Differential Engagement by Race/Ethnicity in Experimental Trials of Mental Health Treatment Interventions: A Systematic Review

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ABSTRACT

Objective: Research on mental health interventions, largely from observational studies, suggests that individuals who are Black, Indigenous, and People of Color (BIPOC) have lower treatment engagement than non-Latino Whites. This systematic review focuses on prospective, experimental treatment trials, which reduce variability in patient and intervention characteristics and some access barriers (eg, cost), to examine the association of race/ethnicity and engagement.

Data Sources: A systematic search of PubMed and PsycINFO through May 2020 using terms covering mental health treatment, engagement, and race/ethnicity.

Study Selection: US-based, English-language, prospective experimental (including quasi-experimental) trials of adults treated for *DSM*-defined mental disorders were included. Studies had to compare engagement (treatment initiation and retention, medication adherence) across 2 or more ethnoracial groups. Fifty-five of 2,520 articles met inclusion criteria.

Data Extraction: Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and the Cochrane Collaboration bias-risk assessment tool were used to report study findings.

Results: Twenty-nine articles (53%) reported significant ethnoracial engagement differences, of which 93% found lower engagement among BIPOC groups compared largely to non-Latino Whites. The proportion of significant findings was consistent across quality of studies, covariate adjustments, ethnoracial groups, disorders, treatments, and 4 engagement definitions. Reporting limitations were found in covariate analyses and disaggregation of results across specific ethnoracial groups.

Conclusions: Prospective experimental treatment trials reveal consistently lower BIPOC engagement, suggesting persisting disparities despite standardized study designs. Future research should improve inclusion of understudied groups, examine covariates systematically, and follow uniform reporting and analytic practices to elucidate reasons for these disparities.

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Individuals in the United States who are Black, Indigenous, and People of Color (BIPOC) tend to have worse access to mental health care and to receive lower-quality services than non-Latino Whites.[1–3] In care, BIPOC individuals often have lower treatment engagement,[1,4–8] defined as treatment initiation, session attendance, adherence to medications or other interventions, or treatment-regimen completion.[9,10] Lower engagement is associated with negative consequences, including morbidity and mortality,[11] lower treatment efficacy,[12] limited data on treatment effects in specific populations,[13] and higher public health costs.[14,15]

Lower engagement in mental health care among BIPOC communities involves patient, provider, organizational, and structural factors.[16,17] Persistent ethnoracial disparities in care[18–20] contribute to disengagement among BIPOC individuals.[6,11] Further, the perception of unequal or uncaring treatment is a strong disincentive to engagement.[21] Other contributors include distrust of mental health professionals,[17,22] often due to prior experiences of poor or biased care,[23,24] and stigma toward mental illness and treatment[25] (patient level); providers' inattention to patients' cultural treatment expectations (eg, regarding communication styles)[17,26] and therapists' implicit or explicit biases[27] (provider); lack of interpreter services to overcome language barriers[28] (organizational); and disparities in insurance availability or coverage[29] or in access to transportation[30] or to jobs with paid sick leave[31] (structural).

Previous literature reviews on BIPOC patient engagement in mental health treatment have focused on community-based services (naturalistic follow-up), not on prospective, experimental treatment trials.[10,32,33] Focusing on the latter may reduce the contribution of several factors to differential ethnoracial engagement, such as access to insurance (since experimental therapies are usually free), availability of therapeutic modality (provided), variation in illness severity (often stipulated at entry),

Clinical Points

- Community-based mental health treatment engagement is often lower among Black, Indigenous, and People of Color (BIPOC) individuals than among White patients. We examined whether this lower engagement occurs in experimental treatment trials that reduce variability in participants, interventions, and some access characteristics.
- Lower BIPOC initiation, adherence, and retention are reported in experimental trials across diagnoses and treatments. Future research should identify correlates and mechanisms of engagement disparities to inform engagement-enhancement strategies.

language barriers (typically excluded or addressed), and variable follow-up schedules (usually specified). Examining differential patient engagement in experimental trials may help clarify if ethnoracial disparities exist after accounting for these factors. Persistent disparities would suggest that more comprehensive engagement-enhancement approaches are required to overcome ethnoracial differences in engagement. Moreover, covariate adjustment or moderation/mediation analyses may identify modifiable correlates or mechanisms of persistent disengagement to inform community-based care.

To address this knowledge gap and inform strategies to eliminate mental health care disparities, we conducted the first systematic review to examine ethnoracial disparities in treatment engagement of US adults in prospective experimental trials of mental health interventions. We examined multiple aspects of engagement (initiation, adherence, and two definitions of retention), any *DSM*-based mental disorder and US adult patient population, and any article comparing engagement outcomes statistically by race/ethnicity. We also examined whether studies identified explanatory factors for ethnoracial differences in engagement, such as clinical or sociodemographic characteristics.

METHODS

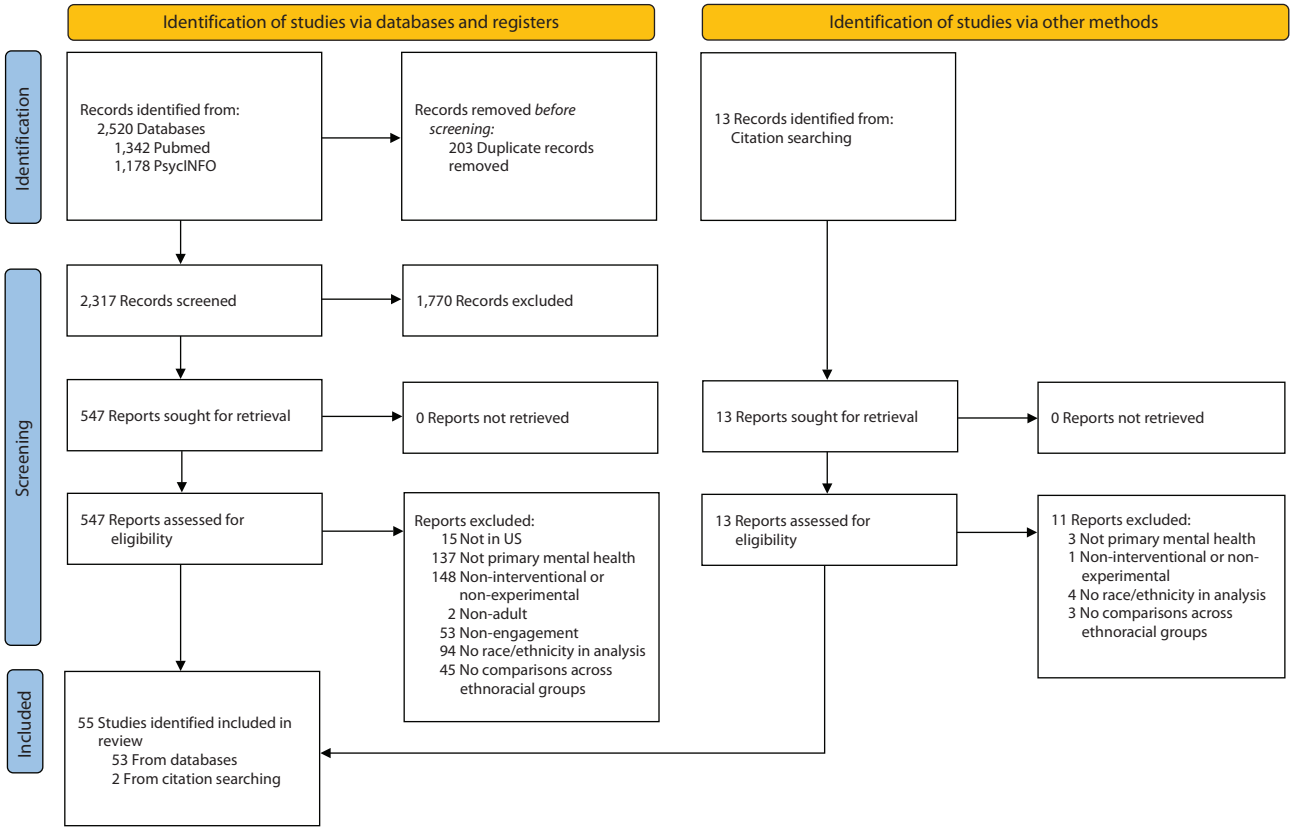
Our systematic review followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[34] guidelines. Experimental and quasi-experimental trials of treatment interventions for *DSM* criteria–based mental disorders in which investigators assigned participants prospectively were included; non-experimental, naturalistic studies were excluded. We included peer-reviewed, English-language, US-based articles on studies of adults (aged 18+ years) reporting the association of race/ethnicity with any engagement outcomes: (1) initiation, or commencing treatment after study enrollment (eg, attending first intervention session); (2) medication adherence, or taking agreed-upon prescriptions; or retention, either (3) a dichotomized measure of premature treatment discontinuation or (4) a continuous measure of treatment duration (eg, time in treatment).

Articles from inception to May 2020 were drawn from PubMed and Ovid's PsycINFO using database-specific search terms and procedures (Supplementary Table 1). Ethnoracial terms were drawn from MEDLINE/PubMed Search and Health Disparities and Minority Health Information Resources and included wildcard or "explode" options with terms capturing mediation/moderation of engagement. Studies on only one ethnoracial group were excluded. Reference lists of selected articles were also reviewed. Two authors (D.S. and M.A.O.) screened titles and abstracts, reviewing full texts as needed. Uncertainty after full-text review was resolved by the senior author (R.L.-F.). The PRISMA flow diagram (Figure 1) presents the search results. Diagnoses and treatments, study duration, sample size and ethnoracial composition, statistical analyses, covariates, and race/ethnicity-related engagement findings were extracted systematically; parent-study articles were consulted as needed.

Terminology describing sample subgroups, including whether race was distinguished from ethnicity, varied substantially. We follow authors' conventions for individual studies and distinguish between race and ethnicity in aggregating results (eg, *non-Latino Whites* vs *Whites*) when warranted by the data and as recommended by the Office of Management and Budget (OMB) standards used by the National Institutes of Health.[35] Otherwise, for cross-study summaries we use the terms *White*, *Black*, *Latino*, and *Asian* and, when aggregating findings, *BIPOC*, defined as Hispanics/Latinos, non-Latino Asians, non-Latino Blacks, non-Latino American Indians/Alaskan Natives (AIAN), and non-Latino Native Hawaiians/Other Pacific Islanders.

Risk of bias was evaluated within and across studies using the Cochrane Risk of Bias tool[36] on 6 domains: selection (both subject randomization and masked intervention assignment), performance (blinding of subjects and study personnel), detection (blinding of outcome assessors), attrition (incomplete outcome data due to discontinuation/exclusion), and reporting (selective presentation of results). Each area was rated as "high," "low," or "unclear" risk of bias. For selection bias, "not applicable" was assigned to non-randomized study designs and "unclear" when randomization or allocation method was unspecified. Two authors (D.S. and D.B.-P.) trained on bias-tool guidelines[36] using 3 sets of 5 articles (not in this review) until a $\kappa \geq 0.9$ was attained; each then rated approximately half of the articles. In sensitivity analyses, we examined how findings varied by study quality assessed using 4 domains after excluding performance blinding (since it is impossible to blind patients to a psychosocial treatment received) and attrition bias (by design, all studies included an engagement outcome). High-quality studies were defined as having low risk of bias in each of the 4 remaining domains and moderate-quality studies as having low risk of bias in at least 2 of the 4 remaining domains. A second sensitivity analysis examined potential statistical power differences, comparing articles above or below a median split of sample sizes.

