). For instance, a review of RCT's for obsessive-compulsive disorder revealed that only 1% of participants (total n = 2221) from 21

studies were Latinx participants (Williams, Powers, Yun, & Foa, 2010). A separate review of the literature yielded only a handful of anxiety or depression RCTs with data representing Latinx (*Table 1*). Only two of these RCTs presented separate ethnic analyses for premature dropout. Based on these studies, dropout rates in RCTs with overrepresented proportions of minorities and Latinx ranged from approximately 30 – 60%; however, sample sizes of CBT conditions were small (ranging from 8 to 43 Latinx), limiting the conclusions that can be drawn about dropout rates among Latinx.

In a non-randomized clinical trial with a large sample of minority patients suffering from depression (44% Latinx), the dropout rate from CBT was 56.73% (Organista et al., 1994). In a community-based outpatient mental health clinic in Los Angeles, the dropout rate for Mexican Americans following the first session was 32%. Interestingly, outpatient clinics which had ethnicity-specific programming and served predominantly (greater than 50%) minority clients had higher retention rates for Mexican Americans (3% dropout after the first session) and other minority groups, than clinics that provided more mainstream programming (Takeuchi, Sue, & Yeh, 1995).

Operationalization of Other Engagement Related Outcomes

Commitment to therapy. Patient commitment to therapy is also considered a component of engagement and, although it is not a frequently assessed construct, it has been measured through observational coding (Moyers, Miller, & Hendrickson, 2005), and self- or therapist-report (Glenn et al., 2013). These methods include a patient's reported desire to change or language indicating commitment in session (e.g., Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2008; Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Lombardi, Button, & Westra, 2014). Commitment to therapy and the related construct of commitment to change has been

associated with superior outcomes in studies on addiction (Aharonovich et al., 2008; Amrhein et al., 2003) and anxiety (Glenn et al., 2013; Lombardi et al., 2014). A shortcoming of therapist-report or behavioral observation of commitment to therapy is that they often only capture a patient's effort within session and not all the efforts made toward symptom change outside of the session (Holdsworth et al., 2014).

Commitment to therapy in Latinx. In the study by Chavira and colleagues (2014), similar rates of commitment to therapy were reported between Latinx and non-Latinx White patients. Unfortunately, other studies that have assessed motivation or commitment to therapy have not included adequate proportions of Latinx (e.g., Lombardi et al., 2014). Studies examining therapy motivation (Zuniga, 1992), a construct similar to therapy commitment, have proposed that cultural adaptations are necessary to improve therapy motivation. For instance, an intervention developed for Latinx incorporating *dichos* or culturally-congruent idioms was found to reduce resistance to therapy and increase motivation (Zuniga, 1992). In addition, particular cultural values, such as *personalismo* (a preference for relationships with individuals rather than institutions), *confianza* (trust and intimacy in a relationship), and *aguantarse* (a preference for withstanding stressful situations) are theorized to impact motivation to engage in therapy (L. A. Anez, Silva, Paris, & Bedregal, 2008; L. M. Anez, Paris, Bedregal, Davidson, & Grilo, 2005). Further research on factors that impact Latinx commitment to therapy is needed.

Homework adherence. In order to capture out-of-session patient engagement, studies have examined homework adherence (e.g., Baydar, Reid, & Webster-Stratton, 2003; Lebeau, Davies, Culver, & Craske, 2013). Homework is a central component of CBT and may be an important factor to examine because it is common in psychotherapeutic settings (Dattilio, Kazantzis, Shinkfield, & Carr, 2011; Kazantzis, Deane, & Ronan, 2004) and is associated with

treatment outcomes for anxiety disorders (Anand, Sudhir, Math, Thennarasu, & Reddy, 2011; Mausbach, Moore, Roesch, Cardenas, & Patterson, 2010; Westra, Arkowitz, & Dozois, 2009) and depressive disorders (e.g., Cowan et al., 2008; Mausbach et al., 2010). A drawback of this method is that it can be difficult to quantify the time and effort spent on out-of-session assignments (Westra & Dozois, 2006).

Homework adherence in Latinx. Studies have reported difficulty with homework adherence among Latinx clients (Aguilera, Garza, & Munoz, 2010; Chavira, Bustos, Garcia, Ng, & Camacho, 2017; Jungbluth & Shirk, 2013). For instance, in a qualitative study, nearly a third of providers working with a Latinx population expressed concern that CBT relies too heavily on homework and Latinx patients have difficulty completing homework assignments (Chavira et al., 2017). A study with Latinx participating in a CBT trial for depression found that Latinx minority status predicted poor homework adherence following the first session; however, it did not predict homework adherence in the following sessions (Jungbluth & Shirk, 2013). On the other hand, the study by Chavira and colleagues (2014) found similar rates of CBT homework adherence between Latinx and non-Latinx Whites, and that, on average, patients tended to miss few homework assignments. Although there is some evidence of poor homework adherence among Latinx, findings are inconsistent and predictors of homework adherence have not been assessed.

Why Study Engagement? Consequences of Lack of Engagement

High rates of dropout are troubling in light of research that suggests it takes approximately 11 to 13 sessions of evidence-based interventions for 50% to 60% of patients to be considered recovered (Hansen, Lambert, & Forman, 2002). Those who prematurely dropout experience fewer treatment gains, fewer positive mental health outcomes, and less satisfaction with treatment (Bjork, Bjorck, Clinton, Sohlberg, & Norring, 2009; Glenn et al., 2013; Klein et

al., 2003; Lampropoulos, 2010). Furthermore, patients who prematurely dropout may require additional mental health services in the future (Barrett et al., 2008). Premature dropout and the associated lack of engagement have a negative influence on providers and associated clinics, including inefficient use of time, lost revenue, and inefficient use of resources, including longer waiting lists (Barrett et al., 2008; Reis & Brown, 1999; Swift & Greenberg, 2012). Within clinics, dropout has been associated with high staff turnover, suggesting patient dropout can be demoralizing for therapists (Klein et al., 2003).

In addition, studies have found a positive relationship between the number of sessions attended and favorable outcomes for individuals with varying types of mental health disorders (Bowen, South, Fischer, & Looman, 1994; Craske et al., 2006; Glenn et al., 2013). Quality of homework adherence has also been significantly associated with better treatment outcomes for individuals with anxiety disorders (Anand et al., 2011; Glenn et al., 2013; Lebeau et al., 2013; Westra et al., 2009) and depression (e.g., Cowan et al., 2008). Fewer studies have directly examined ratings of patient commitment to therapy; however, preliminary research suggests patient commitment (coded by independent raters) predicted positive outcomes for drug abuse and eating disorders (Aharonovich et al., 2008; Amrhein et al., 2003). Importantly, Glenn and colleagues (2013) found that homework adherence and ratings of patient commitment predicted positive outcomes at follow up time points for a CBT trial for anxiety, suggesting engagement variables are important not only for the treatment process but for the maintenance of treatment gains.

Rationale for the Proposed Research

Latinx individuals with mental health problems are at higher risk for treatment dropout and low service utilization compared to their non-Latinx White counterparts (e.g., Chavira et al.,

2014; O'Brien, Fahmy, & Singh, 2009). Previous studies on Latinx engagement primarily focus on predictors of service utilization (i.e., uptake of services and past service utilization), but no study to date has examined variables that may explain differential dropout or therapeutic engagement among Latinx and non-Latinx patients with anxiety disorders. Furthermore, much of the research on dropout has focused on baseline differences between completers and non-completers. Although this approach provides valuable information, this research implicitly assumes that dropout is a function of characteristics present at the start of therapy, rather than a result of a patient's decision-making process over the course of an intervention. At present, there is a dearth of research examining dropout from the perspective of patient characteristics or decision-making occurring over the course of therapy and there is no research that has examined this perspective with a Latinx population.

The dissertation. Each of the three major aims of the dissertation examined therapeutic engagement at a more granular level in order to understand why potential disparities may exist for Latinx. These aims were: 1) to examine whether pretreatment individual level variables explain the relationship between ethnicity and premature dropout, 2) to determine if CBT understanding predicts therapeutic engagement outcomes and explains ethnic disparities in premature dropout, and 3) to examine whether symptom severity and rate of symptom change over the course of treatment differentially influence time to dropout between Latinx and non-Latinx White patients. Therapeutic engagement outcomes other than premature dropout were considered, including commitment to therapy and homework adherence; however, the lack of ethnic differences in these domains precluded analyses examining ethnic disparities.

These aims correspond to three separate studies. Study 1 examined potential reasons for ethnic disparities in premature dropout using pretreatment variables. The Behavioral Model of

Health Service Use (Andersen, 1968, 1995) served as a framework to guide the selection of variables (predisposing, enabling and need factors) included in this study. Study 2 examined whether CBT understanding early in treatment explains ethnic disparities and predicts therapeutic engagement among Latinx and non-Latinx White patients. Preliminary findings suggest that Latinx in the CALM study score lower on a therapist-rated measure of CBT understanding, suggesting some difficulty learning therapy material (Chavira et al., 2014); however, there is no research to date on the influence of CBT understanding on premature dropout or therapeutic engagement outcomes. Last, study 3 examined the role of anxiety symptom severity and rate of symptom change in predicting time to dropout in Latinx and non-Latinx White patients. Rate of symptom change among Latinx patients is unexplored and may partially explain differences in time to dropout between Latinx and non-Latinx White patients.

Context of the current studies. Data to examine these research questions came from the Coordinated Anxiety and Learning Management (CALM) study, a randomized controlled trial to treat anxiety disorders in adults (Craske, Roy-Byrne, et al., 2009; Roy-Byrne et al., 2010), which is the largest randomized trial of collaborative care for anxiety disorders conducted to date (Sullivan et al., 2007). Published data from the CALM study suggest similar outcomes between Latinx and non-Latinx White patients on symptom measures of clinical improvement, but there were significant differences on engagement outcomes, including differences in premature dropout after controlling for patient characteristics, including income and insurance (Chavira et al., 2014). Baseline characteristics of Latinx and non-Latinx White patients in this sample are presented in Table 2, and dropout rates by ethnicity are presented in Table 3.

GENERAL METHOD

Participants

Primary care patients (n = 1004; 714 females) with panic disorder (PD), generalized anxiety disorder (GAD), social anxiety disorder (SAD), or post-traumatic stress disorder (PTSD) were recruited between 2006 and 2008 from 17 primary care clinics at 4 sites across the United States.

Racial-ethnic distinctions. The sample consisted of predominantly non-Latinx White patients (n = 568); however, it also included a large proportion of racial-ethnic minorities, including Latinx (n = 196), and non-Latinx African American/Blacks (n = 101), Native Americans/Alaskan Natives (n = 28), Asians/East Indians (n = 26), Hawaiians/Pacific Islanders (n = 8), and others/a mix of racial minority categories (n = 77).

A majority of Latinx in the sample racially identified as White/Caucasian (n = 106). The remainder identified as Black (n = 1), other (n = 62), or a mix of the above racial categories (n = 16). Some Latinx did not select a racial category (n = 11). Given previous findings suggesting differences in engagement across Latinx and non-Latinx White individuals, as well as the smaller sample sizes of the other ethnic groups, only Latinx and non-Latinx White participants were included in the present studies.

Inclusion criteria. Eligible patients were age 18- to 75-years-old, met *DSM-IV* criteria for one or more of PD, GAD, SAD, and PTSD (based on the Mini International Neuropsychiatric Interview for DSM-IV; Sheehan et al., 1998) and scored at least an 8 (moderate and clinically significant symptoms of anxiety) on the Overall Anxiety Severity and Impairment Scale (OASIS; Campbell-Sills et al., 2009). Participants with co-occurring depression or alcohol or marijuana abuse (but not dependence) were included as participants in the CALM study.

Exclusion criteria. Patients unlikely to benefit from the CALM intervention, such as those with unstable medical conditions, marked cognitive impairments, active suicidal intent or plan, bipolar I disorder, or psychoses were excluded. In addition, patients with substance abuse (other than alcohol or marijuana) and patients with any substance dependence were excluded. Those who were already receiving CBT (n = 7) and those who did not speak English or Spanish (n = 2) were excluded.

Recruitment. Patients were referred by primary care professionals and clinic nursing staff using a five-question anxiety screener, the OASIS (Campbell-Sills et al., 2009). Referred patients met with an Anxiety Clinical Specialist (ACS), who was trained on the study protocol. After eligibility was determined, patients took part in a baseline interview before they were randomized to either the treatment as usual or the intervention group. All patients provided informed, written consent, which was approved by each institution's Institutional Review Board.

Design and Procedure

Setting. Seventeen primary care clinics in four regions (Little Rock, Arkansas, Los Angeles County, San Diego, CA, and Seattle, Washington) were chosen based on a number of considerations, including clinician interest, space availability, size, diversity of the patient population, and insurance factors. RAND corporation in Santa Monica, California served as an assessment only site.

Personnel and training. There were 17 Anxiety Clinical Specialists (ACS) who served as intervention therapists for Latinx and non-Latinx White patients. Thirteen of these ACSs' worked with Latinx patients. The ACS personnel were social workers, registered nurses, master-level psychologists, and one doctorial-level psychologist. All of the ACS personnel provided treatment at the participating primary care clinics. They received six half days of didactics which

focused on training in CBT, as well as motivational interviewing modified for anxiety concerns in order to enhance engagement. They also received information on outreach strategies for ethnic-racial minorities and a medication algorithm for anxiety (Roy-Byrne et al., 2010). Training included role-playing and required successful completion of two to four training patients. They also received weekly group telephone supervision from a psychologist (Craske, Roy-Byrne, et al., 2009).

Randomization and treatment selection. Patients were randomized to intervention (n = 503) or usual care (n = 501) conditions. Randomization was conducted using an automated computer program and stratified by clinic and the presence of comorbid major depression using a permuted block design. Block size was masked to all clinical site study members (for further details see Roy-Byrne et al., 2010).

A summary of randomization and treatment selection among Latinx and non-Latinx White patients is presented in Figure 1. A total of 503 patients were randomized to receive the CALM intervention (n^{Latinx} = 104; $n^{non\text{-}Latinx\ White}$ = 279). Small numbers of Black/African American (n = 51) and other racial-ethnic minorities (n = 69) who received the CALM intervention did not allow for separate analyses. Following randomization to the treatment group, patients were allowed to select pharmacotherapy, CBT, or both, depending on their preference. Out of the 383 Latinx and non-Latinx White patients, 17 dropped out prior to selecting a treatment option (n^{Latinx} = 11; $n^{non\text{-}Latinx\ White}$ = 6). A majority of the remaining patients selected to receive the CBT intervention (n = 336; n^{Latinx} = 85; $n^{non\text{-}Latinx\ White}$ = 251). A subset of these patients chose CBT plus pharmacotherapy (n = 202; n^{Latinx} = 48; $n^{non\text{-}Latinx\ White}$ = 154). The remainder of patients received only pharmacotherapy (n = 30; n^{Latinx} = 8; $n^{non\text{-}Latinx\ White}$ = 22).

The following studies included Latinx and non-Latinx White patients who received the CBT only intervention or CBT plus pharmacotherapy (n = 353; n^{Latinx} = 96; $n^{non\text{-}Latinx\ White}$ = 257). Out of these patients, a minority of Latinx patients reported preferring Spanish over English for the intervention (n = 11).

Intervention. The CALM CBT intervention (i.e., CALM Tools for Living; Craske, Rose, et al., 2009) was developed as a computer-assisted therapy. That is, sessions were led by ACS personnel (i.e., therapists); however, sessions were guided by the computer program (Craske et al., 2011). Of note, the intervention was not self-guided; the computer program facilitated the delivery of the intervention by the ACS and helped to ensure fidelity to the program. The program also incorporated a measurement-based approach to treatment planning by incorporating ongoing assessments. Data from the sessions provided therapists with information on patient progress to guide treatment planning. CBT was administered by the ACS personnel typically in six to eight weekly sessions. The first session included a decision-making module in which patients received information on anxiety disorders and chose an anxiety disorder to focus on. Patients with multiple anxiety disorders were asked to choose the most distressing disorder with the expectation that comorbid anxiety disorders would also improve (T. A. Brown, Antony, & Barlow, 1995; Tsao, Mystkowski, Zucker, & Craske, 2005). The CBT intervention consisted of eight additional modules, which were education, self-monitoring, hierarchy development, breathing training, cognitive restructuring, exposure to internal stimuli, exposure to external stimuli, and relapse prevention (*Figure 2*). After the first round of treatment, patients could opt to receive more of the same modality (stepping up) or the alternative modality (stepping over) for up to three more steps of treatment. Following treatment, patients were entered into continued

care and received monthly follow-up telephone calls to reinforce CBT skills, manage medication adherence, or both.

For medication management, the ACS provided adherence monitoring, and counseling to avoid alcohol, and optimize sleep hygiene and behavioral activity. Communication was also maintained between ACS personnel, a supervising psychiatrist and the primary care physician regarding medication suggestions. Over 50% of patients were already taking medication at the start of the intervention. They were encouraged to continue their medication and consider optimizing it by dose adjustment (since many patients were receiving sub-optimal doses); however, many patients chose to attend CBT without changes to their medication regimens (for further information regarding the CALM intervention see Craske et al., 2011; Roy-Byrne et al., 2010).

Table 1. Review of premature dropout in anxiety or depression RCTs with a substantial proportion of Latinx. Studies were selected if they included randomization, were treating anxiety or depression, and had a sample with at least 20% Latinx.

