



A Systematic Review and Meta-Analysis of Cultural Adaptations of Mindfulness-Based Interventions for Hispanic Populations

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Abstract

Objectives The present study is a systematic review which aims to evaluate the current state of the literature on the effectiveness and cultural adaptations of mindfulness-based interventions (MBIs) for Hispanics. MBIs are widely used psychological therapies, yet little is known about their effectiveness or appropriateness with the Hispanic population, the fastest growing ethnic minority population in the USA.

Methods We identified and reviewed twenty-two studies, across the USA, Spain, and South America. Eight of these studies were coded for meta-analysis. Studies were also rated using methodological rigor and cultural adaptation ratings, developed for this study.

Results Culturally adapted MBIs are associated with depression symptom improvement, stress reduction, stress management, and chronic illness management. Results from meta-analysis suggest a moderate to large effect of the interventions on psychiatric distress relative to scores in the comparison group.

Conclusions Findings from this study suggest there is clear evidence that cultural adaptations can improve evidence-based treatment implementation among Hispanics, but more methodologically rigorous studies are needed. Recommendations for clinical practice and future research are discussed.

Keywords Mindfulness-based interventions · Mindfulness and Latinos/Hispanic · Cultural adaptations and implementations of MBIs

Mindfulness-based interventions (MBIs) are now widely used psychological therapies addressing a broad range of concerns including depression, anxiety, disordered eating, substance abuse, and physical health issues (Alberts et al. 2012; Alsubaie et al. 2017; Chiesa and Serretti 2014; Shortland-Jones and Thompson 2015). MBIs are based on mindfulness practices as a means for systematic training of the mind to develop more awareness of self and others, aimed at understanding universal aspects of human behavior. MBIs aim to increase present moment focus, decentering, and an approach orientation to current experiences to create more emotional

and behavioral self-regulation (Crane et al. 2017). Examples of MBIs include mindfulness-based cognitive therapy (MBCT; Segal et al. 2002) and mindfulness-based stress reduction (MBSR; Kabat-Zinn 2013).

Despite the widespread use of MBIs, most studies examining their effectiveness have been carried out primarily with non-Hispanic, White, female, and middle-to-upper-class participants (Woidneck et al. 2012). The literature on cultural considerations and adaptations of MBIs for Hispanic populations is limited (Germán et al. 2015); thus, there is currently no consensus on the empirical evidence to support the use of MBIs among Hispanics. This represents a significant gap in the MBI literature given that Hispanics make up the fastest growing ethnically diverse population in the USA (United States Census Bureau 2015). As such, evaluating the appropriateness and effectiveness of MBIs for Hispanics is imperative (Goodell and Escarce 2007; Sue 1998).

There is support suggesting that evidence-based treatments (EBTs) may be as effective with ethnic minorities as they are

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with majority groups (Huey and Polo 2008; Lau 2006), but that cultural adaptations may help increase the acceptability of EBTs and thus increase engagement among ethnic minorities (Lau 2006). Cultural adaptations refer to the systematic modifications of evidence-based treatments or intervention protocols by “considering language, culture, and context in a way that is compatible with the client’s cultural patterns, meanings and values” (Bernal et al. 2009; p. 361).

Bernal et al. (1995) propose eight dimensions that should be addressed to fit clients’ cultural perspectives, meanings, and values and thus result in a culturally adapted intervention. The dimensions include (1) Language, which must be in tune with the client’s background to ensure that the intervention is received as intended; (2) Persons, referring to the cultural “match” between clients and therapists, such as client and therapist characteristics; (3) Metaphors, by which therapists include familiar objects and symbols of a client’s culture or utilize sayings or idioms to make their clients feel more comfortable and/or understood; (4) Content, which refers to knowledge about the cultural background of the client and how it is explicitly included in treatment; (5) Concepts, which relates to case conceptualization and how clinical researchers and therapists theorize the presenting problem and, more importantly, how it is explained to the client; (6) Goals, which suggests that in addition to the goal congruence between therapist and client, it is desirable to frame goals within the values, customs, and traditions of the client’s culture; (7) Methods, which refers to practical aspects of how cultural knowledge is integrated into therapy to achieve treatment goals, including method, tasks, and procedures; and (8) Context, which entails considering potentially relevant contextual aspects (e.g., acculturative stress, social, economic, and political context) that might not be directly addressed in the intervention.

Some studies highlight the potential benefits of cultural adaptations for MBIs. Hall et al. (2016) conducted a meta-analysis that included almost 14,000 participants, 95% of whom were non-European American. Across 78 studies, Hall et al. (2016) found that culturally responsive interventions are more effective among minority populations. However, this review only included one MBI and it did not focus solely on Hispanics. Fuchs et al. (2013) conducted a review highlighting the elements of MBIs that may be congruent with culturally responsive treatment and briefly outlined the general principles of cultural competence and responsive treatment. This meta-analysis included 35 studies from 33 peer-reviewed articles and one dissertation. The review consisted of studies that included only individuals who were either (a) non-White, (b) non-European American, (c) older adults, (d) non-heterosexual, (e) low-income, (f) physically disabled, (g) incarcerated, or (h) individuals whose first language was not that of the dominant culture. The authors of this review found that when compared to treatment as usual, culturally adapted interventions had better outcomes, thus demonstrating support for culturally adapting MBIs to minority populations. However, only two of

the studies in this analysis included full samples of Hispanic participants. Although an important first step, this body of work limits our ability to make meaningful conclusions as to the effectiveness of MBIs for Hispanic populations, and the cultural adaptations that may enhance engagement in this population.

Consequently, the current study is a systematic review and meta-analysis which aimed to (1) evaluate the current state of the literature on cultural adaptations of MBIs for Hispanics, (2) review the outcomes that have been associated with culturally adapted MBIs for Hispanics, (3) provide information regarding whether culturally adapted MBIs are effective for Hispanics, (4) evaluate the methodological rigor of culturally adapted MBIs for Hispanics, and (5) make recommendations on what cultural adaptations are important to consider when working with Hispanic populations. The current review fills a significant gap in the MBI literature by focusing solely on studies that include Hispanic populations and that are written in both English and Spanish, and by studying cultural adaptations of different forms of mindfulness therapies in order to shed light on the current state of the literature on MBIs with Hispanics.

Method

Search Strategies

A literature search was conducted using three online databases (PsycINFO, Google Scholar, PubMed). No restrictions were placed on publication dates for search parameters; however, search was conducted between May 2017 and August 2017. Two broad searches were conducted: one in English and one in Spanish. English search terms included the following: *mindfulness therapy Latinos*, *mindfulness therapy Hispanics*, *mindfulness Latinos*, *mindfulness Hispanics*, *DBT Latinos*, *DBT Hispanics*, *dialectical behavioral therapy Latinos*, *dialectical behavioral therapy Hispanics*, *mindfulness based cognitive therapy Latinos*, *mindfulness based cognitive therapy Hispanics*, *mindfulness-based stress reduction Latinos*, and *mindfulness based stress reduction Hispanics*. Spanish search terms included the following: *terapia cognitiva basada en la atención plena (mindfulness based cognitive therapy)*, *reducción del estrés basado en la atención plena (mindfulness based stress reduction)*, and *terapia dialéctica conductual (dialectical behavioral therapy)*. This comprehensive search produced a total of 97 articles that were assessed for inclusion in the current review.