Figure 1. PRISMA Flowchart Showing Identification of 55 Eligible Studies of Mental Health Intervention Experimental and Quasi-Experimental Trials Reporting Ethnoracial Comparisons in Engagement



RESULTS

In total, 2,520 articles (PubMed: 1,342, PsycINFO: 1,178) were identified. After including 13 additional articles from reference lists and removing duplicates, 2,330 articles were screened. Based on title/abstract and full-text review, 2,275 articles were excluded (Figure 1) and 55 included (Table 1).

Sample sizes ranged from 39 to 6,829 and intervention duration from 13 days to 18 months. Ethnoracial composition varied across studies: Whites (included in 91% of studies), Blacks (89%), Latinos (67%), Asians and/or Pacific Islanders (11%), AIAN (4%), and other/ambiguous groupings (58%); these groups constituted 15%–91%, 3%–85%, 1%–63%, 0%–3%, 0%–1%, and 0%–53% of analytic samples, respectively.

The most frequent engagement outcome was retention, examined in 87% of studies (48); 58% (28) reported dichotomous retention, 33% (16) continuous retention, and 9% (4) both. Initiation (22%; 12) and medication adherence (7%; 4) followed; 16% (9) included more than one engagement outcome. The frequency of publication has accelerated: 0 studies before 1989 were included, 8 from the 1990s, 15 from the 2000s, and 32 from the 2010s.

Studies addressed engagement in substance use disorders (SUD) (53%, 29), mood disorders (31%, 17), posttraumatic stress disorder (PTSD) (11%, 6), and schizophrenia (7%, 4). Binge-eating disorder, social anxiety disorder, general serious mental illness (SMI), insomnia, attention deficit-hyperactivity disorder (ADHD), and trichotillomania were examined in 1 article each; 11% (6) of articles examined more than one disorder. Most interventions were psychosocial (58%, 32), largely based on cognitive or cognitive-behavioral therapy (CBT) (36%, 20), followed by pharmacologic (24%, 13), and combined psychosocial-pharmacologic treatments (18%, 10).

Risk of Bias Within and Across Studies

As noted in Table 2, only 2 studies were rated low risk across all 6 bias domains.[53,59] Ten additional articles were rated low risk in all domains except performance bias, which was rated high risk in 87% (Figure 2), reflecting interventions not conducive to patient blinding (eg, psychotherapy). We excluded studies without engagement data, and most studies examined retention as an endpoint, reducing the likelihood of attrition bias. While studies generally lacked detailed descriptions of patient selection and treatment allocation, few articles were rated high risk of attrition bias (5%, 3) or reporting bias (2%, 1).

Across studies (Figure 2), risk of bias varied by domain, with low risk most common for reporting bias (98%) and attrition bias (95%); high risk most common for performance bias (87%) and detection bias (56%); and unclear risk most

Table 1. Study Characteristics and Analysis of Ethnoracial Differences and Patient Engagement Outcomes in 55 Prospective Experimental and Quasi-Experimental Trials of Mental Health Interventions Published Through May 2020

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Aharonovich 2005[37]	Cognitive-behavioral relapse prevention therapy with gabapentin or venlafaxine	12 weekly sessions	Cocaine dependence with or without MDD	N = 56 W: 53.6%; B: 46.4%	χ^2 test	None	*Retention—Dichotomous* Discontinuation defined as staying in treatment for < 12 weeks or missing 2+ consecutive weeks: Discontinuation: B = W
Gonzalez Arnold 2015[38]	Optimized treatment, with or without lithium	6 months	BPD	N = 283 NHW: 61.8%; NHB: 16.6%; H: 13.8%; O: 7.8% Analytic sample: n = 261; NHW: 67.0%; NHB: 18.0%; H: 14.9%	Kaplan-Meier log rank test	None	*Retention—Continuous* Assessed in lithium arm only Discontinuation defined as time in lithium treatment: NHB = NHW and H = NHW
Arnow 2007[39] Parent study: Keller 2000[40]	Nefazadone, CBASP, or combination	12 weeks	MDD	N = 681 W: 90.5%; B: 3.4%; H: 3.3%; A: 1.2%; O: 1.6%	Min vs W χ^2 test	None	*Retention—Dichotomous* Discontinuation: Overall sample: **Min > W** Nefazodone arm: **Min > W** CBASP arm: Min = W Combined arm: Min = W
Blanco 2018[41]	Interpersonal psychotherapy vs problem-solving therapy vs brief supportive therapy Treatment in English and Spanish	12 weeks	MDD among breast cancer patients	N = 134 W: 22.4%; B: 10.4%; H: 62.7%; O: 3.5% Included Spanish-speaking patients	H vs non-H Cox regression	None	*Retention—Dichotomous* Discontinuation from any of the 3 treatments: H = non-H
Blow 2010[42]	Motivational intervention or strengths-based case management vs referral brochure	2 sessions of motivational intervention or 5 sessions of case management	Substance use disorders	Emergency department patients assigned to motivational intervention or case management; N = 957 B: 58%; other groups not described	B vs non-B Multiple logistic regression	Age, male gender, marital status, education, insurance status, employment, emergency department visit reason, physical/mental functioning, substance use history, readiness to change, self-efficacy rating	*Retention—Dichotomous* No unadjusted analyses reported Attendance: defined as attending 1+ sessions: B = non-B Engagement: defined as attending 2+ sessions: B = non-B
Bogner 2006[43]	Depression care managers monitor course and adverse effects, provide follow-up, and advise primary care providers on clinical treatment of primary care patients	12 weeks	MDD, subthreshold depression	Adults age 60+ years N = 228 W: 25.9%, other groups not described	Min vs W Latent class analysis generated 3 groups: Known Adherent, Unknown Adherent, Known Nonadherent Logistic regression	Logistic regression: Adherent or Unknown-Adherent group vs Nonadherent group Logistic regression adjusts for: age, gender, education, depression rating, cognitive status, medical comorbidity	*Medication Adherence* Adherence defined as removing ≥ 80% of pills from blister pack Unadjusted findings not reported After adjustment: **Min < W**

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Brown 2010[44] Parent study: Ling 2009 (NIDA Clinical Trials Network)[45]	Buprenorphine	28-day induction-stabilization period	Opioid dependence	N = 724 after removing O (comprising A, NA patients) NHW: 77.1%; B: 2.8%; H: 10.1%	χ^2 test	None	*Retention—Dichotomous* Discontinuation during induction-stabilization period: B = H = NHW
Cheng 2018[46]	dCBT-I	12 weekly sessions	Insomnia with or without depressive symptoms	dCBT-I allocation sample: n = 946; demographics not reported dCBT-I completion sample: n = 358 W: 75.1%; B: 18.2%; O (A, AI/NA, Multi, Unk): 3.7%	B vs W; O vs W Attrition analysis of allocation sample only Logistic regression stratified by race/ethnicity: B vs W and O vs W	None	*Retention—Dichotomous* Discontinuation defined as attending no treatment sessions or ending treatment prematurely after attending 1+ sessions: B = W; **O > W**
Cook 2013[3] Parent study: Cook 2010[47]	IR vs SN	6 sessions	PTSD	Male Vietnam War veterans; N = 124 W: 42%; B: 52%	B vs non-B, stratified by treatment arm IR arm: Multiple logistic regression SN arm: Simple logistic regression	IR arm: SSRI use, other trauma exposure, perceived treatment credibility rating	*Retention—Dichotomous* Discontinuation defined as attending fewer than 4 of 6 sessions (< 75%) IR arm: Discontinuation prior to adjustment: **B < non-B**. After adjustment: B = non-B SN arm: Discontinuation: B = non-B
Dansereau 1996[48] Parent study: Joe 1994[49]	Node-link mapping in counseling vs standard counseling	6 months	Opioid dependence	N = 304 B: 22.4%; W: 39.8%; Mexican American: 37.8%	MANOVA	None	*Retention—Continuous* Defined as number of sessions attended and number of sessions scheduled but missed No. of sessions attended: **B < W** No. of sessions missed: **B > W**, **Mex-Am > W**
Falkenstein 2015[50] Parent study: Rogers 2014[51]	Two-step treatment approach of online self-help program followed by in-person behavior therapy	Online: 10 weeks In-person: 8 sessions	Trichotillomania	N = 60 Analytic sample: n = 53 completing online intervention NHW: 72%; B: 17%; A: 3.8%; Middle Eastern: 3.8%; Native Hawaiian: 1.9%; H: 1.9%	Min vs NHW Bivariate comparisons for initiation, retention Multiple logistic regression for initiation	Symptom severity after online intervention	*Initiation* Defined as agreement to enter in-person behavior therapy after completing online intervention. Initiation prior to adjustment: Min = NHW Unchanged after adjustment *Retention—Continuous* Frequency of using online intervention: Min = NHW Frequency of attending in-person sessions: Min = NHW, unchanged after adjustment
Hasin 2014[52]	Motivational interviewing with HealthCall-S: smartphone self-monitoring app to reduce alcohol consumption	60–90 days	Alcohol dependence	HIV patients N = 39 B: 61.5%; H: 25.6%: O: 12.8%	χ^2 test	None	*Retention—Dichotomous* Defined as discontinuation within 60 days: B = H = O
Hoblyn 2013[53] Parent study: Rosenheck 2006[54]	Long-acting injectable risperidone vs an oral antipsychotic	18 months	Schizophrenia	VA patients N = 446 W: 43.7%; B:48.9%; O: 7.4%	B vs O vs W in χ^2; non-W vs W in logistic regression χ^2 test; simple logistic regression	None	*Initiation* Defined as agreeing to participate: B = O = W; non-W = W

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Horvitz-Lennon 2011[55] Parent study: Randolph 2002[56]	ACT	12 months	Serious mental illness	N = 6,829 B: 49.7%; L: 5.6%; NHW: 44.7% Included Spanish-speaking patients	Split into two groups: B and W; L and W (same W sample in both) Zero-inflated Poisson regression	Age, sex, marital status, mental health need, general health need, social need (unemployment, homelessness), assessment time point; analysis stratified by timeframe	*Initiation* Service use at baseline: B = L = NHW *Retention—Continuous* Defined as service use frequency among service users No unadjusted analyses reported After adjustment: 0 months: **B < W**, **L < W**; 3 months: B = W, **L < W**; 12 months: B = W, **L < W** Time trend frequency of use: 0–3 months: **B > W**, **L < W**; 0–12 months: **B > W**; L = W
Hser 2014[57] Parent study: Saxon 2013[58]	Methadone vs buprenorphine/naloxone	24 weeks	Opioid dependence	N = 1,269 W: 71.4%; B: 8.7%; H: 12.0%; O: 8.0%	Cox proportional hazards regression	Age, gender, site, alcohol use, number of cigarettes per day, SF-36 scores, urine drug test across 24 weeks, recent opioid use, treatment drug dosage	*Retention—Continuous* Days of attendance before drop, defined as missing 14+ consecutive days of attendance No unadjusted analyses reported After adjustment: **H < NHW**
Jarrett 2013[59] Parent study: Jarrett 2010[60]	Cognitive therapy	12–14 weeks	MDD	N = 523 NHW: 80.9%; B: 10.3%; H: 5.2%; O: 3.6%	NHW and non-NHW Multiple logistic regression with backward elimination of variables	Baseline depression symptoms, working for pay, age, education in years, melancholic features, endogenous depression features	*Retention—Dichotomous* Completing treatment defined as attending ≥ 14/16 sessions, or ≥ 18/20 for "late responders" No unadjusted analyses reported After adjustment: **Non-NHW < NHW**
Johnson 2014[61] Parent study: Anderson 2013[62]	Virtual reality exposure therapy vs exposure group therapy	8 sessions	Social anxiety disorder	N = 74 W: 58%; B: 42%	Multiple logistic regression with hierarchical variable additions, then backward elimination	Treatment, age, gender, pretreatment symptom severity, stereotype confirmation concern score, interaction of race and stereotype confirmation concern score	*Retention—Dichotomous* Discontinuation defined as missing > 2 exposure group therapy sessions or one virtual reality exposure session No unadjusted analyses reported After adjustment: B = W
Kalapatapu 2014[63] Parent study: Mohr 2012[64]	Telephonic CBT vs face-to-face CBT	18 weekly sessions	MDD and alcohol use	N = 103 W: 64.1%; Non-W: 35.9%	χ^2 test	None	*Retention—Dichotomous* Discontinuation defined as not attending session 18: Non-W = W
Keefe 2018[65] Parent study: Resick 2002[66]	CPT vs PE	CPT: 12 sessions PE: 9 sessions	PTSD	Women only N = 160 W: 71.9%; Min: 28.1%	Multiple logistic regression using model-based recursive partitioning to select variables	Childhood physical abuse, current relationship abuse, trait anger, years of education, IQ score, interaction term of treatment type with each variable	*Retention—Dichotomous* Discontinuation defined as not completing treatment No unadjusted analyses reported After adjustment: PE patients **Min > W**; CPT patients Min = W
Kelly 2011[67]	Methadone	365 days	Opioid dependence	Overall N = 349 W:24.8%; B: 74.1%; NA: 0.3%; API: 0.3%; "Other Hispanic": 0.6% Subsample remaining after 3 months: n = 248	W and B/O Cox proportional hazards regression	Gender, age, cocaine use, probation status, treatment motivation, addiction severity	*Retention—Continuous* Time in treatment No unadjusted analyses reported After adjustment: First 3 months: B/O = W; Beyond 3 months: B/O = W

