

Depression Among Latinos in the United States: A Meta-Analytic Review

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The authors conducted a meta-analytic review to assess the prevalence of major depressive disorder and depressive symptoms among Latinos compared with non-Latino Whites in the United States using community-based data. Random-effects estimates were calculated for 8 studies meeting inclusion criteria that reported lifetime prevalence of major depressive disorder (combined $N = 76,270$) and for 23 studies meeting inclusion criteria that reported current prevalence of depressive symptoms (combined $N = 38,997$). Findings did not indicate a group difference in lifetime prevalence of major depressive disorder (odds ratio = 0.89, 95% confidence interval = 0.72, 1.10). Latinos reported more depressive symptoms than non-Latino Whites (standardized mean difference = 0.19, 95% confidence interval = 0.12, 0.25); however, this effect was small and does not appear to suggest a clinically meaningful preponderance of depressive symptoms among Latinos. Findings are examined in the context of theories on vulnerability and resilience, and recommendations for future research are discussed.

Keywords: major depressive disorder, depressive symptoms, Latinos, meta-analysis

A dramatic increase in the number of Latinos residing in the United States, coupled with the fact that Latinos are overrepresented among low-income and underserved U.S. groups, underscores the need for a more comprehensive understanding of their mental health needs. Latinos accounted for 12.5% of the U.S. population in the 2000 Census, and they are predicted to comprise nearly 25% by 2050 (U.S. Department of Health & Human Services, 2001). Latinos continue to face formidable economic and social barriers in this country. For instance, whereas 8% of non-Latino Whites were estimated to live in poverty in 1999, poverty rates were estimated at 14% for Cuban Americans, 27% for Mexican Americans, and 31% for Puerto Ricans. Only 56% of Latinos have graduated from high school, compared with 83% of the total U.S. population (U.S. Department of Health & Human Services, 2001).

A recent meta-analysis (Lorant et al., 2003) found that individuals of low socioeconomic status (SES) are more likely than individuals of high SES to become depressed and even more likely to experience persistent depressive symptoms. This SES–depression relation may be mediated by stress, given that lack of access to critical economic and social resources is stressful and that depression often develops in the context of psychosocial

stress. Moreover, stress can arise not only from material deprivation but also from perceptions of relative inequality (Wilkinson, 1997). Growing evidence indicates that unfair treatment and negative external judgments about one's worth, such as racism, have deleterious effects on both physical and psychological health (Clark, Anderson, Clark, & Williams, 1999). Stress associated with the process of acculturation may also have significant effects on mental health among Latino immigrants (Rogler, Cortes, & Malgady, 1991; Sue & Chu, 2003). Thus, to the extent that Latinos face financial, occupational, and social hardships, cultural adaptation challenges, and exposure to discrimination, they may be at increased risk for depression.

However, cultural factors may also provide powerful sources of emotional resilience. For instance, Plant and Sachs-Ericsson (2004) found that interpersonal functioning protected against depressive symptoms for Latinos and other minorities to a greater extent than for non-Latino Whites. The Latino cultural value of *familismo*, which implies an emphasis on strong family relationships, may foster positive social support that protects individuals against depression, even in the face of substantial environmental risk. Although the pathways have not been well identified to date, Latinos seem to be resilient to a range of negative health outcomes, including infant mortality and low birth weight, in contrast with non-Latino Whites and other groups, a phenomenon often termed the *Hispanic paradox* (Palloni & Morenoff, 2001). This resilience may decrease as individuals become fluent in English or spend more time in the United States.

The prevalence of major depressive disorder and depressive symptoms has been studied extensively among non-Latino Whites, but research on depression among Latinos is more limited, and empirical findings to date are mixed. Epidemiological studies do not tend to indicate dramatic differences in major depression prevalence across ethnic groups, although Latinos in the National Comorbidity Survey reported double the rates of current depression as African Americans (Blazer, Kessler, McGonagle, & Swartz, 1994). By contrast, studies assessing depressive symptoms

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We thank the Robert Wood Johnson Foundation's Health and Society Scholar's Program for its financial support. We also wish to thank Norma Sanchez and Shu-Ju Yang for their help with data coding.

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have reported varied findings. Multiple studies reported that Latinos have higher levels of psychological distress compared with non-Latino Whites (e.g., Golding & Burnam, 1990; Plant & Sachs-Ericsson, 2004; Roberts, 1980a) and African Americans (Frerichs, Aneshensel, & Clark, 1981; Rickert, Wiemann, & Berenson, 2000). However, others found lower levels of distress among Latinos (Antunes, Gordon, Gaitz, & Scott, 1974; Vernon & Roberts, 1982) or no group difference (Roberts, 1980b).

A synthesis of the research on depression prevalence among Latinos can clarify our understanding of this issue and inform recommendations for research, policy, and intervention development. To that end, this article reviews community-based research on depression among Latinos in the United States, compared with non-Latino Whites. We concur that “‘benchmark’ comparisons relative to majority Americans should not take priority over defining the determinants of health status among a minority group” (Flack et al., 1995, p. 592). However, we believe that assessing depression prevalence for Latinos relative to non-Latino Whites is a useful step toward contextualizing risk and resilience among Latinos. Given that non-Latino Whites have been the focus of the vast majority of psychiatric research in the United States, depression among this majority population is well identified and has largely shaped diagnostic instruments and treatments. Situating prevalence data for Latinos relative to non-Latino Whites will likely also prove important with respect to advocating for Latino mental health needs within mainstream U.S. psychiatric communities. Moreover, single-group effect sizes are generally less interpretable than a comparison of effect sizes across groups. With respect to our assumptions about the comparison of ethnic groups, we subscribe to Flack et al.’s (1995) conception of ethnicity as “a surrogate measure of lifestyle and social influences, such as diet, economic status, psychosocial stressors, societal acceptance and interactions, and risk-taking behaviors” (p. 592), rather than a genetically determined construct.

This review takes a meta-analytic approach to synthesize previous findings. Meta-analysis has the potential to enhance a standard review of research, reducing bias by means of systematic data selection techniques and explicit methods for statistical aggregation (Moher et al., 1999). We predicted that Latinos would be at greater risk for depression because their average socioeconomic circumstances and status as an ethnic minority group are likely to cause high levels of stress. We expected to see more pronounced ethnic group differences in depressive symptoms than in major depressive disorder, given patterns in the literature.