Randomized Controlled Trial	Anxiety or Depression	CBT Intervention Condition N	Latinx CBT N (%)	Other racial-ethnic N (%)	Conditions	Dropout Definition	CBT Condition Dropout Rate	Latinx CBT Dropout Rate	Reference(s)
Women Entering Care (WECare) study	Depression	90	43 (47.8%)	41 (45.6%) Black; 6 (6.7%) White	CBT vs. medication vs. referral to community mental health services	Patients who did not attend more than 6 sessions (out of an 8 session treatment)	64.4%	Not reported	Miranda, Chung et al., 2003; Siddique et al., 2012; Miranda et al., 2006
San Francisco General Hospital Depression Clinic study	Depression	103	42 (40.8%) – *CBT only condition*	33 (32.0%) White; 24 (23.3%) Black; 4 (3.9%) other	CBT vs. CBT plus case management	Discontinued attendance prior to the recommended 8 sessions	42.7% - *CBT only condition*	40.5% - *CBT only condition*	Miranda, Azocar et al., 2003
Culturally-adapted behavioral activation treatment for Latinas	Depression	12	12 (100%)	N/A	Behavioral Activation (BA) vs. treatment as usual (TAU)	Discontinued attendance prior to the recommended 12 sessions	50.0%	50.0%	(Kanter, Santiago-Rivera, Rusch, Busch, & West, 2010)
Study for Depressive Symptoms in HIV-Positive Patients	Depression	27	8 (29.6%)	14 (51.9%) White; 3 (11.1%) Black; 2 (7.4%) Asian/other	CBT vs. Interpersonal Psychotherapy (IPT) vs. supportive psychotherapy (SP), vs. SP plus medication	Discontinued attendance prior to the recommended 16 sessions	37.0%	Not reported	(Markowitz, Spielman, Sullivan, & Fishman, 2000)
University of Houston Anxiety Disorder clinic study	Anxiety (any disorder)	65	Not reported (21.8% Latinx reported across conditions)	Not reported (58.6% White; 9.2% Black; 4.6% Asian; 5.7% other across both conditions)	CBT vs. relaxation training	Not specified	29.7%	Not reported	(Norton, 2012)

Table 2. Baseline patient characteristics

	All (n = 353)			Latinx (n = 96)			Non-Latinx Whites (n = 257)		
	N	%	*M*	*N*	%	*M*	*N*	%	*M*
Age (*SD*)			43.32 (13.44)			40.18 (13.34)			44.49 (13.31)
Women N	248	70.3%		79	82.3%				169 (65.8%)
Income*			4.93			3.36			5.52
Education									
Less than or equal to 12 years	74	21%		29	30.2%		45	17.5%	
More than 12 years	279	79%		67	69.8%		212	82.5%	
Nativity Status									
U.S. born	297	84.1%		58	60.4%		239	93.0%	
Foreign born	56	15.9%		38	39.6%		18	7.0%	
Anxiety disorder									
PD	163	46.2%		48	50.0%		115	44.7%	
GAD	270	76.5%		77	80.2%		193	75.1%	
SP	146	41.4%		46	47.9%		100	38.9%	
PTSD	63	17.8%		28	29.2%		35	13.6%	
MDD	220	62.3%		67	69.8%		153	59.5%	

Table 3. The proportion of patients who dropped out, split by ethnicity, is presented. Relapse prevention definition: patients who dropped out prior to completing the relapse prevention module. Dosage definition: patients who dropped out prior to completing at least one cognitive restructuring or exposure module

			Latinx	Non-Latinx White
Dropout	χ^2	*p*	*N* (%)	*N* (%)
Relapse Prevention Definition	7.47*	.006	56 (58.33%)	108 (42.02%)
Dosage Definition	15.57**	< .001	28 (29.17%)	30 (11.67%)

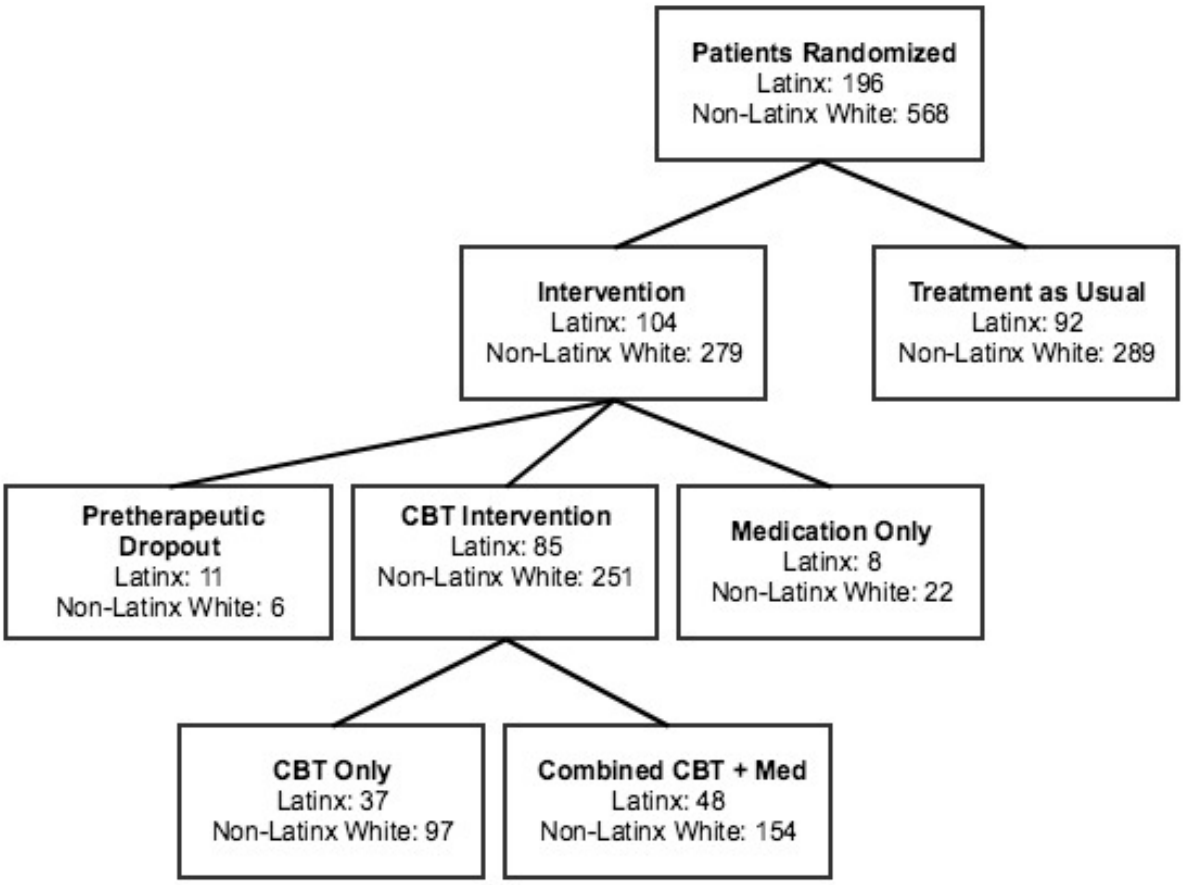


Figure 1. Randomization and treatment condition selection for Latinx and non-Latinx White patients.

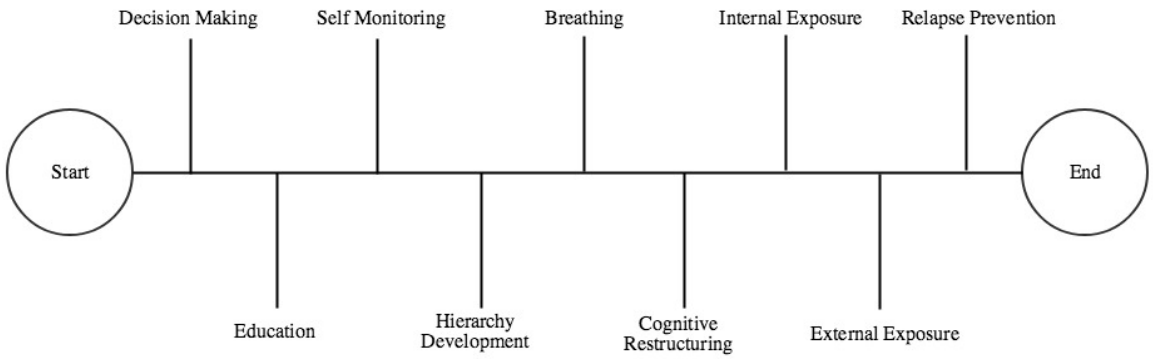


Figure 2. Coordinated Anxiety and Learning Management (CALM) study modules

Study 1: Pretreatment predictors of premature dropout among Latinx and non-Latinx White patients

Underserved racial-ethnic groups in the United States experience many disparities in mental health care. The U.S. Surgeon General's report on culture, race, and ethnicity in mental health in 2001 described the mental health care system as less effective in engaging racial-ethnic minorities in services. Latinx have less access to mental health care, are less likely to receive services (Alegría et al., 2007; United States Department of Health and Human Services, 2001), are more likely to receive services that poorly match their needs (Vega & Alegría, 2001), and are less likely to receive evidence-based care (United States Department of Health and Human Services, 2001) especially if they are less acculturated or recent immigrants (Alegría et al., 2007; Cabassa et al., 2006). Racial-ethnic minorities also attend fewer treatment sessions (Chavira et al., 2014), and are less likely to adhere to psychotropic medication regimens (Diaz et al., 2005; Olfson et al., 2006). Previous studies have reported minority status as a significant predictor of dropout among patients with anxiety or depression (Chavira et al., 2014; Olfson et al., 2009; Organista et al., 1994). Although there have been some findings that Latinx have lower therapeutic engagement and higher premature dropout (Chavira et al., 2014; O'Brien et al., 2009), most studies with Latinx have focused on treatment uptake and past-year service use. The poor representation of Latinx in many studies (Miranda et al., 2005) has limited research examining premature dropout as a study outcome.

Predictors of Engagement: Models of Health Service Utilization

Given the paucity of research on predictors of therapeutic engagement (i.e., engagement occurring over the course of psychotherapy), a broader model of mental health service use was considered. In an attempt to understand the complexities of service use, Andersen's Behavioral

Model of Health Service Use (Andersen, 1968, 1995) offers a conceptual framework that integrates barriers from varying levels of influence. This model categorizes population characteristics (i.e., individual predictors of service use and adherence) into predisposing, enabling, and need domains. Predisposing factors are those that are descriptive of the individual seeking services (e.g., attitudes and beliefs). Enabling factors are issues or situations that promote or block an individual's use of services (e.g., poverty; social support). Need factors are those that relate to an individual's perceived or actual need for treatment (e.g., symptom severity). A part from individual level predictors, environmental influences such as health system factors and provider level characteristics are also considered in Andersen's model (Andersen, 1968, 1995).

Predisposing factors. In addition to ethnic group membership, a number of other predisposing factors (i.e., patient characteristics) have been found to negatively impact Latinx service use (e.g., Cabassa & Zayas, 2007). Stigma and beliefs stemming from previous use of mental health treatment are thought to influence service use and engagement in mental health treatment (Castillo, Waitzkin, Ramirez, & Escobar, 1995). In the larger CALM sample (i.e., the sample of both patients randomized to usual care as well as patients randomized to the intervention condition), there were no significant differences between Latinx and non-Latinx White patients in endorsement of stigma (Hunt et al., 2013); previous research has found that attitudes toward mental health, including stigma, are associated with lower medication adherence (Interian, Martinez, Guarnaccia, Vega, & Escobar, 2007) and help-seeking in Latinx (Cabassa & Zayas, 2007). Latinx immigrants tend to rely on informal sources of care first before turning to formal sources, such as psychotherapy (Cabassa & Zayas, 2007). It has been suggested that these preferences are related to views on depression, and beliefs about social norms related to seeking

treatment even after accounting for clinical characteristics, perceived barriers to care, and past service use (Cabassa & Zayas, 2007).

A qualitative study on endorsement of stigma beliefs among Latinx found that negative labeling extended both to depression symptoms and use of antidepressant medication (Interian et al., 2007). Participants tended to label experiences negatively, particularly within their social contexts (Interian et al., 2007). For instance, Latinx reported concern of being negatively evaluated if they were to have mental health problems or use medication. Patients also described family members as exerting influence over whether or not the patient should adhere to treatment, which may contribute to familial conflicts and limited social support to continue treatment (Interian et al., 2007). The extent to which stigma explains ethnic disparities in premature dropout requires additional attention.

In addition to attitudinal factors, predisposing factors traditionally include demographic characteristics (Andersen, 1968, 1995), such as gender, age, marital status, and education level (e.g., Ortega & Alegria, 2002; Peifer, Hu, & Vega, 2000; Vega et al., 2001). Meta analyses indicate that younger age and lower education levels are the most consistent demographic variables that predict premature dropout, whereas other factors such as gender and marital status are not consistently predictive (Swift & Greenberg, 2012; Wierzbicki & Pekarik, 1993).

Enabling factors. Enabling factors (i.e., factors related to access to services) have been examined as predictors of service use among Latinx, including lack of health insurance (Albizu-Garcia, Alegria, Freeman, & Vera, 2001; Vega et al., 2001), low income (Alegría et al., 2002), lack of culturally appropriate education for providers (McGuire & Miranda, 2008), and limited availability of bilingual clinicians (Bernal & Castro, 1994). Low income specifically has been related to premature dropout (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013; Edlund et al.,

2002; Roseborough, McLeod, & Wright, 2016; Warden et al., 2009) in the general population. Latinx are more likely to experience low income and poverty (also true in this sample; Chavira et al., 2014), which places them at greater risk for lesser engagement and premature dropout from treatment. One study, conducted by Miranda and colleagues (2003) compared a CBT-only intervention with CBT enhanced by case management via telephone outreach. Case management was designed to address enabling factors, such as problems with employment and relationships. They found a rate of 17.10% dropout among Latinx in the CBT plus case management condition relative to 40.50% in the CBT-only condition, suggesting that enabling factors may play an important role in Latinx retention in psychotherapy (Miranda, Azocar, Organista, Dwyer, & Areane, 2003).

Social support. There are competing hypotheses regarding the role of social support in service use of Latinx. On the one hand, social support has been viewed as a factor that facilitates service use in that it provides a buffer from barriers to treatment-seeking and retention such as lack of transportation and childcare support. Alternatively, individuals who have social support may perceive less of a need for treatment or require less treatment; for instance, family support is associated with more favorable self-rated mental health (Mulvaney-Day, Alegria, & Sribney, 2007). One explanation for the underutilization of mental health services in Latinx has been the presence of strong familial support (Schwarzbaum, 2004). Although few epidemiological studies have examined social support as a predictor of service use, two studies found that small supportive social networks increased the likelihood of service use while large networks may delay or replace the urgency of formal mental health services (Albizu-Garcia et al., 2001; Pescosolido, Wright, Alegria, & Vera, 1998). Additionally, social perceptions of need (i.e., presence of friends and family members who believe an individual to need mental health

services) predict use of both formal mental health services and informal or religious services (Villatoro, Morales, & Mays, 2014). Only one study has examined the impact of social support on dropout among Latinx. Data from the National Latino and Asian American Study (NLAAS) suggest lower levels of familial social support increase the likelihood of dropout (defined as termination of psychotherapy against provider recommendation within the 12 months prior to the survey; Chang & Biegel, 2018).

Perceived discrimination. Cultural processes such as acculturative stress, which includes distress related to adapting to a new society and perceptions of discrimination, can also enhance our understanding of the way that culture may impact Latinx engagement. This may be an important construct given that among patients presenting to primary care, Latinx report higher levels of perceived discrimination than non-Latinx Whites (Escovar, et al., 2018). Although the impact of perceived discrimination on Latinx service use and engagement has not been examined, perceived discrimination is associated with use of informal services in Asian Americans (Spencer, Chen, Gee, Fabian, & Takeuchi, 2010) and lower mental health service utilization in non-Latinx Whites and other minorities, including Blacks and Asian Americans (Burgess, Ding, Hargreaves, van Ryn, & Phelan, 2008). Perceived discrimination may be considered a proxy for social circumstances such as acculturative stress that may be relevant to Latinx.

Need factors. Research on ethnic differences in need factors (i.e., factors pertaining to the patient's need for health services) is mixed. Studies suggest mostly comparable prevalence rates for anxiety and depressive disorders among Latinx relative to non-Latinx White individuals (Asnaani, Richey, Dimaite, Hinton, & Hofmann, 2010; Breslau et al., 2006; Grant et al., 2005; S. M. Smith et al., 2006) and some studies suggest that rates of disorders may increase with higher

levels of acculturation (Alegría et al., 2008; Burnam, Hough, Karno, Escobar, & Telles, 1987). More consistently, studies have found ethnic group differences in the persistence of anxiety and depressive symptomology (Breslau, Kendler, Su, Aguilar-Gaxiola, & Kessler, 2005), as well as differences in symptom expression, with Latinx reporting greater persistence and more somatic expressions of anxiety (Escovar et al., 2018; Gureje, Simon, Ustun, & Goldberg, 1997). Research is also mixed with regard to ethnic differences in functional impairment for anxiety. Some data suggest heightened functional impairment (Moitra et al., 2014; Polo, Alegría, Chen, & Blanco, 2011), while other studies have found comparable to lower levels of functional impairment in Latinx relative to non-Latinx Whites (Huang, Chung, Kroenke, & Spitzer, 2006; Ortega & Rosenheck, 2000).

Need factors are some of the most consistent predictors of past-year service use for Latinx (Alegría et al., 1991; Cabassa et al., 2006). Among Latinx, factors such as functional impairment, comorbidity, poor physical health, and self-rated mental health have been associated with service use even after adjusting for demographic factors, social network variables, and health insurance (for a review see Cabassa et al., 2006). Studies conducted with the general population suggest that low initial symptom severity across disorders is associated with premature dropout (Issakidis & Andrews, 2004; Simon & Ludman, 2010); however research also suggests that patients with mental health comorbidity, including comorbidities between mood and anxiety disorders (Issakidis & Andrews, 2004; Olfson et al., 2009), and greater levels of functional impairment (Jennings, Zinzow, Britt, Cheung, & Pury, 2016) will be more likely to drop out of both general medical treatment and psychiatric treatment. It is possible that patients with multiple diagnoses may feel their treatment needs are not being adequately addressed,

particularly if treatment regimens address only one of the presenting problems. The impact of these need factors on premature dropout has not been extensively studied in Latinx.

The studies that cite an association between low initial symptom severity and premature dropout (e.g., Issakidis & Andrews, 2004; Simon & Ludman, 2010) were conducted with the general population and use general measures of anxiety or depression that do not separately examine cognitive and somatic symptoms (e.g., Depression Anxiety Stress Scales; Penn State Worry Questionnaire; Patient Health Questionnaire). Given that Latinx express higher levels of somatization relative to non-Latinx Whites (Escovar et al., 2018; Gureje et al., 1997), it may be important to consider the unique contribution of somatic symptoms to anxiety symptomology when examining the impact of symptom severity on premature dropout. Low initial somatization may reflect a lack of perceived need among patients, and subsequent dropout. On the other hand, high levels of somatization have also been associated with mental health stigma (Kirmayer, 2001; McNealy & Lombardero, 2019), which is associated with premature dropout (Ben-Noun, 1996; Olfson et al., 2009; Sirey et al., 2001). Latinx expressing somatization may also be at risk for the perception that their physiological treatment needs are not being met. In this case, there may be a positive relationship between somatization symptom severity and premature dropout. Overall, however, the association between the presence of somatization and dropout is understudied.

Conceptualizing Dropout

While varying definitions of dropout exist, premature dropout has often been defined as occurring when a patient stops the intervention without completing the recommended course of treatment or without gaining the full benefits that would have been available if the patient had continued to attend (Swift & Greenberg, 2012). In the case of the CALM protocol, failure to

complete the relapse prevention module was used as an index of premature dropout (Chavira et al., 2014; Glenn et al., 2013). Alternatively, completion of sessions containing theorized mechanisms of change in CBT (i.e., cognitive restructuring and exposure) is another way of conceptualizing dropout. Cognitive and behavioral skills that target dysfunctional thoughts and reduce avoidance are considered active and necessary ingredients of CBT interventions (e.g., Beck, Rush, Shaw, & Emery, 1979; Craske, Roy-Byrne, et al., 2009). Few studies have examined "dosage" dropout as defined by patients who discontinue treatment before receiving active doses of cognitive restructuring or exposure skills (McLean et al., 2001; Wergeland et al., 2015).

The Present Study

The purpose of this study was to examine whether pretreatment variables mediate the relationship between ethnicity and premature dropout in a sample of Latinx and non-Latinx White adults participating in a CBT intervention for anxiety. A well-established theoretical framework, the Behavioral Model of Health Service Use, was used to select variables that may mediate the relationship between ethnicity and dropout. Previous research suggests that factors from each of the categories posited by Andersen's model—predisposing, enabling, and need—are relevant for predicting treatment uptake and past-year service use in Latinx and non-Latinx Whites (Cabassa et al., 2006). No previous study to date has examined predisposing, enabling, or need factors as potential mediators of the relationship between ethnicity and premature dropout. Additionally, in this study, two definitions of dropout were used in order to better understand whether pretreatment factors mediate the relationship between ethnicity and different types of dropout.

Aims and Hypotheses

Aim 1. To examine whether predisposing characteristics explain ethnic disparities in premature dropout.

Hypothesis 1. It was hypothesized that predisposing attitudinal factors, such as beliefs about treatment and stigma, would mediate the relationship between ethnicity and premature dropout (operationalized as both relapse prevention dropout and dosage dropout) after accounting for demographic factors and treatment site. It was predicted that Latinx patients, relative to non-Latinx White patients would have higher levels of negative beliefs about treatment and stigma. In addition, it was predicted that these attitudinal variables would be associated with greater premature dropout. Mediation analyses that include the alternative conceptualization of dropout (i.e., dosage dropout) were exploratory given that previous studies have not addressed this question.

Aim 2. To examine whether enabling factors that have been shown to enable and inhibit treatment engagement explain ethnic disparities in premature dropout.

Hypothesis 2. It was hypothesized that poverty, social support, and perceived discrimination would mediate the relationship between ethnicity and premature dropout (operationalized as both relapse prevention dropout and dosage dropout). It was predicted that Latinx patients would have higher levels of poverty and perceived discrimination and lower levels of perceived social support. It was predicted that higher levels of poverty, lesser social support, and higher perceived discrimination would be associated with greater dropout. Mediation analyses that used dosage dropout as the outcome variable were exploratory given that previous studies have not addressed this question.

Aim 3. To examine whether need factors, such as somatic symptom severity, explain ethnic disparities in premature dropout.

***Hypothesis 3*.** It was hypothesized that somatic symptom severity would mediate the relationship between ethnicity and premature dropout (operationalized as both relapse prevention dropout and dosage dropout). It was predicted that Latinx would endorse higher levels of somatic symptoms. It was also predicted that greater somatic symptoms would be associated with greater dropout. Due to the mixed literature regarding ethnic differences for cognitive symptoms of anxiety, depressive symptoms, comorbidity between anxiety disorders, and functional impairment, analyses with these variables were exploratory. Mediation analyses that include the alternative conceptualization of dropout (dosage dropout) were also exploratory given that previous studies have not addressed this question.