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Kleinman 1992[68]	Family or individual therapy vs paraprofessional-led group therapy	Up to 24 sessions	Cocaine dependence	N = 148 W: 16%; B: 63%; H: 21%	Race dummy variable: B vs W; B vs H Short-term retention: multiple logistic regression Longer-term retention: general linear model	Short-term retention: education, age, cocaine use, number of arrests, Symptom Checklist-90 score, marijuana use Longer-term retention: age, number of arrests, Symptom Checklist-90 score, marijuana use, cocaine use, therapy type, education	*Initiation* Short-term retention defined as attending up to two intake interviews only Prior to adjustment: B = H = W Unchanged after adjustment *Retention—Continuous* Longer-term retention defined as number of sessions after intake Prior to adjustment: **B < W**, B = H Unchanged after adjustment
Kurtz 2011[69] Parent study: Kurtz 2007[70]	Psychosocial rehabilitation community day program	12 months	Schizophrenia	N = 127 W: "largely Caucasian"; B: 14.2%	Coding for race/ethnicity not specified Multiple logistic regression with hierarchical variable selection ($P \leq .25$)	Age, sex, number of hospitalizations, education, age at onset, Positive and Negative Syndrome Scale hostility score, vocabulary score from Wechsler Adult Intelligence Scale III/IV	*Retention—Dichotomous* Discontinuation defined as not completing at least one month plus follow-up assessment before discharge No unadjusted analyses reported After adjustment: B = W
Lee 2017[71] Parent study: Liebschutz 2014[72]	Linkage (facilitated transition to outpatient hospital-based clinic visits)		Opioid dependence	N = 72 W: 44.4%; B: 60.6%; L: 19.4%; O: 5.6% Analytic sample: Initiation: n = 72; retention: n = 52	Non-NHW vs NHW Initiation: multiple logistic regression Retention: ordinary least means regression	Both regressions: Age, gender, days hospitalized, lifetime buprenorphine treatment, lifetime methadone treatment, social support, PTSD symptoms, readiness to quit measure	No unadjusted analyses reported *Initiation* Defined as attending initial outpatient visit After adjustment: not-NHW = NHW *Retention—Continuous* Defined as number of days with active buprenorphine prescription After adjustment: **not-NHW < NHW**
Lesser 2011[73] Parent study: Rush 2011[74] (CO-MED study)	Antidepressant combination trial	12-week acute phase followed by 16-week continuation phase	MDD	N = 665 W: 64.8%; B: 26.2%; API: 3.3%; NA: 1.1%; Multi: 1.4% H not reported for N = 665 sample Analytic sample: Excluded some groups for small sample size. N = 600 NHW: 59%; B: 28%; White Hispanic: 13%	Multiple logistic regression for 12-week and 16-week phases	Both regressions: treatment, education, employment, blood pressure, hypochondriasis, panic disorder, clinic setting, quality of life measure, Social Adjustment Scale score	*Retention—Dichotomous* Retention defined as early termination 12-week phase: Prior to adjustment: **B > NHW**; H = NHW Unchanged after adjustment 16-week phase: Prior to adjustment: **B > NHW**; H = NHW Unchanged after adjustment
Lester 2010[75] Parent study: Resick 2002[66]	Active treatment (CPT or PE) vs waitlist	6 weeks	PTSD	N = 308 women W: 70%; B: 30%	Multinomial logistic regression	Trauma history, treatment expectations, age, education, income	*Initiation* Defined as starting treatment No unadjusted analyses reported After adjustment: **B < W** *Retention—Dichotomous* Retention defined as discontinuing treatment Prior to adjustment: **B > W** Unchanged after adjustment

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Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Levin 2007[76]	Methylphenidate vs placebo in combination with CBT	14 weeks	ADHD among adults with cocaine dependence	N = 106 B: 19.8%; H: 14.2%; W: 60.4%; O: 5.7%	χ^2 test	None	*Retention—Dichotomous* Retention defined as completing treatment: B = H = O = W
McCarthy 2019[77] Parent study: Baker 2016[78]	Nicotine patch alone vs varenicline vs patch and lozenge	27 days	Nicotine dependence	N = 1,045 W: 67.4%; B: 28.0%; O: 4.6%	Min vs W Latent class analysis on combined adherence-abstinence status during first 27 days of treatment	Number of years smoking, number of past quit attempts, longest period of abstinence, cigarette dependence score	*Medication Adherence* Adherence based on daily report, calculated in 3-day parcels No unadjusted analyses reported After adjustment: lowest-adherence type: **Min > W**
Milligan 2004[79] Parent study: Carroll 1994[80]; Carroll 1998[81]	Pharmacotherapy with psychotherapy Study 1: Cocaine dependence: CBT with desipramine vs placebo Study 2: Cocaine dependence with alcohol dependence: disulfiram plus CBT/12-step facilitation or clinical management vs CBT or 12-step facilitation alone	12 weeks	Cocaine dependence, with or without alcohol dependence	Study 1: N = 121 Study 2: N = 122 W: 39%; B: 56%; H: 3%; O: 2% Analytic sample: Study 1: N = 111 B: 47.7%; W: 52.3% Study 2: N = 111 B: 58.6%; W: 41.4%	Limited to B and W patients only χ^2 tests, ANOVAs	Treatment duration expectations, treatment type, medication type, interaction of race and treatment duration expectations	*Retention—Continuous* Defined as time in treatment No unadjusted analyses reported Overall retention: **B < W** Study 1: Significant race-treatment duration expectation interaction: Among those who reported expecting at least 1 month of treatment before improvement: **B < W** Significant race-treatment duration expectations interaction: Among those expecting improvement after a month or longer: **W > B** Study 2: Treatment differences among B: **Disulfiram B > No-med B** **CBT/12-step B > clinical management B**
Miranda 2003[82]	Case management with CBT Treatment in English and Spanish	12 weekly CBT sessions; case management over 6 months	MDD	N = 199 H, Spanish first-language: n = 77 Non-H, English first-language: n = 122: W: 47%; B: 38%; A or NA: 15%	χ^2 and *t* tests	None	*Retention—Dichotomous* Defined as attending ≥ 8/12 sessions H, Spanish first-language = Non-H, English first-language

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Mohr 2012[64]	Telephonic or face-to-face CBT	18 sessions	MDD	N = 325 Race and ethnicity reported separately: H/L: 13.5% B: 22.2%; W: 57.5%; Multi: 9.2%; O: 2.8% ("Other" includes American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander)	χ^2 and *t* test	None	Unclear if any of the analyses include ethnicity *Retention—Dichotomous* Completion: attending all 18 sessions B = Multi = O = W Failure to complete: 4–18 sessions B = Multi = O = W Failure to engage: ≤4 sessions B = Multi = O = W *Retention—Continuous* Number of sessions attended B = Multi = O = W
Montgomery 2012[83] Parent study: Carroll 2006[84]	Psychotherapy or drug counseling with or without CM	8 weeks, with 3-month and 6-month follow-up	Marijuana dependence	N = 136 B: 60%; Latin American: 13%; European American: 23% Analytic sample: B and W only n = 112 B: 72.3%; W: 27.7%	χ^2 tests	None	*Initiation* Attending first session: B = W *Retention—Dichotomous* Completing treatment: **B < W** Attend 3-month follow-up: **B < W** Attend 6-month follow-up: **B < W**
Nwokeji 2012[85] Parent study: Gimm 2009 (Texas DMIE program)[86]	Enhanced health services benefits with case management vs standard services	365 days	MDD	N = 166 W: 38.6%; B: 33.1%; H/L: 26.5%; API: 1.0%; O: 1.2%	Adherence: Ordinary least squares generalized linear model Non-persistence: Cox proportional likelihood hazard model	Both outcomes: pre-enrollment adherence, age, gender	No unadjusted analyses reported *Medication Adherence* Adherence defined as proportion of days covered (number of days with medication over 365 days of study) After adjustments: B = W; H = W Non-persistence defined as period of 35+ days without prescription refill After adjustments: **B > W**; H = W
Rosenblum 1999[87] Parent study: Magura 1994[88]	High-intensity CBT (5 times/week) vs low-intensity CBT (once/week)	6 months	Cocaine dependence with mood disorder autonomous or nonautonomous from substance use disorder	N = 67 H: 62.7%; B: 19.4%; W: 14.9%; O: 3.0%	H vs non-H bivariate only; B vs non-B regression Forward stepwise variable selection based on bivariate analyses for multiple logistic regression	Mood disorder autonomy, use of psychiatric medication, cocaine use frequency in last 30 days	*Retention—Dichotomous* Retention defined as completing treatment Unadjusted analyses: **H < non-H**; **B > non-B** After adjustment: H dropped from analyses after forward stepwise variable selection. **B > non-B**
Rosenheck 2000[89]	Clozapine vs haloperidol	12 months	Schizophrenia	N = 423 VA medical center patients W: 66.4%; B: 29.6%; H: 3.8%; O: 0.2%	Full-sample analysis and among those still in treatment at 6 weeks (n = 296); stratified by arm Cox regression with dummy variables for B and H	Age, receiving public support, lifetime alcoholism, lifetime cocaine use, years of education, symptom change, side effects, change in akathisia, change in quality of life	*Retention—Continuous* Medication continuation defined as number of weekly sessions attended No unadjusted analyses reported After adjustment: Overall: **B < non-B**, H = non-H; among 6+ weeks retained: **B < non-B**, H = non-H Clozapine: Overall: H = non-H, **B < non-B**; among 6+ weeks retained: H = non-H, **B < non-B** Haloperidol: Overall: B = non-B; among 6+ weeks retained: H = non-H, B = non-B