Inclusion and Exclusion Criteria

Inclusion criteria were as follows: (1) the intervention had to be conducted in the USA or in a country where Spanish is the

predominant language, (2) the intervention had to be delivered for Latino or Hispanic populations in the USA (at least 50%) or delivered in Spanish (fully or partially), (3) the intervention had to be described as a mindfulness-based intervention, and (4) the intervention had to be published in a peer-reviewed journal. We utilized the Online Regional Information System for Scientific Journals from Latin America, the Caribbean, Spain, and Portugal to determine whether all journals met the peer-reviewed process criteria. Exclusion criteria were as follows: (1) studies published in a language other than English or Spanish, (2) interventions delivered in another language (e.g., Portuguese), (3) case studies (i.e., a comprehensive report about a person, group, or situation that has not been studied; Mills et al. 2010), and (4) studies that did not specifically test an intervention. Applying these inclusion and exclusion criteria resulted in 20 studies that met the eligibility criteria for inclusion in the current review.

Qualitative Coding Procedures

Methodological Rating Process

Once studies were identified, each intervention was evaluated on its methodological rigor based on the APA Task Force on Promotion and Dissemination of Psychological Procedures criteria for assessing empirically validated programs (APA 1995). Six criteria were evaluated: (1) definition of a specific problem or population; (2) randomized sample; (3) large sample size ($N > 25$); (4) comparison with other treatments, standard services, or waitlist control; (5) reported use of treatment manual or curriculum; and (6) reported use of validated and reliable outcome measures. For each criterion that was met by a given study, one point was given towards their methodological rigor score. After designating a rigor score for each study, methodological rigor scores were categorized into one of four categories or rigor types (RTs). RT-1 studies were missing three or more elements of rigor, RT-2 studies were missing two elements of rigor, RT-3 studies met all but one of the rigor criteria, and RT-4 studies met all the rigor criteria.

Cultural Adaptation Rating Process

Studies in the current review were also evaluated based on their level of cultural adaptations. For the purposes of this review, a cultural adaptation count was developed based on Bernal et al. (1995)'s dimensions of cultural adaptation and development of psychosocial treatments with Hispanics/Latinos. Eight dimensions were evaluated: (1) Language, (2) People, (3) Metaphors, (4) Content, (5) Concepts, (6) Goals, (7) Methods, and (8) Context. Each study received a count between 0 and 8, with higher scores indicating more aspects of cultural adaptations utilized in the study. This count was meant to serve as an aggregate of adaptations utilized in each

study. Operational definitions for each of these dimensions are described below and included in Table 1. Further, because some dimensions overlapped in Bernal's original descriptions, we attempted to maintain discrete coding categories.

To our knowledge, no prior study has systematically reviewed cultural adaptations among Hispanic populations in this manner; thus, the analytic plan involved individually coding and evaluating all included studies using established review criteria. Initially, all studies were independently coded by one bilingual researcher. Subsequently, all studies published in English were coded by another English-speaking researcher and all studies published in Spanish by a second bilingual coder. Ten percent of the studies were coded by all three coders; agreement between all three coders was approximately 90% (Gwet 2014). When there was disagreement, the final code was determined as a result of re-examination of the study details and additional discussion among coders utilizing final coding schemes that can be found in Table 1 (Gwet 2014).

Meta-Analysis Procedures

Study Selection

In order to be included, each study identified above must have also provided posttest means and standard deviations for the intervention and comparison group on a measure of psychiatric symptom distress to describe a range of symptoms and experiences of a person's internal life that are commonly held to be troubling, confusing, or out of the ordinary.

Search Procedure

Our search procedure is outlined in the PRISMA flowchart (Fig. 1), to identify the eight journal articles included in this meta-analysis.

Data Extraction

Two raters coded individual studies. When raters provided contradictory judgments, disagreements were discussed until consensus was reached.

Calculation of Effect Size

We calculated the biased corrected standardized mean difference (Hedges' g) in order to estimate the effect size of the association between the intervention posttest and comparison group posttest values. An estimate of 0 for the g effect size indicated that there were equivalent outcome scores among both groups, whereas a g value less than 0 indicated that the intervention group had lower scores (i.e., better outcomes) and a g value greater than 0 indicated that the intervention group

Table 1 Qualitative coding definitions

Type of adaptation	Definition	Examples
Language	Culturally appropriate language for the person. Interventions in a Spanish-speaking country were assumed to be delivered in Spanish. For studies conducted in the USA, we coded for statements that demonstrated that the intervention had been delivered in Spanish	Statement that intervention delivered was done by bilingual therapist
Persons	Cultural “match” between clients and therapists. Interventions that mentioned an intentional match in terms of ethnicity or other characteristic (e.g., member of the community) between intervention provider and client. For interventions outside the USA, even though the provider and client were presumably of the same ethnicity (e.g., Spaniards), it needed an explicit mention of an intentional matching to be coded as having the adaptation	Statement that therapist was also Hispanic/community member
Metaphors	Interventions that used sayings or stories from the culture and used participants’ own stories and metaphors, or materials were intentionally adapted to fit the intended culture	Books or DVDs with Hispanic characters
Content	Adaptations that were informed explicitly by knowledge of the participants’ culture	Including relevant cultural content in the curriculum (e.g., functional analysis of gender violence within the context of prison)
Concepts	Explicit integration of cultural aspects into conceptualization of the psychological model and the theorized process of change were coded as concept-related adaptations for the current study	Dependence (e.g., fusion, attachment) is a negative feature in some cultures, but cultures that value collectivism may not perceive dependence as negative
Goals	Discussion of treatment goals included cultural considerations in regard to the participants’ values, customs, or traditions	Therapist meets with participant and discuss client’s values in regard to therapy goals
Methods	Pragmatic and practical aspects informed by knowledge of the culture and context and not directly related to the therapeutic process	Providing childcare and transportation for low-income communities
Context	Discussions of potentially relevant contextual aspects that were not targeted directly in the intervention	Mentioning how acculturative stress may be relevant to participants

had higher scores than the comparison group (i.e., poorer outcomes).

Statistical Analysis

We conducted a random-effects model and estimated heterogeneity of effect sizes using the standard Cochran’s Q test (Hedges and Olkin 1983); a non-significant Q test statistic suggests that the pooled effect size represents a unitary effect. We also report I^2 and tau² (T^2) as the estimated heterogeneity and between-study variance, respectively. We assessed publication bias via Egger’s (Egger et al. 1997) and Begg’s (Begg and Mazumdar 1994) tests. We conducted leave-one-out sensitivity analyses to test whether a single study unduly influenced effect size estimates. We used Stata 14.2 to conduct the statistical analyses.

Additional Post hoc Analyses

We conducted correlation analyses to determine whether there was any relation between cultural adaptation ratings, methodological rigor type, and study outcomes.