Method

For information regarding patient characteristics, recruitment, and design of the CALM intervention please see the general method section.

Measures

Outcome measures. The primary outcome measure was premature dropout, using a well-established definition—discontinuation of treatment prior to completion of the therapeutic protocol (in the case of the CALM protocol, failure to complete the relapse prevention module after having been randomized to the intervention condition and initiation of psychotherapy services). An exploratory, alternative definition of dropout—"dosage" dropout—was also examined. Dosage dropout was defined as patient termination prior to completion of at least one session containing cognitive restructuring or exposure principles. Cognitive restructuring and exposure are considered critical factors of anxiety treatment (e.g., Beck et al., 1979; Craske, Roy-Byrne, et al., 2009); thus, dropout prior to introduction of these modules is considered representative of an inadequate dose of treatment.

Demographic information. Demographic information for each patient was collected, including age, gender, and education level. Education was treated as a dichotomous variable reflecting less than or equal to versus more than a high school education.

Attitudinal predisposing factors. ***Beliefs about treatment.*** Beliefs about treatment were captured with two subscales: beliefs about medication and beliefs about psychotherapy. These scales were treated separately for the purpose of analyses. Items for each subscale were selected from the Beliefs about Medications and Psychotherapy scale, which was developed with a primary care sample of patients with anxiety disorders (Bystritsky et al., 2005). The patients indicated their level of agreement or disagreement on a five-point Likert scale (scored on a 0 to 4 scale) with two statements regarding medication (‘‘Medications are important in the treatment of anxiety;’’ and ‘‘Medication for anxiety does not help a person cope better,”) and two statements regarding psychotherapy (‘‘Therapy can help an individual learn new ways of coping with problems;’’ and ‘‘Therapy patients are wasting money’’) (Bystritsky et al., 2005). When applicable, items were reverse coded such that low scores indicate positive beliefs about treatment and high scores indicate negative beliefs about treatment.

Stigma. Five items from the National Comorbidity Survey Replication (NCS-R), a nationally-representative household survey, were included to measure comfort with and stigma toward mental health treatment. Patients responded to items addressing willingness to seek formal mental health treatment, comfort with speaking to a mental health professional, and embarrassment if others knew about help-seeking for an emotional problem using a four-point Likert scale. These items were summed to form a stigma scale. In addition, two items inquired about percentage of individuals who 1) Are helped by professional services for serious emotional problems and 2) Get better even without professional help.

Enabling factors. ***Poverty.*** Poverty level was determined by collecting income and calculating a weighted average income threshold based on the Federal Poverty Guidelines (United States Census Bureau, 2010), adjusted for family size, age of respondent, and number of children less than 18-years-old. Family income divided by this threshold value created a poverty ratio.

Social support. Four items were included from the Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991). Patients indicated how often other individuals are available for various kinds of support, including relaxation, help with daily chores, suggestions on how to deal with a personal problem, and love/feeling wanted. Patients indicated responses on a five-point Likert scale with the options *None of the time, A little of the time, Some of the time, Most of the time and All of the time.* The items demonstrated good internal consistency reliabilities among non-Latinx Whites (Cronbach's alpha = 0.80), and Latinx (Cronbach's alpha = 0.73).

Perceived discrimination. Perceived discrimination was measured with an item adapted from the National Latino and Asian American Survey (NLAAS; Alegría et al., 2004) in which participants indicated the frequency that they are treated unfairly due to their race or ethnicity by choosing *never, rarely, sometimes, or often*.

Need factors. ***Anxiety.*** The Brief Symptom Inventory (BSI-18; Derogatis, 2001) is an abbreviated 18-item version of the SCL-90-R, a scale that measures psychological distress. Respondents rate each of the BSI-18 items on a five-point Likert scale according to how distressed they have felt during the past seven days. The subscales measure somatization (distress caused by the perception of bodily dysfunction), psychic anxiety (symptoms of nervousness, tension, motor restlessness, apprehension, and panic states), and depression. Only

the raw scores of the somatization and psychic anxiety subscales are examined in the following analyses. The BSI-18 has been examined in numerous Latinx samples and demonstrates good reliability and validity; however, a couple studies have revealed an inconsistent factor structure, suggesting the need for further research on the psychometric properties of the BSI-18 with Latinx (Galdon et al., 2008; Torres, Miller, & Moore, 2013; Wiesner et al., 2010). In the current sample, both the anxiety and somatization subscales demonstrated good internal consistency reliabilities among non-Latinx Whites (Cronbach's alphas = 0.84 and 0.74 respectively), and Latinx (Cronbach's alphas = 0.85 and 0.79 respectively).

Depression. The Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) is a self-report questionnaire that assesses depressive disorders and suicidal ideation in the previous two weeks from administration. Each of the 9 items can be scored from 0 (*not at all*) to 3 (*nearly every day*). A score of 12 or greater is considered clinically significant distress. The Spanish version of the PHQ has been shown to have good reliability and validity in primary care and community samples (Diez-Quevedo, Rangil, Sanchez-Planell, Kroenke, & Spitzer, 2001; Donlan & Lee, 2010). In the current sample, the PHQ-9 had high internal consistency in non-Latinx Whites (Cronbach's alpha = 0.85), and Latinx (Cronbach's alpha = 0.83).

Functional impairment. Functional impairment was measured with the Short Form Health Survey (SF-12; Ware, Kosinski, Bowker, & Gandek, 2002). The SF-12 is a 12 item self-report questionnaire that assesses health-related quality of life and functional impairment. Functional impairment is the extent to which health-related quality of life—both physical and emotional—interferes with functioning (i.e. one's ability to accomplish domestic, work-related or social activities. It yields a separate Physical Health Component Score (PCS) and Mental Health Component Score (MCS). The PCS consists of role limitations due to physical health and

bodily pain. The MCS consists of role limitations due to personal problems, emotional problems, social functioning, vitality (energy/fatigue), and general mental health. Possible scores range from 0 to 100, with higher scores indicating better functioning. The SF–12 has been shown to be reliable and valid with Latinx primary care patients (Ayuso-Mateos, Lasa, Vazquez-Barquero, Oviedo, & Diez-Manrique, 1999; Castillo, 2007). In the current sample, both the PCS and the MCS had high internal consistency in non-Latinx Whites (Cronbach's alphas = 0.87 and 0.82 respectively), and Latinx (Cronbach's alpha = 0.82 and 0.83 respectively).

Comorbidity. Comorbidity was defined as having more than one anxiety disorder. Patients could have up to four anxiety-related diagnoses (generalized anxiety disorder, social anxiety disorder, post-traumatic stress disorder, and panic disorder). Diagnoses were made using the Mini International Neuropsychiatric Interview for *DSM-IV* (Sheehan et al., 1998).

Data Analytic Plan

A series of multiple mediation models (model 6; Preacher, Rucker, & Hayes, 2007) were used to examine the association between ethnicity and premature dropout and the indirect effect of predisposing, enabling and need factors. In order to examine multiple definitions of dropout, the relapse prevention definition of dropout (RP dropout) and the definition for dosage dropout were examined. Data analyses consisted of two phases. In phase one, analyses were conducted to screen for ethnic differences in potential mediators using independent samples t-tests and chi-square analyses. In phase two, the variables that differed significantly between Latinx and non-Latinx Whites in the hypothesized direction were added to a multiple mediation model. In order to be conservative, variables were considered to differ between Latinx and non-Latinx Whites using the convention of a p-value of .10 or less. Demographic factors thought to be related to premature dropout based on meta analyses (i.e., age and education Swift & Greenberg, 2012;

Wierzbicki & Pekarik, 1993), treatment type (combined with medication or psychotherapy only) and site were included as covariates. Given the paucity of research on the contribution of pretreatment factors to disparities in rates of ethnic dropout, separate multiple mediation models were conducted for each group of factors in Andersen's Behavioral Model of Health Service Use (i.e., predisposing, enabling and need factors).

Multiple mediation based on bootstrapping was used. Bootstrapping utilizes nonparametric resampling and enables evaluation of the contingency of multiple mediators simultaneously with adjustment for potential covariates (MacKinnon, Krull, & Lockwood, 2000), which reduces the probability of encountering effects such as confounding and suppression by the variables included in the regression model (Preacher & Hayes, 2008). Multiple mediation controls for intercorrelations among each mediator, and calculates the unique role of each individual mediator over and above the other. Analyses were conducted with the PROCESS macro (version 2.16.3), which allows for multiple mediators to be placed in one model and for binary outcomes.

The multiple mediation models estimated the following parameters: (1) the specific effect of ethnicity on each mediator variable after controlling for covariates, (2) specific effects of each mediator variable on each type of dropout after controlling for ethnicity and covariates, and (3) the indirect effect of ethnicity on dropout through each proposed mediator. Parameter estimates and 95% bias-corrected and accelerated confidence intervals for indirect effects were generated based on 50,000 bootstrap resamples (Preacher & Hayes, 2008). Significance of indirect effects was determined by examining confidence intervals. Mediation analyses were conducted using SPSS 24.0 and the publicly available SPSS macro for multiple mediation (http://afhayes.com/spss-sas-and-mplus-macros-and-code.html).

Results

Characterization of Premature Dropout

Latinx patients were overrepresented among patients who did not complete the relapse prevention module (58.33% Latinx; 42.02% non-Latinx White) and among patients who did not complete cognitive restructuring and exposure modules (29.17% Latinx; 11.67% non-Latinx White; *Table 2*). It is important to note that patients participating in psychotherapy had the option of also taking medication or participating in only psychotherapy; however, Latinx were not disproportionately represented in either treatment type (*Table 1*).

Ethnic Differences in Demographic Factors and Proposed Mediators

Ethnic differences of the demographic factors and hypothesized mediators are presented in Table 1. There were significant ethnic differences for gender (i.e., women were overrepresented in the Latinx group), age (i.e., Latinx tended to be younger than non-Latinx Whites), and education (i.e., Latinx were overrepresented among patients who did not achieve a college education or higher). Ethnic differences were also examined for predisposing factors (i.e., stigma, beliefs about psychotherapy, and beliefs about medication), enabling factors (i.e., poverty, perceived discrimination, and social support), and need factors (i.e., anxiety, somatization, depression, mental functional impairment and physical functional impairment).

Predisposing factors. As shown in Table 1, Latinx patients had higher ratings on a measure of negative beliefs about medication ($t(351) = -3.49$, $p = .001$). Latinx patients also had higher ratings on a measure of negative beliefs about psychotherapy ($t(351) = -1.70$, $p = .09$); however, this difference was marginally significant and positive beliefs were more often endorsed in both groups. Contrary to the study hypothesis, Latinx patients provided higher percentage ratings when asked to estimate the percentage of patients who are helped by

psychotherapy ($t(351) = -1.75$, $p = .08$). Other stigma ratings did not significantly differ between Latinx and non-Latinx White patients.

Enabling factors. Latinx patients endorsed higher rates of perceived discrimination ($t(351) = -7.14$, $p < .001$) and poverty ($t(351) = -3.86$, $p < .001$) than non-Latinx Whites. They also endorsed lower rates of social support than non-Latinx Whites ($t(351) = -2.27$, $p = .02$).

Need factors. Latinx patients had, on average, more anxiety disorders than non-Latinx White patients ($t(351) = -3.58$, $p < .001$). In addition, there was a significant ethnic difference on the PCS ($t(351) = 1.60$, $p = .10$), with Latinx indicating higher levels of physical functional impairment. There was a significant ethnic difference on the BSI Somatization subscale ($t(351) = -2.35$, $p = .01$), with Latinx endorsing higher rates of somatization; however, there were no significant ethnic differences for psychic anxiety, depression, or mental health functional impairment.

Multiple Mediation Analyses

Model 6 was used to test for multiple mediation (Preacher et al., 2007) predicting both relapse prevention (RP) and dosage dropout. Three separate models were used for predisposing, enabling, and need factors for each type of dropout. The mediation models are presented in *Figure 1* (RP dropout) and *Figure 2* (dosage dropout).

` **Predisposing factors.** Given the results of the analyses screening for ethnic differences, the proposed multiple mediation models for attitudinal predisposing factors included beliefs about medication and beliefs about psychotherapy. In addition, the model included age, education, treatment type, and site as covariates. Ethnicity was not associated with beliefs about medication or beliefs about psychotherapy, after accounting for demographic factors, treatment type, and site. Neither beliefs about medication, nor beliefs about psychotherapy significantly

mediated the relationship between ethnicity and RP dropout (*Table 3; Figure 1b)* or dosage dropout (*Table 3; Figure 2b*).

Enabling factors. Given the results of the analyses screening for ethnic differences, the proposed multiple mediation models for enabling factors included perceived discrimination, social support, and poverty. Again, the model included age, education, treatment type, and site as covariates.

Ethnicity was significantly associated with perceived discrimination and social support, but was not associated with poverty, after covarying demographic variables, treatment type, and site (*Table 4*). Social support, but not perceived discrimination or poverty, was significantly associated RP dropout after controlling for ethnicity and covariates (*Table 5*). The bootstrap confidence intervals derived from 50,000 samples indicated that there was a negative indirect effect of social support with Latinx expressing lower social support and higher rates of RP dropout (*95% CI* = 0.01, 0.25; *Table 3; Figure 1c*). None of the enabling mediators were associated with dosage dropout (*Table 3; Figure 2c*).

Need factors. Given the results of the analyses screening for ethnic differences, the proposed multiple mediation models for need factors included the measures for somatization (BSI Somatization), comorbidity (number of anxiety disorders), and physical functional impairment (SF-12 PCS subscale). In addition, the model included age, education, treatment type, and site as covariates.

Ethnicity was significantly associated with all three mediators—BSI Somatization, number of anxiety disorders, and PCS after covarying demographic variables, treatment type, and site (*Table 4*). Only BSI Somatization was significantly associated with RP dropout after controlling for the covariates (*Table 5*). The bootstrap confidence intervals indicated that there

was a negative indirect effect of BSI Somatization on the relationship between ethnicity and RP dropout (*95% CI* = .01, 0.30; *Table 3; Figure 1d*). PCS and number of anxiety disorders did not mediate the relationship between ethnicity and RP dropout (*Table 3; Figure 1d*). BSI Somatization, number of anxiety disorders, and PCS also did not mediate the relationship between ethnicity and dosage dropout (*Table 3; Figure 2d*).

Discussion

Consistent with previous studies, data from this study also found that Latinx patients drop out of CBT at higher rates than non-Latinx White patients. In fact, Latinx were overrepresented among patients who dropped out of treatment using two differing definitions of dropout; those who did not complete the relapse prevention module (58.33% Latinx; 42.02% non-Latinx White) and those who were considered dosage dropouts (i.e., who dropped out prior to completing cognitive restructuring or exposure modules; 29.17% Latinx; 11.67% non-Latinx White). This is concerning given data suggesting that treatment dose (i.e., attendance at sessions and completion of exposures) is associated with improved treatment outcomes, including anxiety symptom severity and functional impairment (Glenn et al., 2013). It is also concerning given that more Latinx were not receiving the ingredients that are proposed to make CBT effective, that is, cognitive restructuring and exposure exercises. Thus, in this regard, important disparities in engagement and receipt of quality care were identified.

The primary aim of this study was to examine factors that may explain higher rates of dropout in Latinx patients when compared to non-Latinx White patients. While studies have identified factors that increase risk for premature dropout in treatment-seeking samples, few studies have identified factors that may mediate the relationship between ethnicity and premature dropout. In the current study, potential mediators were selected based on previous literature

examining factors that impact service use or treatment dropout among Latinx, using the Behavioral Model of Health Service Use (Andersen, 1968, 1995) as a framework to differentiate predisposing, enabling, and need factors.

Overall, findings indicated that most of the selected individual level factors did not explain ethnic disparities in dropout between Latinx and non-Latinx White patients, with the exception of perceived social support, and pretreatment somatization symptoms. Furthermore, findings were limited to the RP definition of dropout and not the alternative definition of dropout based on receipt of evidence-based elements of treatment (i.e., dosage dropout). Thus, findings are discussed primarily with reference to the more commonly used definition of dropout (i.e., completion of the therapy up until the relapse prevention module).

Among the enabling factors, ethnic differences emerged for social support and perceived discrimination; however, only social support was associated with RP dropout and mediated the relationship between ethnicity and RP dropout. Latinx endorsed lower levels of social support than non-Latinx Whites and lower levels of social support were associated with higher rates of RP dropout. The assessment of social support collected for the present study assessed the quality of social support related to various functions, including emotional support (i.e., perceived empathy and love), tangible support (i.e., help with chores), informational support, and social companionship. The results are in line with previous research that has found that lower levels of familial social support were associated with an increased likelihood of dropout in a national sample of Latinx who had received mental health services (Chang & Biegel, 2018).

Reasons for the association between low social support and premature dropout require further investigation. Previously, social support has been viewed as an enabling factor to service use in that it mitigates potentially important barriers to treatment retention such as lack of

transportation and childcare support. This explanation is consistent with results from a qualitative study with CALM providers, which suggested that Latina women experienced issues with treatment engagement when they did not receive necessary support from their families to participate in sessions (Curran et al., 2012). Based on these findings, it would appear that social support may exert its influence through structural and emotional support that patients derive from their families. The number of Latinx men in the study (n = 17) precluded the examination of gender as a moderator of social support.

Among need factors, Latinx reported higher rates of somatization, physical functional impairment, and number of anxiety disorders than non-Latinx Whites; however, only somatization partially mediated the relationship between ethnicity and RP dropout. Among Latinx, only one other study, conducted with a Brazilian sample, has found that somatization predicts premature dropout (Diniz et al., 2011). The connection between Latinx somatization and premature dropout is potentially explained by differing perceptions of anxiety symptomology. The idea that psychological symptoms carry greater stigma in collectivistic societies (Keyes & Ryff, 2003) has led to the interpretation that patients who present with somatic, rather than psychological symptoms, may be attempting to "deny" psychological symptoms (Kirmayer, 2001). Thus, it may be that Latinx patients who are reporting somatic symptoms may also experience their symptoms as more stigmatizing leading to greater dropout. However, the fact that stigma itself was not a significant mediator in this study, lessens the credibility of this explanation. Another possibility is that insufficient discussion of physiological symptoms in CBT interventions may lead patients to disagree with proposed diagnostic explanations and treatment goals leading to perceptions that their symptoms are not being understood or adequately addressed. The relationship between endorsement of somatic symptoms and

satisfaction with treatment or working alliance has not been explicitly studied; given the potential connection between somatization and disengagement from treatment, it is an important area for future research.

It is also possible that patients who reported more somatic symptoms had medical comorbidities that lead to their premature dropout. Findings from the CALM study do not support this explanation, as Latinx had fewer comorbid medical conditions (e.g., diabetes, hypertension) relative to non-Latinx Whites (Niles et al., 2015). Thus, findings cannot be attributed to differences in rates of medical illnesses.

Other studies, conducted with primarily non-Latinx White samples, have found that low initial symptom severity is predictive of dropout (Issakidis & Andrews, 2004; Simon & Ludman, 2010). In this sample, the opposite was found with respect to somatization. That is, high levels of initial somatic symptoms were predictive of RP dropout. There were no ethnic differences in cognitive symptoms of anxiety. These findings suggest that somatic and cognitive symptoms of anxiety may have different implications for treatment and should be considered separately, particularly with Latinx samples.

Contrary to our hypotheses, attitudinal factors, including beliefs about treatment, did not mediate the relationship between ethnicity and premature dropout. While Latinx patients tended to have more negative beliefs about treatment relative to non-Latinx White patients, these differences were small. Instead, beliefs about treatment for both Latinx and non-Latinx White patients were generally positive. Previous research suggests patients who endorse stigma are more likely to dropout of treatment (Ben-Noun, 1996; Olfson et al., 2009; Sirey et al., 2001); however, this association has not been studied explicitly in Latinx. Other research conducted

with the larger CALM sample indicated that beliefs about treatment and stigma were also not predictive of service use over the previous six months (Hunt et al., 2013).

Previous research on enculturation and acculturation suggests that higher levels of enculturation (i.e., the process in which one's original or native norms are learned or maintained; e.g., Alamilla, Kim, & Lam, 2010) are associated with stigma and preferences for culturally-relevant treatment and no treatment among Mexican Americans (Hirai, Vernon, Popan, & Clum, 2015). It is possible the present sample lacked sufficient variability in enculturation and acculturation levels, resulting in minimal variability in stigma and beliefs about treatment. A majority of the sample from the present study was English-speaking and the mean length of residency was 25 years. Some of the relationships examined in the current study may be better examined in a sample that includes less acculturated individuals, inclusive of more Spanish monolingual and recently immigrated Latinx participants.