Method

Search Procedures

Four databases were searched: PsycINFO, PubMed, the Social Science Citation Index, and Sociological Abstracts. Search terms included *major depression*, *depressive symptoms*, *psychological distress*, *Latino*, *Hispanic*, *Mexican*, *Puerto Rican*, *Dominican*, *Salvadoran*, *Cuban*, *South American*, *Central American*, *Latin American*, *Chicano*, *Spanish-speaking*, and *ethnic*. References from articles selected for inclusion were searched for additional studies. The following criteria were used to select studies: (a) provision of prevalence figures for lifetime major depressive disorder or current depressive symptoms among both U.S. Latinos

and non-Latino Whites; (b) inclusion of an adult sample (mean sample age between 18 and 65); (c) inclusion of community or student populations not selected on the basis of risk for depression; (d) use of a valid measure of major depression (i.e., a structured clinical interview for major depressive disorder) or depressive symptoms (i.e., a validated measure that specifically assesses depressive symptoms, rather than stress or distress more generally); (e) inclusion of at least 30 participants per ethnic group; and (f) publication in a peer-reviewed journal. Dissertations, book chapters, and meeting abstracts were not included. We did not exclude studies on the basis of language of publication.

We chose to focus on studies of nonclinical populations who would not be expected to be at high risk for depression on the basis of specialized characteristics. Thus, we excluded, for example, studies of individuals with psychiatric or medical conditions, psychiatric or medical patients, homeless individuals, individuals selected on the basis of severe trauma exposure, caregivers for the ill or elderly, and incarcerated individuals. Our rationale for those exclusions was that each is associated with depression, and ethnic group differences in depression among patient populations or specialized at-risk groups may be different from group differences in the general population. Our aim in this review is to determine population-based ethnic differences in depression prevalence in order to evaluate whether ethnicity is itself a risk factor for depression. This type of exclusion of clinical or specialized at-risk samples is consistent with the approach pursued in a recent meta-analysis of the relation between socioeconomic status and depression (Lorant et al., 2003). We also excluded studies of individuals with perinatal mood disorders, as these individuals may differ significantly from those at other points in the life cycle.

Our decision to include only published articles was based primarily on concern about the validity of non-peer-reviewed studies. The potential for bias as a result of omitting unpublished studies is less likely to be a concern when reviewing research on depression prevalence than research on treatment outcomes. As the research we reviewed was often not geared toward supporting a hypothesis of group differences, null findings would not appear to limit chances of publication; indeed, a number of studies reported effect sizes only for descriptive purposes.

Our database search yielded the following numbers of abstracts for review (these numbers do not denote a sum total of unique studies, as the databases contained substantial overlap): PsycINFO, $n = 1,776$; PubMed, $n = 1,322$; Social Science Citation Index, $n = 1,494$; and Sociological Abstracts, $n = 286$. Of those, 211 articles were appropriate for further screening. Review of the 211 articles resulted in the exclusion of 134 studies that did not meet our criteria: 70 of those studies (52.2%) did not provide effect estimates by ethnic group, 19 (14.2%) provided effect estimates for Latinos only, 22 (16.4%) did not include either a diagnostic interview for depression or a depression-specific symptom measure, 20 (14.9%) included clinical or specialized high-risk samples, 1 (0.7%) was not published in a peer-reviewed journal, 1 (0.7%) assessed a sample outside our specified age range, and 1 (0.7%) reported on a non-United States sample. (We excluded each study on the basis of a single criterion in the order of priority listed above, although some studies could have been excluded for multiple criteria.)

An additional 46 studies were excluded due to overlapping samples (i.e., more than one publication per data set). Thirty-one

studies were retained ($n = 8$ studies on lifetime major depressive disorder prevalence and $n = 23$ studies on current depressive symptom prevalence). It is noteworthy that more studies were excluded due to overlapping samples than were retained in the final meta-analytic sample. One advantage of a meta-analysis is that a conceptual, nonquantitative review of the literature might lead to biased conclusions about depression prevalence in the event that each publication was treated as an independent observation when many are not.

Coding of Studies

Studies were coded for relevant sample and statistical information, if reported, including sample size, gender, ages, location, Latin American country of origin, depression measure, depression outcome assessed (disorder or symptoms), covariates controlled, effect estimate, and confidence interval/ p value of outcome. Data were abstracted from each article independently by two trained coders with at least a master's-level education. Disparities between coders were resolved through discussion among the study authors.

We extracted one primary estimate of effect from each publication. We used lifetime disorder prevalence and current symptom prevalence, as these were the most commonly reported time frames. We retained only one study per data set using the following guidelines in the order of priority listed: (a) most relevant analyses and outcome measures, (b) largest sample size, and (c) most recent publication. We used effect estimates that were not adjusted for demographic or socioeconomic covariates in order to increase the consistency and interpretability of our analyses, given that only four studies included effect estimates appropriate for our purposes that were adjusted for potential confounders. (An exception was the study by Iwata, Turner, and Lloyd, 2002, in which only adjusted estimates were presented. We retained this adjusted estimate, and our summary effect estimates were not substantially affected by its inclusion.)

Moderators

When at least four studies reported effect estimates for a subpopulation of interest, we assessed ethnic group differences in those subpopulations. Those analyses enabled us to evaluate whether the subgroup characteristic moderated the relation of Latino ethnicity to depressive symptoms. We specified subpopulations of interest a priori to avoid bias (Thompson & Higgins, 2002). Sufficient data were available to permit analysis of depressive symptoms among three such subpopulations: (a) Latinos of Mexican descent, (b) females, and (c) students. The studies we reviewed did not report sufficient data to permit tests of other potential moderators (e.g., nativity, time spent in the United States, language spoken).