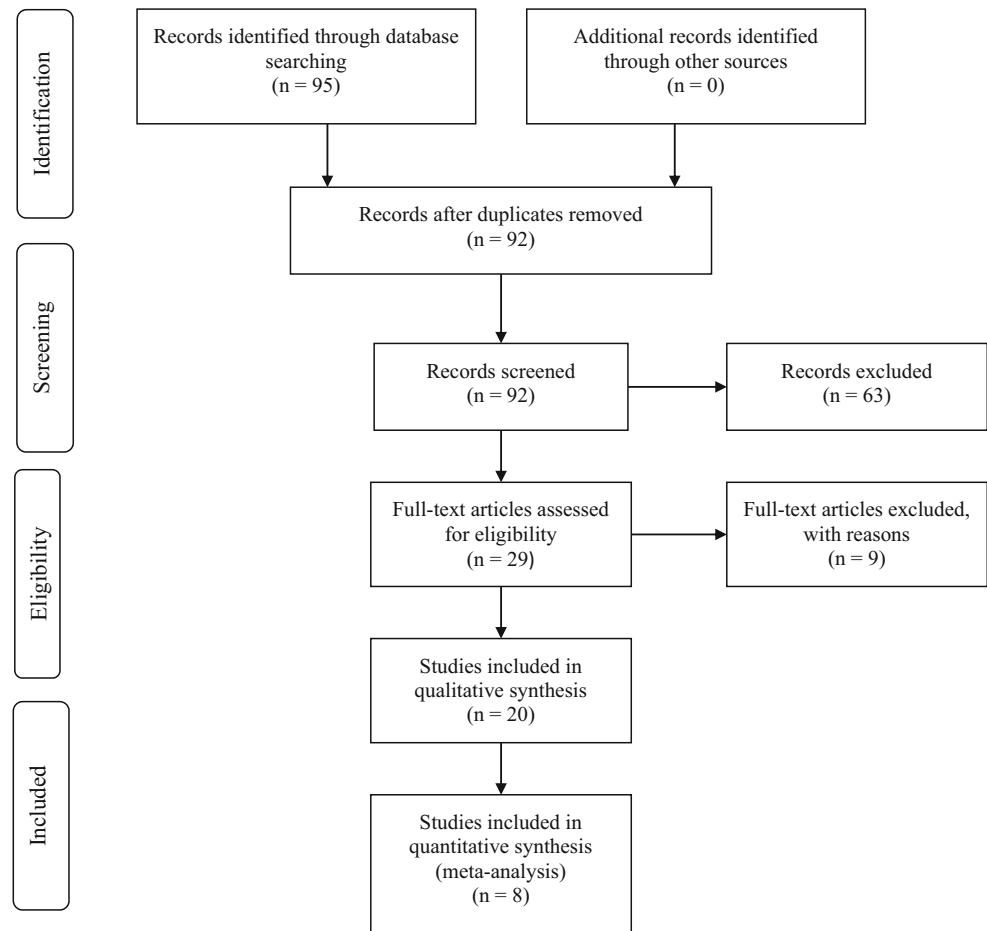
Results

Descriptive Information Across Studies

Among the 20 studies included in this review, the average number of participants was 64. Age means across studies ranged from 15 to 80 years old, with a median age average of 42 years across studies. Two studies (10%) did not report age averages or ranges for their samples. Two studies (10%) included predominantly adolescent samples with ages ranging from 12 to 17 years old, six studies (30%) included samples with age means in the young adult range of 20 years old to 40 years old, eight studies (40%) had samples in the middle adulthood range of 41 years old to 65 years old, and one study (5%) included older adults with participants who had an average age of 80 years old.

Few studies reported on socioeconomic status (SES) and data varied in each study (Abercrombie et al. 2007; Roth and Robbins 2004; Wagner et al. 2015, 2016). Seventeen (85%) studies included both male and female samples. Ten studies were published in English, while ten were published in Spanish. None of the studies reported on ethnicity despite considerable ethnic heterogeneity among Hispanic populations in the USA. Intervention targets and geographic location of intervention can be found in Table 2.

Fig. 1 PRISMA flowchart



Characteristics of Interventions

MBSR was utilized in 55% of studies ($n = 11$); seven of those interventions followed the original MBSR curriculum while the other four were MBSR-based with other components added (i.e., parenting, yoga, MBSR for teens). Fifteen percent ($n = 3$) of the studies utilized a MBCT curriculum, and 10% ($n = 2$) were based on a DBT curriculum. There were also some studies that combined principles from different MBIs; 18% of studies ($n = 4$) implemented a program developed by Franco (2010) called Flow Meditation which consists of a program based on MBSR (see de la Fuente Arias et al. 2010; Delgado et al. 2010; Franco et al. 2010; Justo et al. 2016). Finally, one study developed a culturally sensitive stress management program that combined principles of MBCT, DBT, and CBT (see Wagner et al. 2015, 2016). See Table 2 for intervention type.

Most interventions (85%) were delivered in a group setting, while two of the studies (Ricard et al. 2013; Martínez et al. 2010) adapted part of the intervention for individuals, and one intervention (Rathus and Miller 2002) was delivered entirely in an individual format with an added component of multi-family skills training. In terms of dosage, in most studies, interventions were delivered via weekly sessions, ranging

from 50 min to 3 h per session. Three studies had interventions (Martín-Asuero and García-Banda 2010; Medeiros and Pulido 2011; Quintana and Rincón Fernández 2011) delivered via an intensive 6–8-h session in addition to weekly sessions. Interventions ranged from four sessions to twenty-four sessions with one intervention delivering 288 total sessions over the course of 3 years and meeting three times per week (Hernández et al. 2014).

Outcome-Related Descriptions of Interventions

Measures

There were a wide range of measures utilized throughout the studies included in this review. Most studies utilized several measures to evaluate outcomes, but there were a few patterns in the use of such measures. The Beck Depression Inventory (BDI; Beck et al. 1996) and the Symptom Checklist 90 Revised (SCL-90-R; Derogatis 1996) were each utilized by five studies (22.70%). The Perceived Stress Scale (PSS; Cohen et al. 1994) was utilized by three studies (13%). The State Trait Anxiety Inventory (STAI; Spielberger et al. 2010), the Mindful Attention Awareness Scale (MAAS; MacKillop