Overall, most individual pretreatment factors examined in this study did not explain ethnic disparities in RP dropout between Latinx and non-Latinx White patients. Similarly, these factors did not account for ethnic disparities in dosage dropout (i.e., dropout prior to completion of cognitive restructuring or exposure modules). One possibility for these null results is that the proposed mediators in the present study were limited to pretreatment variables. It is possible that factors related to dosage dropout among Latinx are related to events occurring over the course of therapy, rather than individual factors collected at pretreatment.

Another possibility is that differing rates of dropout may be explained by factors that were not assessed in this study, such as environmental and provider-related factors. Environmental factors include characteristics of the healthcare delivery system and the patient's community (e.g., the availability of providers; insurance and health policies), while provider-

related factors include provider characteristics that interact with patient characteristics to influence health care utilization (e.g., the provider's gender, or therapist-patient ethnic match). Further, the CALM study did not include measurements of logistic or structural barriers to receiving treatment such as issues related to scheduling (e.g., lack of appointment availability), circumstances that make it difficult to attend treatment (e.g., lack of transportation, lack of childcare, inconvenient location of services, travel distance), financial concerns, and change in circumstances (e.g., schedule changes, moving). Previous research on the relationship between structural barriers and premature dropout using national samples (NCS-R and WHO World Mental Health) has found that attitudinal factors (e.g., stigma, perceived need) are more often cited by patients as reasons for discontinuation than structural barriers (Andrade et al., 2014; Mojtabai et al., 2011). These studies concluded that structural barriers should generally be considered as less important than attitudinal barriers, such as the perceived need or ineffectiveness of treatment; however, structural barriers are often cited as important factors in determining access to and initiation of treatment among minority clients (e.g., Cabassa et al., 2006). Although the effect of structural barriers on premature dropout among minority clients is understudied, a couple of studies have found that structural barriers may be relevant for minority clients when examining premature dropout as well as initiation of treatment (e.g., McCabe, 2002; A. Wells, Lagomasino, Palinkas, Green, & Gonzalez, 2013).

Last, cultural fit of an intervention may be particularly important for treatment engagement (Cabral & Smith, 2011). Previous studies have found that when cultural elements were considered important but were not discussed in treatment, patients reported being less satisfied with their health care (Meyer & Zane, 2013). The CALM intervention was not adapted

a priori to meet the specific needs and issues of ethnic minority patients; the degree to which there was a cultural mismatch may have affected rates of treatment dropout for Latinx patients.

Limitations

These findings should be interpreted with some limitations in mind. The CALM study focused on the overall effectiveness of a CBT model of treatment delivery for patients with anxiety disorders in primary care; as such, it was not designed to measure constructs that may be relevant to ethnic disparities such as acculturation, enculturation, and perceived discrimination. Although this is the largest sample of Latinx in a randomized controlled trial to date, the number of Latinx in the study who participated in psychotherapy (n = 96) does not allow for more nuanced analyses, such as examining the moderating effect of gender on the relationship between social support and premature dropout. Another caution with respect to the Latinx sample is the assumption that ethnic group membership reflects cultural beliefs. Although distal measurements of culture (i.e., ethnic group membership) are common in the literature, they do not reflect diversity within the Latinx group. For the present study, country of origin, acculturation, and cultural beliefs were not specifically assessed. Thus, future research should aim to examine premature dropout among a larger group of Latinx that will allow for further examination of more proximal cultural factors.

Since the CALM study sample was drawn from primary care settings, these patients represent a subsample of their racial/ethnic groups and cannot be considered representative of the broad spectrum of individuals, some of whom may not seek or be able to access medical and mental health care. The homogeneity of the sample in this respect may account for the lack of detection of differences across ethnic groups in stigma and beliefs about treatment. Despite this issue of generalizability, the nature of data collection from primary care can be considered a

strength of the study. These results provide insight into the nature of a treatment-seeking population. Furthermore, a primary care sample is important when examining ethnic disparities because Latinx are more likely to seek their mental health care in primary care than in specialty mental health clinics (Alegría et al., 2002).

Conclusion

In this study, Latinx patients dropped out of treatment more often than non-Latinx White patients, resulting in roughly one-third of Latinx patients failing to receive treatment that included important therapy elements for anxiety such as cognitive restructuring and exposure. Findings from this study begin to explain why dropout may be more common in Latinx compared to non-Latinx White patients, highlighting the importance of social support and somatization; however, much work remains in this regard. Future research focusing on environmental and provider-related factors as well as variables that occur throughout the therapy process are worthwhile directions for research in order to better understand disparities in treatment engagement among Latinx.

Table 1. Ethnic differences in demographic variables and hypothesized mediators

Variables			Latinx	Non-Latinx White
	χ^2	*p*	*N* (%)	*N* (%)
Treatment Type (Combined)	0.63	0.43	48 (56.47%)	154 (61.35%)
Gender (Women)	9.14*	.002	79 (82.29%)	169 (65.76%)
Education (College level or higher)	6.80	.009	67 (69.79%)	212 (82.49%)
Marital Status (Married or living together)	3.95	0.05	65 (67.71%)	144 (56.03%)
Insurance (Consistent health insurance in the past 6 months)	0.09	0.76	66 (90.41%)	197 (89.14%)
	t	*p*	*M* (*SD*)	*M* (*SD*)
Age	2.71*	.007	40.18 (13.34)	44.49 (13.31)
Stigma	-0.36	0.72	5.44 (1.58)	5.36 (1.67)
Estimate of percentage of patients who are helped	-1.75	0.08	66.14 (19.97)	62.02 (19.26)
Estimate of percentage of patients who get better without professional help	-1.00	0.31	24.25 (21.08)	22.09 (16.17)
Beliefs about Psychotherapy	-1.70	0.09	1.67 (1.39)	1.27 (0.08)
Beliefs about Medication	-3.49**	.001	3.44 (1.61)	2.75 (1.73)
Perceived Discrimination	-7.14**	< .001	1.99 (0.92)	1.33 (0.69)
Poverty	-3.86**	< .001	3.35 (2.45)	5.52 (10.63)
Social Support	-2.27*	0.02	3.08 (0.92)	3.27 (1.07)
BSI Anxiety	-0.60	0.55	10.24 (5.31)	9.87 (5.13)
BSI Somatization	-2.35*	0.01	6.91 (4.65)	5.65 (4.36)
Number of Anxiety Disorders	-3.58***	< .001	2.17 (0.97)	1.72 (0.75)
PHQ-9 (Depression)	0.29	0.98	12.42 (6.58)	12.44 (6.57)
SF-12 (Functional Impairment)				
Mental Functional Impairment	1.12	0.26	31.30 (10.32)	32.66 (10.04)
Physical Functional Impairment	1.60	0.10	48.01 (10.31)	50.19 (11.72)

Table 2. The proportion of individuals who dropped out, split by ethnicity, is presented.

			Latinx	Non-Latinx White
Dropout	χ^2	*p*	*N* (%)	*N* (%)
Relapse Prevention Definition	7.47*	.006	56 (58.33%)	108 (42.02%)
Dosage Definition	15.57**	< .001	28 (29.17%)	30 (11.67%)

Table 3. Tests of indirect effects for each type of dropout (covariates not shown)

	Coefficient (*SE*)	95% CI (lower limit)	95% CI (upper limit)
Outcome: RP Dropout			
Predisposing Factors			
Beliefs about medication	0.01 (0.03)	-0.06	0.08
Beliefs about psychotherapy	0.02 (0.03)	-0.01	0.13
Enabling Factors			
Perceived discrimination	.005 (0.12)	-0.22	0.26
Social support	0.09 (0.05)	0.01	0.25
Poverty	-0.02 (0.09)	-0.11	0.23
Need Factors			
BSI Somatization	0.12 (0.07)	0.01	0.30
Number of anxiety disorders	-0.07 (0.06)	-0.22	0.02
SF-12 Physical functional impairment	-0.04 (0.06)	-0.18	0.06
Outcome: Dosage Dropout			
Predisposing Factors			
Beliefs about medication	-0.01 (0.05)	-0.16	0.06
Beliefs about psychotherapy	0.04 (0.04)	-0.02	0.17
Enabling Factors			
Perceived discrimination	0.12 (0.15)	-0.16	0.43
Social support	-0.02 (0.05)	-0.16	0.05
Poverty	0.36 (0.21)	0.09	0.98

Need Factors			
BSI Somatization	0.03 (0.05)	-0.03	0.18
Number of anxiety disorders	-0.13 (0.09)	-0.36	-.004
SF-12 Physical functional impairment	0.11 (0.08)	-0.02	0.31

Table 4. Associations between ethnicity and mediators (*a paths*) after covarying sociodemographic factors, treatment type, and site (covariates not shown)

	Coefficient (*SE*)	95% CI (lower limit)	95% CI (upper limit)
Predisposing Factors			
Beliefs about medication	0.39 (0.22)	-0.05	0.83
Beliefs about psychotherapy	0.18 (0.17)	-0.16	0.53
Enabling Factors			
Perceived discrimination	0.75 (0.10)	0.55	0.95
Social support	-0.27 (0.13)	-0.53	-.003
Poverty	-2.16 (1.19)	-4.50	0.18
Need Factors			
BSI Somatization	1.02 (0.58)	0.12	2.16
Number of anxiety disorders	0.36 (0.10)	0.16	0.57
SF- 12 Physical functional impairment	-4.24 (1.42)	-7.04	-1.44

Table 5. Association of mediators and ethnicity to each type of dropout (*b and c' paths*) after covarying sociodemographic factors, treatment type, and site (covariates not shown)

	Coefficient (*SE*)	OR	95% CI (lower limit)	95% CI (upper limit)
Outcome: RP Dropout				
Predisposing Factors				
Ethnicity (direct effect)	0.56 (0.28)	1.75	0.02	1.11
Beliefs about medication	.004 (0.07)	1.00	-0.13	0.14
Beliefs about psychotherapy	0.13 (0.08)	1.33	-0.04	0.29
Enabling Factors				
Ethnicity (direct effect)	0.62 (0.29)	1.86	0.04	1.20
Perceived discrimination	.007 (0.15)	1.01	-0.28	0.29
Social support	-0.30 (0.11)	0.74	-0.53	-0.08
Poverty	.007 (0.01)	1.00	-0.01	0.03
Need Factors				
Ethnicity (direct effect)	0.70 (0.28)	2.01	0.14	1.25
BSI Somatization	0.08 (0.03)	1.09	0.03	0.14
Number of anxiety disorders	-0.20 (0.14)	0.81	-0.49	0.08
SF-12 Physical functional impairment	.008 (0.01)	1.01	-0.01	0.03
Outcome: Dosage Dropout				
Predisposing Factors				
Ethnicity (direct effect)	1.25 (0.35)	3.49	0.55	1.95
Beliefs about medication	-0.04 (0.09)	0.96	-0.22	0.14

Beliefs about psychotherapy	0.19 (0.11)	1.21	-0.03	0.41
Enabling Factors				
Ethnicity (direct effect)	0.97 (0.38)	2.65	0.22	1.72
Perceived discrimination	0.16 (0.18)	1.17	-0.20	0.52
Social support	0.09 (0.16)	1.09	-0.22	0.40
Poverty	-0.17 (0.07)	0.84	-0.30	-0.03
Need Factors				
Ethnicity (direct effect)	1.25 (0.36)	3.49	0.53	1.97
BSI Somatization	0.03 (0.03)	1.03	-0.04	0.10
Number of anxiety disorders	-0.36 (0.20)	0.69	-0.76	0.04
SF-12 Physical functional impairment	-0.02 (0.01)	0.97	-0.05	.004

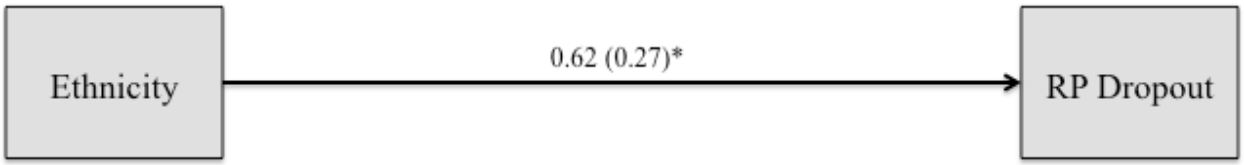


Figure 1a. Total effect of ethnicity (non-Latinx White coded as 0; Latinx coded as 1) on relapse prevention (RP) dropout (remained in study coded as 0; dropped out coded as 1), after accounting for covariates age, education, treatment type, and site.

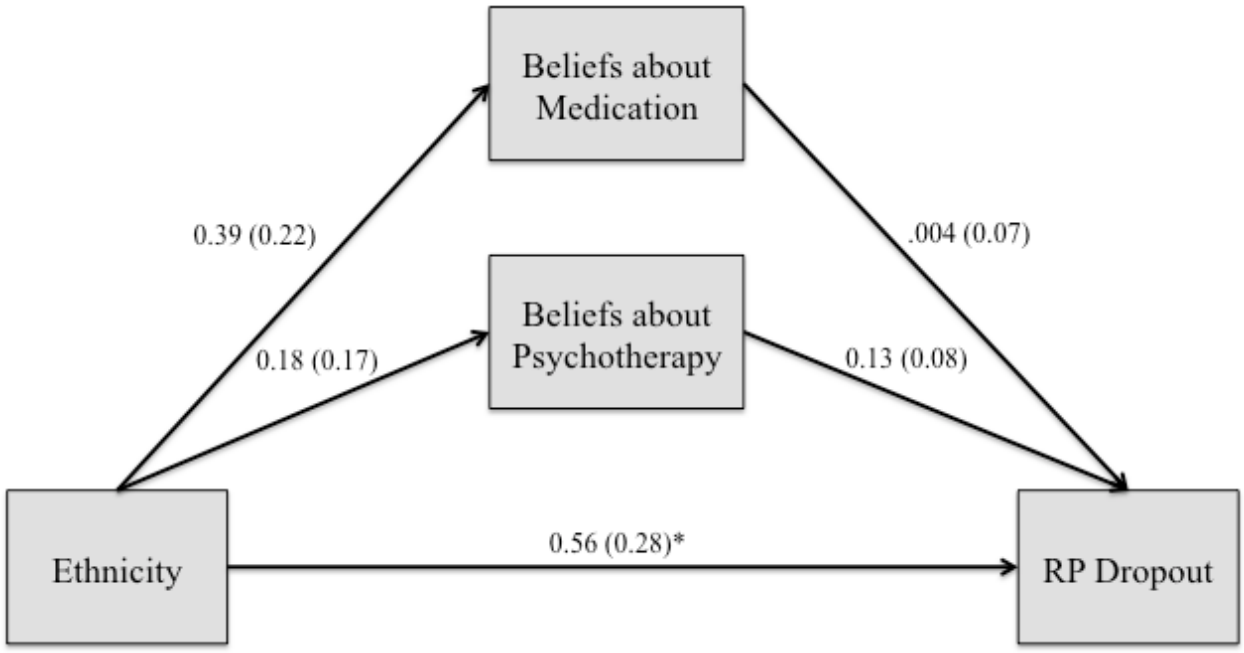


Figure 1b. Multiple mediation model of predisposing factors predicting relapse prevention (RP) dropout

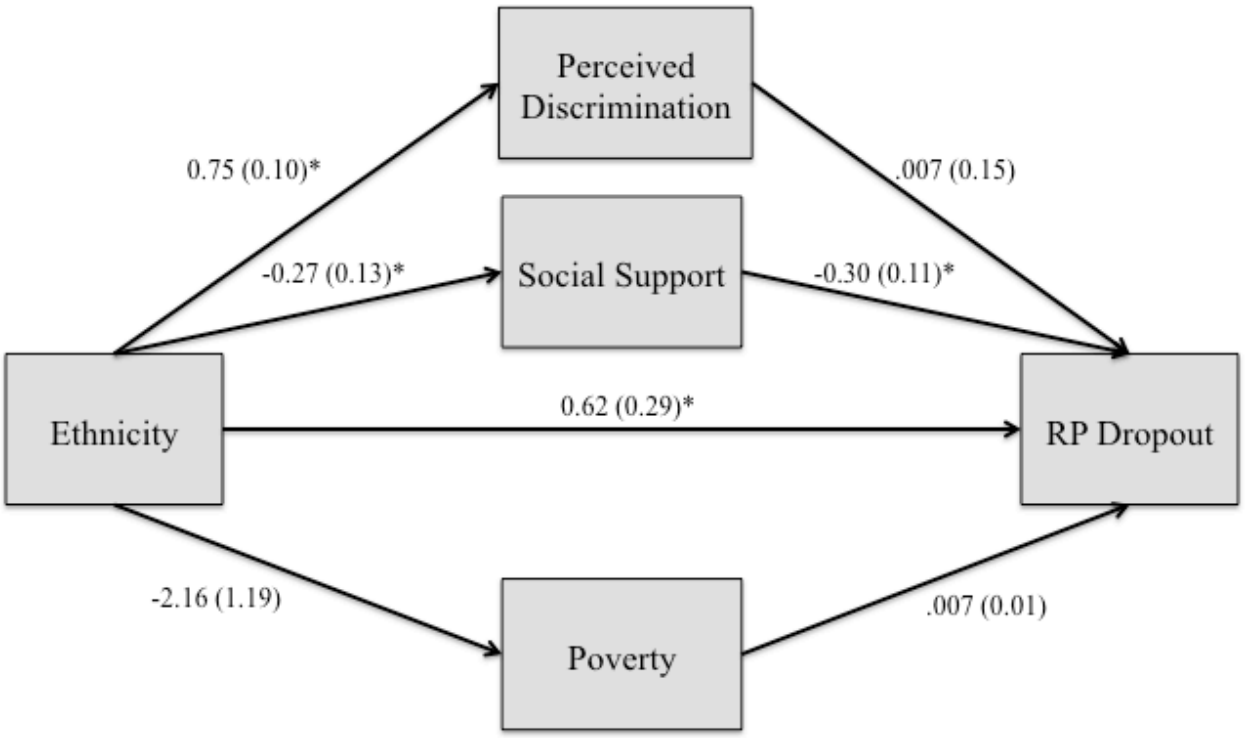


Figure 1c. Multiple mediation model of enabling factors predicting RP dropout

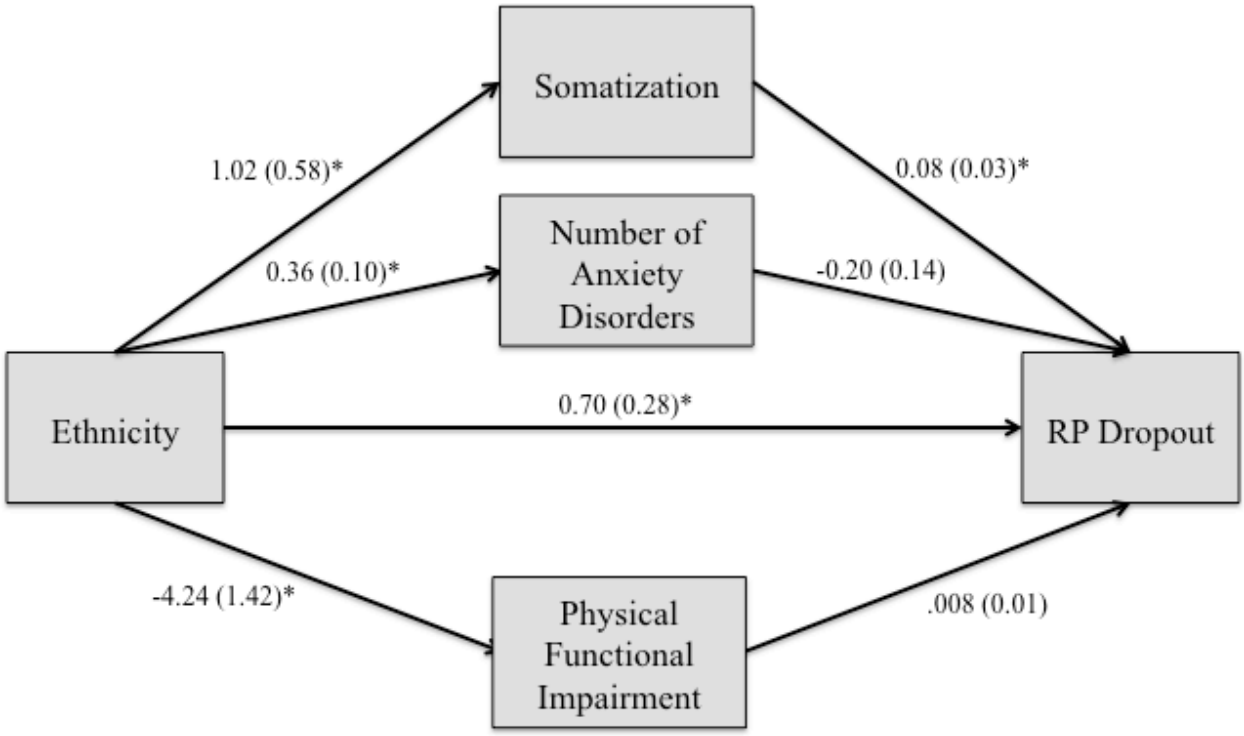


Figure 1d. Multiple mediation model of need factors predicting RP dropout

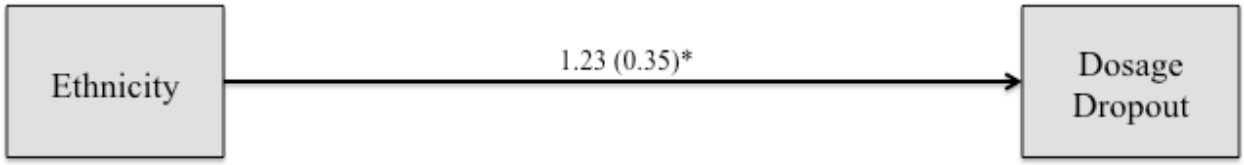


Figure 2a. Total effect of ethnicity (non-Latinx White coded as 0; Latinx coded as 1) on dosage dropout (remained in study coded as 0; dropped out coded as 1), after accounting for covariates age, education, treatment type, and site.