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Ruglass 2014[90] Parent study: Hien 2009 (The Women and Trauma Study)[91]	Seeking Safety (CBT with trauma and substance use components) vs Women's Health Education (psychoeducation, focus on health-related topics) Racial/ethnic matching between patient and therapist	12 sessions	PTSD with co-occurring substance abuse or dependence	N = 353 women B: 34.0%; W: 45.6%; H: 6.5%; Multi: 13.3%; O: 0.6% Analytic sample: n = 224 B: 45.1%; W: 54.9%	*t* Test	None	*Retention—Continuous* Number of sessions attended: B = W
Ruglass 2016[92] Parent study: Hien 2015[93]	Seeking Safety with or without sertraline	12 sessions	PTSD with co-occurring alcohol or other substance use disorder	N = 69 NHB: 59.4%; NHW: 23.2%; L: 10.1%; Multi/O: 7.2% Analytic sample: n = 57 B: 71.9%%; W: 28.1%	Bivariate tests	None	*Medication Adherence* Proportion of positive urine screens for sertraline/placebo: B = W *Retention—Dichotomous* Treatment completion defined as attending 6 or more sessions: B = W *Retention—Continuous* Number of psychotherapy sessions: B = W Number of medication sessions: B = W
Saxon 1996[94]	Methadone alone, methadone with standard counseling, or methadone with enhanced services; with or without contingency condition (3 × 2 design)	18 months	Opioid dependence	N = 353 B: 36.0%; H: 3.7%; W: 56.7%; O: 3.7% Analytic sample: n = 337	B vs non-B Cox proportional hazards regression, with backward elimination	Treatment condition, age, male gender, education, previous methadone treatment, living alone, frequency of drug/alcohol use, symptom impact	*Retention—Dichotomous* Discontinuation defined as ending treatment prematurely Unadjusted analysis: B = non-B After adjustment: **B > non-B**

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Siqueland 1998[95] Parent study: NIDA Collaborative Cocaine Treatment Study; Pilot/ Training phase[142]	Supportive-expressive therapy, cognitive therapy, or individual drug counseling	6 months of active treatment, followed by 3 monthly booster sessions	Cocaine dependence	N = 1,975 screened: Min: 53% n = 1,386 eligible: Min: 52% n = 776 kept intake appointment (Min: % not shown) n = 675 start stabilization Min: 55% n = 286 randomized to treatment Min: 43%	Moving to next phase and treatment completion outcomes: Multiple logistic regression Number of days in treatment and number of sessions attended: Survival analysis, early vs later discontinuation: χ^2 test	All analyses: age Start-stabilization sample: gender, employment, education, occupational status, living situation Start-stabilization sample with cocaine use data: education, cocaine use before intake, lifetime cocaine use, previous drug treatments count, addition severity, number of days between screening and intake Randomized to treatment sample: education, employment, living situation, psychiatric and drug severity measures	No unadjusted analyses reported *Initiation* Attended intake: After adjustment: Min = non-Min Randomized to treatment: After adjustment: **Min < non-Min** Completed stabilization: After adjustment: Min = non-Min Randomized to treatment with cocaine use data: After adjustment: Min = non-Min *Retention—Dichotomous* Completed treatment: After adjustment: **Min < non-Min** Started stabilization: After adjustment: Min = non-Min Started stabilization with cocaine use data: After adjustment: **Min < non-Min** Early discontinuation (within 10 days of treatment) vs later discontinuation: Min = non-Min *Retention—Continuous* Days in study: After adjustment: Min = non-Min
Siqueland 2002[96] Parent study: NIDA Collaborative Cocaine Treatment Study, Crits-Christoph 1999 (NIDA Collaborative Cocaine Treatment Study)[97]	Supportive-expressive therapy, cognitive therapy, or individual drug counseling	6 months of active treatment, followed by 3 monthly booster sessions	Cocaine dependence	N = 2,197 screened. W: 56% n = 1,777 screened and eligible. W: 55% n = 937 kept intake appointment W: 53% n = 870 started orientation. Ethnoracial distribution not reported n = 487 completed intake/orientation and randomized W: 58%	Non-W vs W Continuation Ratio ordinal logistic regression for progressing through treatment stages. Terms entered in stepwise fashion, and significant variables kept for final model	Gender, living situation, employment status, age, cocaine use habit (binge vs chronic), days of cocaine use in past month, past-month substance abuse treatment, past-month psychiatric treatment	*Initiation* Progressing from screening to randomization Unadjusted analyses: **non-W < W** progressing at every stage Unchanged after adjustment
Siqueland 2002[98] Parent study: Crits-Christoph 1999 (NIDA Collaborative Cocaine Treatment Study)[97]	Supportive-expressive therapy, cognitive therapy, or individual drug counseling	6 months of active treatment, followed by 3 monthly booster sessions	Cocaine dependence	N = 487 W: 58%; B: 40%; H: 2%	Min vs W Cox proportional hazards regression	Age, employment status, education years, mode of cocaine use, treatment type Interactions between demographics, and between demographic and treatment type with and without drug and psychiatric severity measures	*Retention—Continuous* Days from randomization to last contact with treatment provider Unadjusted analyses: **Min < W** Unchanged after adjustment Significant race/ethnicity-living situation interaction: **Min alone > Min with partner** **W alone < W with partner**

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Stein 2010[99]	Escitalopram (or placebo control) during buprenorphine treatment	12 weeks	Opioid dependence with MDD	N = 147 NHW: 80.1%; B: 4.8%; H: 9.6%; O: 5.5%	Simple logistic regression	None	*Retention—Dichotomous* Discontinuation defined as missing 7 consecutive buprenorphine dosing days: B = H = O = NHW
Sullivan 2019[100]	Extended-release naltrexone vs oral naltrexone, both with behavior therapy	24 weeks	Opioid dependence	N = 60 W: 63.33%; B: 11.67%; H: 21.67%; O: 3.33%	Non-W vs W Cox regression	Age, gender, opioid administration route, baseline opioid use severity	*Retention—Continuous* Weeks until last on-site clinical contact No unadjusted analyses reported After adjustment: non-W = W
Svikis 1997[101] Parent study: Jansson 1996[102]	Financial incentives during start of intensive day treatment (methadone maintenance and non-methadone treatment)	30 days, including the first 7 days when financial incentives are offered	Opioid dependence	N = 142 pregnant women B: 84.5%	ANOVA, multiple regression	ANOVA: treatment group and incentive level Multiple regression: age, years of education, methadone treatment, incentive level, addiction severity scores	No unadjusted analyses reported *Retention—Continuous* Number of full treatment days (4+ hours of program participation) After adjustment: B = non-B Hours attended in for first 7 days After adjustment: B = non-B Hours attended after first 7 days After adjustment: B = non-B Days in treatment, from transfer to intensive day treatment to last face-to-face contact with program: After adjustment: B = non-B
Tate 2011[103]	Integrated CBT vs 12-step facilitation therapy	Twice-weekly sessions for 12 weeks, followed by weekly sessions for 12 weeks	Alcohol, cannabinol, or stimulant dependence with co-occurring MDD	N = 253 veterans W: 72%; B: 16%; H: 3%; API/NA/O: 3% Analytic sample: W: 72%; Min: 28%	Multiple linear regression. Post hoc test for dichotomous discontinuation: χ^2 tests	Age, pretreatment substance use, social support, acute health events	*Retention—Dichotomous* Discontinuation defined as attending fewer than 8 sessions. Min = W *Retention—Continuous* Number of sessions out of 36 attended Unadjusted analyses: **Min < W** Unchanged after adjustment
Thompson-Brenner 2013[104]	Psychosocial interventions: self-help or therapist-led, group or individual	10 weeks to 24 weeks, depending on treatment studied	Binge-eating disorder	N = 1,073 individuals aggregated from 11 randomized controlled trials W: 88.2%; B: 7.4%; H/L: 4.5%	Multiple logistic regression with mixed effects	Age, education, baseline BMI, baseline binging episodes, treatment length, treatment type (self-help or guided self-help/other; group/individual), interaction of race, age, education, and treatment types; random intercept for study site	*Retention—Dichotomous* Discontinuation defined as stopping participation prior to posttreatment assessment No unadjusted analyses reported After adjustment: **B > W**; H/L = W; B = H/L
Vendetti 2002[105] Parent study: Stephens 2002 (Marijuana Treatment Project)[106]	CBT with MET and case management vs MET alone vs delayed treatment control	9 sessions (CBT) vs 2 sessions (MET)	Marijuana dependence	N = 813 W: 65.0%; B: 15.6%; H: 16.5%; O (A, NA, Unknown): 2.9%	Forward stepwise variable selection based on bivariate analyses for multiple logistic regression	Age, marital status, employment status, years of education, self-perceived marijuana dependence, past 30-day sedative use, past 30-day cocaine use	*Initiation* Pre-treatment discontinuation defined as declining participation once eligible: Unadjusted analyses: Race/ethnicity significant difference at bivariate variable selection After adjustment: **O > W**; B = W; H = W

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Wagner 1998[107]	Fluoxetine vs placebo-control	8 weeks	MDD in HIV patients	N = 118 (n = 116 men) W: 66.9%; B: 18.6%; L: 14.4%	Direct linear regression	Age, education, baseline CD4 count, baseline HDRS score	*Retention—Dichotomous* Defined as treatment discontinuation Unadjusted analyses: **L > B**; **L > W** After adjustment: L = B = W
Warden 2009[108] Parent study: Rush 2004 (STAR*D study)[109]	Treatment strategies: switch from citalopram to bupropion, sertraline, or venlafaxine; citalopram augmentation with bupropion or buspirone	12–14 weeks (Level 2)	MDD	N = 1,286: Medication switch (MS): n = 723 Medication augmentation (MA): n = 563 Sample frequencies not shown.	Race analyzed separately from ethnicity W, B, O (A, NA, Native Hawaiian or other Pacific Islander, Multi); H Stepwise multiple logistic regression MA included race and ethnicity; MS included race	MA: current medication, family history of drug abuse, melancholic features, age, Level 2 baseline depression severity MS: new medication, melancholic features, citalopram exit dose from Level 1	*Retention—Dichotomous* Attrition defined as leaving treatment before week 12 without transition to next treatment step or follow-up Unadjusted analyses: MA: **B > W**; **O > W**; **H > non-H** MS: **B > W**; **O > W**; **H < non-H** After adjustment: MA: Unchanged after adjustment MS: **B > W**; **O > W**
Warden 2009[110] Parent study: Rush 2004 (STAR*D study)[109]	Citalopram with flexible dosing (Level 1)	12–14 weeks (Level 1)	MDD	N = 3,581 Race reported separately from ethnicity. W: 76%; B: 18%; A/O/Multi: 6% H: 12%	Race analyzed separately from ethnicity W, B, O; H Lower income: < $20k; Middle income: $20k-< $40k; Higher income: ≥ $40k Bivariate logistic regression; Stepwise multiple logistic regression based on significant bivariate findings. Sample stratified by income group	Regional center, care setting (psychiatric care vs primary care), insurance status, family history of drug abuse, atypical MDD features, melancholic features, recurrent depression, number of Axis I disorders, age, education, Short-Form Health Survey score Sample stratified by income level.	*Retention—Dichotomous* Attrition defined as leaving treatment before week 12 without transition to next treatment step or follow-up Unadjusted analyses: Lower income: **B > W**; O = W; H = non-H Middle income: **B > W**; O = W; H = non-H Higher income: B = W; O = W; H = non-H After adjustment: Lower income: B = W; O = W; H = non-H Middle income: **B > W**; **O > W**; H = non-H Higher income: B = W; O = W; **H > non-H**

