Cultural competence in outpatient substance abuse treatment: Measurement and relationship to wait time and retention

Erick Guerrero [a,*], Christina M. Andrews [b]

[a] School of Social Work, University of Southern California, Social Work Center, Office #219, 655 West 34th Street, Los Angeles, CA 90089, United States
[b] School of Social Service Administration, University of Chicago, 969 E. Sixtieth Street, Chicago, IL 60637, United States

ARTICLE INFO

ABSTRACT

Background: Culturally competent practice is broadly acknowledged to be an important strategy to increase the quality of services for racial/ethnic minorities in substance abuse treatment. However, few empirically derived measures of organizational cultural competence exist, and relatively little is known about how these measures affect treatment outcomes.

Method: Using a nationally representative sample of outpatient substance abuse treatment (OSAT) programs, this study used item response theory to create two measures of cultural competence—organizational practices and managers' culturally sensitive beliefs—and examined their relationship to client wait time and retention using Poisson regression modeling.

Results: The most common and precisely measured organizational practices reported by OSAT managers included matching providers and clients based on language/dialect; offering cross-cultural training; and fostering connections with community and faith-based organizations connected to racial and ethnic minority groups. The most culturally sensitive belief among OSAT managers was support for language/dialect matching for racial and ethnic minority clients. Results of regression modeling indicate that organizational practices were not related to either outcome. However, managers' culturally sensitive beliefs were negatively associated with average wait time ($p < 0.05$), and positively associated with average retention ($p < 0.01$).

Conclusions: Managers' culturally sensitive beliefs—considered to be influential for effective implementation of culturally competent practices—may be particularly relevant in influencing wait time and retention in OSAT organizations that treat Latinos and African American clients.

© 2011 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Significant racial and ethnic disparities have been documented in substance abuse treatment (Institute of Medicine, 2001). Evidence suggests that Latinos and African-Americans are less likely than whites to enter treatment (Daley, 2005; Lundgren et al., 2001; Wu et al., 2003), and when they do enter treatment, are more likely to drop out before completing it (Jacobson et al., 2007; Marsh et al., 2009; Mertens and Weisner, 2006; Wells et al., 2001). While the causes of these problems are complex, there is a growing consensus that organizational cultural competence—defined as a set of practices through which organizations recognize and respond to the needs of culturally diverse populations—represents an important part of the solution (Betancourt et al., 2003; Campbell and Alexander, 2002; Howard, 2003a,b; Zane et al., 2004). Indeed, the new Patient Protection and Affordable Care Act will require health care organizations receiving federal funds, including those providing substance abuse treatment, to enhance cultural competence by setting more rigorous standards for workforce diversity, and cross-cultural training and education (Andrulis et al., 2010).

Despite growing recognition of the importance of culturally competent service provision in outpatient substance abuse treatment (OSAT), conceptualizing and measuring organizational cultural competence has been a persistent challenge for researchers and practitioners alike. Attempts at identifying practices and attitudes that are linguistically and culturally relevant for service outcomes have suffered from several methodological flaws (Fisher et al., 2007; Lewin Group, 2001). Many existing measures of organizational cultural competence have relied upon single case designs or small samples to design measures and test psychometric properties, leading to problems in assessing validity and generalizability (Cross et al., 1989; González-Calvo et al., 1997; Harper et al., 2009; Lewin Group, 2001; National Center for Cultural Competence, 2007; Smith, 1998). Others have relied upon expert panels to develop measures, which remain for the most part unvalidated (Harper et al., 2009). Consequently, there remains a need for measures of

* Corresponding author. Tel.: +1 213 821 1385; fax: +1 213 821 2088.
 E-mail address: erickgue@usc.edu (E. Guerrero).

organizational cultural competence that are theoretically informed and empirically grounded.

In response, this study drew from a nationally representative sample of OSAT organizations to develop two empirically derived measures of cultural competence using Rasch modeling. Rasch models, which are informed by item response theory, represent a relatively novel approach to measurement development and validation in substance abuse treatment research (Henderson et al., 2008). In this study, Rasch models were used to examine whether two measures of organizational cultural competence—*organizational practices* and *managers' culturally sensitive beliefs*—appropriately modeled participants' responses to questions regarding their beliefs and a series of culturally competent practices offered by OSAT programs. We then considered the role of these measures as predictors of program effectiveness by exploring their relationship with treatment wait time and retention—both outcomes of central importance to OSAT organizations.