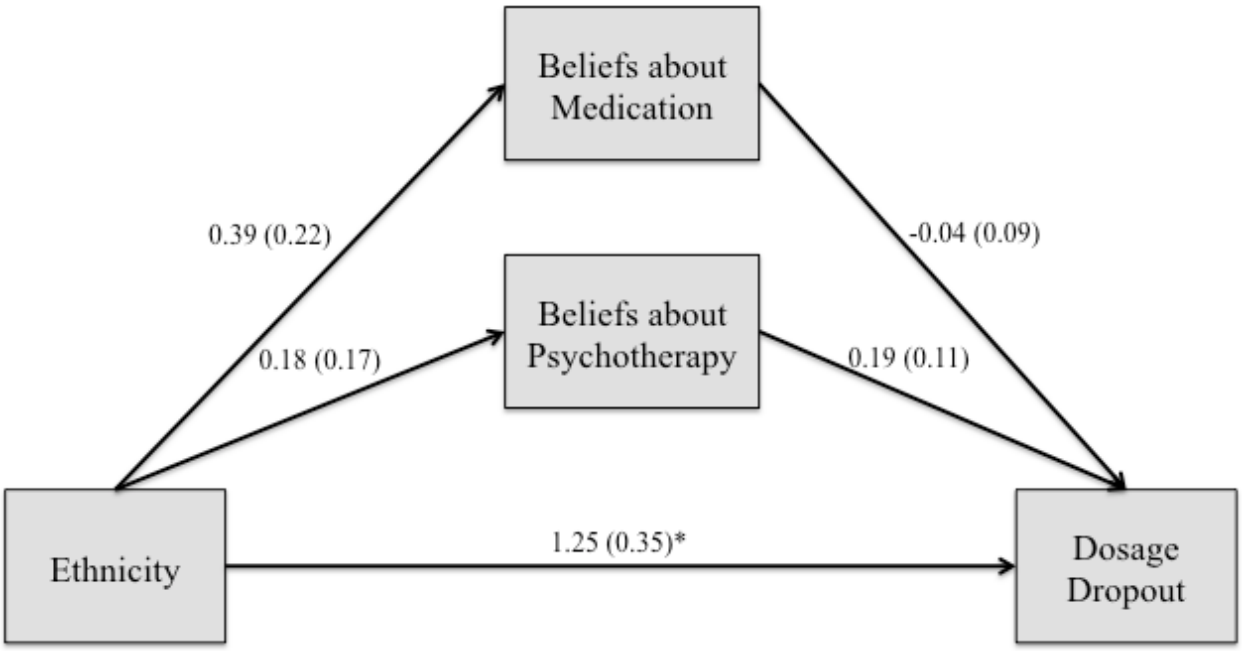


Figure 2b. Multiple mediation model of predisposing factors predicting dosage dropout

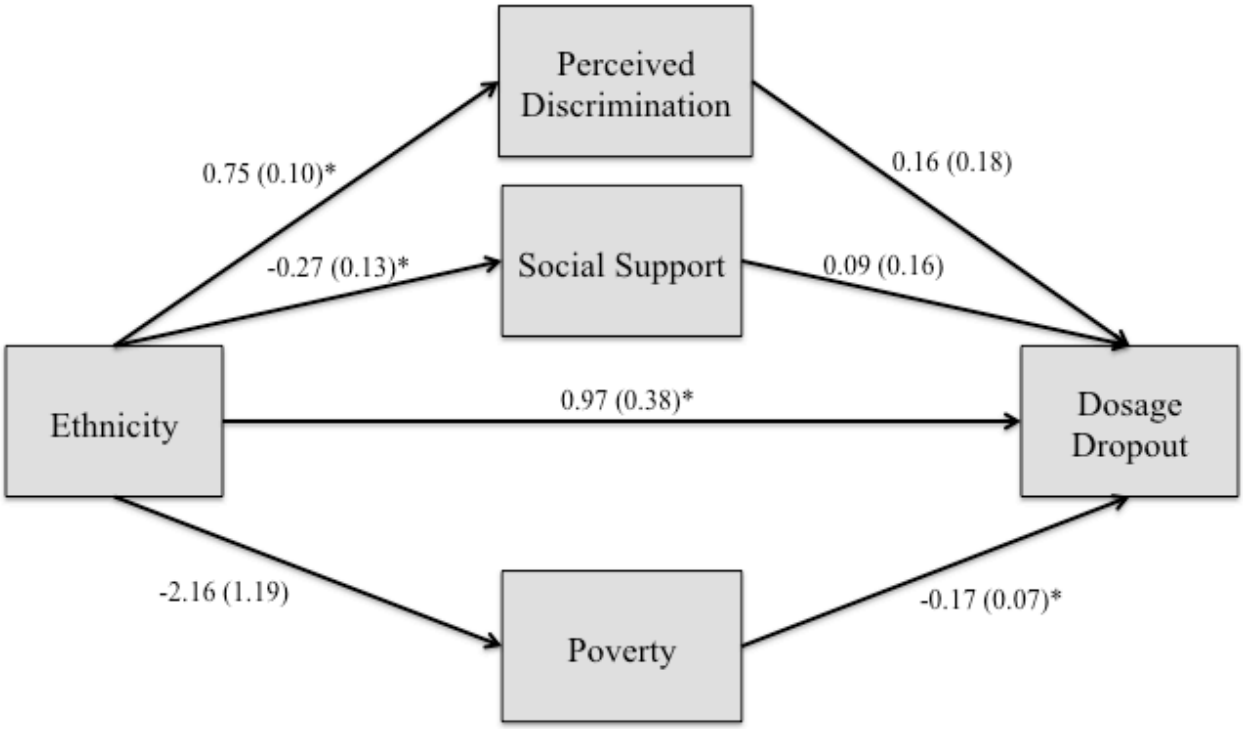


Figure 2c. Multiple mediation model of enabling factors predicting dosage dropout

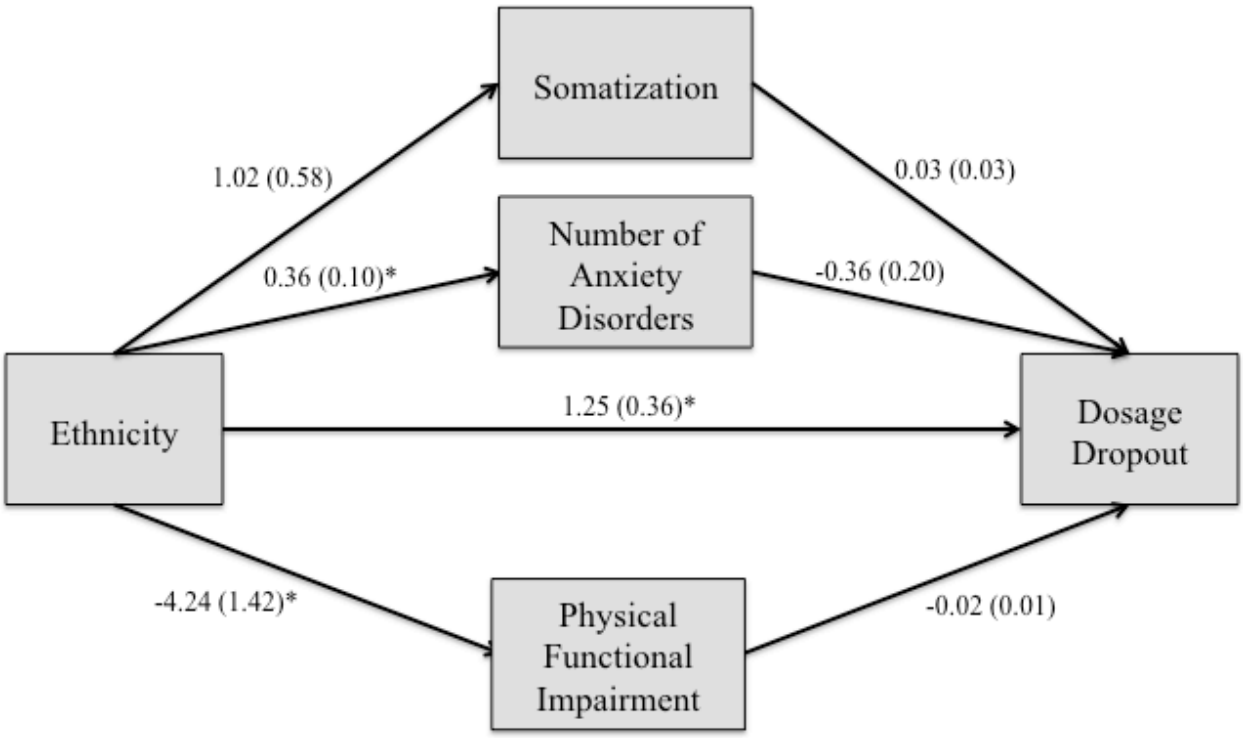


Figure 2d. Multiple mediation model of need factors predicting dosage dropout.

Study 2: Relationship between CBT understanding and therapeutic engagement in Latinx and non-Latinx White patients

Cognitive-behavioral therapy (CBT) is a well-validated treatment for anxiety disorders and is efficacious in preventing relapse (for reviews see Butler, Chapman, Forman, & Beck, 2006; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). Findings from meta-analyses have revealed medium to large effect sizes for CBT for generalized anxiety disorder, panic disorder (with and without agoraphobia), social anxiety disorder, posttraumatic stress disorder, and major depressive disorder in adult samples (Butler et al., 2006; Hofmann et al., 2012). There is also evidence that CBT is efficacious in reducing anxiety symptoms across racial and ethnic minorities, including Latinx (e.g., Cardemil, Reivich, Beevers, Seligman, & James, 2007; Chavira et al., 2014; Miranda et al., 2003). Cognitive-behavioral therapies emphasize the importance of skill acquisition and use (e.g., learning about anxiety; reducing avoidance through exposures) to reduce symptoms (e.g., Beck et al., 1979; Craske, Roy-Byrne, et al., 2009). One metric of skill acquisition is CBT understanding.

CBT understanding is a multifaceted construct that includes a patient's knowledge of CBT skills (e.g., Craske, Roy-Byrne, et al., 2009; Hundt, Mignogna, Underhill, & Cully, 2013). A number of studies have found that patients' understanding of how to use CBT skills improves over the course of treatment (e.g., Macrodimitris et al., 2011; Neuhaus, Christopher, Jacob, Guillaumot, & Burns, 2007; Wright et al., 2002). Despite its potential importance, there have only been a few studies that directly examine patients' understanding of CBT principles as a mechanism of change in CBT treatment (Hundt et al., 2013). For example, findings from two studies of patients with depression suggest that low CBT understanding at mid-treatment or the end of treatment predicts negative symptom outcomes (Barber & DeRubeis, 2001; Neimeyer,

Kazantzis, Kassler, Baker, & Fletcher, 2008) and risk for relapse six months later (Neimeyer & Feixas, 1990; Strunk, Brotman, & DeRubeis, 2010). These studies operationalized CBT understanding as being somewhat synonymous with skill acquisition, and included ratings that reflect the degree to which patients' use responses that align with what a cognitive therapist would recommend (Barber & DeRubeis, 2001), as well as patients' daily mood logs coded for skill in cognitive restructuring (Neimeyer & Feixas, 1990; Neimeyer et al., 2008).

To date, research examining CBT understanding has been confined to studies that examine clinical symptom outcomes (e.g., Hundt et al., 2013); however, it is possible that those who do not understand CBT principles are subsequently less likely to engage in future therapy tasks. Understanding of a subject matter is associated with an individual's confidence in his or her own ability to motivate and use resources needed to successfully execute a task and to persist in behaviors (Stajkovic & Luthans, 2003). Further, CBT understanding early on in treatment may be particularly important because it lays the groundwork for skill acquisition later in treatment. To date, no study has examined the association between CBT understanding in the first sessions of treatment and subsequent therapeutic engagement.

Findings from the CALM study suggest that Latinx have poorer CBT understanding than non-Latinx Whites (Chavira et al., 2014). In that study, CBT understanding was aggregated over the course of treatment to create an overall CBT understanding variable; CBT understanding early on in treatment was not specifically examined. In addition to poorer CBT understanding, Latinx in the CALM sample attended fewer sessions, and were more likely to drop out of treatment (Chavira et al., 2014). Research has not yet examined CBT understanding as an early indicator of therapeutic engagement, nor has it focused on CBT understanding as a variable that

explains higher rates of dropout among Latinx when compared to other racial/ethnic groups such as non Latinx Whites.

Aims and Hypotheses. The primary aim of this study was to determine if early CBT understanding predicts premature dropout and explains differential rates in premature dropout between Latinx and non-Latinx White patients with anxiety disorders. It was hypothesized that Latinx patients would have lower CBT understanding than non-Latinx White patients, that lower CBT understanding would be associated with higher rates of premature dropout, and that CBT understanding would mediate the relationship between ethnicity and premature dropout after accounting for demographic factors, baseline anxiety, treatment type, and site.

A secondary aim of this study was to examine if early CBT understanding predicts other engagement outcomes, including commitment to therapy and homework adherence. Although there were no ethnic differences in commitment to therapy and homework adherence (Chavira et al., 2014), these secondary engagement outcomes may also be positively associated with CBT understanding.

Method

Patients included in these analyses participated in at least one session of CBT using the modular, computer-assisted program *CALM Tools for Living* (Craske, Rose, et al., 2009). Following completion of one round of treatment, patients were provided the option of continuing treatment with the repetition of relevant modules. For information regarding patient characteristics, recruitment, and design of the CALM intervention please see the general method section.

Measures

Outcome measures. The primary outcome measure was premature dropout, using a well-established definition—discontinuation of treatment prior to completion of the therapeutic protocol. In the case of the CALM protocol, premature dropout can be defined as the failure to complete the relapse prevention module following randomization to the intervention condition and initiation of psychotherapy services (i.e., relapse prevention dropout).

Secondary outcome measures included commitment to therapy and homework adherence. "Overall commitment to CBT this session" was rated on a 0 to 10 point scale (0 = No commitment, 10 = Complete commitment) by the anxiety clinical specialist (ACS) following each session. ACSs also rated the extent to which patients completed assigned homework on a 4-point scale (1 = Missed most, 2 = Missed half, 3 = Missed few, and 4 = Missed none) at each session. For instance, following a module teaching relaxation skills, patients were asked to practice breathing skills a particular number of times.

CBT understanding. Following each session, ACSs provided a rating of CBT understanding (i.e., "How well did the patient understand the CBT principles presented in this session?") on a scale of 0 to 10 (0 = No understanding, 10 = complete understanding). Early CBT understanding was defined as the mean rating of CBT understanding from sessions 2 and 3. (Session 1 was typically a decision-making module during which patients decided on primary symptoms to target and thus was not included in the mean rating). Program modules did not have a one-to-one correspondence with session number. Thus, session ratings of CBT understanding were not understanding ratings of a particular skill; CBT modules within the first three sessions of treatment primarily consisted of psychoeducation (95.48% of patients), record keeping (92.47% of patients), hierarchy development (90.66% of patients) and breathing (81.63% of patients).

Demographic information. Demographic information for each patient was collected, including age, education level, and a poverty index. Education was treated as a dichotomous variable reflecting less than or equal to versus above a high school education. Poverty was determined by collecting income and calculating a weighted average income threshold based on the Federal Poverty Guidelines (United States Census Bureau, 2010), adjusted for family size, age of respondent, and number of children less than 18-years-old. Family income divided by this threshold value created a poverty ratio.

Baseline anxiety severity. Baseline anxiety severity was used as a covariate in all analyses. The Brief Symptom Inventory (BSI-18; Derogatis, 2001) is an abbreviated 18-item version of the SCL-90-R, a scale that measures psychological distress. Respondents rate each of the BSI-18 items on a five-point Likert scale according to how distressed they have felt during the past seven days. The subscales measure somatization (distress caused by the perception of bodily dysfunction), psychic anxiety (symptoms of nervousness, tension, motor restlessness, apprehension, and panic states), and depression. A composite score of the anxiety and somatic subscales will be used to represent baseline anxiety severity. The BSI-18 has been examined in numerous Latinx samples and demonstrates good reliability and validity; however, a couple studies have revealed an inconsistent factor structure, suggesting the need for further research on the psychometric properties of the BSI-18 with Latinx (Galdon et al., 2008; Torres et al., 2013; Wiesner et al., 2010). In the current sample, both the anxiety and somatization subscales demonstrated good internal consistency reliabilities among non-Latinx Whites (Cronbach's alphas = 0.84 and 0.74 respectively), and Latinx (Cronbach's alphas = 0.85 and 0.79 respectively).

Data Analytic Plan

A primary aim of this study was to determine if early CBT understanding mediated the relationship between ethnicity and premature dropout. The mediation model estimated the following parameters: (1) the specific effect of ethnicity on each mediator variable after controlling for covariates, (2) specific effects of each mediator variable on each type of dropout after controlling for ethnicity and covariates, and (3) the indirect effect of ethnicity on dropout through each proposed mediator. Parameter estimates and 95% bias-corrected and accelerated confidence intervals for indirect effects were generated based on 50,000 bootstrap resamples (Preacher & Hayes, 2008). Significance of indirect effects was determined by examining confidence intervals. Mediation analyses were conducted using SPSS 25.0 and the publicly available SPSS macro for mediation (http://afhayes.com/spss-sas-and-mplus-macros-and-code.html).

A secondary aim of this study was to examine if early CBT understanding predicted other engagement outcomes, including therapist ratings of commitment to therapy and homework adherence. Given that there were no ethnic differences in commitment to therapy or homework adherence in this sample (Chavira et al., 2014), the relationships between early CBT understanding and these outcomes were examined in the whole group. Both commitment to therapy and homework adherence were collected as at each session, forming a multilevel structure with repeated measures collected within patients (Raudenbush, Brennan, & Barnett, 1995). Analyses were run using a mixed model in SPSS 25.0. These outcomes were modeled as a function of intercept at level 1. Early CBT understanding, baseline anxiety severity, age, education poverty, treatment type, and site (dummy coded) were included as level 2 predictors. In the equations below, outcomes were modeled for time (session) *t* within patient *i*.