Table 2 Intervention characteristics

Study	Country	Type of MBI	Intervention targets	Target outcomes	Evaluation method	Outcome effects ^a	Cultural adaptation rating ^b	Methodological rigor type ^c
Abercrombie et al. (2007)	USA	MBSR	Women aged more than 18 years, not pregnant, fluent in English or Spanish, and have abnormal Pap smear within the last 12 months	Anxiety, self-compassion	Pretest, posttest, 3-month follow-up	0	3	1
Brito Pons (2011)*	Chile	MBSR	Patients and staff at a public hospital	Depression symptoms, anxiety symptoms, stress reduction, general well-being	Pretest and posttest	2	2	1
de la Fuente Arias et al. (2010)*	Spain	Flow meditation	College students	Alexithymia, social skills	Pretest and posttest	2	2	4
Delgado et al. (2010)*	Spain	Authors created program based on MBSR	High school and middle school teachers	Emotion regulation, stress reduction	Pretest and posttest	2	2	3
Delgado et al. (2012)*	Spain	MBCT	Patients with fibromyalgia	Anxiety	Pretest, posttest, 3-month follow-up	0	3	4
Edwards et al. (2014)	USA	MBSR for teens	Latino/Latina students	Mindfulness, self-compassion, perceived stress; psychological symptoms including depression, anxiety, and hostility	Prepretest, pretest, posttest	1	2	1
Franco et al. (2010)*	Spain	Flow meditation	Family caregivers of Alzheimer's dementia patients	Psychological distress, caregiver overload	Pretest, posttest, 4-month follow-up	1	2	4
Gallego et al. (2016)*	Spain	MBCT	College students	Emotion regulation	Pretest and posttest	2	1	3
Hernández et al. (2014)*	Spain	MBSR-based treatment	Patients over 65 years old with probable Alzheimer's diagnosis, who lived at home and who were also being treated with donepezil	Clinical course of Alzheimer's disease	Baseline, follow-up at 6 months, 12 months, 18 months, and 24 months	2	2	4
Justo et al. (2016)**	Spain	Flow meditation	Special education teachers	Anxiety, depression, stress	Pretest, posttest	2	2	4
Manotas et al. (2014)	Colombia	MBSR	Healthcare professionals	Mindfulness, perceived stress, psychological distress	Pretest, posttest	1	2	4
Martín-Asuero and García-Banda (2010)	Spain	MBSR	Healthcare professionals	Stress, psychological distress	Pretest, posttest, 3-month follow-up	1	1	2
Martínez et al. (2010)*	Spain	MBSR-based sessions	Community members, college students, patients with different mental health dx, and a group of athletes	Mindfulness skills, somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism	Pretest, posttest	2	1	1

Table 2 (continued)

Study	Country	Type of MBI	Intervention targets	Target outcomes	Evaluation method	Outcome effects ^a	Cultural adaptation rating ^b	Methodological rigor type ^c
Medeiros and Pulido (2011)*	Chile	MBSR	Healthcare professionals	Mindfulness skills, quality of life, depression and anxiety symptoms, somatic distress	Pretest and posttest	1	2	1
Quintana and Rincón Fernández (2011)*	Spain	MBSR	Women with fibromyalgia	Quality of life, pain management, depression	Pretest, posttest, and 1-month follow-up	1	1	1
Rathus and Miller (2002)	USA	DBT	Suicidal adolescents	Suicide attempts, psychiatric hospitalizations, treatment completion	Pretest, posttest	1	2	3
Ricard et al. (2013)	USA	DBT	Students attending Disciplinary Alternative Education Program	General health, health-related quality of life, sleep quality, family harmony	Pretest, posttest	2	3	3
Roth and Robbins (2004)	USA	MBSR	Patients in community health center	Psychological distress	Pretest, posttest	1	2	2
Santamaria et al. (2006)*	Spain	MBSR adapted for parent training	Mothers of children with different psychological disorders	Mindfulness	Pretests, posttest	1	4	2
Wagner et al. (2015, 2016)	USA	MBCT, DBT, and CBT-tailored intervention	Latinos/Latinas with type 2 diabetes	Psychosocial outcomes, glycemic levels, cortisol levels	Pretest, posttest	1	5	4

*Interventions published in Spanish

**Article available in English and Spanish

^a Outcome effects legend: 0 = little to no effect; 1 = significant effects across some of target outcomes; 2 = significant effects across all target outcomes^b Aggregate score of cultural adaptation rating^c RT-1 studies were missing three or more elements of rigor, RT-2 studies were missing two elements of rigor, RT-3 studies met all but one of the rigor criteria, and RT-4 studies met all the rigor criteria

and Anderson 2007), the Depression Anxiety Stress Scales (DASS-21; Lovibond and Lovibond 1995), and the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2008) were each utilized by 9% of the studies ($n = 2$). Taken together, there were over 30 different measures utilized throughout the studies.

Target Outcomes

Thirty-six percent of the interventions ($n = 8$) were aimed at reducing depression and anxiety, making these the most frequently targeted outcomes by reviewed interventions. Twenty-seven percent ($n = 6$) of interventions were targeted at stress reduction or stress management, and 18% ($n = 4$) targeted reduction of psychological distress. About 10% of interventions were aimed at improving self-compassion, mindfulness skills, and quality of life, or, at reducing hostility and somatization. Other outcomes can be found in Table 2.

Intervention Effects

All the interventions that aimed at reducing symptoms of depression ($n = 7$) demonstrated consistent significant symptom reduction between pretest and posttest in their experimental groups (Brito Pons 2011; Edwards et al. 2014; Gallego et al. 2016; Justo et al. 2016; Rathus & Miller, 2002; Santamaría et al. 2006; Wagner et al. 2016).

Seven studies addressed anxiety reduction, four of which demonstrated anxiety reduction at posttest, when compared to TAU or control groups (Brito Pons 2011; Justo et al. 2016; Rathus and Miller 2002; Wagner et al. 2016). However, two studies did not find any differences from pretest to posttest in either the experimental or control group (Abercrombie et al. 2007; Delgado et al. 2012). Moreover, Delgado et al. (2012) found that anxiety symptoms reverted to pretest state at the 3-month follow-up.

All studies that aimed at reducing stress or improving stress management skills ($n = 6$) showed consistent improvements in these areas (Delgado et al. 2010; Edwards et al. 2014; Justo et al. 2016; Manotas et al. 2014; Santamaría et al. 2006). This was also the case for studies aimed at reducing psychological distress ($n = 3$) (Martín-Asuero and García-Banda 2010; Gallego et al. 2016), improving emotional regulation, reducing hostility (Delgado et al. 2010), and reducing obsession-compulsion, interpersonal-sensitivity, and suicidal ideation (Rathus and Miller 2002).

Results were mixed when studies looked at increases in mindfulness, self-compassion, and quality of life. Out of four studies assessing mindfulness skills, three found significant improvement (Edwards et al. 2014; Manotas et al. 2014; Martínez et al. 2010), and one study did not find any impact from the intervention (Santamaría et al. 2006). Two interventions targeted self-compassion improvement; one found improvements in this area

(Delgado et al. 2012), while the other did not (Abercrombie et al. 2007). Studies that looked at quality of life improvement ($n = 2$) as an outcome reported mixed results. Medeiros and Pulido (2011) found no change in overall quality of life scores, interpersonal relationships, and social role subscales, but they did find significant changes on psychological and environmental subscales. In contrast, Quintana and Rincón Fernández (2011) found improvements in social functioning, overall mental health, vitality, and overall well-being perception, all of which were subscales of their quality of life measure.