1.1. Conceptualization and measurement of organizational cultural competence

Cultural competence has been most commonly defined as "a set of congruent behaviors, knowledge, attitudes, and policies that come together in a system, organization, or among professionals that enables effective work in cross-cultural situations" (Cross et al., 1989). Prior studies that have attempted to operationalize cultural competence have identified a diverse set of organizational practices, attitudes, and services that can be adapted to enhance the cross-cultural sensitivity and responsiveness of health care organizations (Brach and Fraser, 2000; Fisher et al., 2007; Harper et al., 2009; Prince Inniss et al., 2009; Lewin Group, 2001; Sue et al., 1992; Weech-Maldonado, 2002). These studies have identified several organizational domains in which cultural competent practices can be developed, including organizational governance, program evaluation, communication, human resources, and facilitation of services to clients. Among the most prevalent and well-recognized practices designed to improve organizational cultural competence across these domains are: (1) race–ethnic matching, defined as treatment by staff of the same racial or ethnic minority group as the client; (2) language congruence, defined as treatment by staff who speaks the primary language of the client; (3) cross-cultural training, which entails providing staff with knowledge and skills regarding the needs, preferences, and beliefs prevalent among specific racial and cultural minority groups; (4) inclusion of family in the treatment process; and (5) collaboration with faith-based organizations during treatment and follow-up.

While much work has focused on defining and conceptualizing organizational cultural competence, standardized and empirically validated comprehensive scales through which to measure organizational cultural competence have been lacking (Cross et al., 1989; Harper et al., 2009; Lewin Group, 2001). Furthermore, *managers' culturally sensitive beliefs* about the service needs of racial and ethnic minorities—a dimension of cultural competence different, but no less important, than *organizational practices*—has not been incorporated into the measurement of this organizational concept. These issues have made it difficult for researchers to comprehensively compare organizations' varying dimensions of cultural competency and assess their influence on client-level treatment outcomes.

1.2. Organizational cultural competence and treatment outcomes

Among seekers of help for substance abuse, wait time to treatment entry is the most commonly cited barrier to access (Appel et al., 2004; Claus and Kindleberger, 2002; Farabee et al., 1998; Pollini et al., 2006). Empirical research corroborates these claims,

suggesting a positive relationship between wait time and pretreatment dropout (Claus and Kindleberger, 2002; Festinger et al., 1995; Jackson et al., 2006). Reflecting its importance to treatment access, wait time has been included in a series of performance measures developed by the Washington Circle (Garnick et al., 2002, 2009) and the Network for the Improvement of Addiction Treatment (NIATx) (McCarty et al., 2007).

Yet, relatively little is known about the relationship of organizational cultural competence to client wait time in substance abuse treatment. To our knowledge, no studies have specifically examined the association of cultural competence to client wait time to enter substance abuse treatment. In the broader field of medicine, research has indicated that language barriers may contribute to longer waiting periods to receive treatment (Betancourt, 2006). Additionally, it has been suggested that when interpreters or bilingual providers are not readily available, clients in need of such services may wait longer to commence treatment (Gonzalez et al., 2010). Moreover, research suggests that members of racial and ethnic minority groups are more likely than whites to experience difficulties in navigating the health services system and gaining knowledge about programmatic and financial resources that may facilitate access to treatment (Institute of Medicine, 2003). In particular, ethnic minorities with Limited English Proficiency (LEP) face additional challenges to receiving and benefiting from linguistically appropriate services (Gonzalez et al., 2010). Taken together, these findings suggest that programs that address minority clients' needs for linguistic and culturally tailored engagement through available practices and materials will facilitate more rapid entry into treatment.

Retention in treatment is an important process outcome related to clinical outcomes (Grella et al., 1999; Hubbard et al., 1997; Simpson et al., 1997; Zhang et al., 2003). These studies suggest that longer retention is associated with improved substance use outcomes at post-treatment, although the study by Zhang and colleagues (2003) suggest that retention may have diminishing returns as length of time in treatment increases. Similar to wait time, aspects of retention in treatment have also been incorporated into performance measures developed by NIATx (McCarty et al., 2007); client retention in treatment is considered to be a key process measure of system performance.