1. $CBT\ commitment_{ti} = \gamma_{00} + \gamma_{10}(Early\ CBT\ understanding) + \gamma_{20}(\text{baseline anxiety severity}) + \gamma_{30}(\text{age}) + \gamma_{40}(\text{education}) + \gamma_{50}(\text{poverty}) + \gamma_{60}(\text{treatment type}) + \gamma_{70}(\text{site1}) + \gamma_{80}(\text{site2}) + \gamma_{90}(\text{site3}) + \mu_{0i} + e_{ti}$

2. $CBT\ Homework\ adherence_{ti} = \gamma_{00} + \gamma_{10}(Early\ CBT\ understanding) + \gamma_{20}(\text{baseline anxiety severity}) + \gamma_{30}(\text{age}) + \gamma_{40}(\text{education}) + \gamma_{50}(\text{poverty}) + \gamma_{60}(\text{treatment type}) + \gamma_{70}(\text{site1}) + \gamma_{80}(\text{site2}) + \gamma_{90}(\text{site3}) + \mu_{0i} + e_{ti}$

Results

Ethnicity was associated with early CBT understanding after covarying demographic variables, baseline anxiety, treatment type, and site (*b* = -0.43, *95% CI* = -0.77, -0.09). ACSs indicated lower ratings of early CBT understanding for Latinx relative to non-Latinx White patients; differences in estimated marginal means were small (*Table 1*). Early CBT understanding was significantly associated with premature dropout (*b* = -0.27, *95% CI* = -0.49, -0.06). Model 6 was used to test for mediation (*Table 2; Figure 1*). The bootstrap confidence intervals derived from 50,000 samples indicated that there was a negative indirect effect of early CBT understanding (*95% CI* = .011, 0.41), with Latinx having lower CBT understanding and higher rates of premature dropout.

Due to lack of ethnic differences, the associations between early CBT understanding and other engagement outcomes were examined in the whole group. Results from mixed models indicated positive associations between early CBT understanding and commitment to therapy as well as homework adherence, after covarying demographic factors, baseline anxiety, treatment type, and site (*Table 3*).

Discussion

Typically, ethnic differences in premature dropout have been attributed to attitudinal, logistic, or motivational factors (Miranda et al., 2003; Organista et al., 1994). Results from the present study suggest that another factor—understanding of CBT concepts—may be at play in predicting engagement in therapy. CBT understanding may be especially important given the theoretical importance that the cognitive-behavioral orientation places on skill acquisition and use (e.g., Beck et al., 1979; Craske, Roy-Byrne, et al., 2009). Studies indicate that information presented earlier in treatment is related to increased awareness of mental illness, decreased stigma, and increased engagement (Cho, Torres-Llenza, Budnik, & Norris, 2016; Martinez, Lau, Chorpita, Weisz, & Hlth, 2017). Thus, it was hypothesized that patient understanding of CBT principles lays the groundwork for subsequent engagement.

In fact, early CBT understanding was predictive of premature dropout (defined as failure to complete the intervention protocol) as well as other markers of therapeutic engagement, including therapist ratings of commitment to therapy and homework adherence. Early CBT understanding significantly predicted both commitment to therapy and homework adherence, indicating that early CBT understanding is relevant not only to premature dropout, but to other indicators of patient engagement over the course of therapy.

As hypothesized, results indicated that Latinx patients had higher rates of premature dropout and poorer CBT understanding relative to non-Latinx White patients; findings also supported the role of CBT understanding as a factor that may explain some of the higher rates of dropout among Latinx patients when compared to non Latinx White patients.

There are numerous explanations for lower CBT understanding in Latinx. For example, differing conceptualizations of anxiety disorders, may have contributed to ethnic differences in

CBT understanding. There is research to suggest that ethnic minority patients are more likely than non-Latinx White patients to conceptualize emotional problems as a social or life issue as opposed to a psychological disorder (Guarnaccia & Farias, 1988; Karasz, Sacajiu, & Garcia, 2003). In addition, Latinx in this study may have been less aligned with more traditional explanations of anxiety such as cognitive worry. It is possible that cultural mismatches between patients' experiences and manualized explanations of anxiety symptoms may have affected therapist perceptions of patient CBT understanding. It is also possible that Latinx patients had lesser understanding of anxiety and CBT to start off with, and that this persisted during treatment. A previous study indicated that only 20% of Latinx have adequate knowledge of mental health treatments (Yorgason, Linville, & Zitzman, 2008). Last, it is possible that differences in CBT understanding can be attributed to Spanish-language barriers (e.g., concepts lost in the translation of materials; patients conveying understanding back to ACSs). Only 11 patients opted to receive the intervention in Spanish, which limited the ability to conduct analyses on language as a predictor of early CBT understanding. Previous research indicates that language matching, in conjunction with ethnic matching, increases the length of treatment and decreases dropout rates (Sue, Fujino, Hu, Takeuchi, & Zane, 1991). Although it is possible that language barriers were present for Latinx who opted to receive the intervention in English (e.g., difficulty conveying understanding in a non-native language), data on language and therapist-ethnicity match, as well as cultural fit of the intervention were not collected.

Limitations and Future Directions

Measurement of CBT understanding in this study was limited to a therapist rating of patient understanding of the session content, which does not include the patients' perspectives. Furthermore, CBT understanding was measured using a single item reported by ACSs. Although

a single-item measure that is predictive of dropout is valuable because it is clinically useful and easy for clinicians to collect, future research should include more robust measurements of CBT understanding. More robust measurements should incorporate multiple facets of CBT understanding, including knowledge of a skill, frequency of skill use, quality of skill use, as well as a patient's sense of self-efficacy in using a particular skill (Craske, Roy-Byrne, et al., 2009; Hundt et al., 2013). It is likely that research on the relationship between CBT understanding and psychotherapy outcomes is limited due to the absence of psychometrically valid measures of this construct. Similarly, research is limited by the absence of measures to be completed by differing informants including patients, therapist, and independent raters, as well as the absence of measures of understanding for specific CBT skills (e.g., relaxation, cognitive restructuring, exposure, etc.). Last, CBT understanding in the present study was assessed by asking therapists to rate "How well did the patient understand the CBT principles presented in this session?". The focus of this assessment is on principles at each session, rather than a patient's understanding of how principles from each session relate to overall CBT goals or the trajectory of treatment. For instance, the patient's understanding of how to complete an anxiety hierarchy may differ from the patient's understanding of the purpose of the hierarchy and how the hierarchy relates to exposure and anxiety reduction. Future measures of CBT understanding should attempt to differentiate between patient knowledge of executing skills, and patient knowledge of the purpose of skills as they relate to cognitive-behavioral theory.

Another limitation in this study is the lack of accounting for therapist differences. Although analyses in this study controlled for treatment site, therapist and site were not treated as additional levels in multilevel analyses given that small sample sizes ($n_{site} = 4$; $n_{therapist} = 17$) at these levels would lead to biased estimates of standard errors (Maas & Hox, 2005). The role of

therapists in this study may have been relevant given previous research with CALM data indicating variability in therapists' competence (i.e., the skill of the therapist in delivering a particular therapeutic intervention) associated with some clinical symptom outcomes (L. A. Brown et al., 2013). The relationship between therapist competence and premature dropout has not been examined and is an important area for future research. It is possible CBT understanding mediates the relationship between the therapist competence and important clinical outcomes. (That is, therapist ability to administer an intervention affects patient understanding, which in turn affects clinical and engagement outcomes).

Furthermore, patient and therapist ratings of therapeutic alliance were not collected. Elements of therapeutic alliance may be important in accounting for variance in premature dropout (Keijsers, Schaap, & Hoogduin, 2000). Studies show that as therapists get better at delivering treatment (i.e., competency improves), CBT outcomes also improve (e.g., DeRubeis, Brotman, & Gibbons, 2005). In previous research therapeutic alliance predicted CBT homework adherence (Dunn, Morrison, & Bentall, 2006), which in the CALM study was associated with both CBT understanding and considered an indicator of therapeutic engagement. Further research is needed examining the associations between therapeutic alliance and CBT understanding and ultimately their associations with premature dropout.

Clinical Implications

Therapists' perceptions of patient CBT understanding within the first three sessions of treatment are indicative of subsequent patient disengagement. The use of brief patient and therapist report measures of CBT understanding in clinical practice have the potential benefit of alerting a clinician to potential disengagement and risk for premature dropout early in treatment. Thus, in addition to tracking symptom change, therapists would benefit from assessing and

tracking lapses in understanding of CBT. CBT understanding may also partially explain ethnic disparities in premature dropout; however, further research is needed as effect sizes were small. Given that patient understanding of CBT principles is an understudied area, considerable research and development of psychometrically valid measures is needed to fully understand the relationships between understanding of CBT principles, therapeutic alliance, symptom outcomes, and engagement.

Table 1. Estimated marginal means of early CBT understanding for Latinx and Latinx-White patients in an ANCOVA with demographic factors, baseline anxiety, treatment type and site as covariates.

	Latinx		Non-Latinx White			
	M	*SD*	*M*	*SD*	*F*	*p*
Early CBT Understanding	7.70	0.14	8.14	0.08	6.37	0.01

Table 2. Mediation analysis examining whether ACS-reported early CBT understanding mediates the relationship between ethnicity and premature dropout. Covariates (not shown) included age, education, poverty index, baseline anxiety, treatment type, and site.

	Coefficient (*SE*)	*OR*	*95% CI*
Early CBT Understanding			
Ethnicity (*a path*)	-0.43 (0.17)	--	[-0.77, -0.09]
Premature Dropout			
Early CBT Understanding (*b path*)	-0.28 (0.11)	0.76	[-0.49, -0.06]
Ethnicity (*c' path*)	0.15 (0.31)	1.16	[-0.45, 0.76]
Test of indirect effect	0.12 (0.07)	--	[0.01, 0.41]

Table 3. Fixed effects of early CBT understanding on CBT commitment and homework adherence. Covariates (not shown) included age, education, poverty index, baseline anxiety, treatment type, and site.

	Coefficient (*SE*)	*t*	*95% CI*
Outcome: CBT Commitment			
Intercept	3.81 (0.47)	8.13	[2.89, 4.73]
Early CBT Understanding	0.53 (0.04)	11.88	[0.44, 0.61]
Outcome: Homework Adherence			
Intercept	2.26 (0.30)	7.43	[1.66, 2.86]
Early CBT Understanding	0.16 (0.03)	5.69	[0.22, 0.11]

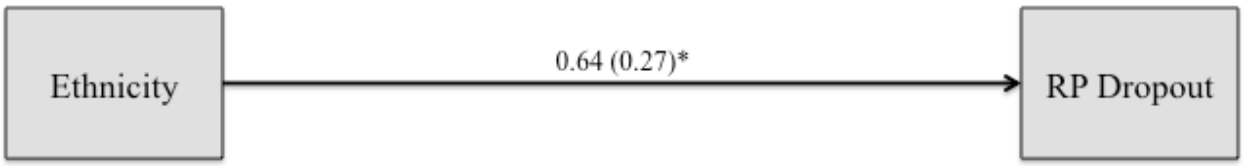


Figure 1a. Total effect of ethnicity (non-Latinx White coded as 0; Latinx coded as 1) on relapse prevention (RP) dropout (remained in study coded as 0; dropped out coded as 1), after accounting for covariates and site.

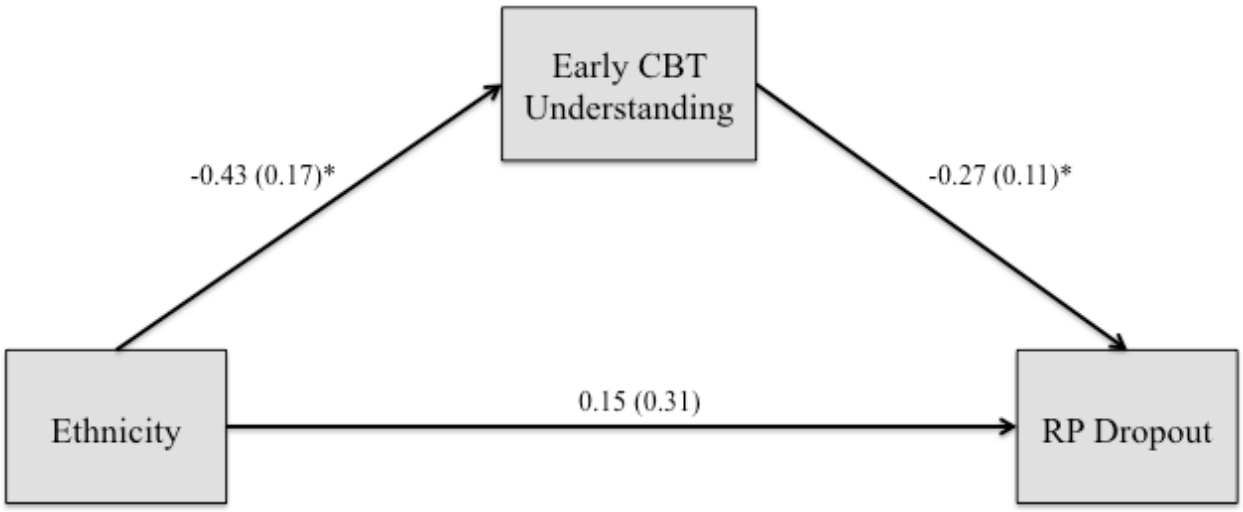


Figure 1b. Model of ACS-reported early CBT understanding mediating the relationship between ethnicity and RP dropout. Covariates (not shown) included age, education, poverty index, baseline anxiety, treatment type, and site.

Study 3: Survival modeling of premature dropout from CBT: Rate of anxiety symptom change in Latinx and non-Latinx White patients

Much of the research on premature dropout focuses on pretreatment predictors and group differences between completers and non-completers (e.g., Swift & Greenberg, 2012). Although group differences may be useful in understanding engagement in treatment, there may be more proximal factors that contribute to the decision to discontinue services. Variables relevant to the clinical disorder and therapeutic process such as symptom severity, and rate of symptom change (Bados, Balaguer, & Saldana, 2007; Hunsley, Aubry, Verstervelt, & Vito, 1999; Krishnamurthy, Khare, Klenck, & Norton, 2015; Zandberg, Rosenfield, Alpert, McLean, & Foa, 2016) may have important implications for therapeutic engagement.

Research on how symptoms influence therapeutic engagement and premature dropout is limited to the investigation of initial symptom severity. For instance, studies on treatment uptake suggest that high symptom severity attracts people to seek treatment (Bartels et al., 2004; Vera et al., 1998). In addition, high initial symptom severity is positively associated with retention of patients while low initial symptom severity is associated with premature dropout (Issakidis & Andrews, 2004; Simon & Ludman, 2010). Although these studies offer important information on patient engagement and premature dropout, they only examine fixed clinical variables as predictors of later discontinuation and do not capture the dynamic process of symptom change and engagement over the course of treatment.

The Role of Symptom Change in Patient Decision-Making: A Theoretical Approach

The episodic nature of psychotherapy allows patients to assess the costs and benefits of attending treatment on a session-by-session basis. Thus, patients can be viewed as active decision makers weighing the long-term benefits of therapy attendance with potential short-term

costs (Krishnamurthy et al., 2015). Borrowing from decision-making literature, the goal as a reference point hypothesis (Heath, Larrick, & Wu, 1999) holds that the farther away an individual is from a goal, the higher the perceived need of pursuing the goal. This results in greater motivation to pursue the goal (Heath et al., 1999). In line with this theory, patients with higher symptom severity, who have more to gain by pursuing the goal of symptom reduction, will be more likely to remain in treatment relative to patients with lower symptom severity (Krishnamurthy et al., 2015).

Research on decision-making has also focused on intertemporal choice, or the study of how people weigh trade-offs between short-term and long-term consequences when making a decision (Chapman, 1998). This research suggests that when individuals perceive that costs exceed benefits, they are at risk for abandoning the activity (Zwick, Rapoport, Lo, & Muthukrishnan, 2003). In other words, exposure to aversive costs (e.g., time, effort, stigma) is weighed in a decision-making process against the goal of symptom reduction. As symptoms reduce, the social, emotional, financial and time costs of therapy may begin to outweigh the benefit of symptom reduction and perceived need for treatment (Krishnamurthy et al., 2015).

The association between rate of symptom change and premature dropout may be especially important among ethnic groups such as Latinx, who often experience more social, emotional, and financial barriers to accessing and adhering to services (for a review see Cabassa et al., 2006). It is possible that Latinx patients may respond to symptom improvement somewhat paradoxically, as suggested by the decision-making literature. That is, as symptoms reduce, Latinx may be more likely to dropout due to the diminishing benefits of treatment in the context of greater social, emotional, and financial barriers to engagement.

Symptom Change and Premature Dropout

Very few studies have investigated the role of symptom change over the course of therapy in predicting premature dropout and none have examined these effects specifically in Latinx. To date, two studies have examined symptom change in relation to premature dropout. Krishnamurthy and colleagues (2015) examined outpatients in a 12-week CBT treatment for anxiety disorders using survival analysis (n = 139) and found that faster rates of anxiety symptom reduction were associated with greater risk of dropout. This relationship was stronger for patients with low levels of initial anxiety relative to patients with high levels of initial anxiety. A second study (Zandberg et al., 2016) found similar, though more nuanced, results in a sample of patients with PTSD and alcohol dependence from a specialty anxiety clinic and a Veterans Affairs hospital. In this study, Zandberg and colleagues examined dropout as a dichotomous variable (i.e., modeling odds of a binary event, rather than continuously modeling the hazard rate as in survival techniques) and found that among patients with low initial PTSD severity, faster PTSD symptom improvement predicted higher likelihood of dropout. In addition, among patients with high initial symptom severity, both extremes of symptom improvement (i.e., the patients with very rapid or very slow symptom improvement) predicted likelihood of dropout.

Thus, across the studies, rapid symptom improvement was associated with greater premature dropout, particularly for those with low initial anxiety, a finding consistent with the cost-benefit hypothesis which suggests that patients who no longer perceive that the need for treatment outweighs the costs of attending are more likely to prematurely discontinue therapy. Overall, these studies suggest that rate of symptom change interacts with initial symptom severity in its influence on premature dropout; however, given the paucity of research in this area, especially with ethnic minority samples, further research is needed.

Other Sociodemographic and Clinical Factors Related to Premature Dropout

The influence of sociodemographic variables on time to dropout has not been extensively studied. Krishnamurthy and colleagues did not find that demographic characteristics such as age, marital status, and education (Krishnamurthy et al., 2015) were predictive of time to dropout among anxiety patients; however, meta-analyses examining the likelihood of premature dropout (i.e., modeling odds of a binary event) have found have found that younger age and lower education levels are the most consistent predictors, whereas factors such as gender and marital status are generally not predictive (Swift & Greenberg, 2012; Wierzbicki & Pekarik, 1993). Thus, sociodemographic factors such as age and education level should be accounted for when considering premature dropout.

The Present Study

This study is unique in that it is the first to examine symptom change as a predictor of premature dropout in Latinx. The CALM data lends itself well to the study of symptom change and premature dropout given that data was collected at multiple weekly time points, which allows for tracking symptom data up until the point of dropout. The CALM study does not include measures of logistic or structural barriers to receiving treatment. Thus, an examination of interactive effects of these barriers and symptom change on time to dropout was not possible.

Aims and hypotheses. The primary aim of the present study was to examine whether the influence of symptom severity variables, mainly rate of anxiety symptom change, on time to dropout differs between Latinx and non-Latinx White patients. It was hypothesized that the relationship between rapid anxiety improvement and greater risk of premature dropout would be present for both Latinx and non-Latinx White patients; however, given that Latinx face significant barriers to treatment access (Cabassa et al., 2006), the relationship between rapid

symptom improvement and premature dropout was predicted to be stronger in Latinx relative to non-Latinx White patients. A secondary aim of this study was to examine the role of rate of anxiety change and moderation between this slope and baseline anxiety severity in predicting premature dropout in the whole group. Based on previous research, it was predicted that rapid symptom improvement (i.e., greater positive slope) would predict greater risk of premature dropout. The relationship between rapid symptom improvement and the risk of premature dropout was predicted to be stronger in patients with low initial anxiety severity relative to those with high initial anxiety severity.

Method

Outcome measure. This study employed survival modeling; thus, premature dropout was defined as the point at which the patient does not return for subsequent sessions following randomization to the intervention condition, having not completed the relapse prevention module (i.e., the module that indicated completion of the study).

Demographic information. Demographic information for each participant was collected, including age, education level, and a poverty index. Poverty was determined by collecting income and calculating a weighted average income threshold based on the Federal Poverty Guidelines (United States Census Bureau, 2010), adjusted for family size, age of respondent, and number of children less than 18-years-old. Family income divided by this threshold value created a poverty ratio. These variables were considered as covariates in the analyses.