Some studies assessed outcomes directly related to their treatment population. For example, Hernández et al. (2014) studied whether their mindfulness intervention improved the clinical course of patients with probable Alzheimer's disease; they found that patients in the experimental group remained stable over the 2-year intervention, while patients in the control group showed a mild but significant worsening of mental capacities. On the other hand, Wagner et al. (2015) aimed to examine whether glycated hemoglobin (HbA1c) and diabetic distress levels were improved by a mindfulness-based stress management intervention. They found no significant group effects for these outcomes; however, they found a dose-response effect in which increased attendance at stress management sessions was associated with greater improvements in both outcomes. Results for interventions with more specific target outcomes such as impulsive behavior, caregiver overload, alexithymia, social skills, reduction of pain levels, suicide attempts, psychiatric hospitalizations, treatment completion, and sleep quality can be found in Table 2.

Methodological Rigor

Six studies (30%) received an RT-1 classification; these were studies that were missing three or more elements of rigor. None of the studies in this classification randomized their samples or utilized comparisons to other treatments, while all met criteria for use of validated and reliable outcome measures and defined specific problems or populations. Of this subset, only one study included a large sample size (e.g., more than 25 participants), though it was also the only study to not utilize treatment manuals or curricula.

Three studies (15%) received an RT-2 classification; that is, they were missing two elements of methodological rigor. Within this classification, none of the studies utilized sample randomization, while all utilized treatment manuals, validated and reliable outcome measures, and defined specific problems or populations. Two of the studies did not meet criteria for large sample size, while two did not meet criteria for comparison with other treatments (see Table 3).

Four studies (20%) were classified under the RT-3 category. Studies in this classification met all rigor criteria but one. All the studies in this category met criteria for use of validated and reliable outcome measures, use of treatment manuals or

Table 3 Means and standard deviations of pretest and posttest measures for meta-analysis

	Measure	No. of control	No. of intervention	Mean control posttest	Mean intervention posttest	SD control posttest	SD intervention posttest
Delgado et al. (2010)*	BDI	15	25	6	3.5	3.3	4.5
Delgado et al. (2012)*	STAI	17	15	31.94	22.8	9.44	8.45
Franco et al. (2010)*	SCL-90 (Depression Subscale)	17	19	1.23	0.53	0.72	0.37
Gallego et al. (2016)*	DASS-21	45	84	34.21	25.27	16.56	10.37
Justo et al. (2016)**	ED-6	18	18	179.75	159.93	30.18	26.63
Manotas et al. (2014)	Brief Symptom Inventory (BSI-18)	43	40	0.56	0.3	0.52	0.26
Ricard et al. (2013)	YO1 (Depression/Anxiety Subscale)	178	125	3.9	5.5	3.7	4.3
Santamaría et al. (2006)** ^a	BDI	9	9				
Wagner et al. (2015, 2016)	PHQ-8	46	16	6.2	4.7	5.8	5.1

*Interventions published in Spanish

^a $z = -2.156, p = .021$

curriculum, and definition of a specific problem or population. Of this subset, only one study met criteria for sample randomization, though it was also the only study to not meet criteria for large sample size. Finally, seven studies (35%) met RT-4 classification criteria; that is they met all methodological rigor criteria (see Table 2).

Cultural Adaptations Utilized by Interventions

Ninety percent of the interventions ($n = 18$) utilized Language adaptations; these were adaptations where language was in tune with the client's background to ensure that the intervention was received as intended. Most of these interventions were delivered partially or completely in Spanish, and they included materials and measures translated and available in Spanish to their participants. Materials included handouts, and CDs or tapes of meditations and mindfulness exercises. Measures utilized by these studies were translated and generally validated for Spanish-speaking populations.

Eighty percent of the studies in this review ($n = 16$) included Persons adaptations. Most of the interventions that were categorized under this type of adaptation had a "cultural match" between facilitators and participants. For example, Ricard et al. (2013) carried out a DBT-based intervention with 303 Hispanic participants; in this intervention, they ensured that two facilitators were Hispanic, and they had a Hispanic licensed psychologist as a supervisor for the clinicians delivering the intervention (see Table 2).

Thirty percent of the investigations ($n = 6$) utilized Metaphor adaptations; these adaptations typically utilized metaphors or symbols that were culturally relevant to the treatment population. For example, De la Fuente Arias et al. (2010) list several metaphors as part of their treatment protocol. Ten percent of the interventions ($n = 2$) utilized Content adaptations; these were interventions that referred to knowledge

about the cultural background of the client and how it was explicitly included in treatment. Many interventions incorporated a discussion of chosen values with the clients at the beginning of treatment to inform other aspects of the intervention (see Table 2).

None of the interventions utilized Concept adaptations, which refers to case conceptualization and how clinical researchers and therapists theorize the presenting problem and, more importantly, how it is explained to the client. One percent of the studies ($n = 1$) incorporated Goal adaptations into their interventions. Goal adaptations involved framing goals within values relevant to the group being treated. For example, Delgado et al. (2012) included discussions with participants with agreement on individual treatment goals and individual values to incorporate into the broader context of the group intervention.

Thirty percent of the studies ($n = 6$) utilized Method adaptations; these refer to practical aspects of how cultural knowledge is integrated into therapy to achieve treatment goals, including method, tasks, and procedures. One excellent example of this process was Rathus and Miller (2002)'s study which adapted a DBT intervention for suicidal adolescents with 67% Hispanic participants. In their intervention, the researchers added a multi-family skills training component to their protocol, which ensured a match between cultural values such as familismo—which involves individuals' strong identification with and attachment to nuclear and extended families—and treatment. In this case, parents and family members were trained to serve as skills coaches to enhance treatment strategies. They were also included in individual therapy when familial issues seemed paramount. Another example of this adaptation was Wagner et al. (2015)'s study in which transportation was offered for every session of the intervention for any participant that requested it (see Table 2).

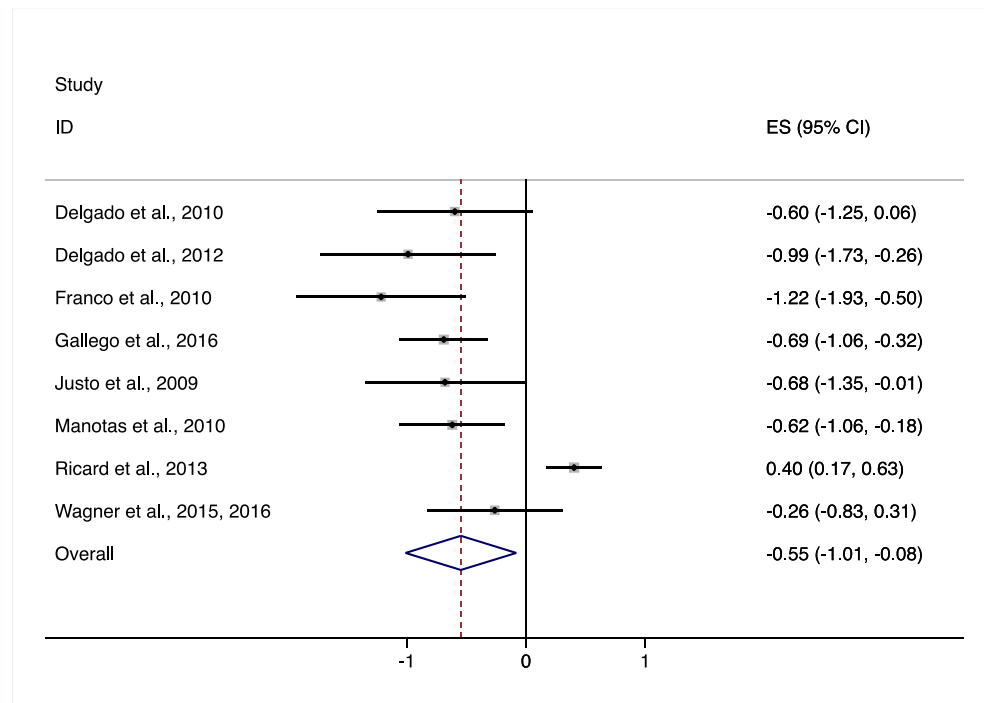
Finally, 20% of the interventions ($n = 4$) reported the use of Context adaptations, which entailed discussing potentially