Relatively little is known about the nature of this relationship within the context of substance abuse treatment. Studies in medical settings suggest that organizational cultural competence may improve client retention by providing a more positive treatment experience for clients from racial and ethnic minority groups. Cultural competence among staff has been linked to better communication, more accurate diagnosis, positive therapeutic alliance, and higher client satisfaction (Brach and Fraser, 2000; Cross et al., 1989; Gonzalez et al., 2010; Saha et al., 1999, 2000). Indeed, at least some research suggests that clients from racial and ethnic minority groups may be more likely to remain in treatment when the services they receive are responsive to their needs. Culturally competent practices such as race/ethnic matching and language congruence have been linked to increased retention in health care, particularly when combined with congruency in other dimensions such as regional culture, socioeconomic status and/or belief systems (Sue et al., 1991). Additionally, some studies using ethnic matching and cross cultural training have documented higher retention in minority clients within the first three weeks of services (Sue et al., 1991; Wade and Berstein, 1991).

1.3. Research questions and hypotheses

Taken together, these studies suggest that organizational cultural competence may help to enhance the quality of OSAT for racial and ethnic minority populations and improve in-treatment

outcomes. Yet, the most commonly used measures of organizational cultural competence lack information about psychometric properties. Moreover, relatively little is known about the role of organizational cultural competence in shaping important outcomes in OSAT. In light of these gaps in the literature, we examine the following research questions in the present study: (1) What cluster of *organizational practices* and *managerial beliefs* best represent the latent constructs of organizational cultural competence? (2) To what extent do measures of organizational cultural competence (*organizational practices* and *managers' culturally sensitive beliefs*) predict wait time and retention in OSAT?

Extant research suggests that potential clients from racial and cultural minority groups may have difficulty accessing treatment due to language barriers and lack of culturally appropriate services and informational materials. As such, organizations with managers who are knowledgeable about the services needs of members from racial/ethnic minorities, and who provide culturally competent services in outreach and assessment phases, will be more likely to move these clients into treatment quickly. Moreover, programs that provide services tailored to the needs of racial and ethnic minorities may be more likely to retain them, particularly if these programs are led by managers with high levels of cultural sensitivity. Managers with greater cultural sensitivity may direct more thorough implementation of culturally competent practices and, consequently, a more accepting and responsive treatment experience for racial and ethnic minority groups. Thus, we hypothesize the following relationships:

H1. Degree of adoption of culturally competent practices will be negatively associated with average wait time to enter OSAT.

H2. Degree of managers' culturally sensitive beliefs will be negatively associated with average wait time to enter OSAT.

H3. Degree of adoption of culturally competent practices will be positively associated with average retention in OSAT.

H4. Degree of managers' culturally sensitive beliefs will be positively associated with average retention in OSAT.

2. Methods

2.1. Sampling frame and data collection

This study used Wave IV (1995) of the National Drug Abuse Treatment Service Survey (NDATSS). NDATSS is a longitudinal study examining the organizational structure and characteristics of OSAT units in the United States (for information on NDATSS, see Adams and Herringa, 2001). Wave IV was selected for this study because it included a series of questions measuring organizational practices and managers' culturally sensitive beliefs regarding cultural competence in OSAT. The sampling frame included several national lists of substance abuse treatment providers. Sampling was stratified by treatment modality, ownership, and organizational affiliation. The total sample included 618 treatment units or programs.

2.2. Analytic sample

Because we are interested in examining the relationship between cultural competence and outcomes among African American and Latino clients, we limited the sample to OSAT organizations that served a significant proportion of African American and Latino clients (demarcated at 20% and 15% respectively). These cut offs represent the national average proportion of African American and Latino clients in OSAT units (see SAMSHA, 2007). Considering only diverse units, the resulting analytic sample included 363 OSAT programs.

2.3. Study variables

We examined two dependent variables: (1) client wait time to treatment and (2) client retention in treatment. Client wait time to treatment was measured by a single survey item representing managers' report of the average number of days clients wait to start treatment. Retention in treatment was also measured using a single survey item, in which managers were asked to estimate the average number of months clients stay in treatment. Both variables are count measures in that they represent estimates of number of days or months, accordingly.