Computation of Effect Sizes

Our research focused on the comparison of two groups, Latinos and non-Latino Whites, with respect to two outcomes—lifetime major depressive disorder, a dichotomous outcome, and current depressive symptoms, a continuous outcome. We compared prevalence of major depressive disorder among Latinos versus non-Latino Whites in terms of odds ratios. For depressive symptom

scores, we standardized differences between scores of Latinos and non-Latino Whites to obtain a summary estimate that was consistent across studies using different depression scales (e.g., Center for Epidemiologic Studies Depression Scale [CES-D], Beck Depression Inventory [BDI]). We used the standardized mean difference Hedges's adjusted g . This was calculated for each study by subtracting the Latinos' symptom score from the non-Latino Whites' score and dividing by the pooled standard deviation (Cooper & Hedges, 1994). In pooling the effect estimates, the inverse of the variance was used to weight the studies, so larger studies with more precise estimates would more strongly influence the summary effect estimate. Analysis of depressive symptoms among prespecified subpopulations (Mexican Americans, females, and students) were conducted in the same way.

For both disorder and symptom analyses, we considered random- as well as fixed-effects estimates. Our initial assumption based on the literature was that random-effects derived estimates would be most appropriate due to the heterogeneity of study populations and depression measures. Tests for heterogeneity among studies indicated the appropriateness of random-effects summary effects estimates. In addition, individual studies exerted undue influence on results in fixed-effects models (data not shown). Thus, we present results for the random-effects models.

We present results for the disorder and symptom analyses using forest plots to display visually the extent to which an ethnic difference in depression was present in each study. The summary effect estimate across all studies is also shown. A funnel plot is displayed, which evaluates potential publication and selection bias by indicating how error in each study compared with the standardized effect size across all the studies. If publication and selection bias are not present, studies with less error should be closer to the summary effect estimate, whereas studies that were less precise and had more error should be scattered more widely, resulting in an inverted funnel shape. We also determined the fail-safe N at the $\alpha = .05$ level to estimate the number of studies required to reduce the summary effect measure to a null result (Rosenberg, 2005).

We produced summary estimates of effect using the *rmeta* package (Version 2.12) and the *meta* package (Version 0.5) for R 2.4.0 (R Development Core Team, 2005). The function *meta.DSL()* was used for calculating random effects (DerSimonian-Laird) summary estimates, the function *meta.MH()* for calculating Mantel-Haenszel summary estimates for disorder studies, and the function *metacont()* for calculating summary estimates for symptom studies.

Results

A summary of effect sizes and study characteristics is presented in Table 1 for studies assessing major depression and in Table 2 for studies assessing depressive symptoms. Of the 8 disorder studies, 4 reported gender composition for the sample used in our review (50.0%), 3 reported country of origin (35.7%), 2 reported depression estimates separately by country of origin (25.0%), 0 reported nativity status, language spoken, length of stay in the United States, or other acculturation factors (0%), 6 reported gender as a covariate in at least one analysis (75%), and 5 included at least one analysis controlling for one or more aspects of SES (62.5%). Of the 23 symptom studies, 14 reported gender composition for the sample used in our review (60.9%), 9 reported country of origin

Table 1
Studies Reporting Lifetime Prevalence of Major Depression

Study (year)	Sample (dates)	<i>N</i>	Gender	Ages, in years	Country of origin	Design (region)	Depression measure	Effect size (95% CI)
Blazer et al. (1994)	National Comorbidity Survey (1990-1992)	6,098 W 786 L	50.5% female, 49.5% male	15-54	NR	Stratified, multistage probability sample (nat. rep.)	CIDI for <i>DSM-III-R</i>	0.98 (0.81, 1.20)
Zhang & Snowden (1999)	Epidemiologic Catchment Area Study (early 1980s)	12,176 W 1,433 L	53.4% female, 46.6% male	18+	NR	5-site multistage probability sample (CT, MD, MO, NC, CA)	DIS for <i>DSM-III</i>	1.04 (0.81, 1.33)
Turner & Gil (2002)	Miami-Dade public school study follow-up (1998-2000)	463 W 888 L	NR	19-21	25% Cuban, 25% other Caribbean-basin Hispanic	Public schools, plus random follow-up sample (FL)	Michigan CIDI for <i>DSM-IV</i>	0.89 (0.67, 1.19)
Dunlop et al. (2003)	Health and Retirement Survey (1996)	5,760 W 662 L	51.6% female, 48.4% male	54-65	NR	Probability sample (nat. rep.)	CIDI-SF for <i>DSM-III-R</i>	1.43 (1.10, 1.86)
Breslau, Aguilar-Gaxiola et al. (2005)	National Comorbidity Survey Replication (2001-2003)	4,180 W 527 L	52.9% female, 47.1% male	18+	NR	Stratified, multistage probability sample (nat. rep.)	CIDI	0.71 (0.55, 0.93)
Hasin et al. (2005)	National Epidemiologic Survey on Alcoholism and Related Conditions (2000-2002)	24,507 W 8,308 L	NR	18+	NR	Nat. rep.	AUDADIS-IV	0.62 (0.58, 0.68)
Hernandez et al. (2005)	Colorado Social Health Survey (1985-1986)	3,986 W 473 L	NR	<i>M</i> = 42.6	Mostly Mexican American	Random sample (CO)	DIS for <i>DSM-III</i>	1.04 (0.70, 1.54)
Riolo et al. (2005)	National Health and Nutrition Examination Survey (1988-1994)	2,646 W 3,377 L	NR	15-40	Mexican American	Stratified, multistage probability sample (nat. rep.)	DIS for <i>DSM-III-R</i>	0.75 (0.63, 0.89)

Note. The effect size is an odds ratio. CI = confidence interval; NR = not reported; W = non-Latino White; L = Latino; nat. rep. = nationally representative; CIDI = Composite International Diagnostic Interview; *DSM-III*, *DSM-III-R*, and *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.; 3rd ed., revised; and 4th ed., respectively); DIS = Diagnostic Interview Schedule; AUDADIS-IV = Alcohol Use Disorder and Associated Disabilities Interview Schedule—*DSM-IV* Version.

(39.1%), 8 reported nativity status, language spoken, length of stay in the United States, or other acculturation factors (34.8%), 3 reported depression estimates separately by nativity status or language spoken (13.0%), 3 reported gender as a covariate in at least one analysis (13.0%), and 7 included at least one analysis controlling for one or more aspects of SES (30.4%). Due to the lack of data reported on potential moderators, as well as inconsistencies across studies (e.g., different SES measures), we were unable to test for moderation by nativity, SES, or countries of origin other than Mexico.