Table 4 Correlations among cultural adaptations, methodological rigor ratings, and outcome ratings

	Correlations		
	1	2	3
(1) Methodological rigor	1		
(2) Cultural adaptations	.271	1	
(3) Outcome ratings	.151	-.335	1

relevant contextual aspects (e.g., acculturative stress, social, economic, and political context) that were not directly addressed in the intervention. For example, Santamaría et al. (2006) implemented a parenting intervention for mothers of children with conduct issues; the authors included a description of how modern families are having children later in life and have less support and mentoring from extended family, thus limiting the availability of models of parenting skills.

Cultural Adaptation Ratings were assigned to each intervention based on the number of adaptations utilized by each study. In the investigations included in this review, this count ranged from one to five adaptations. Four interventions (20%) included only one adaptation. Eleven interventions (55%) included two adaptations, while three interventions utilized three adaptations (15%). One intervention (5%) utilized four adaptations, and one intervention included five adaptations (5%). None of the studies included in this review integrated all eight domains of cultural adaptations proposed by Bernal et al. (1995).

Fig. 2 Forest plot of the nine studies that met the eligibility criteria

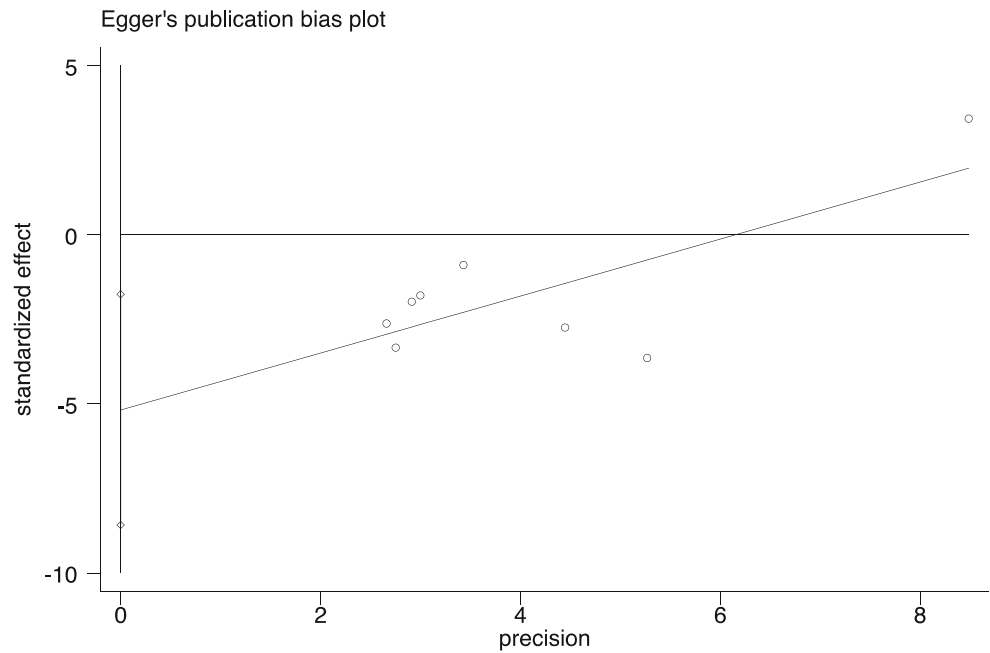
Post hoc analyses

Post hoc analyses conducted to determine whether there was a correlation between cultural adaptation ratings and methodological rigor type, and outcomes indicated that correlations were not significant among these variables (see Table 4). However, we found a negative relation with a moderate effect size between cultural adaptation ratings and outcomes, and a positive relation with a marginally moderate effect size between methodological rigor ratings and cultural adaptation ratings (Cohen 2013).

Meta-analysis

Table 3 presents descriptive information for each included study. Eight studies met inclusion criteria, with a total N across all studies of 717 (292 intervention; 425 comparison group). Hedges g ranged from -1.22 to 0.40 (Fig. 2). The random-effects meta-analysis indicated that individuals who completed an intervention reported lower psychological distress than those in the comparison condition ($g = -0.55$; 95% CI, -1.01 , -0.08), an effect that differed significantly from zero ($Z = 2.31$, $p = .021$). There was also significant heterogeneity across studies ($Q(7) = 52.10$, $p < .001$; $I^2 = 86.6\%$; $T^2 = 0.37$). Begg's publication bias tests yielded no significant publication bias ($z = -1.24$, $p = .216$). However, Egger's test detected significant bias (Coef. = -5.17 , SE = 1.40 , $t = -3.71$, $p = .010$). A visual examination of the funnel plot (Fig. 3) revealed that the study with the greatest precision

Fig. 3 Egger's plot to detect the potential publication bias



(i.e., largest *N*) showed a positive effect (i.e., more distress among the intervention group compared to the control group).

Given the significant heterogeneity in effects, we conducted sensitivity analyses for all of the outcomes using the leave-one-out approach (i.e., conducting the random-effects model following the removal of each study individually, with replacement). Interestingly, the removal of the study of Ricard et al. (2013) influenced estimates in a manner in which heterogeneity was no longer found among studies with its exclusion. The updated analyses without this study revealed an even stronger effect, with much greater precision in the 95% CI, for

those who completed an intervention reported lower psychological distress than those in the comparison condition ($g = -0.68$; 95% CI, $-0.88, -0.47$), an effect that differed significantly from zero ($Z = 6.48, p < .001$) (see Fig. 4). There was also no significant heterogeneity across studies for this updated analysis ($Q(6) = 5.06, p = .537; I^2 = 0\%; T^2 < 0.001$). After removing the study of Ricard et al. (2013), the removal of individual studies resulted in similar overall estimates from the random-effects meta-analysis (*gs* ranging from -0.63 to -0.74).