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Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Warden 2007[111] Parent study: Rush 2004 (STAR*D study)[109]	Citalopram with flexible dosing (Level 1)	12–14 weeks (Level 1)	MDD	N = 4,041 Race reported separately from ethnicity. W: 76%; B: 18%; A: 2%; O/Multi: 4% H: 13%	Race analyzed separately from ethnicity. W, B, O; H Stepwise multiple logistic regression for 3 attrition timepoints	Recurrent depression, age, education, Short-Form Health Survey mental score	Unadjusted analyses not presented Only significant variables in stepwise regression reported; H ethnicity not included in models *Initiation* Immediate attrition defined as attended baseline visit only After adjustment: B = W; O = W *Retention—Dichotomous* Attrition defined as leaving treatment before week 12 without transition to next treatment step or follow-up Attrition at any time: After adjustment: **B > W**; O = W Later attrition defined as attending at least one visit after baseline but discontinuing before week 12: After adjustment: **B > W**; O = W
Watkins 2018[112] Parent study: Watkins 2017[113]	Brief therapy or extended-release naltrexone in primary care setting	6 months	Alcohol use disorders	N = 290 Race reported separately from ethnicity W: 40.7%; H: 33.8% Included Spanish-speaking patients	Race analyzed separately from ethnicity. Combined B, O, Multi vs W; H vs non-H Multiple logistic regression, modeling each of: receiving brief therapy, receiving naltrexone, receiving either treatment	Clinic site, clinical trial group assignment, receiving any of the other treatments, predisposing factors (age, gender identity, marital status, education), enabling factors (homelessness, employment status, previous treatment for alcohol use, depressive symptoms), need factors (co-occurring opioid use disorder in remission, emergency department/ hospital stay in past 90 days, endorsing more negative consequences related to substance use)	*Initiation* Defined as receiving either of the treatments Unadjusted analyses: Either treatment: non-W = W; H = non-H Brief therapy: non-W = W; H = non-H Naltrexone: **non-W < W**; H = non-H After adjustment: Either treatment: **non-W < W**; H = non-H Brief therapy: Unchanged after adjustment Naltrexone: Unchanged after adjustment
Weinstock 2007[114] Parent study: Petry 2004[115]	Contingency management	4 weeks of intensive outpatient treatment, then 12 months of weekly aftercare	Cocaine or opioid abuse or dependence	N = 393 W: 34.6%; B: 52.4%; O: 13.0%	Non-W vs W ANCOVA	Age, gender, alcohol dependence, cocaine dependence, treatment study, treatment condition, psychiatric severity, treatment condition × psychiatric severity interaction	*Retention—Continuous* Weeks in study Unadjusted analysis not presented After adjustment: non-W = W

(continued)

Table 1 (continued).

Articles[a]	Intervention	Intervention Duration	Study Sample Diagnoses[b]	Study Sample Ethnoracial Background[c]	Analysis for Ethnoracial Background and Engagement[c,d]	Covariate Adjustments[e]	Engagement Outcomes[f]
Weisman de Mamani 2014[116]	CIT-S vs PSY-ED Culturally adapted treatment incorporating cultural models of illness and treatment Treatment in English and Spanish	CIT-S: 15 sessions, or PSY-ED: 3 sessions	Schizophrenia	N = 69 families (patient and caregiver) H/L: 58.0%; W: 20.2%; B: 15.9%; O: 5.7% Included Spanish-speaking patients.	χ^2 test	None	*Retention—Dichotomous* Discontinuation defined as not completing treatment or termination assessment: B = H/L = O = W
Ziedonis 2009[117] Parent study: Ling 2005 (NIDA Clinical Trials Network)[118]	Opioid withdrawal managed with buprenorphine-naloxone vs clonidine in inpatient vs outpatient settings	13 days	Opioid dependence	N = 344 W: 48.5%; B: 31.4% Other groups unspecified	Race variable levels for analysis not described Multiple logistic regression	Medication type	*Retention—Dichotomous* Treatment success: attended day 13 and opioid abstinent by day 13/14 based on urine toxicology screen Unadjusted analyses not presented After adjustment: no significant difference by race
Zoellner 1999[119]	Active treatment (PE and/or stress inoculation) vs waitlist	9 twice-weekly sessions, with 3-month, 6-month, and 12-month follow-up	PTSD	N = 95 women W: 63.2%; B: 36.8%	No test statistics presented on engagement outcome	None	*Retention—Dichotomous* Discontinuation defined as not completing treatment: B = W

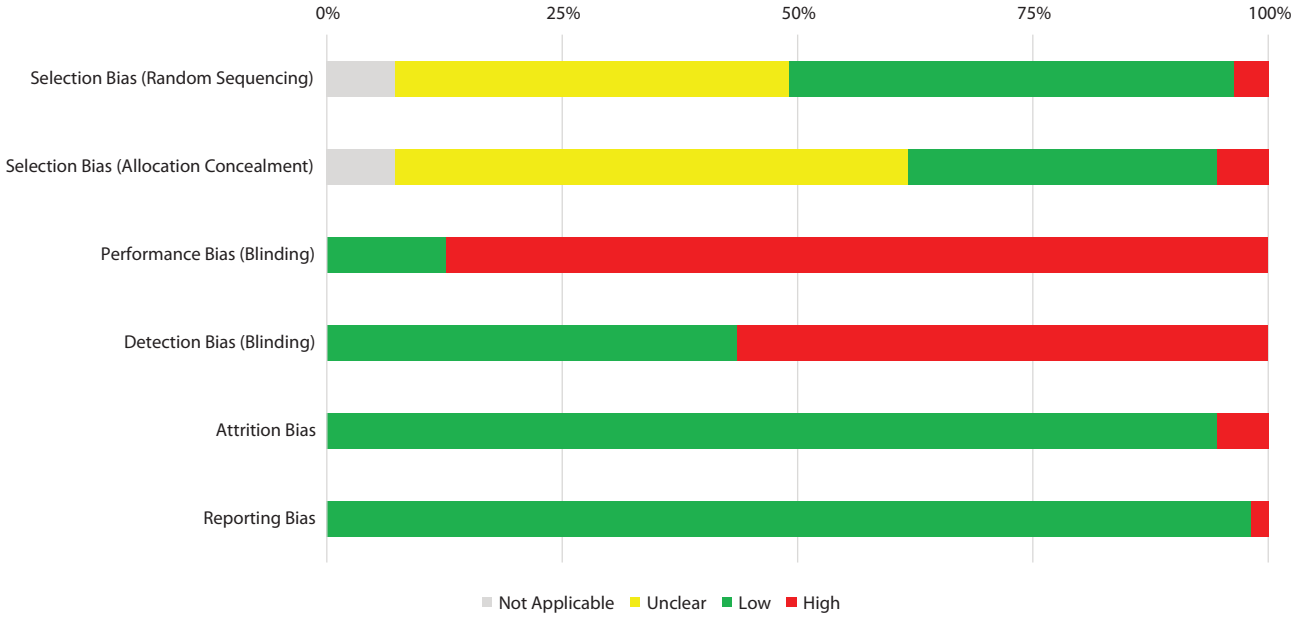
[a]First author and year of publication for each article are listed. If ethnoracial composition was unavailable in secondary data analysis, the parent study (also listed) was reviewed to extract data.
[b]Alcohol use = alcohol use disorder and problematic alcohol use; schizophrenia = any schizophrenia-spectrum diagnosis (eg, schizophrenia, schizoaffective disorder).
[c]Studies may or may not have considered Latino ethnicity. If race and ethnicity were reported separately, it is indicated here. If ethnoracial distributions differed between overall sample and analytic sample (eg, due to sample reduction or combination), both samples are reported. We report ethnoracial background as described by study authors.
[d]Indicates if ethnoracial groups were combined for analyses and if race was analyzed separately from ethnicity. Analysis technique used to compare ethnoracial background based on authors' description.
[e]Covariates in studies analyzing ethnoracial background with adjustment (eg, in multiple regression).
[f]Engagement outcomes included (1) initiation, or commencing treatment after study enrollment (eg, attending first intervention session); (2) medication adherence, or taking agreed-upon prescriptions; and retention, either (3) a dichotomized measure of premature treatment discontinuation or (4) a continuous measure of treatment duration (eg, time in treatment). Significant findings are noted in bold.
Abbreviations: A = Asian, ACT = Assertive Community Treatment, ADHD = attention-deficit/hyperactivity disorder, ANCOVA = analysis of covariance, API = Asian/Pacific Islander, B = Black/African American, BMI = body mass index, BPD = bipolar disorder, CBASP = Cognitive Behavioral Analysis System of Psychotherapy, CBT = cognitive behavioral therapy, CIT-S = culturally informed treatment for schizophrenia, CM = contingency management, CPT = cognitive process therapy, dCBT-i = Digital CBT for insomnia, DMIE = Demonstration to Maintain Independence and Employment, H = Hispanic, HDRS = Hamilton Depression Rating Scale, IR = imagery rehearsal, L = Latino, MANOVA = multiple analysis of variance, MDD = major depressive disorder, Min = Minority (not always specified), MET = motivational enhancement therapy, Mex-Am = Mexican American, Multi = more than 1 race (only if explicitly reported in this manner), NA = Native American/American Indian, NHB = non-Hispanic/Latino Black/African American, NHW = Non-Hispanic/Latino White/Caucasian, NIDA = National Institute on Drug Abuse, O = Other (not always specified, includes multiracial individuals in some studies), PSY-ED = psychoeducation, PTSD = posttraumatic stress disorder, SF-36 = 36-Item Short Form Survey, SN = sleep and nightmare management, SSRI = selective serotonin reuptake inhibitor, STAR*D = Sequenced Treatment Alternatives to Relieve Depression, Unk = unknown, VA = Veterans Affairs, W = White/Caucasian.

Table 2. Risk of Bias in 55 Reviewed Experimental and Quasi-Experimental Mental Health Intervention Studies Reporting Ethnoracial Comparisons in Engagement[a,b]

Article[c]	Selection Bias (Random Sequencing)	Selection Bias (Allocation Concealment)	Performance Bias (Blinding)	Detection Bias (Blinding)	Attrition Bias	Reporting Bias
Aharonovich 2006[37]	●	●	−	−	+	+
Gonzalez Arnold 2015[38]	+	+	−	+	+	+
Arnow 2007[39]	+	+	−	+	+	+
Blanco 2019[41]	?	?	−	+	+	+
Blow 2010[42]	?	?	−	−	+	+
Bogner 2006[43]	+	−	−	−	+	+
Brown 2010[44]	+	+	−	−	+	+
Cheng 2018[46]	+	+	−	+	+	+
Cook 2013[3]	+	+	−	−	+	+
Dansereau 1996[48]	?	?	−	−	−	+
Falkenstein 2015[50]	+	+	−	+	−	+
Hasin 2014[52]	−	−	−	+	+	+
Hoblyn 2013[53]	+	+	+	+	+	+
Horvitz-Lennon 2011[55]	+	?	−	−	+	+
Hser 2014[57]	?	?	−	−	+	+
Jarrett 2013[59]	+	+	+	+	+	+
Johnson 2014[61]	+	+	−	+	+	+
Kalapatapu 2014[63]	+	+	−	+	+	+
Keefe 2018[65]	?	?	−	+	+	+
Kelly 2011[67]	●	●	−	−	+	+
Kleinman 1992[68]	●	●	−	−	+	+
Kurtz 2011[69]	●	●	−	−	+	+
Lee 2017[71]	+	+	−	−	+	+
Lesser 2011[73]	+	?	+	−	+	+
Lester 2010[75]	?	+	−	−	+	+
Levin 2007[76]	?	?	+	+	+	+
McCarthy 2019[77]	+	?	−	−	+	+
Milligan 2004[79]	?	?	−	+	+	+
Miranda 2003[82]	?	?	−	−	−	+
Mohr 2012[64]	+	+	−	+	+	+
Montgomery 2012[83]	?	?	−	−	+	+
Nwokeji 2012[85]	?	?	−	−	+	+
Rosenblum 1999[87]	?	?	−	−	+	+
Rosenheck 2000[89]	?	?	+	+	+	+
Ruglass 2014[90]	+	+	−	+	+	+
Ruglass 2016[92]	?	?	+	+	+	+
Saxon 1996[94]	?	?	−	−	+	+
Siqueland 1998[95]	+	?	−	+	+	+
Siqueland 2002[96]	+	?	−	+	+	+
Siqueland 2002[98]	+	?	−	+	+	+
Stein 2010[99]	?	?	+	+	+	+
Sullivan 2019[100]	+	?	−	−	+	+
Svikis 1997[101]	?	?	−	−	+	+
Tate 2011[103]	−	?	−	−	+	+
Thompson-Brenner 2013[104]	?	?	−	−	+	+
Vendetti 2002[105]	?	?	−	−	+	+
Wagner 1998[107]	?	?	−	−	+	−
Warden 2007[111]	+	+	−	+	+	+
Warden 2009[110]	+	+	−	+	+	+
Warden 2009[108]	+	+	−	+	+	+
Watkins 2018[112]	+	+	−	−	+	+
Weinstock 2007[114]	+	?	−	−	+	+
Weisman de Mamani 2014[116]	?	?	−	−	+	+
Ziedonis 2009[117]	?	?	−	−	+	+
Zoellner 1999[119]	?	?	−	−	+	+