A forest plot of the odds ratios of studies assessing major depressive disorder is shown in Figure 1. The vertical dotted line

highlights the point (i.e., 1) at which there was no ethnic group difference in depression. Effect estimates to the right of the line (i.e., > 1) represent studies in which depression rates were higher among Latinos than non-Latino Whites, whereas effect estimates to the left of the line (i.e., < 1) represent higher rates among non-Latino Whites. The summary odds ratio is 0.89 (95% confidence interval [CI] = 0.72, 1.10). Thus, although Latinos had slightly lower odds, the two groups did not differ significantly with respect to major depression prevalence. The test for heterogeneity was significant, $\chi^2(7) = 61.06, p < .001$.

Figure 2 displays a forest plot of the standardized difference in depressive symptom scores for Latinos and non-Latino Whites. As

in Figure 1, placement of the effect estimates around the vertical line indicates the depression level among Latinos relative to non-Latino Whites. The summary difference score indicates that depression scores for Latinos were 0.19 (95% CI = 0.12, 0.25) standard deviations higher than those of non-Latino Whites, a significant difference. The test for heterogeneity was significant, $Q(22) = 94.8, p < .001$.

Summary effect estimates for the three subpopulations (i.e., Mexican Americans, females, and students) were also calculated. For Mexican American samples ($n = 6$ studies), the summary effect estimate was 0.21 (95% CI = 0.15, 0.27). For women ($n = 7$ studies), the summary effect estimate was 0.38 (95% CI = 0.18, 0.57). For studies with college student samples ($n = 10$ studies), the summary effect estimate was 0.11 (95% CI = 0.04, 0.17). In comparison to the overall summary effect estimate of 0.19 (95% CI = 0.12, 0.25), results for Mexican Americans were very similar, for women the ethnic group difference in depression was somewhat more extreme, and for students the difference was slightly attenuated.

Figure 3 displays a funnel plot of the depressive symptom studies. The rank correlation test of funnel plot symmetry indicated that we cannot reject the hypothesis of symmetry ($Z = 0.77, p > .4$), which supports a lack of publication bias. Moreover, the fail-safe number indicated 58 additional studies, a fairly large number in relation to our sample, would be needed to obtain a nonsignificant summary effect estimate for depressive symptoms.

Discussion

This meta-analytic review compared prevalence of major depression and depressive symptoms between Latinos and non-Latino Whites in the United States. An analysis of 8 studies reporting lifetime major depression prevalence indicated that prevalence did not differ significantly between Latinos and non-Latino Whites. By contrast, an analysis of 23 studies reporting depressive symptom prevalence showed significantly higher symptom levels for Latinos than for non-Latino Whites, although the magnitude of the difference in depression score was small.

Disorder Estimates

Three studies reported lower lifetime prevalence of major depression among Latinos compared with non-Latino Whites, and four studies reported no ethnic difference in prevalence. Higher lifetime prevalence of major depression among Latinos was observed in only one study (Dunlop, Song, Lyons, Manheim, & Chang, 2003), which assessed a sample of older adults (aged 54–65) born between 1931 and 1941. Whether Latinos are at greater risk for major depression than non-Latino Whites at older ages and, if so, whether such disparities are primarily a result of age-related factors (e.g., inadequate health care) or cohort effects merits further investigation.

Depressive Symptoms

Findings indicated significantly higher levels of depressive symptoms among Latinos compared with non-Latino Whites. However, the magnitude of the difference was small, consistent

with a 1–2 point difference on a standard symptom measure. The CES-D, the most commonly used symptom measure in the studies reviewed, has a range of 0–60 points, and standard deviations were often as high as 10 points. In this context, a 1–2 point difference is quite modest and may not be clinically meaningful. Analyses of potential moderators indicated that the effect estimate comparing Mexican American samples with non-Latino Whites was very similar to the overall effect estimate, which likely reflects a high concentration of Mexican Americans across most studies reviewed, as discussed below. Ethnic group differences in depressive symptoms were slightly increased among females and slightly attenuated among college students.

Stress-based theories of health have argued that minority race or ethnicity may confer population-level risk for poor health and mental health outcomes as a result of racism and discrimination, lack of access to economic and social resources, and other sources of stress exposure due to social disadvantage (Chakraborty & McKenzie, 2002; Plant & Sachs-Ericsson, 2004; Wilkinson, 1997; Williams, Neighbors, & Jackson, 2003). We excluded from this review samples selected for specialized characteristics associated with depression (e.g., clinical samples) in order to examine that theory with greater clarity, that is, to assess the extent to which Latino ethnicity, in and of itself, is associated with increased risk for depression. Our findings do not indicate a clinically significant preponderance of depressive disorders or symptoms among Latinos compared with non-Latino Whites.

Heterogeneity in the experience of stress may be as great within the Latino population as between individuals of different ethnic origin, such that the stress experience cannot be well characterized by a global assessment of ethnicity. Either more specificity is needed with respect to ethnic background, or stress-based theories as applied to minority ethnicity may be oversimplified. Alternatively, our findings may be compatible with work suggesting that protective factors may buffer Latinos from negative health outcomes (i.e., the Hispanic paradox; Palloni & Morenoff, 2001), despite the potential for greater stress associated with minority status. Should the latter explanation prove compelling, potential protective factors (e.g., family networks, spirituality) would merit additional study, as they may be targets for enhancing Latino mental health. It will be important to distinguish between these explanations in future research.