Furthermore, there was no evidence of publication bias from Begg's ($z = -1.35, p = .176$) or Egger's (Coef. = -

Fig. 4 Updated forest plot with the removal of the study of Ricard et al. (2013)

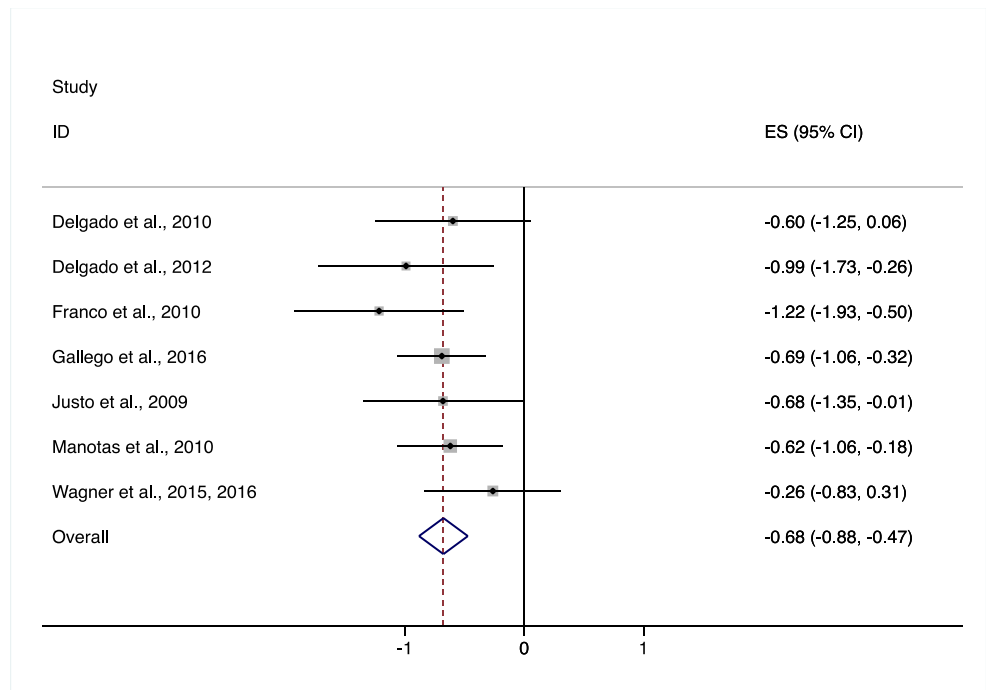
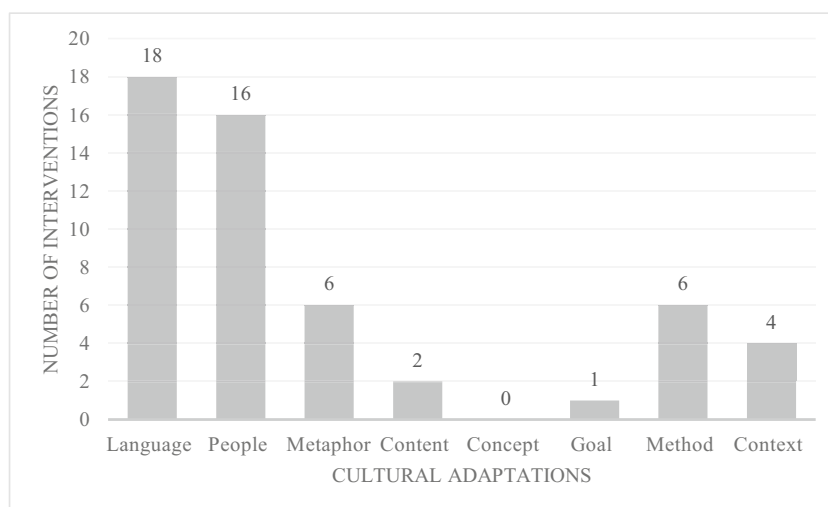


Fig. 5 Frequencies of cultural adaptations utilized by interventions



1.09, $SE = 1.42$, $t = -0.77$, $p = .477$) tests upon removal of Ricard et al. (2013). Given that removing the study of Ricard et al. (2013) resulted in improved precision in estimates and heterogeneity between studies, we have greater confidence in the effects of the models with this removed, which indicates a moderate to large effect of the interventions on psychiatric distress relative to scores in the comparison group.

Discussion

MBIs are now widely used psychological therapies addressing a broad range of concerns including depression, anxiety, disordered eating, substance abuse, and physical health issues (Grossman et al. 2004). While there is promise for MBIs, research has traditionally focused on non-Hispanic, White, female, and middle-to-upper-class participants. This gap in the literature is critical considering the fast-growing Hispanic population in the USA and the widespread use of MBIs worldwide.

Our first aim was to evaluate the current state of the literature on cultural adaptations of MBIs for Hispanics. When discussing this aim, it is important to first note that our ratings of the cultural adaptations present in each study were necessarily impacted by how clearly and thoroughly the study authors described the intervention curriculum and methods (Fig. 5). With this caveat in mind, we found that the most frequently used adaptation is what Bernal et al. (1995) classified as a Language adaptation. Studies included translations of materials and validated and reliable measures in Spanish. Language is the most basic type of cultural adaptation because without a common language between client and clinician, the treatment may be difficult, if not impossible to deliver (Bernal et al. 1995). Thus, most cultural adaptations in this review meet minimum delivery standards; however, experts in this

field argue that translating materials is not sufficient to ensure cultural adaptation (Cardona et al. 2012).

We also found that several studies included Metaphor adaptations and Method adaptations. Experts argue that these types of adaptations, while more challenging to deliver, ensure a cultural fit between treatment and participants which, in turn, ensures better treatment outcomes (Cardona et al. 2012; Bernal and Domenech Rodríguez 2012). Lastly, several studies included discussions about Contextual elements that were potentially relevant to the population studied but were not directly addressed in the intervention, suggesting that researchers are aware of potential culturally relevant components but are not necessarily integrating them into the interventions' designs.

The least utilized cultural adaptations were Goal adaptations and Concept adaptations. The lack of Goal adaptations might be due to the group-based nature of most interventions which makes it more difficult to personalize treatment goals to each client. Additionally, Bernal et al. (1995) argue that the Concept adaptation is perhaps the most challenging to include in cultural adaptation efforts. Concept adaptations refer to the constructs utilized by different psychosocial models that inform treatment (Bernal et al. 1995). It is possible that some treatments were congruent with the client's cultural values regarding case conceptualization of the problem; however, this was not clearly stated in the studies included in this review. Such abstract constructs are challenging to operationalize, which, in turn, may create difficulties in how cultural adaptations are evaluated. On the other hand, the lack of Concept adaptation might suggest that the process of cultural adaptation generally emphasizes more superficial aspects to increase engagement (e.g., language). These findings also indicate limited knowledge of cultural adaptations by researchers in this field.

Our second aim was assessing outcomes that have been associated with culturally adapted MBIs for Hispanics. In the general population, MBIs have been associated with a wide range of outcomes, and results from this review are

consistent with the literature (Masuda, 2014). Specifically, our results show that MBIs are effective for reducing depression symptoms, anxiety, and stress management (Brito Pons 2011; Delgado et al. 2010; Edwards et al. 2014; Gallego et al. 2016; Justo et al. 2016; Manotas et al. 2014; Rathus and Miller 2002; Santamaría et al. 2006; Wagner et al. 2016). On the other hand, utilizing MBIs to promote self-compassion and quality of life improvement showed mixed results (Abercrombie et al. 2007; Delgado et al. 2012; Medeiros and Pulido 2011). The lack of support for using MBIs for self-compassion and quality of life may be due to the variety of interventions utilized in the current review; some interventions such as MBSR might be more effective for stress management and other outcomes, but they do not directly target aspects such as quality of life and/or self-compassion.