[a] ● = High risk of bias, + = Low risk of bias, ? = Unclear risk of bias, ● = Bias domain is not applicable for this study.
[b] Selection bias: participant randomization (sequence generation) and concealing assignment of participants (allocation concealment). Performance bias: blinding of participants and study staff from participant treatment assignment. Detection bias: blinding of outcome assessors to participant's treatment assignment. Attrition bias: systematic differences in participant exclusion or withdrawal from the study leading to incomplete data. Reporting bias: systematic differences between reported and unreported results.
[c] First author and year of publication for each article are listed.

Figure 2. Overall Risk of Bias Across 55 Experimental and Quasi-Experimental Trials of Mental Health Interventions Reporting Ethnoracial Comparisons in Engagement



[a]See Table 2 for definition of each type of bias.

common for selection biases (7% each). In sensitivity analysis, 24% of studies (13) were high-quality and 47% (26) moderate-quality.

Overall Engagement

Across all 4 engagement definitions, 29 of 55 studies (53%) reported significant ethnoracial differences, of which 93% found lower engagement among BIPOC groups compared mostly to Whites. Thirty articles (55%) compared multiple ethnoracial groups simultaneously or a mixed-BIPOC group against Whites. Seventeen of these (57%) found significant engagement differences, similarly distributed across SUD (56%; 9/16) and mood-disorder trials (60%; n = 6/10). Black patients were compared to other groups in 45% of studies (25); 52% (13) of these found engagement differences, including 45% (5/11) of SUD and 86% (6/7) of mood-disorder trials. Thirteen studies (24%) compared Latinos to other groups; 31% (4) found significant differences, including for mood-disorder (38%; 3/8) and SUD trials (50%; 2/4).

Fifty-two percent of SUD trials (15/29) reported significant differences in ethnoracial engagement, compared to 63% (10/16) of mood disorder, 33% (2/6) of PTSD, and 25% (1/4) of schizophrenia trials. Regarding treatment modalities, 56% (18/32) of psychosocial-intervention, 47% (7/15) of medication, and 50% (4/8) of combined-psychosocial-medication trials reported significant ethnoracial differences. A similar proportion of articles reported significant differences in initiation (42%, 5/12), dichotomous retention (44%, 14/32), and continuous retention (45%, 9/20), compared to 75% of medication-adherence articles (3/4). Table 3 lists the reviewed studies by engagement outcome.

Sensitivity analyses. Studies of at least moderate quality showed similar findings: 46% (6/13) of high-quality and 54% (14/26) of moderate-quality studies reported significant ethnoracial differences in engagement. Moreover, studies with larger samples (Ns > 290) were more likely than those with smaller samples (Ns ≤ 290) to report significant ethnoracial engagement differences: 70% (19/27) vs 32% (9/28).

Ethnoracial Differences by Engagement Outcome

Treatment initiation. Among 12 articles examining initiation, 5 (42%) reported statistically significant differences, all showing worse BIPOC engagement relative to Whites: 2[75,96] reported only significant differences, and 3[95,105,112] both significant and nonsignificant findings. The remaining 7 articles (58%) reported nonsignificant results.[50,53,55,68,71,83,111] Most articles addressing initiation studied SUD (7, 58%)[68,71,83,95,96,105,112] and psychosocial interventions (8, 67%).[50,55,68,71,75,83,96,105]

Three of 5 articles with any significant findings compared a combined group of BIPOC patients to Whites, focusing on psychosocial treatment for SUD. BIPOC individuals had poorer initiation outcomes than Whites with lower likelihood of reaching the pre-randomization stabilization stage after intake[95,96] and lower odds of attending intakes[96] or accepting study participation.[105] A primary care–based collaborative-care trial for alcohol use disorders found that White patients were significantly more likely to initiate treatment with extended-release naltrexone than a mixed-BIPOC group.[112] However, a Hispanic/non-Hispanic comparison was nonsignificant, and there were no significant ethnoracial differences in initiation of brief psychotherapy

Table 3. Experimental and Quasi-Experimental Trials of Mental Health Interventions (55) Examining Association of Ethnoracial Background With Engagement Outcomes[a]

Initiation (12 studies)	*Retention—Dichotomous (32 studies)*	*Retention—Continuous (20 studies)*
Falkenstein 2015[50]	Aharonovich 2005[37]	Gonzalez Arnold 2015[38]
Hoblyn 2013[53]	Arnow 2007[39,b]	Blanco 2019[41]
Horvitz-Lennon 2011[55]	Blow 2010[42]	Dansereau 1996[48,b]
Kleinman 1992[68]	Brown 2010[44]	Falkenstein 2015[50]
Lee 2017[71]	Cheng 2018[46,b]	Horvitz-Lennon 2011[55,b]
Lester 2010[75,b]	Cook 2013[3]	Hser 2014[57,b]
Montgomery 2012[83]	Hasin 2014[52]	Kelly 2011[67]
Siqueland 1998[95,b]	Jarrett 2013[59,b]	Kleinman 1992[68,b]
Siqueland 2002[96,b]	Johnson 2014[61]	Lee 2017[71,b]
Vendetti 2002[105,b]	Kalapatapu 2014[63]	Milligan 2004[79,b]
Warden 2007[111]	Keefe 2018[65,b]	Mohr 2012[64]
Watkins 2018[112,b]	Kurtz 2011[69]	Rosenheck 2000[89,b]
	Lesser 2011[73,b]	Ruglass 2014[90]
	Lester 2010[75,b]	Ruglass 2016[92]
	Levin 2007[76]	Siqueland 1998[95]
Medication Adherence (4 studies)	Miranda 2003[82]	Siqueland 2002[98,b]
Bogner 2006[43,b]	Mohr 2012[64]	Sullivan 2019[100]
McCarthy 2019[77,b]	Montgomery 2012[83,b]	Svikis 1997[101]
Nwokeji 2012[85,b]	Rosenblum 1999[87,b]	Tate 2011[103,b]
Ruglass 2016[92]	Ruglass 2016[92]	Weinstock 2007[114]
	Saxon 1996[94,b]	
	Siqueland 1998[95,b]	
	Stein 2010[99]	
	Tate 2011[103]	
	Thompson-Brenner 2013[104,b]	
	Wagner 1998[107]	
	Warden 2007[111,b]	
	Warden 2009[110,b]	
	Warden 2009[108,b]	
	Weisman de Mamani 2014[116]	
	Zoellner 1999[119]	
	Ziedonis 2009[117]	

[a]First author and year of publication for each article are listed. Articles addressing multiple engagement outcomes are listed under each outcome.
[b]Study reports any significant difference between ethnoracial groups for that engagement outcome.

for alcohol use disorders.[112] A PTSD study[75] found that White women were significantly more likely than African American women to start treatment post-randomization to cognitive processing therapy, prolonged exposure, or waitlist control.

Seven articles reporting nonsignificant differences studied SUD, SMI, schizophrenia, major depressive disorder (MDD), and trichotillomania and compared initiation between Black and White patients,[55,68,83,111] non-Latino White and Latino patients,[55] and a combined-BIPOC group and non-Latino White patients.[50,53,71,111] No Black-White differences were found in attending the first CBT/contingency management session for marijuana dependence,[83] participating in the first two sessions of individual or group therapy for cocaine dependence,[68] attending the first outpatient session after inpatient discharge for opioid dependence,[71] or discontinuing treatment immediately after the baseline session in the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) study.[111] Latino patients with SMI reported similar probability of mental health service use as White patients after initiating assertive community treatment (ACT).[55] Likewise, a mixed-BIPOC group did not differ from White patients in using any mental health service for SMI after initiating ACT,[55] agreeing to receive long-acting injectable antipsychotics for schizophrenia,[53] or agreeing to attend in-person treatment for trichotillomania.[50]

Medication adherence. Of 4 articles, 3 (75%) reported significantly worse adherence among BIPOC patients compared to Whites[43,77,85] in trials of nicotine dependence, MDD, and PTSD. BIPOC status predicted non-adherence in a latent-class analysis of a varenicline trial for nicotine dependence.[77] Two studies of antidepressant treatment for MDD found that White patients, relative to an undescribed BIPOC group, had greater adherence to medication in a latent-class analysis[43] and that African Americans were more likely than non-Latino Whites to experience a period of non-persistence, defined as ≥ 35 consecutive days without medication[85]; however, African Americans and Latinos did not differ significantly from non-Latino Whites in percentage of days without medication.[85] The remaining article addressing medication adherence found nonsignificant differences between non-Hispanic African American patients and non-Hispanic Caucasians in adherence to sertraline therapy for PTSD comorbid with alcohol use disorder.[92]

Treatment Retention

Dichotomous measures. Fourteen of 32 articles (44%) found significant ethnoracial differences in dichotomous retention outcomes.[39,46,59,65,73,75,83,87,94,95,104,108,110,111] In every case except one,[87] BIPOC patients reported lower retention than Whites, including 8 specific comparisons

between Black and White patients and 7 between a mixed-BIPOC group and Whites. Four of the 14 articles described mixed significant-nonsignificant findings.[46,73,95,104] The remaining 18 (56%) reported no significant differences.[3,37,42,44,52,61,63,64,69,76,82,92,99,103,107,116,117,119] Most studies examined psychosocial interventions (19, 59.4%) and SUD (14, 44%) or mood disorders (12, 38%).

Eight of 14 studies reporting significant differences compared Black and White patients.[46,73,75,83,104,108,110,111] In 4 of these 8, Black patients were more likely than non-Hispanic Whites to discontinue antidepressant therapy for MDD.[73,108,110,111] Three other articles also found higher discontinuation among African Americans compared to Whites during psychosocial treatment for binge-eating disorder,[104] PTSD,[75] and marijuana dependence.[83] The eighth article examined discontinuation from internet-based CBT for insomnia and reported no significant difference between Black and White patients.[46]

Two of the 14 articles reported that African Americans were less likely to complete methadone treatment with contingency management[94] but more likely to complete a trial of high- or low-intensity CBT for cocaine dependence with co-occurring mood disorders[87] than a combined group of non–African American patients.