Our review has certain limitations. First, as we excluded specialized at-risk samples, our findings are not generalizable to those groups. However, we believe our findings regarding ethnicity and depression are more interpretable because we reduced additional heterogeneity due to diverse selection biases. Second, caution is warranted in the interpretation of our results given differences in depression nosology and instrumentation across studies (e.g., *Diagnostic and Statistical Manual of Mental Disorders* 3rd. ed., revised vs. 4th ed. diagnostic criteria). Third, although stratified analyses enabled us to evaluate potential moderators, we were unable to do a formal statistical test of relevant interactions (e.g., Gender \times Ethnicity) due to the small number of studies that reported data on potential moderators. For example, although seven studies reported depression data for women, only one study reported those data for men. Fourth, we excluded studies without a non-Latino White comparison group. The excluded study samples likely differ

Table 2
Studies Reporting Current Prevalence of Depressive Symptoms

Study (year)	Sample (dates)	<i>N</i>	Gender	Ages, in years	Country of origin	Design (region)	Depression measure	Effect size (95% CI)
Frerichs et al. (1981) [†]	Community survey (1979)	609 W 201 L	NR*	18+	NR	Multistage probability sample (Los Angeles)	CES-D	0.23 (0.07, 0.39)
Griffith (1984) ^{a†}	Community survey (1980)	256 W 259 L	NR	<i>M</i> per group = 32-44	Mexican American	Random multistage sampling (southern CA)	Depression Scale (18 items)	0.09 (-0.08, 0.27)
Lloyd & Musser (1989) ^b	Dental student sample (1981-1982)	251 W 22 L	NR*	20-30+ <i>M</i> = 26 (<i>SD</i> = 4)	NR	Dental school (TX)	HSC	-0.43 (-0.87, 0.00)
Golding & Burnam (1990) ^{a†}	Los Angeles Epidemiologic Catchment Area Study (early 1980s)	1,088 W 1,206 L	50.4% female, 49.6% male	18+	Mexican American	Multistage probability sample (Los Angeles)	CES-D	0.18 (0.10, 0.26)
Vaden Gratch et al. (1995) ^b	College student sample (dates NR)	163 W 168 L	NR*	<i>M</i> = 24.2	NR	Southwestern university	BDI	0.16 (-0.05, 0.38)
Jackson (1997) ^{a††}	National Survey of Families and Households (1987-1988)	9,419 W 821 L	59.0% female, 41.0% male	18+	76.7% Mexican American, 23.3% Puerto Rican	Multistage probability sample (nat. rep.)	CES-D (12-item format)	0.03 (-0.04, 0.11)
Fitzgibbon et al. (1998) ^c	Community survey (dates NR)	55 W 117 L	100.0% female, 0.0% male	Group <i>Ms</i> = 34.6-40	NR	Women recruited via hospital study or health program	BDI	0.70 (0.37, 1.03)
Tucker & Mitchell-Kernan (1998) ^c	Community survey (1989)	119 W 56 L	100.0% female, 0.0% male	> 18	Two-thirds Mexican American	Subsample of single women from stratified, random sample (CA)	CES-D	0.24 (-0.08, 0.56)
Hao & Johnson (2000) ^{a††}	Health and Retirement Survey, Wave 1 (1992)	6,688 W 543 L	NR	51-61	Mexican American	Individuals born 1931-1941 (nat. rep.)	5-item scale from HRS survey	0.31 (0.23, 0.39)
McGruder-Johnson et al. (2000) ^{a,b}	College student sample (dates NR)	97 W 61 L	100.0% female, 0.0% male	<i>M</i> = 18	Mexican American	Southwestern university	Depression subscale of the Trauma Symptom Inventory	0.25 (-0.09, 0.59)
Gutierrez et al. (2001) ^b	College student sample (dates NR)	269 W 101 L	57.3% female, 42.7% male	17-24 <i>M</i> > 18	NR	Midwestern university	BDI	0.29 (0.06, 0.52)
Bay-Cheng et al. (2002) ^c	Community survey (dates NR)	608 W 60 L	100.0% female, 0.0% male	18-45 <i>M</i> = 34	NR	Women recruited via random digit dialing (nat. rep.)	CES-D	0.48 (0.22, 0.75)
Iwata et al. (2002) ^{b††}	Miami-Dade public school study follow-up (dates NR)	463 W 888 L	NR*	19-21	NR	Random sample, cohort study & supplemental sample (FL)	CES-D	0.03 (-0.08, 0.15)
Caetano & Cunradi (2003) ^c	National survey (1995)	486 W 422 L	42.7% female, 57.3% male	> 18	NR	National household probability sample of couples	CES-D	0.17 (0.04, 0.30)

Table 2 (continued)

Study (year)	Sample (dates)	<i>N</i>	Gender	Ages, in years	Country of origin	Design (region)	Depression measure	Effect size (95% CI)
Gore & Aseltine (2003) ^b	Prospective study of high school seniors, Wave 1 (1998) and Wave 2 (2000)	648 W 145 L	50.7% female, 49.3% male	16-20 <i>M</i> > 18	Modal country of origin: Puerto Rico	Probability student sample from 7 urban school districts (MA)	CES-D (12-item format)	0.15 (−0.03, 0.33)
Contreras et al. (2004) ^b	College student sample (dates NR)	2,703 W 1,110 L	64.5% female, 35.5% male	18-25	NR	San Diego State University (CA)	BDI	0.12 (0.05, 0.19)
Everson-Rose et al. (2004) ^{c†}	Study of Women's Health Across the Nation (1996-1997)	1,318 W 182 L	100.0% female, 0.0% male	42-52	NR	Random sample, 7 sites (MA, IL, MI, CA, NJ, PA)	CES-D	0.60 (0.45, 0.76)
Masten et al. (2004) ^{a,c††}	Community survey (dates NR)	38 W 38 L	100.0% female, 0.0% male	Group <i>Ms</i> = 29-32	Mexican American	Women recruited at 2 social service agencies (KS)	CES-D	0.41 (−0.05, 0.86)
Plant & Sachs-Ericsson (2004)	Colorado Social Health Survey (dates NR)	3,995 W 470 L	NR [*]	18-94 <i>M</i> = 42.7	NR	Random sample (CO)	CES-D	0.19 (0.09, 0.28)
Wei et al. (2004) ^b	College student sample (dates NR)	296 W 163 L	NR [*]	18-59 <i>M</i> = 22 (<i>SD</i> = 5.7)	NR	Midwestern university	DASS—Short Form	0.18 (0.00, 0.38)
Morera et al. (2005) ^b	College student sample (dates NR)	304 W 194 L	NR [*]	<i>M</i> ages = 19-20	NR	Southeastern and southwestern universities	BDI	0.07 (−0.12, 0.26)
Switzer et al. (2005)	Survey of potential bone marrow donors (1998-2001)	1,359 W 101 L	9.2% female, 90.8% male	44% W & 59% L < 40	NR	Random sample of potential marrow donors at 65 centers	HSC	0.00 (−0.20, 0.20)
Ullman & Filipas (2005) ^{b,c}	College student sample (dates NR)	161 W 81 L	100.0% female, 0.0% male	<i>M</i> = 19.4 (<i>SD</i> = 2.2)	NR	Urban university	CES-D	−0.04 (−0.30, 0.23)

Note. The effect size is a standardized mean difference. CI = confidence interval; NR = not reported; NR^{*} = reported for the study's total sample but not for the sample used in our review; W = non-Latino White; L = Latino; nat. rep. = nationally representative; CES-D = Center for Epidemiologic Studies Depression Scale; BDI = Beck Depression Inventory; DASS—Short Form = Depression, Anxiety, and Stress Scale (Depression scale); HSC = Hopkins Symptom Checklist (Depression scale).