Anxiety. The Overall Anxiety Severity and Impairment Scale (OASIS; Norman, Cissell, Means-Christensen, & Stein, 2006) was collected at baseline and at each session. The OASIS is a five-item scale that can be used to assess severity and impairment associated with any anxiety disorder or multiple anxiety disorders. The scale measures the frequency and severity of anxiety,

as well as level of avoidance, and the work/school/home/social interference. Patients select among five different response options for each item that refers to anxiety "over the past week." Responses are coded 0 – 4 and summed to create a total score. A psychometric analysis of the OASIS indicated the scale is a valid instrument for the measurement of anxiety severity and impairment in clinical samples (Campbell-Sills et al., 2009). In a clinical sample, the five items displayed strong loadings on a single factor and had a high degree of internal consistency (Campbell-Sills et al., 2009). Change in anxiety was measured by computing a linear trend (i.e., the regression coefficient of the OASIS score using time as the predictor variable) from the first session to each session (e.g., session 1 to session 2, session 1 to session 3, etc.). The OASIS has also been used to measure trajectories of anxiety change in an anxiety treatment sample (Joesch et al., 2013).

Data Analytic Plan

Previous research has indicated that baseline anxiety symptom severity as well as rate of anxiety symptom change influence when patients prematurely discontinue psychotherapy (Krishnamurthy et al., 2015). The primary aim of the present study was to examine whether the influence of anxiety symptom variables on time to dropout differs between Latinx and non-Latinx White patients.

Analyses were run with Stata Version 15.0 using the *gsem* options *group* and *ginvariant* to allow for the comparison of multiple groups. Discrete time survival models (Hosmer, Lemeshow, & May, 2008) were used to predict the number of sessions in attendance with point of dropout as the censoring variable. Premature dropout was defined as failing to return to any subsequent treatment session following randomization to the treatment condition without having completed the relapse prevention module. Baseline anxiety was measured prior to the start of

treatment, using the OASIS. In addition, the OASIS was collected at each session. Rate of symptom change was measured by computing a linear trend (i.e., the regression coefficient of the OASIS score using time as the predictor variable) from the first session to the current session. The model included initial anxiety severity, rate of anxiety symptom change, and the interaction between initial anxiety severity and rate of anxiety symptom change. Treatment type (psychotherapy only or combined), sociodemographic factors (age, education, and poverty), and site were also included as predictors in the model. As a follow-up, a separate model was also created for depression symptoms; depression was not included as a covariate due to its strong overlap with anxiety in this sample (see Appendix B).

Ethnic differences in predictive relationships were examined using multiple-group comparisons. Testing for cross-group invariance involved comparing two nested models. A constrained model allowed only the intercepts to differ across ethnic groups and held constant all coefficients across the groups. An unconstrained model allowed the intercepts as well as the coefficients of symptom variables (i.e., baseline symptom severity, rate of symptom change, and their interaction) to vary. In this model, coefficients of covariates were held constant across the groups.

Models were compared using Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) with smaller values indicating a better fit. AIC and BIC measure relative model fit and can be used to rank order the relative fit of models of interest (rather than provide a marker of overall goodness of fit) (Burnham & Anderson, 2004). They are estimates of the distance between the model and an approximation of population statistics, with a penalty for the number of parameters in the model (Burnham & Anderson, 2004). Although there is no significance test associated with comparing AIC or BIC values, a difference in AIC values

between models of two or less indicates little support for choosing one model over the other. Difference values between three and seven indicate considerable support for choosing the best fitting model over the other model. Difference values of seven or greater provide even greater support for choosing the best fitting model (Burnham & Anderson, 2004).

Results

Descriptive Statistics

Table 1 presents means and significance tests for ethnic differences in treatment type and sociodemographic characteristics. Significant differences across ethnic/racial groups were noted for gender (higher proportion of Latina women), education level (lower proportion of Latinx individuals with a college education or higher), age (Latinx individuals tended to be younger), and poverty (Latinx individuals tended to be closer to the poverty line).

Dropout Statistics

Latinx were overrepresented among patients who did not complete the relapse prevention module (58.33% Latinx; 42.02% non-Latinx White). Latinx ethnicity, relative to non-Latinx White ethnicity, significantly predicted greater odds of premature dropout (*OR* = 1.95 [*95% CI* = 1.13, 3.38]; $p = 0.01$) after accounting for treatment type, site, and sociodemographic factors.

Figure 1 depicts a Kaplan-Meier curve of time to dropout with ethnicity as the only predictor. Ethnicity also predicted time to dropout, controlling for treatment type, site, and sociodemographic factors with a statistically significant survival advantage for non-Latinx White patients relative to Latinx patients (median, 5 sessions for non-Latinx Whites vs. 4 sessions for Latinx; hazard ratio, 1.62; 95% CI, 1.09 to 2.42, $p = 0.01$).

Group Differences in Symptom Prediction of Time To Dropout

Ethnic differences in predictive relationships of symptom variables were examined using multiple-group comparisons. Anxiety symptoms (i.e., baseline OASIS, OASIS change from the first session at each session, and their interaction) were all included in the model. Comparison of the AIC and BIC values of the constrained and unconstrained models revealed that the constrained model best fit the data relative to the unconstrained model (*Table 2*). Thus, the model that constrained anxiety symptom coefficients to be the same across ethnic groups was the more parsimonious model relative to the model that allowed anxiety symptom coefficients to vary across ethnic groups, suggesting that influence of symptom severity measures on time to dropout did not significantly differ between Latinx and non-Latinx White patients.

Proportional Hazards Model in the Whole Group

Due to lack of ethnic differences in symptom prediction of time to dropout, a Cox proportional-hazard regression analysis was examined in the whole group. The model examined anxiety symptoms (i.e., baseline OASIS, OASIS change from baseline at each session, and their interaction) after accounting for site, treatment type, and sociodemographic factors.

The interaction between baseline OASIS and the time-varying change in OASIS scores was not significant ($p = 0.32$) and was subsequently removed from the analysis. Results from the model (with the interaction between baseline anxiety severity and the time-varying change in anxiety symptoms removed) are listed in Table 3. Only high baseline OASIS significantly predicted time to dropout; however, the hazard ratio was small (hazard ratio, 1.07; 95% CI, 1.01 to 1.14, $p = 0.04$).

These results represent the risk of dropout for one-unit changes in the OASIS; however, it can be useful to examine hazard in the context of definitions of clinically significant differences on each measure. Reliable change criteria (Jacobson & Truax, 1991) are commonly used for

quantifying improvement during interventions (Ogles, Lunnen, & Bonesteel, 2001); four or more points is considered to be a reliable change on the OASIS (Moore et al., 2015). The hazard ratio was also examined for unit changes of four on the baseline OASIS (hazard ratio, 1.29; 95% CI, 1.01 to 1.65, $p = 0.04$).

Discussion

The primary aim of the present study was to examine whether the influence of symptom severity variables, mainly rate of anxiety symptom change, on time to dropout differs between Latinx and non-Latinx White patients. Given that previous research on premature dropout has focused on static predictors measured at pretreatment, an objective of the current study was to focus on symptomatology as a time-varying symptom predictor, occurring over the course of treatment. Despite the shift in focus from pretreatment predictors to predictors occurring over the course of treatment, reasons for disparities in premature dropout between Latinx and non-Latinx White patients remain unclear.

Of primary importance to the aims of this study, there were no ethnic differences between Latinx and non-Latinx White patients in the association between anxiety (both at baseline and over the course of treatment) and time to dropout, suggesting that initial anxiety severity and changes in anxiety severity were not major contributors to differences in dropout between the ethnic groups. Informed by cognitive and decision making theories (e.g., Kivetz, Urminsky, & Zheng, 2006; Zwick et al., 2003), it was initially hypothesized that ethnic differences in time to dropout could be partially explained by initial symptom severity and changes in symptom severity because of an iterative process of weighing costs and benefits associated with therapy attendance. That is, Latinx would be more likely to drop out due to the diminishing benefits of therapy as symptoms reduce, and ongoing costs associated with therapy attendance (cost, time,

travel, etc.). This hypothesis was not supported in our study; however, it is important to note that costs (e.g., logistic barriers) associated with attending therapy were not assessed. Therefore, it is not possible to say that Latinx patients in this study experienced greater costs than non-Latinx White patients. However, research suggests that logistic barriers are relevant for minority clients when examining premature dropout as well as initiation of treatment (e.g., McCabe, 2002; A. Wells et al., 2013). In previous studies, these barriers have typically included issues related to scheduling (e.g., lack of appointment availability), circumstances that make it difficult to attend treatment (e.g., lack of transportation, lack of childcare, inconvenient location of services, travel distance), financial concerns, and changes in circumstances (e.g., schedule changes, moving) (Mohr et al., 2010; A. Wells et al., 2013). Indeed, these factors may have had a separate or interactive effect with rate of symptom change in predicting dropout for Latinx patients in this study, and warrant further investigation.

The degree to which the therapeutic alliance waxed and waned throughout treatment is also important to consider, and may have interacted with symptom change to influence premature dropout. Meta-analytic findings suggest that there is a moderately strong relationship between therapeutic alliance and premature dropout, such that patients with weaker alliance are more likely to terminate prematurely (Sharf, Primavera, & Diener, 2010). It is conceivable that those with a poorer therapeutic alliance may have been more apt to drop out of treatment in the presence of slower symptom change; however, this has not been examined.

On a related note, cultural factors such as shared language, understanding of a patient's cultural background, and discussion of cultural elements in treatment (Cabral & Smith, 2011; Sue & Zane, 2009) may have also affected the therapeutic alliance and should be assessed in future studies. For instance, when cultural elements were considered important but were not

addressed in treatment, patients reported being less satisfied with their health care (Meyer & Zane, 2013).

Due to a lack of ethnic differences in the relationships between symptom variables and time to premature dropout, these relationships were examined in the whole group. Only high initial anxiety predicted time to dropout, meaning patients who reported high initial anxiety were at greater risk for dropout at any particular session relative to patients with lower levels of initial anxiety. It is possible that those with high initial anxiety were more likely to drop out given the nature of the collaborative care intervention and setting. Perhaps those with high levels of anxiety did not perceive that this time limited intervention was intensive enough to meet their needs, and consequently dropped out, opting for specialty mental health services. Unfortunately, there are no data on satisfaction with CALM services and alternative service use among individuals who dropped out of the CALM study. It should also be noted that effect sizes were small in the current study, limiting conclusions regarding the predictive power of symptom variables on time to dropout. These effects were small even after calculating hazard ratios for unit changes considered to be clinically significant (McMillan, Gilbody, & Richards, 2010; Moore et al., 2015).

Furthermore, the present study used continuous measures of symptom severity at baseline and symptom change to examine the impact of symptom severity on premature dropout; however, criterion-based predictors that capture symptom severity relative to previously established clinical cutoffs may have been useful in predicting dropout. For instance, previous research indicates that an OASIS score of eight or higher correctly identifies 78% of individuals who meet criteria for an anxiety disorder and continued medical necessity for treatment (Norman

et al., 2011). It is possible that those patients who reach a particular threshold of symptom severity (i.e., a score lower than eight on the OASIS) are more likely to prematurely drop out.

Limitations

It is important to consider how anxiety was conceptualized and measured. In the CALM study, change in anxiety over time was measured using the OASIS. The OASIS measures overall anxiety severity and impairment; however, it does not distinguish between somatic and cognitive subcomponents of anxiety. On another measure of anxiety administered at pretreatment in the CALM study (i.e., the BSI-18), Latinx patients endorsed similar levels of cognitive symptoms of anxiety but higher levels of somatic symptoms relative to non-Latinx White patients (Escovar et al., 2018). Given that Latinx express higher levels of somatization relative to non-Latinx Whites, it may be important to consider the unique contribution of somatic symptoms when examining the impact of change in symptoms on premature dropout. The relationships between manifestations of anxiety (i.e., cognitive and somatic) and premature dropout may be different. For instance, studies conducted with primarily non-Latinx White samples have found that low initial anxiety severity is predictive of premature dropout (Issakidis & Andrews, 2004; Simon & Ludman, 2010); however, these studies focused on cognitive components of anxiety. On the other hand, high levels of somatization have been associated with mental health stigma (Kirmayer, 2001), which is associated with premature dropout (Ben-Noun, 1996; Olfson et al., 2009; Sirey et al., 2001). In the current study, it is plausible that there may be a positive relationship between somatic symptom severity, somatic symptom change or lack thereof, and premature dropout that was not captured through measurement of cognitive anxiety expressions.

Another limitation of this study is that logistic or structural barriers to receiving treatment were not assessed. Thus, analyses could not fully address the cost-benefit hypothesis, which

suggests that patients will weigh potential benefits of therapy (e.g., symptom reduction) with potential costs (e.g., overcoming logistic barriers) in the decision to continue with therapy. The measurement of such barriers could include patient perceptions of the quality of appointment availability, patient access to resources such as transportation and childcare, patient travel distance to the clinic, and patient change in circumstances (e.g., moving) (Mohr et al., 2010; A. Wells et al., 2013).

As mentioned in previous studies, the CALM study focused on the overall effectiveness of a CBT model of treatment delivery for patients with anxiety disorders in primary care; as such, it was not designed to focus on ethnic group differences. In addition, it is important to note that patients from primary care represent a subsample of their racial/ethnic groups and cannot be considered representative of the broad spectrum of individuals, some of whom may not seek or be able to access medical and mental health care. Thus, there may be homogeneity in this sample with respect to ability to continue accessing mental health treatment that is not representative of the general population. Nevertheless, these results provide insight into the nature a primary care sample; this may be especially important when examining ethnic disparities because Latinx are more likely to seek their mental health care in primary care than in specialty mental health clinics (Alegría et al., 2002).

Conclusion

Much of the previous treatment outcome literature has examined static client and clinical variables at pretreatment as predictors of later discontinuation. The present study is novel in that it examined whether there were differential effects of time-varying variables, such as rate of symptom change, on time to dropout between Latinx and non-Latinx Whites. Findings did not support the proposed hypotheses, suggesting that rate of symptom change did not account for

ethnic disparities in engagement (i.e., dropout) in the CALM study. Furthermore, symptom severity and symptom change overall represented a minimal contribution in predicting time to dropout in this sample, suggesting other factors are at play in predicting discontinuation from therapy among Latinx patients with anxiety specifically, and among patients with anxiety in general.

Table 1. Means and significance tests for ethnic differences in treatment type and sociodemographic characteristics.

Variables			**Latinx**	**Non-Latinx White**
	χ^2	*p*	*N* (%)	*N* (%)
Treatment Type (Combined)	0.63	0.43	48 (56.47%)	154 (61.35%)
Gender (Women)	9.14*	.002	79 (82.29%)	169 (65.76%)
Education (College level or higher)	6.80	.009	67 (69.79%)	212 (82.49%)
	t	***p***	***M* (*SD*)**	***M* (*SD*)**
Age	2.71*	.007	40.18 (13.34)	44.49 (13.31)
Poverty [a]	-3.86**	< .001	3.35 (2.45)	5.52 (10.63)

[a] Income is adjusted for family size and age of respondent. Using Federal Poverty Guidelines (U.S. Census Bureau, 2010), we defined individuals with regard to the poverty line such that 0 = poverty level, 1 =100% above poverty line, 2 = 200% above poverty line, 3 = 300% above the poverty line, and so on.

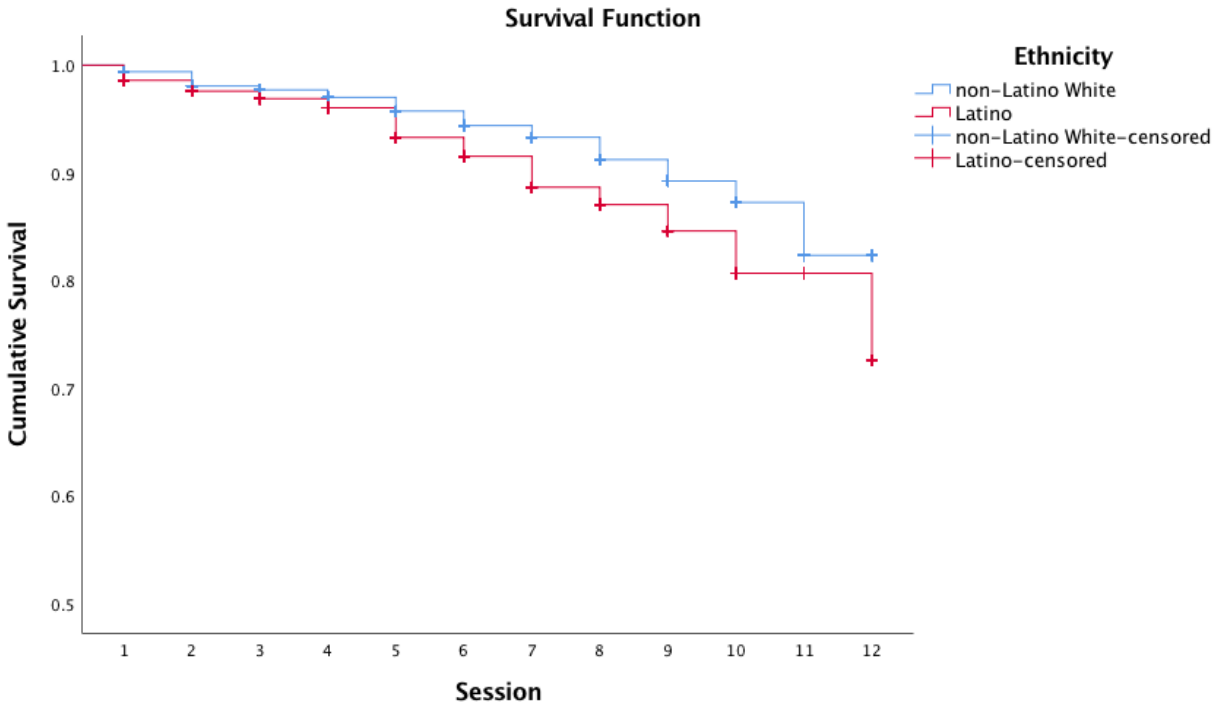
Table 2. Information criteria for constrained and unconstrained models.

Model	AIC	BIC
Constrained	1679.683	1766.69
Unconstrained	1709.42	1779.03

Table 3. Cox proportional hazards models of anxiety and depression symptoms predicting time to dropout in the whole group. Statistics of covariates included in the model (site, treatment type, and sociodemographic factors) are not included.

	Hazard Ratio	Hazard Ratio 95% CI	*p*
Anxiety Model			
Baseline OASIS	1.07	1.01, 1.14	0.04
Change in OASIS	1.00	0.99, 1.01	0.15

Figure 1. Kaplan-Meier estimates of the time to dropout for Latinx and non-Latinx Whites.



General Discussion

The primary aim of this dissertation was to examine factors that explain disparities in therapeutic engagement in a large sample of Latinx and non-Latinx White primary care patients seeking treatment for anxiety. In the present sample, Latinx patients were more likely to prematurely drop out than non-Latinx White patients after accounting for treatment type, site, and sociodemographic factors. Latinx were also overrepresented among individuals who dropped out early from treatment using an alternative definition of dropout that stipulated that the patients did not receive active elements of the intervention (i.e., did not receive doses of cognitive restructuring or exposure). Previous research on ethnic disparities in premature dropout has been limited for a variety of reasons, including a general lack of attention to issues of race and ethnicity in treatment outcome research (Polo et al., 2019) and inadequate representation of Latinx and other racial/ethnic minority groups in RCTs (Miranda et al., 2005). In a review of RCTs for anxiety or depression (see *Table 1* of the general introduction) only a handful of studies had a sufficient number of Latinx to examine issues of ethnicity (e.g., intervention efficaciousness for Latinx, ethnicity moderation effects, etc.). Of these, only two RCTs presented separate ethnic analyses for premature dropout, however, sample sizes were small, limiting the conclusions that could be drawn about dropout rates among Latinx patients. The CALM study, with the largest sample of Latinx patients with anxiety disorders, provides a unique opportunity to examine variables that may account for ethnic differences in therapeutic engagement, thereby addressing an important gap in the treatment outcome literature.