Additionally, there appears to be potential for utilizing MBIs to manage and treat the stress related to chronic health conditions such as diabetes, fibromyalgia, and Alzheimer's disease (Delgado et al. 2012; Hernández et al. 2014; Quintana and Rincón Fernández 2011; Wagner et al. 2015). Thus, utilization of MBIs could help with secondary prevention efforts focused on strategies to stop or slow the progression of disease (Owen et al. 1999). Findings from this study also suggest a pattern in utilizing MBIs with populations prone to high chronic stress, such as healthcare professionals, caregivers of patients with chronic conditions, and teachers (Brito Pons 2011; Delgado et al. 2010; Franco et al. 2010; Justo et al. 2016; Manotas et al. 2014; Martín-Asuero and García-Banda 2010; Medeiros and Pulido 2011).

Our third aim was to assess whether culturally adapted MBIs are effective for Hispanics. There is no simple answer to this question. A meta-analysis was used to assess whether there were significant differences between control and intervention groups after intervention delivery. Eight studies that included posttest means and standard deviations for the intervention and comparison group on a measure of psychiatric symptom distress were included. Results indicated a moderate to large effect of the interventions on psychiatric distress relative to scores in the comparison group. These findings provide strong evidence that culturally adapted MBIs are effective at ameliorating psychiatric symptoms among Hispanics relative to non-intervention comparison conditions. These findings indicate that utilizing cultural adaptations does not imply sacrificing methodological rigor. For example, Wagner et al. (2015) incorporated the most cultural adaptations and this study also had an RT-4 rigor rating. Thus, this study evidences that cultural adaptations can be utilized to improve engagement and implementation without sacrificing quality of the research. This finding was also supported by post hoc analyses that suggested a marginally moderate effect size in the relation between methodological rigor ratings and cultural adaptation ratings. Post hoc analyses also showed a negative relation between cultural adaptations and outcomes that was not significant; this non-significant association might

be due to the wide variety of outcome measures in the studies; thus, future research should focus on systematization of cultural adaptations and outcomes.

Moreover, post hoc analyses indicated that there was no additive effect of cultural adaptation ratings and methodological rigor type on outcomes. Many of the studies that were identified as having stronger results (i.e., significant effects across all target outcomes) had higher methodological rigor overall (i.e., RT-3 or RT-4), but they had few cultural adaptations. Most of these studies were conducted outside the USA; thus, they probably included cultural adaptation processes that were not stated explicitly in the articles. For example, an intervention done in Spain would most likely have an ethnic match between therapist and participants or include materials familiar to participants; however, authors might not state these cultural adaptations explicitly. Hispanics in the USA are an ethnic minority group, and thus, authors might be more likely to report efforts to make interventions culturally adapted in their articles.

Our fourth aim was to evaluate the methodological rigor of culturally adapted MBIs for Hispanics. Fifty-five percent of the studies in the current review met either RT-3 or RT-4 classification, which indicates that a large number of studies in the current review were methodologically rigorous. However, 45% of adaptations included in this study met either RT-1 or RT-2 classification, with about half of the studies reporting comparison of interventions to control or other treatments and/or use of manuals, and only eight studies reporting sample randomization. Lack of sample randomization and comparison with other treatment or a control group prevents researchers from establishing intervention effectiveness and evaluating potential benefits of the cultural adaptations. Thus, there is a need to further incorporate appropriate comparison designs.

Limitations and Future Research Directions

There are some limitations to this review. First, as mentioned earlier, our coding and analyses are limited by what authors reported in their studies. That is, it is possible that cultural adaptations were included in the studies, but no clear description of the adaptation was made in the reviewed paper, especially in studies outside the USA. Second, some studies failed to report on the validation of measures with Hispanic populations. Some authors did report measure validity for Hispanic populations (Manotas et al. 2014; Martín-Asuero and García-Banda 2010; Roth and Robbins 2004), while others only mentioned translation of the measures (Abercrombie et al. 2007; Wagner et al. 2016). This does not necessarily mean that the measures used were not validated for Hispanic populations; for example, SCL-90 was used without mention of validity in one study (Rathus and Miller 2002), but the SCL-90 has been validated for

Hispanic populations (Martin-Asuero and Banda 2010), thus highlighting a need for authors to discuss measure validity in their studies. Third, the current review focused on the most commonly used MBIs and may have therefore missed other therapies that include mindfulness.

Despite the study limitations, the study had several strengths. It was guided by a strong empirical foundation that included the APA Task Force on Promotion and Dissemination of Psychological Procedures criteria for assessing empirically validated programs (APA, 1995) and Bernal et al. (1995)'s cultural adaptation domains. Both guidelines have been widely used to assess cultural adaptations and to assess methodological rigor. Moreover, we studied interventions that already have a strong empirical base. This study is also unique because it offers information about studies written in English and Spanish in the USA and outside the USA; few reviews include studies in both languages.

Taken together, our findings can inform recommendations for clinical practice as well as directions for future research. Clinicians working with Hispanic populations presenting with depression, anxiety, and high levels of stress may implement MBIs given that these are effective to treat these issues. Providers interested in implementing cost-effective programs with strong empirical support might benefit from utilizing MBSR, which showed the most evidence base in this review. Practitioners working with clinically diverse populations might also benefit from utilizing MBIs, as there is evidence that MBIs are being effectively utilized in innovative ways such as parent training and managing chronic conditions such as diabetes and fibromyalgia.

Research efforts targeted at improving this area should include more rigorous methodological procedures, particularly sample randomization and treatment group comparisons. Moreover, MBIs targeting Hispanics must ensure that interventions target different cultural adaptation domains, particularly content and concepts, and that these efforts are stated in published studies. It would be beneficial for researchers in this field to design a measure of cultural adaptations, so that researchers wishing to implement these adaptations may have a standard to be guided by and a way to evaluate implementation. Developing a measure for cultural adaptations would also address issues of operationalization for the dimensions utilized in this study.

Findings in this study confirm the importance of conducting cultural adaptation studies. The question of *what* interventions work for *whom* remains unclear, making it imperative to continue this line of research. Culturally adapted MBIs are associated with depression symptom improvement, stress reduction, stress management, and chronic illness management. There is clear evidence to suggest that cultural adaptations can improve evidence-based treatment implementation among Hispanics, but more methodologically rigorous studies are needed.

Author Contributions RC: designed and executed the study, assisted with the data analyses, and wrote the paper. MYS: assisted in the data analysis and coding procedures and wrote part of the results and discussion. VP: assisted in the data analysis and coding procedures and wrote part of the results. ROA: collaborated with the revisions to the paper and wrote part of the paper. KH: collaborated on the meta-analysis and wrote part of the results. KF: collaborated with the design and writing of the study. All authors approved the final version of the manuscript for submission.

Compliance with Ethical Standards

Conflicts of Interest The authors declare that they have no conflict of interest.

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An (*) indicates the paper is included in this review.

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