^a Included in the stratified analysis of Mexican American samples. ^b Included in the stratified analysis of college students. ^c Included in the stratified analysis of female samples.

[†] Surveys administered in Spanish, if requested. ^{††} Nativity status assessed.

with respect to certain demographic characteristics from the samples we included (e.g., more Spanish-speaking Latinos), which may have introduced bias into our analyses. Finally, findings regarding lifetime disorder prevalence may have been different had we been able to control for age, gender, or other confounders. It is possible that effects of ethnicity are being masked by biased age and gender distributions. However, it is not likely that such bias is systematic across the diverse studies we reviewed. Regardless, because the disorder studies used large and generally representative samples, our findings indicate the public health burden of depression that exists, which is valuable from an intervention and policy perspective.

This meta-analysis highlights shortcomings in previous research, which limit our ability to understand Latino mental health in a comprehensive fashion. We summarize the key issues below, along with recommendations for future study. We were able to consider only two of the issues (differential risk among Latino subgroups and gender differences) in this meta-analysis due to data limitations.

Differential Risk Among Latino Subgroups

Participants' country of origin was not reported in approximately 63% of the disorder studies and 61% of the symptom

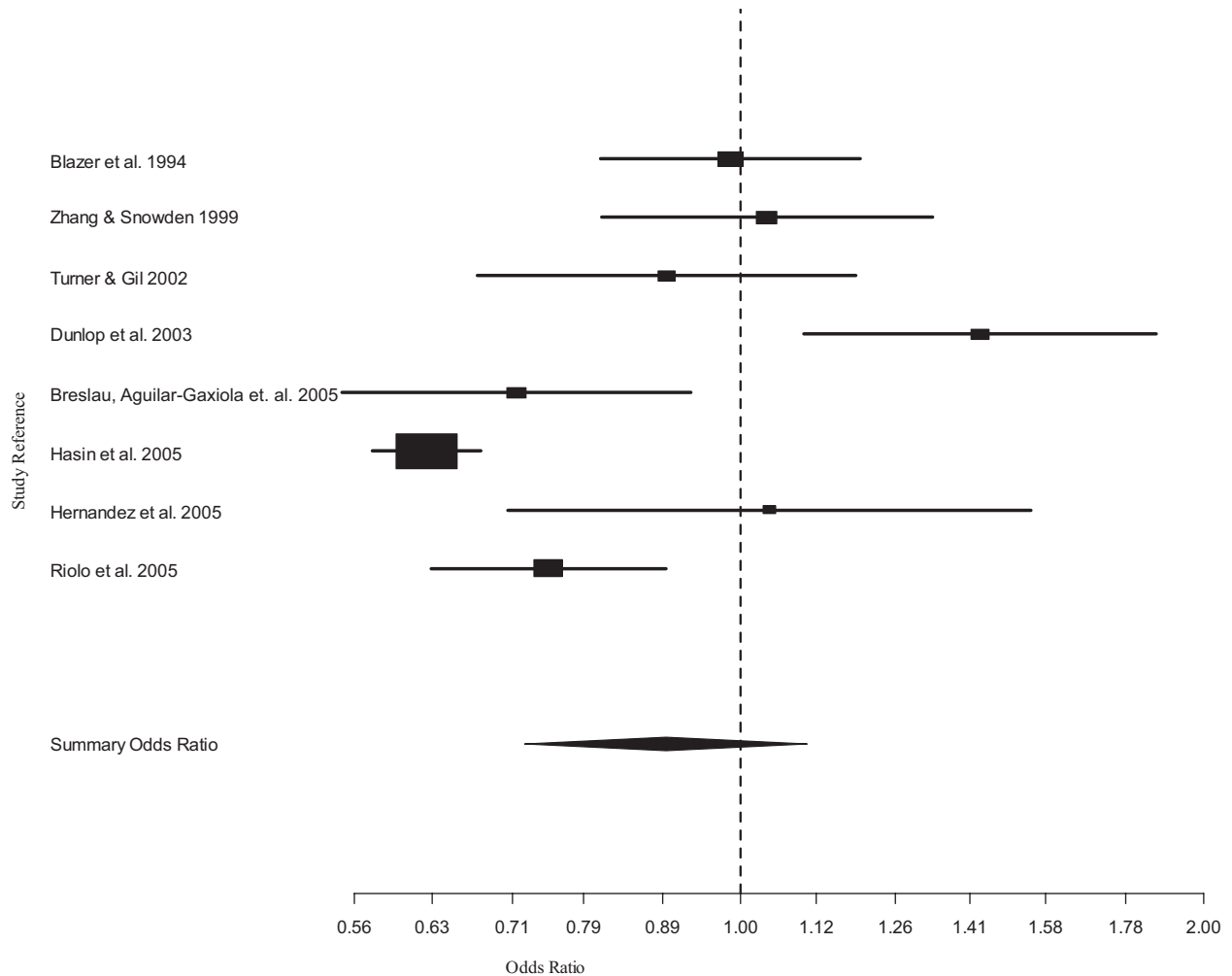


Figure 1. Prevalence of major depression for Latinos versus non-Latino Whites ($n = 8$ studies). Each study's 95% confidence interval is shown by a horizontal line, and its point estimate is indicated by a square whose height is inversely proportional to the standard error of the estimate. The summary odds ratio (0.89) is shown as a diamond whose tallest point indicates the estimate and whose horizontal limits show the 95% confidence intervals of the effect estimate. A null value of no difference in major depression between Latinos and non-Latino Whites is indicated by the dashed vertical line at odds ratio = 1.0.