Three articles compared Hispanic and non-Hispanic patients.[87,108,110] In the STAR*D trial for MDD, higher-income Hispanics in the first stage of treatment[110] and Hispanics taking citalopram augmented with bupropion sustained release (SR) or buspirone[108] were more likely to discontinue treatment than non-Hispanics. Hispanic patients were also less likely than non-Hispanic patients to complete CBT treatment for cocaine dependence comorbid with mood disorder.[87]

Seven of the 14 articles reporting significant ethnoracial differences compared a mixed-BIPOC group to White patients. Three of 4 articles on MDD reported STAR*D findings of higher BIPOC discontinuation relative to non-Latino Whites during the first stage of treatment among middle-income patients,[110] medication augmentation or medication switch,[108] and CBT for MDD.[59] The fourth, non-STAR*D, article found greater nefazodone discontinuation[39] in the BIPOC group.

A mixed-BIPOC group was significantly more likely than White patients to discontinue prolonged exposure therapy for PTSD[65] and an internet-based CBT for insomnia.[46] One article[95] reported significantly lower psychosocial therapy retention for cocaine dependence during one study period (after stabilization) but not another (after randomization) in an undescribed BIPOC group compared to Whites.

Eighteen articles reported non-significant ethnoracial differences in dichotomous retention outcomes. Four compared Blacks to Whites,[37,61,92,119] 5 compared a mixed-BIPOC group to Whites,[3,52,63,64,103] 6 compared more than two ethnoracial groups,[42,44,76,99,107,116] 1 compared Hispanics to non-Hispanics,[82] and 2 provided scant details on their ethnoracial comparisons (eg, "largely Caucasian"[69,117]). No significant ethnoracial differences were found in psychosocial treatment for PTSD[3,119]; psychotherapy plus sertraline for PTSD comorbid with alcohol use disorder[92]; fluoxetine for MDD patients with HIV[107]; CBT with case management[82] or telephonic CBT[64] for MDD patients; CBT with relapse prevention for cocaine dependence with or without MDD[37]; telephonic CBT for MDD patients with alcohol use disorders[63]; motivational interviewing and self-monitoring via smartphone app for alcohol dependence[52]; brief motivational intervention or strengths-based case management for SUD[42]; CBT or 12-step program involvement for SUD with MDD[103]; buprenorphine[44] or buprenorphine-naloxone versus clonidine treatment for opioid dependence[117]; escitalopram during buprenorphine maintenance for opioid dependence with depressive symptoms[99]; psychotherapy for schizophrenia[69,116]; virtual reality exposure compared to exposure group therapy for social anxiety disorder[61]; and methylphenidate for ADHD comorbid with cocaine dependence.[76]

Continuous measures. Nine of 20 articles (45%) found significant ethnoracial differences in continuous measures of retention.[48,55,57,68,71,79,89,98,103] In every instance except one,[89] BIPOC patients reported lower retention, including 3 specific comparisons between a mixed-BIPOC group and Whites, 3 between African American and White participants, and 1 between Mexican American and White participants. One study[55] had mixed findings, in which significant differences depended on the group compared. The remaining 11 articles reported no significant differences.[38,41,50,64,67,90,92,95,100,101,114] Most articles described psychosocial interventions (12, 60%) and SUD (14, 70%).

Eight of 9 articles with significant differences compared at least 1 BIPOC group to White patients.[48,55,57,68,71,79,98,103] Compared to Whites, African Americans had significantly fewer psychotherapy sessions for cocaine dependence[68] and fewer days in treatment in 2 separate trials comparing different behavioral treatments (CBT/12-step facilitation) and pharmacotherapy (desipramine/disulfiram) for cocaine dependence with or without alcohol dependence.[79] Compared to Whites, a mixed-BIPOC group had fewer days in psychosocial therapy for cocaine dependence[98] and for cocaine, cannabinol, or stimulant dependence comorbid with MDD,[103] as well as fewer days in outpatient buprenorphine treatment for opioid dependence post-hospitalization.[71] One article reported a comparison of methadone to buprenorphine/naloxone for opioid dependence and found that Hispanics had fewer days in treatment than non-Hispanic Whites.[57] A study testing a visual communication tool in counseling for opioid dependence[48] found that non-Latino Whites attended more sessions overall than African Americans and missed fewer scheduled sessions than African Americans and Mexican Americans. Another article tested the effect of ACT on mental health service visits among homeless patients with SMI; relative to each ethnoracial group's baseline, non-Latino Black patient visits increased significantly over time, Latino patient visits initially decreased significantly and then returned to baseline, and non-Latino White patient

visits remained constant.[55] The ninth article reported that African American patients stayed in pharmacotherapy for schizophrenia for fewer weeks than non–African Americans (Whites and unspecified "others").[89]

Of the 11 articles reporting non-significant differences, 9 compared BIPOC and White patients. Of these, 2 articles on treating PTSD with co-occurring substance abuse or dependence[90] or alcohol/SUD[92] reported nonsignificant differences in number of sessions attended by African Americans versus Whites. A study of low-dose lithium augmentation of personalized, algorithm-guided pharmacotherapy for bipolar disorder found no difference in early discontinuation relative to non-Hispanic-Whites among Hispanic and, separately, Black patients.[38] Six articles compared a mixed-BIPOC group to White patients. Nonsignificant ethnoracial differences were reported in number of days in psychotherapy for cocaine dependence[95] or methadone treatment for opioid dependence[67]; number of treatment weeks in contingency management for cocaine or opioid abuse/dependence[114]; and time to discontinuation in naloxone treatment plus behavior therapy for opioid dependence.[100] Additionally, nonsignificant differences were found in number of sessions in telephonic CBT for MDD[64] or in online self-help and in-person behavior therapy for trichotillomania.[50]

One study examined financial incentives in methadone-maintained and non–methadone-maintained pregnant women, finding nonsignificant differences between African American and non–African American patients in number of treatment hours or days.[101] Another study found nonsignificant differences in time to discontinuation between Hispanic and non-Hispanic cancer patients receiving 3 different psychotherapies for MDD.[41]

Ethnoracial Differences in Engagement Controlling for Covariates

Engagement analyses of 36 studies (65%) included covariate adjustments. Of these, 69% (25/36) reported significant engagement differences; 23 of 25 found lower engagement among BIPOC patients. The other 2 studies found better dichotomous[87] or continuous retention[55] among Black patients relative to other ethnoracial groups. Clinical covariates (eg, symptom severity) were included in 92% of adjusted analyses (33/36); 64% (21/33) found significant ethnoracial differences. Fifty-six percent of studies (20/36) adjusted for education, income, and other socioeconomic status (SES) measures; 80% (16/20) found significant adjusted differences, of which 69% (11/16) were also significant before adjustment. Among studies without covariate adjustment, 21% (4/19) reported significant unadjusted ethnoracial differences.

Only 42% (15/36) of articles with covariate adjustments reported both unadjusted and adjusted findings; 10 reported no change in differential ethnoracial engagement after adjustment (6 remained significant, 4 remained nonsignificant, and 1 retained mixed results), 3 reported a change from significant to nonsignificant findings, and 2 reported a change from nonsignificant to significant differences.

Among initiation findings, 83% (10/12) of studies included covariate adjustments, with 60% (6/10) finding significant engagement differences by race/ethnicity. The 2 studies without adjustments reported nonsignificant findings. Three of 4 medication-adherence studies included covariate adjustments: all 3 found significant differences. The fourth, unadjusted study reported nonsignificant differential engagement.

Fifty-three percent (17/32) of articles reporting dichotomous retention included covariate adjustment; 65% (11/17) found significant retention differences by race/ethnicity. Only 20% (3/15) of the remaining studies without covariate adjustment found significant differential retention. In continuous-retention articles, 60% (12/20) adjusted for covariates, half of which (6/12) found significant ethnoracial differences. Of the remaining 8 studies without covariate adjustment, only 38% (3/8) reported significant ethnoracial differences in retention.

Moderation and Mediation Analyses

Four articles[61,79,98,104] directly tested a moderation effect of race/ethnicity on engagement and another stratified the sample by race/ethnicity and income[110]; 3 found significant potential moderation.[79,98,110] None of the reviewed studies examined mediation between race/ethnicity and engagement outcomes.

A psychosocial intervention for cocaine dependence found cohabitating BIPOC patients had a shorter treatment duration than those living alone, with an opposite effect among Caucasians.[98] In another cocaine dependence trial, African Americans expecting improvement to take over a month had shorter treatment durations than White patients with similar expectations.[79] A STAR*D study[110] found significant potential moderation of race/ethnicity by income on retention using stratification and adjusting for site, clinical, and sociodemographic characteristics. Prior to adjustment, only Black patients in the low- and middle-income brackets had worse retention than Whites. After adjustment, Black and "Other" BIPOC patients in the middle-income group and Hispanic patients in the higher-income group[110] showed lower retention than Whites.

The two remaining studies did not find significant moderation: neither stereotype confirmation in a virtual reality and group-based exposure therapy for PTSD[61] nor education level in psychosocial treatment for binge-eating disorder[104] moderated race/ethnicity and treatment retention.

DISCUSSION

Research on ethnoracial differences in mental health treatment engagement has expanded recently, with over half of reviewed articles published after 2009. The growing database made possible this systematic review, the first to solely focus on differential engagement by race/ethnicity

in prospective experimental mental health intervention trials. This focus reduces some variability in sampling, treatment characteristics, and engagement barriers present in community-based studies.

Despite the controls introduced in experimental studies, 53% of 55 articles reviewed reported significant ethnoracial differences in engagement; nearly always (93%), BIPOC individuals had worse engagement than Whites, the most frequent comparison group. This proportion of significant findings was similar in high-quality (46%) and moderate-quality (54%) studies and among articles with covariate adjustment (69%), which control for several factors not considered in study inclusion criteria. Only 2 articles found significantly higher BIPOC engagement after controlling for sociodemographic and clinical covariates: in one, more Black patients completed CBT-based treatment for cocaine dependence plus mood disorder than a non-Black cohort,[87] and in the other, homeless Black patients with SMI in ACT showed increased outpatient service use over time, a trend not observed among White or Latino patients with similar characteristics.[55]

With few exceptions, among studies finding significant differences, lower engagement in BIPOC groups was consistent across ethnoracial groups, disorders, treatments, covariate adjustments, and 4 definitions of engagement. This pattern of lower BIPOC engagement relative to White patients threatens the generalizability of experimental treatments in real-world conditions. With disengagement, biases can emerge that attenuate the validity of treatment efficacy data, especially in cases of differential ethnoracial attrition between treatment arms, when treatment efficacy becomes confounded with the effects of retention.[120] The evidence base for these treatments among BIPOC patients also becomes less reliable as representativeness of BIPOC samples remaining in the treatment is reduced.[121] This may limit intervention efficacy, acceptability, and compatibility across diverse cultural contexts in community settings relative to experimental results, exacerbating treatment disparities and exhausting limited time and resources.

The reasons for lower BIPOC engagement in experimental trials remain elusive, given the methodological limitations of reviewed studies. We detected few consistent differences between studies with and without significant ethnoracial engagement findings in inclusion/exclusion criteria, recruitment methods, or other study factors, except for sample size, cultural adaptation/Spanish-language inclusion, and use of covariate adjustment. Sensitivity analysis revealed that studies with larger samples (70%) were more likely than those with smaller samples (32%) to report significant ethnoracial engagement differences. We suspect smaller studies may be underpowered to detect ethnoracial differences, suggesting that our findings may underestimate actual disparities. Alternatively, larger studies may simply be more likely to find small differences statistically significant, independent of their clinical importance.