Importantly, participants in the CALM study were recruited from primary care settings. Services delivered in primary care settings are often viewed as central to creating a system of care that facilitates access and reduces stigma associated with mental health treatment (Chapa &

De la Rosa, 2004). Various studies suggest that Latinx individuals are more likely to seek mental health services in primary care medical settings as opposed to specialty mental health clinics (Alegría et al., 2002). Thus, primary care is a feasible and relevant context to implement evidence-based treatments for Latinx and to examine facilitators and inhibitors of treatment engagement.

Each of the three major aims of this dissertation examined therapeutic engagement, with a focus on premature dropout, in order to better understand factors that may influence this disparity among Latinx and non-Latinx White patients. These aims were: 1) to examine whether pretreatment variables mediate the relationship between ethnicity and premature dropout, 2) to determine if CBT understanding predicts therapeutic engagement outcomes and explains ethnic disparities in premature dropout, and 3) to examine whether anxiety symptom severity and rate of anxiety symptom change differentially influence time to dropout between Latinx and non-Latinx White patients. Other engagement outcomes were considered, including commitment to therapy and homework adherence, however, the lack of ethnic differences on these domains precluded additional analyses. Findings from these studies are intended to inform potential modifications to evidence-based interventions for Latinx patients with anxiety disorders, particularly those in primary care.

Explaining Premature Dropout using Andersen's Framework

Andersen's Behavioral Model of Health Service Use (Andersen, 1995), a well-established theoretical framework of service utilization, was used to identify potential variables that mediate the relationship between ethnicity and premature dropout. Andersen's Model (1995) includes predisposing, enabling and need factors (i.e., population characteristics) as subsumed within a system of environmental factors, health behaviors, and outcomes of health behaviors (*Figure 1*).

This model was selected because of the preexisting literature supporting use of this model to explain service utilization among Latinx (Cabassa et al., 2006). This dissertation aimed to extend model outcomes from service use to therapeutic engagement (i.e., factors indicative of engagement following the start of psychotherapy, such as premature dropout) with a focus on population characteristics specific to individual patients.

Overall, individual pretreatment factors did not explain ethnic disparities in premature dropout (Study 1), with the potential exception of low levels of social support (an enabling factor) and high levels of somatization (a need factor). While results were few, they are meaningful. For example, it is useful to consider how strategies aimed at improving social support during interventions could improve patient engagement. In addition, monitoring and addressing somatic symptoms may be a necessary modification for anxiety interventions with Latinx primary care patients in order to address their experience of anxiety and perceptions of need.

Dynamic Variables During Therapy: CBT Understanding and Rate of Symptom Improvement

In light of findings from Study 1, the question, "what explains differential dropout among Latinx and non-Latinx Whites?" largely remained unanswered by pretreatment factors. Study 3 aimed to understand whether premature dropout was influenced by rates of symptom improvement over the course of the intervention. As suggested by Study 3, change in anxiety symptom severity throughout treatment and the interaction with baseline symptom severity did not explain ethnic differences in time to dropout.

Study 2 aimed to move beyond the health behavior outcomes outlined in Andersen's model (1995), and consider a less frequently studied variable, CBT understanding. This is the

first study to identify patient understanding of CBT principles as a potentially important factor in understanding therapeutic engagement. CBT understanding early in treatment was significantly associated with engagement outcomes, including premature dropout, homework adherence, and patient commitment to therapy after controlling for sociodemographic factors. Results also indicated that Latinx patients had poorer CBT understanding relative to non-Latinx White patient and early CBT understanding mediated the relationship between ethnicity and premature dropout. It is possible that Spanish-English language barriers may have played a role (either in the translation of CBT materials or in the patients conveying understanding of CBT principles in either language to ACSs); however, further research is needed on reasons for ethnic differences in CBT understanding, as well as the development of psychometrically sound measures of CBT understanding.

Alternative Factors to Explain Ethnic Disparities in Premature Dropout

There are a variety of factors not examined in the current study that may further explain differing patterns of premature dropout between Latinx and non-Latinx White patients. For instance, many theories of service utilization have highlighted logistic barriers to accessing formal mental health services (e.g., Cabassa, Lester, & Zayas, 2007; Kouyoumdjian, Zamboanga, & Hansen, 2003; Ramos-Sanchez & Atkinson, 2009). Although the CALM study measured poverty, an enabling factor in Andersen's model, other environmental and logistic barriers relevant to engagement, such as ease of access to clinics, transportation, and childcare, were not assessed.

Environmental factors (e.g., health care system factors) may offer further insight into reasons for ethnic disparities in premature dropout. Environmental factors include characteristics of the healthcare delivery system and the patient's community (e.g., health policies; the

availability of providers). These factors include social, structural, economic, and public policy inequities embedded in the healthcare system that contribute to negative psychosocial outcomes for minorities, such as diminished engagement in health care (Aldarondo, 2007; Liu, Pickett, & Ivey, 2007). For instance, public policy support for low-income and uninsured populations influences access to care (Davidson, Andersen, Wyn, & Brown, 2004). In addition, shortages in bilingual or bicultural mental health professionals is a systemic issue that may lead to underutilization of services or influence treatment progress (Schwarzbaum, 2004).

Further, provider-level characteristics may interact with patient-level factors to influence engagement (Andersen, 1995). In the case of this dissertation, cultural characteristics of the ACSs, and perhaps the primary care providers as well, may have had an effect on engagement outcomes. Maramba and Hall (2002) conducted a meta-analysis and found that patients matched with therapists of the same race/ethnicity (including Latinx, Asian, and Black patients) were less likely to drop out of therapy and more likely to attend sessions; however effects were small suggesting that this was not the most salient variable. Studies also have indicated that Latinx patients prefer language matching (more so than simply ethnic matching) when seeking mental health services (Griner & Smith, 2006; Sue et al., 1991). Such matching may affect therapeutic engagement by facilitating a stronger working alliance (Chao, Steffen, & Heiby, 2012), enhancing cultural competence, and relatedly, the ability to make appropriate cultural adaptations to an intervention. One study found that when cultural elements were considered important but were not discussed in treatment, patients reported being less satisfied with their healthcare (Meyer & Zane, 2013). Per Andersen's model (1995), satisfaction with healthcare services may be an important predictor of engagement.

A potentially important factor to consider in the context of the cultural match of the intervention and cultural competence of the therapist is the increased rates of somatic symptoms reported by Latinx patients in this study. Findings from Study 1 revealed that Latinx patients reported higher rates of somatization and physical functional impairment (but lower rates of medical comorbidities) relative to non-Latinx White patients. This is in line with previous research indicating Latinx are more likely to express somatic symptoms than non-Latinx Whites (Kirmayer & Young, 1998). Cultural concepts of distress include clusters of symptoms, ways of communicating emotional distress, and explanations for origins of symptoms that may be common in specific cultural groups (Hofmann & Hinton, 2014; Kohrt et al., 2014). Furthermore, somatization partially mediated the relationship between ethnicity and premature dropout (marginally significant effect), with higher rates of somatization predicting premature dropout. Thus, there may have been a mismatch in how patients were expressing their anxiety and how it was being addressed in the CALM study. As an example, if the interventions targeted cognitive worry symptoms more so than somatic symptoms, then a patient may have not perceived that his or her experience was being adequately understood. Misunderstandings such as these may be reflective of a lack of cultural fit of the intervention or the therapist not being adept at flexibly adapting an intervention to fit the client. Although the CALM intervention was translated into Spanish and therapists received a two-hour cultural competency training, the degree to which there were cultural mismatches during therapy sessions is unknown. Future research should focus on these issues more closely by measuring perceptions of cultural fit using self report or observational coding methodologies, and examining its influence on subsequent engagement.

Limitations

Measurement of anxiety. A limitation of this dissertation is that somatization was measured at baseline, but not at each session, limiting the analyses that could be done examining changes in somatization over the course of psychotherapy. This may be important for Latinx given previous research indicating change in symptom variables is predictive of premature dropout (Krishnamurthy et al., 2015; Zandberg et al., 2016). Measurements of distress that represent cultural expressions of illness, such as somatic symptoms, may be warranted in treatment outcome research for anxiety disorders. At present, most measures of anxiety symptoms emphasize cognitive over somatic expressions of anxiety. As such, important changes in symptoms (or lack thereof) that are relevant to Latinx may be missed. For example, as part of Study 3, anxiety symptomology was measured using the OASIS. The OASIS measures overall anxiety severity and impairment; however, it does not distinguish between somatic and cognitive subcomponents of anxiety. Given the finding from Study 1 that Latinx patients endorsed similar levels of cognitive symptoms of anxiety but higher levels of somatic symptoms relative to non-Latinx White patients, the presence of cognitive symptoms of anxiety may not adequately convey symptom severity among Latinx. Symptom severity and changes in symptoms among Latinx may be better captured through somatic symptoms or a combination of cognitive and somatic symptoms.

Sample generalizability. A majority of the sample from the present study was English-speaking and the mean length of residency was 25 years. It is possible that low levels of variability in enculturation and acculturation resulted in an inadequate representation of important factors known to vary with acculturation (e.g., help seeking attitudes, mental health literacy) that are present in community samples of Latinx individuals (Lopez, Sanchez, Killian, & Eghaneyan, 2018; Sun, Hoyt, Brockberg, Lam, & Tiwari, 2016). Since the CALM study

sample was drawn from primary care settings, these patients represent a subsample of their racial/ethnic groups and cannot be considered representative of broader community samples of Latinx individuals. The homogeneity of the sample in this respect may account for the lack of detection of differences across ethnic groups in stigma and beliefs about treatment (Study 1). Some of the relationships examined in the current study may be better examined in a sample that includes less acculturated individuals, inclusive of more Spanish monolingual and recently immigrated Latinx individuals.

Lack of comprehensive assessment of relevant variables. Another limitation of the present studies is the lack of measurement of logistic barriers (e.g., time constraints, childcare, difficulty with appointment availability, costs associated with missed work, etc.), as previously mentioned. In addition, there was a lack of measurement of cultural values that might be relevant to service use in the CALM study. Researchers have posited that acculturation may influence cultural values, such as *familismo* (Bhatia & Ram, 2001; Maldonado-Molina, Reyes, & Espinosa-Hernandez, 2006), which in turn will have an impact on engagement (Aguilar-Gaxiola, Loera, Méndez, Sala, & Nakamoto, 2012). Cultural values were not measured in the CALM study; the examination of these and other more proximal measures of culture may facilitate our understanding of ethnic disparities in treatment engagement.

Last, many measures utilized in this study, including symptom measures, were collected via self-report; self-report is susceptible to potential biases, including social desirability, and shared method variance (Rosenman, Tennekoon, & Hill, 2011). Self-report response bias can be particularly problematic in intervention research when response-shift bias occurs (Rosenman et al., 2011). Response-shift bias reflects a change in the patient responding due to a shift in frame of reference (e.g., understanding of anxiety concepts; desire of patients to indicate symptom

reduction despite symptom experience) as a function of participation in the intervention itself (Rosenman et al., 2011).

Clinical Implications

High rates of dropout among Latinx patients is troubling in light of research that suggests those who prematurely drop out experience fewer treatment gains, fewer positive mental health outcomes, and less satisfaction with treatment (Bjork et al., 2009; Glenn et al., 2013; Klein et al., 2003; Lampropoulos, 2010). Furthermore, patients who prematurely drop out may require additional mental health services in the future (Barrett et al., 2008). Data from the CALM study suggest that CBT is efficacious in reducing anxiety symptoms for Latinx patients at 6, 12, and 18 months following the start of the intervention (Chavira et al., 2014); however ethnic differences in other outcomes, such as functional impairment and consumer satisfaction, were not assessed across the varying time points. While premature dropout did not appear to have direct consequences for symptom improvement, its impact may be manifested in other ways (e.g., functional impairment, willingness to seek therapy, etc.), warranting additional research in this regard.

Modifying or adapting EBPs to better suit ethnic minorities remains a promising approach to addressing ethnic disparities. The results of this dissertation lay the groundwork for modifications in assessing, monitoring, and targeting somatic symptoms in anxiety interventions. As mentioned previously, current trends in anxiety measurement may overlook somatic symptom expression in Latinx, potentially underestimating Latinx levels of distress and missing areas to target in treatment. Modifications should be made to incorporate culturally influenced expressions of distress through improved measurement, more inclusive outcomes, and enhanced cultural competence training for clinicians.

Another modification, indicated by the results of these studies, is the need to assess and understand the importance of family and social support for Latinx patients. Interventions to garner support from others (e.g., the inclusion of relevant family members in sessions) may promote understanding of the patient's disorder, decrease stress in the family, foster empathy, and focus on functional impairments within the family system (R. L. Smith & Montilla, 2013). Last, findings from this dissertation also suggest that it is important for clinicians to check in with patients about understanding of CBT concepts, particularly if they perceive gaps in understanding. ACSs in the CALM study were able to detect a predictor of later disengagement within the first three sessions of psychotherapy. Clinicians may use perceptions of CBT understanding to open up discussions regarding understanding of CBT principles and the patient's perceived relevancy of therapeutic concepts to symptoms. Further research is needed to understand the extent to which open discussion regarding gaps in understanding will remediate future disengagement.

Conclusion

Overall, findings from this dissertation suggest that there are a multitude of factors that affect ethnic disparities in mental health treatment, factors that extend beyond individual level variables. It is likely that structural inequities embedded in the healthcare system, and interactions between individual and provider level/environmental factors are also important. The comprehensive measurement of barriers occurring over the course of treatment is needed to fully understand how these individual, provider, and system level variables influence therapeutic engagement over time. Given that these are the first studies to examine reasons for therapeutic disengagement and premature dropout from psychotherapy among Latinx patients with data from a randomized controlled trial, these studies lay the groundwork for future research on ethnic

disparities in dropout and highlight the need for research on broader cultural and environmental factors in understanding Latinx engagement in psychotherapy.

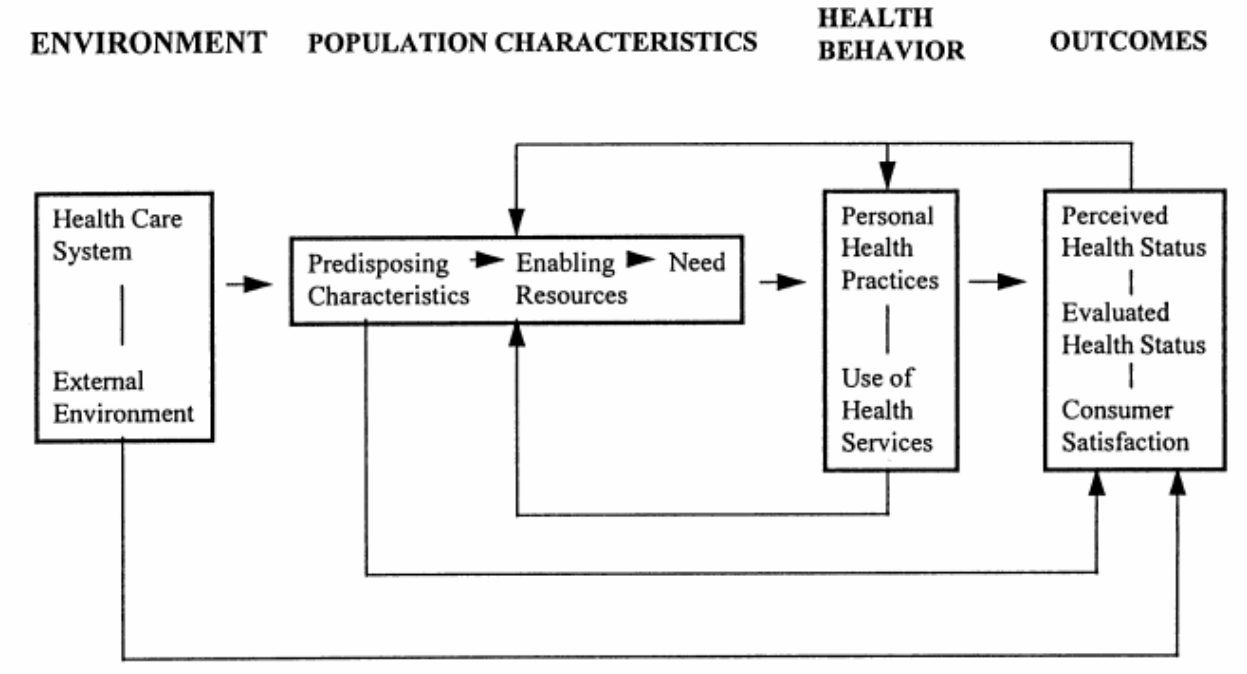


Figure 1. Andersen's Behavioral Model of Health Service Use (Andersen, 1995).

APPENDIX A: DESCRIPTIONS OF MODULES FROM CALM TOOLS FOR LIVING

The following descriptions were adapted from the CALM study training manual for ACS personnel.

Decision Making

- Provides information on each of the anxiety disorders
- Aims to understand similarities and differences among anxiety disorders and select the anxiety disorder to target for treatment

Education

- This module has multiple aims, which include:

  1) Providing reassurance that anxiety disorders are common and treatable

  2) Review the purpose of fear and anxiety (i.e., further psychoeducation on anxiety)

  3) Further psychoeducation: understand the causes of anxiety disorders

  4) Further psychoeducation: Understand what keeps anxiety going (includes psychoeducation on physical, behavioral and thinking parts of anxiety)

  5) Further psychoeducation: On symptoms and understanding that symptoms are not harmful

Recording

- Understanding the purpose of ongoing recording of anxiety or fear
- Knowing what to record (including triggers, thoughts, physical symptoms, behaviors, levels of anxiety)

- Knowing when to record it
- Explanation of a personal scientist model
- Explanation of the importance of observing one's own reactions from an objective point of view
- Providing data regarding progress

List

- Goals of this module include understanding the long term consequences of avoidance behaviors.
- Generation of a calm list
- Learning the 0-10 scale rating for anxiety

Breathing

- Goals for this module include understanding the mechanics of breathing and what it means to over-breathe.
- Introduction to calm breathing
- Demonstration of calm breathing (i.e., shifting to abdominal and smooth breathing and focused attention)
- Practice components of calm breathing, including slowing the breath, and imaging distracting places).
- Introduction of calm breathing as a coping skill

Thinking

- This module introduces cognitive restructuring.
- A review of the anxiety cycle (connect between physical symptoms, thoughts and behaviors)
- Learning about the downward arrow, negative thoughts, types of cognitive distortions, and methods for dealing with thinking errors.

Living

- This module involves exposure.
- Psychoeducation on the value of direct experience with anxious situations
- An introduction to the methods of direct experience with anxious situations (e.g., done repeatedly without long intervals in between; should be designed so that it provides information that discomforts worries), and aiding the client in designing an intervention that involves direct experience with that client's anxious situations

Feeling

- This module differs for anxiety with and without comorbid depression.
- The goal is to understand the value of repeated experience with the physical symptoms of fear and anxiety.
- Involves imaginal exposure (e.g. for PTSD writing about the traumatic experience) and record keeping of the practice of repeated imagery exercises

Relapse Prevention

- Teaches client how to structure continued practice
- Sets up long term goals

- Teaches about maintaining long term progress
- Helps client to identify high risk times and manage set backs

APPENDIX B: SURVIVAL MODELING OF PREMATURE DROPOUT FROM CBT: RATE OF DEPRESSION SYMPTOM CHANGE

A diagnosis of depression has been found to be a consistent predictor of premature dropout among patients receiving CBT (Fernandez, Salem, Swift, & Ramtahal, 2015; Issakidis & Andrews, 2004), likely by way of depression's impact on motivation to attend treatment sessions (D. J. Smith et al., 2013). Thus, analyses analogous to anxiety analyses conducted in study 3 were conducted with depression as a variable of interest. Depression symptoms were examined in a separate model given high correlations between anxiety and depression symptom variables. Analyses were conducted using the Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke, Williams, & Primary, 1999), which was collected at baseline and at each session.

Table B1. Information criteria for constrained and unconstrained models of depression.

Model	AIC	BIC
Depression		
Constrained	1662.08	1749.07
Unconstrained	1692.98	1762.58

Table B2. Cox proportional hazards model of depression symptoms predicting time to dropout in the whole group. Statistics of covariates included in the model (site, treatment type, and sociodemographic factors) are not included.

	Hazard Ratio	Hazard Ratio 95% CI	*p*
Depression Model			
Baseline PHQ-9	1.03	1.01, 1.06	0.03
Change in PHQ-9	1.00	0.99, 1.01	0.53

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