studies in this meta-analysis. This is a critical limitation, given emerging evidence that disorder prevalence among Latinos varies by country of origin; for example, the prevalence of psychiatric disorders was recently found to be higher among Puerto Ricans than Mexican or Cuban Americans (Alegría et al., 2007). Six studies in our review reported sampling Mexican Americans. Most of the other studies likely contained a majority of Mexican Americans even when country of origin was unspecified, given that Mexican Americans are the largest U.S. Latino group, and many studies were conducted in areas with a high Mexican American concentration (e.g., California). Thus, our findings may underestimate depression prevalence among other subgroups, such as Puerto Ricans. It is encouraging that a recent national survey, the National Latino and Asian American Study (Alegría et al., 2004), collected data on four Latino subgroups. We recommend that researchers obtain such data to avoid the pitfalls inherent in aggregating heterogeneous groups.

Gender Differences

Findings from our subgroup analysis of all-female samples suggest that ethnic group differences in depressive symptoms may be slightly larger among women than in the general population. Women are more likely to experience depression than men in both Latino and non-Latino White populations (e.g., Hasin, Goodwin, Stinson, & Grant, 2005), but cultural differences in gender socialization may impact the magnitude of this gender difference. Traditional Latino values that emphasize strength and authority for males (i.e., *machismo*) and submissiveness for females (i.e., *marianismo*; see Galanti, 2003) may increase the likelihood that Latinas will express distress via internalizing (i.e., inwardly directed) pathways, such as depressive symptoms. Exploring gender as a potential moderator of ethnic differences in depression may suggest ways to tailor depression interventions to be sensitive to both culture and gender.

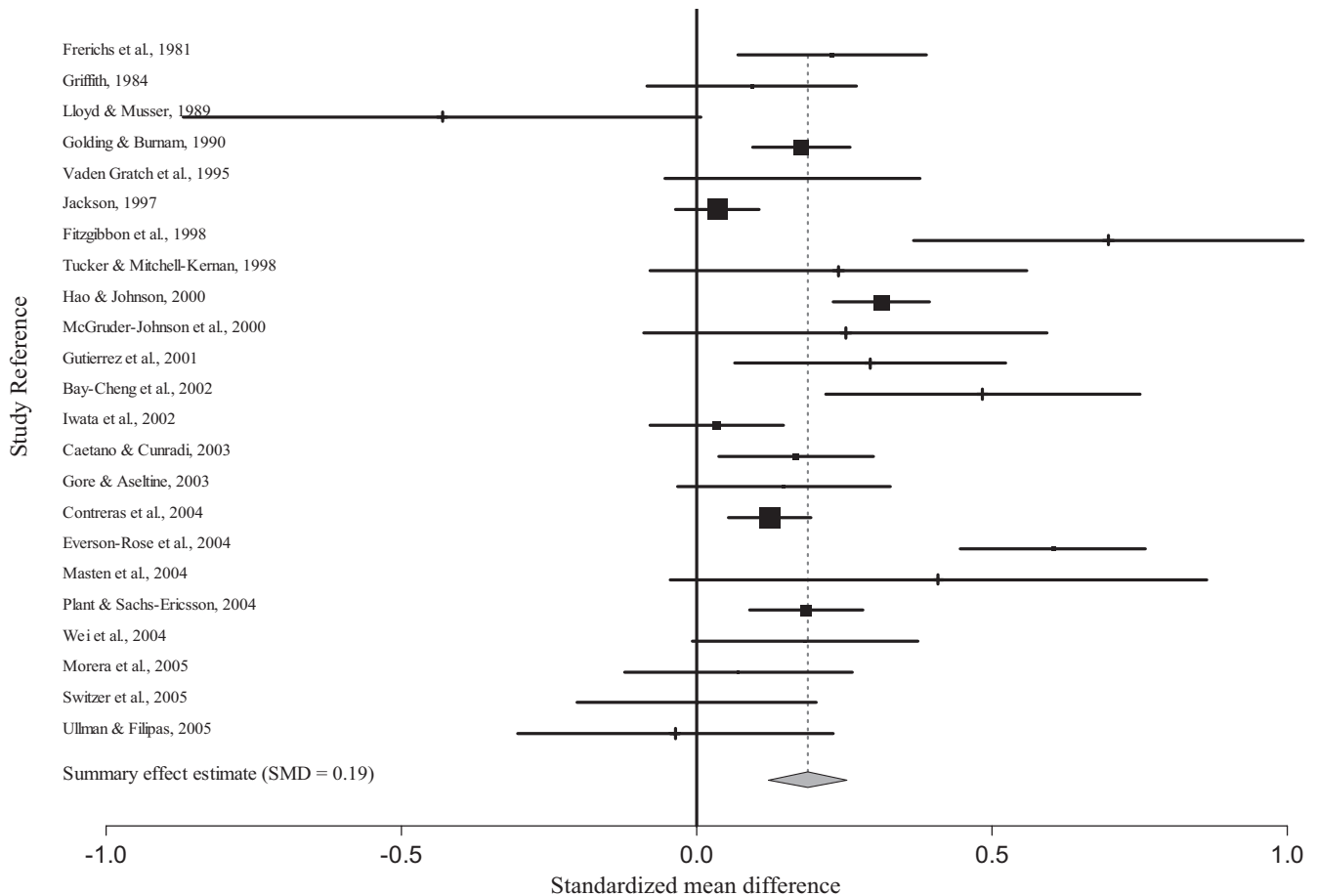


Figure 2. Prevalence of depressive symptoms for Latinos and non-Latino Whites ($n = 23$ studies). Each study's 95% confidence interval is a horizontal line, and its point estimate is a square whose height is inversely proportional to the standard error of the estimate. The summary odds ratio (0.19) is a diamond whose tallest point indicates the estimate and whose horizontal limits show the 95% confidence intervals of the effect estimate. A null value of no difference in depressive symptoms between groups is indicated by the dashed vertical line at standardized mean difference (SMD) = 1.0.