Five studies included Spanish-speaking patients,[41,55,82,112,116] and all but 1[55] found no significant Latino-White differences in engagement. One tested a "culturally informed" therapy for schizophrenia,[116] incorporating participants' cultural views and practices, and found no significant overall engagement differences. A sixth study matched patients and clinicians on race/ethnicity, reporting no significant engagement differences.[90] Albeit only 6 studies, some with small sample sizes, finding non-significant ethnoracial differences in most (5/6) supports the beneficial effects of language matching and/or treatment cultural adaptation on BIPOC disengagement.[122–124]

Only 65% of studies reported covariate adjustment, which can isolate factors impacting engagement differentially by race/ethnicity. Even in this subset of articles, clear trends were elusive: covariates varied markedly, were usually study-specific, and were variously defined. Only 42% of covariate-adjusting studies reported findings before and after adjustments, which is necessary for characterizing which differences are disparities and identifying potential moderators or mediators of the relationship between race/ethnicity and engagement.[125]

Nevertheless, the proportion of articles with significant ethnoracial differences in engagement increased from 21% to 69% when covariates were assessed, including 84% of SES-related and 64% of clinical covariate adjustments. This result suggests our findings may underestimate the impact on engagement of factors that vary by race/ethnicity and SES,[16,126] such as logistical barriers (eg, transportation,[31] work restrictions[127]), mental health treatment stigma,[41,75,103,105] distrust of mental health providers,[16,22,96,126] and prior experiences of provider biases.[128,129] The few articles that tested potential moderators suggest that examining income, living arrangement, and treatment expectations may reveal strategies to reduce engagement disparities.

However, several key covariates were missed. For example, only 36% of articles (20) adjusted for social determinants (eg, education, income) that likely impact engagement.[130] Clinical covariates ignored disorder persistence, which tends to be higher in BIPOC groups[131] and may increase treatment refractoriness,[132] affecting engagement. Studies did not address cultural variations in illness models regarding psychiatric diagnoses, causes, and treatments, which impact treatment acceptability and engagement. Experimental treatment engagement research should explicitly include these factors in study designs.

Reporting of ethnoracial characteristics also varied across studies despite the 1997 OMB guidelines on collecting and reporting race/ethnicity[35] recommending use of at least 5 racial and 2 ethnicity categories. Race was inconsistently distinguished from ethnicity, and diverse BIPOC groups were often combined into a single cohort, limiting the ethnoracial granularity of our review. Almost all studies contrasted individual or mixed-BIPOC groups to White patients, with few exceptions.[3,82,89,94,101] Only 37 articles (67%) reported Latino ethnicity, 6 (11%) Asian/Pacific Islander background, and 2 (4%) AIAN origin; the latter two categories were always combined into an "other" group or excluded from analyses. These findings argue for greater inclusion in future

trials of understudied groups and examination of inter- and intra-BIPOC group differences.

Differences between naturalistic and experimental settings complicate translation of our findings into novel community-based engagement-enhancing strategies. Engagement in reviewed trials may have been boosted by additional monitoring, attendance/adherence reminders, greater social desirability, and financial incentives. Our finding of consistent BIPOC disengagement despite these enhancements suggests that experimental designs are not addressing key engagement barriers that differ by race/ethnicity. Fortunately, prior research suggests potential solutions to disengagement that can be implemented in community and experimental research settings.

A 2018 meta-analysis[133] found strategies aimed at reducing barriers to be most strongly associated with retention in health care research, including locating treatment sites within BIPOC communities or near public transportation[83,105] and proactively providing accommodations for work schedules, childcare needs, and travel expenses, as some patients may be hesitant to request them.[105] Community-engaged approaches, especially community-based participatory research, in which community members are involved in all levels of research, can improve BIPOC engagement in mental health care.[134–136] Bias-reduction training may reduce provider biases.[137] Contrasting models of care and patient apprehension can be addressed through open discussion of sociocultural differences, treatment expectations, and anticipated attendance barriers early in the treatment process[17] and throughout the intervention.[108] The core Cultural Formulation Interview (CFI), a semistructured individual cultural assessment eliciting models of illness and care, appears to improve treatment retention among BIPOC outpatients compared to treatment-as-usual when used during community-based intake sessions.[138] The CFI may reduce patient distrust in providers and facilitate patient-clinician negotiation of treatment expectations (P.C.L., unpublished data, 2018). Stigma and distrust of mental health providers may be partially addressed through language or ethnoracial matching between patient and provider; our review offers qualified support for language matching. In research trials, targeted recruitment, long-term outreach,[139] and oversampling[121] can offset BIPOC retention problems, especially for groups underrepresented in treatment research, such as Asian, Native Hawaiian/other Pacific Islander, and AIAN individuals.

This review has several limitations. First, additional databases may have identified new articles. Second, studies may lack sufficient power to detect statistically significant ethnoracial differences across subsamples; our results could underestimate actual disparities. Third, many studies lacked ethnoracial granularity, reducing our ability to identify subgroup-specific outcomes. However, existing engagement data were consistent across BIPOC subgroups, suggesting that BIPOC may experience common social disadvantages possibly by a minoritizing process manifesting in similar engagement challenges. Fourth, we excluded studies on single ethnoracial groups, whose larger samples of specific groups may have identified potential moderators or mediators of BIPOC engagement missed in ethnoracially diverse studies with insufficient sample sizes for subsample analyses[140,141]; future research on specific ethnoracial groups may generate tailored engagement strategies. Fifth, BIPOC patients consenting to study participation may be especially motivated to engage in treatment; our findings may overstate engagement compared to naturalistic studies. Sixth, the limited number of studies on most individual disorders limits our ability to discuss specific engagement disparities by disorder. Finally, a PRISMA protocol was not prepared and registered prior to completing this review.

CONCLUSIONS

Our systematic review found that 53% of prospective experimental trials reported significant ethnoracial differences in treatment engagement, and 93% of these indicated lower BIPOC engagement. This proportion was consistent across study quality, ethnoracial groups, disorders, treatments, covariate adjustments, and 4 engagement definitions. However, differential engagement was more frequently observed in studies with larger sample sizes and covariate adjustments and less frequently in studies with language matching or cultural adaptation of treatments. Nevertheless, covariate adjustments were inconsistently applied and reported, limiting our ability to identify reasons for engagement disparities. Several factors omitted or insufficiently included in study designs or analyses may contribute to ethnoracial differences in engagement—eg, SES, stigma, patients' previous negative treatment experiences, and patients' distrust and socio-structural access barriers—and should be further explored. Long-term engagement in BIPOC communities, oversampling of diverse BIPOC groups, and reporting of unadjusted and adjusted findings with relevant covariates are needed to improve inclusion and clarify the reasons for persistent ethnoracial disparities in treatment engagement, a necessary step for eliminating them.

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Supplementary Material

Article Title: Differential Engagement by Race/Ethnicity in Experimental Trials of Mental Health Treatment Interventions: A Systematic Review

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List of Supplementary Material for the article

1. Table 1 Search terms by database

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Supplementary Table 1. Search terms by database[a]

Pubmed

((((((Mental disorder[MESH] OR Mental health[MESH])) AND Humans[Mesh] AND English[lang] AND adult[MeSH])) AND ((((("African Americans"[MESH] OR "Arabs"[MESH] OR "Asian Americans"[MESH] OR "Hispanic Americans"[MESH] OR "Indians, North American"[MESH] OR "Minority Groups"[MESH] OR "Minority Health"[MESH] OR "Oceanic Ancestry Group"[MESH])) OR (Aborig*[Text Word] OR African American[Text Word] OR Arab[Text Word] OR Asian[Text Word] OR Black[Text Word] OR Cuban[Text Word] OR Ethnic*[Text Word] OR First Nation*[Text Word] OR Hispanic[Text Word] OR Indian[Text Word] OR Indigenous[Text Word] OR Latina[Text Word] OR Latino[Text Word] OR Mexican[Text Word] OR Middle East*[Text Word] OR Minorit*[Text Word] OR Native Hawaiian[Text Word] OR New Canadian[Text Word] OR Pacific Islander[Text Word] OR Puerto Rican[Text Word] OR Race[Text Word] OR Racial[Text Word] OR Alaska*[Text Word] OR Inuit[Text Word] OR Native American[Text Word])) AND Humans[Mesh] AND English[lang] AND adult[MeSH])) AND ((((Medication adherence[MESH] OR Patient compliance[MESH] OR Patient dropouts[MESH] OR Patient participation[MESH] OR Treatment refusal[MESH])) OR (adherence[Text Word] OR attrition[Text Word] OR disengagement[Text Word] OR dropout[Text Word] OR drop-out[Text Word] OR Patient activation[Text Word] OR Patient Compliance[Text Word] OR Treatment compliance[Text Word] OR Patient engagement[Text Word] OR Patient involvement[Text Word] OR patient participation[Text Word] OR retention[Text Word] OR treatment discontinuation[Text Word] OR treatment initiation[Text Word] OR nonadherence[Text Word] OR non-adherence[Text Word] OR drop out[Text Word] OR Non-compliance[Text Word] OR Noncompliance[Text Word])) AND Humans[Mesh] AND English[lang] AND adult[MeSH])) AND (((Effect Modifier, Epidemiologic[MESH]) OR (Associat*[Text Word] OR Factor*[Text Word] OR Interact*[Text Word] OR Mediat*[Text Word] OR Moderat*[Text Word] OR Modif*[Text Word] OR Predict*[Text Word] OR Stratif*[Text Word] OR Variab*[Text Word])) AND Humans[Mesh] AND English[lang] AND adult[MeSH]) AND (Humans[Mesh] AND English[lang] AND adult[MeSH])

PsycINFO

1. exp mental disorders/ or exp mental health/
2. exp client participation/ or exp Treatment Barriers/ or exp treatment compliance/ or exp treatment dropouts/ or exp treatment refusal/ or exp treatment termination/
3. **(**adherence or attrition or Patient Compliance or Treatment compliance or disengagement or dropout or drop-out or patient activation or patient engagement or patient involvement or patient participation or retention or treatment discontinuation or treatment initiation or nonadherence or non-adherence or drop out or noncompliance or non-compliance).mp [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
4. (Associat* or Factor* or Interact* or Mediat* or Moderat* or Modif* or Predict* or Stratif* or Variab*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
5. exp "latinos/latinas"/
6. exp "racial and ethnic groups"/
7. exp Alaska natives/ or exp American Indians/ or exp Arabs/ or exp Asians/ or exp blacks/ or exp Ethnic Identity/ or exp Hawaii Natives/ or exp indigenous populations/ or exp Inuit/ or exp Mexican americans/ or exp minority groups/ or exp Pacific Islanders/
8. (aborig* or African American or Alaska* or Arab or Asian or black or Cuban or ethnic* or first nation* or Hispanic or Indian or indigenous or Inuit or latina or latino or Mexican or Middle East* or Minorit* or Native American or Native Hawaiian or New Canadian or Pacific Islander or Puerto Rican or Race or Racial).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
9. 5 or 6 or 7 or 8
10. 2 or 3
11. 1 and 10 and 4 and 9
12. limit 11 to ("300 adulthood <age 18 yrs and older>" and english and human)

[a]For PubMed, ethnoracial terms were drawn from Medline/PubMed Search and Health Disparities and Minority Health Information Resources. For PsycINFO, similar terms were drawn from the Thesaurus of Psychological Index Terms. Abbreviations: *=wildcard; Exp=explode option; MeSH=Medical Subject Heading.