Effects of Nativity, Language, and Other Acculturation Factors

None of the disorder studies and only 13% of the symptom studies we reviewed examined nativity, language, or other factors associated with the acculturation process. However, United States-born nativity, fluency in English, and length of time in the United States have been found to predict a higher prevalence of psychiatric disorders (Alegría et al., 2007; Vega et al., 1998; Vega, Sribney, Aguilar-Gaxiola, & Kolody, 2004). The impact of acculturation was found in recent research to vary as a function of psychiatric disorder (Alegría et al., 2007) and country of origin (Alegría, Canino, Stinson, & Grant, 2006). This is a critical area for future research, and it has significant implications for developing culturally sensitive depression prevention and treatment programs.

Social and Contextual Factors

An analysis of social-contextual mechanisms that may confer vulnerability (e.g., low SES) or resilience (e.g., social support) is

critical for understanding mental health. For instance, elevated rates of psychiatric disorders among Puerto Ricans compared with Mexican Americans and Cuban Americans may derive from higher rates of unemployment among this population (Alegría et al., 2007). However, less than 39% of the studies we reviewed included analyses controlling SES. In addition, the SES indicators assessed varied across studies, and, with one exception, effect estimates adjusted only for SES were not provided. Less than 10% of the studies included analyses controlling for potential protective factors, such as social support. Given the small numbers and variations across studies described above, we were not able to evaluate the effects of SES or social support statistically. We recommend that researchers evaluate social-contextual factors relevant to Latino mental health. Such factors can serve as targets for intervention efforts.

Measurement Issues

Measurement validity is a concern in cross-cultural research, as most U.S. depression measures were developed and normed using

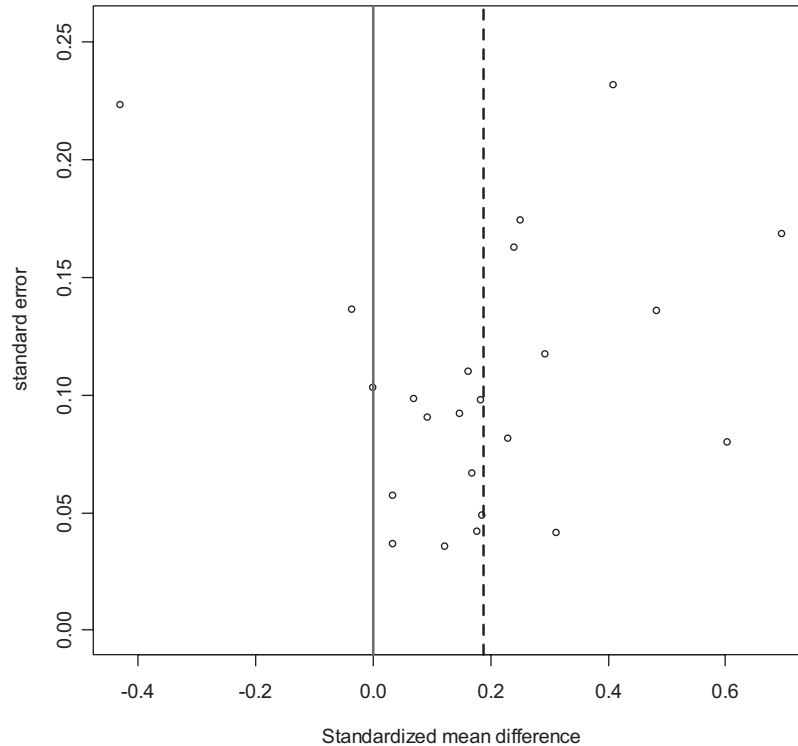


Figure 3. Funnel plot of depressive symptom studies. The solid vertical line indicates the position of studies with null findings, whereas the dashed vertical line shows the summary estimate of effect calculated from our meta-analysis (0.19). Studies are plotted by the standard error (y-axis) and the standardized mean difference, an effect estimate (x-axis).

non-Latino White samples. Although some studies have indicated that commonly used scales, such as the CES-D and the BDI, have comparable psychometric properties for non-Latino Whites and Latinos (Aneshensel, Clark, & Frerichs, 1983; Golding & Aneshensel, 1989; Wiebe & Penley, 2005), other data have suggested differences in item response bias or factor structure (Azocar, Areán, Miranda, & Muñoz, 2001; Garcia & Marks, 1989; Posner, Stewart, Marín, & Pérez-Stable, 2001). Future research should address cross-cultural measurement validity, particularly among Spanish-speaking groups. An assessment of syndromes unique to Latino cultures (e.g., *ataque de nervios*) is also desirable to capture distress symptoms not reflected in standard U.S. measures.

Chronic and Comorbid Depression

Ethnic differences in the expression of psychological distress may not be adequately captured by assessing only major depressive disorder or depressive symptoms. For instance, data suggest that Latinos may be more likely than non-Latino Whites to have persistent or chronic forms of mood disorder (Breslau, Kendler, Su, Aguilar-Gaxiola, & Kessler, 2005; Riolo, Nguyen, Greden, & King, 2005), as well as co-occurring depression and other psychiatric disorders (Blazer et al., 1994). Those findings suggest that Latinos may be at higher risk for chronic or comorbid states of psychological distress that are perhaps not readily recognized or treated by health care professionals. Future research should evaluate disorder course and comorbidities.

Findings suggest limited differences in vulnerability to depression between Latinos and non-Latino Whites based on current assessment strategies. However, we believe an assessment of true vulnerability may benefit from attention to the issues outlined above before we draw firm conclusions. This meta-analysis highlights challenges inherent in cross-cultural mental health research, with many of the concerns raised here likely relevant for other cross-cultural comparisons. Moreover, regardless of differences that may or may not exist in vulnerability to depression, we know that Latinos who are depressed suffer more than depressed non-Latino Whites as a result of decreased access to mental health care (McGuire, Alegria, Cook, Wells, & Zaslavsky, 2006) and poorer quality of care (Young, Klap, Sherbourne, & Wells, 2001). Further research on the areas outlined above is critical for developing culturally sensitive depression interventions, as well as for implementing policies to aid in increased access to mental health care among Latinos.

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Received May 22, 2007

Revision received January 29, 2008

Accepted February 4, 2008 ■