The independent variables in the study are two measures of organizational cultural competence: *culturally competent practices* and *managers' culturally sensitive beliefs*. To develop the first measure, we identified 14 practices in the NDATSS survey, drawing mainly from Brach and Fraser (2000) representation of organizational culturally competent practices and the National Standards on Culturally and Linguistically Appropriate Services (Office of Minority Health, 2001). While these practices do not encompass all culturally competent activities in an organization, these two frameworks are widely used for conceptualizing and measuring culturally competent health care practices. A list of these practices is included in Table 1. Items reflecting organizational practices included cross-cultural training, language congruence, diversity of staff, and availability of same-race individual and group-counseling (Brach and Fraser, 2000; Fisher et al., 2007). Similarly, items reflecting managers' culturally sensitive beliefs were included, as evidence suggests that leaders can play a pivotal role in implementing and promoting culturally competent practices (Aarons and Palinkas, 2007; Guerrero, 2010; Center for Substance Abuse and Treatment, 2009).

Several control variables were included. These included *organizational size* (log of the total number of clients served during the past fiscal year); *location* (urban or other); *staffing resources* (log of the ratio of staff to clients); *service comprehensiveness* (total number of services offered by treatment organization); *treatment modality* (outpatient counseling or methadone maintenance); *ownership* (private for-profit, private nonprofit, or public); and *affiliation* (organization is freestanding or part of a larger mental health or hospital setting). These variables were selected because they have been shown to be associated with at least one of the treatment outcomes under study in prior literature (Carr et al., 2008; D'Aunno and Pollack, 2002; Friedmann et al., 2003; Howard, 2003a; Jackson et al., 2006; McCaughrin and Howard, 1996; Pollack et al., 2006).

2.4. Procedure and data analysis

2.4.1. Developing Rasch measures of cultural competence. A Rasch model was used to investigate the extent to which the data were consistent with the postulated latent construct of organizational cultural competence. The Rasch model relies on fit statistics (Outfit and Infit) in order to describe the fit of the endorsement patterns to an underlying Rasch model. Outfit captures the average mismatch between the Rasch model and the data considering extreme values, while Infit measures the central performance of each item (Linacre and Wright, 1999). Using this comparative approach, Rasch modeling indexes items on their difficulty or probability of endorsement (Wright and Masters, 1982). Items that have higher difficulty (lower probability of endorsement) reflect more of the latent trait. This is analogous to conventional measures of intelligence, in which the most challenging items are used to identify the most exceptional respondents. In Rasch modeling, when a participant endorses an item that is unlikely to be endorsed, it increases the participant's score.

To produce valid fit statistics, the Rasch model requires that items represent one dimension and remain locally independent from each other (Wright and Masters, 1982). We examined the assumption of unidimensionality using principal component analysis and tested local independence by computing the Pearson correlations of respondents' residual variance. We used WINSTEPS 3.0 software (Linacre and Wright, 1999) to test model's assumption, to examine item fit indices (Infit and Outfit), and to create two true interval scales representing organizational cultural competence. Compared to other measurement methods, Rasch true interval scales can strengthen the accuracy and statistical validity of analysis and help achieve greater generalizability. The Rasch model produces normally distributed true interval scales, which improve estimates in multivariate regression analysis and allow greater generalization. By assessing each item's difficulty, the resulting Rasch measure is not limited by the sample, allowing for generalization to other similar populations (Embretson and Reise, 2000).

In our study, items included *organizational practices* reflecting cultural competence and *managers' culturally sensitive beliefs* regarding cultural competence. Items in both measures were introduced in dichotomous scales, as required by the Rasch model. For the culturally competent practices, 6 of the 14 items representing practices were transformed to dummy variables using cutoff points informed by conceptual expectations or empirical generalizations from nationally representative samples. Similarly, survey items for managers' culturally sensitive beliefs were transformed from a five-point Likert scale, which ranged from *strongly disagree* to *strongly agree*, to a dichotomous scale. Considering their response distribution, we collapsed *strongly disagree*, *disagree*, and *neutral* to represent "no support," while "support" included two points, *agree* and *strongly agree*.

The model produced two measures expressed in logits, creating a true interval scale analogous to a "yardstick" (Embretson and Reise, 2000). We recalibrated both measures to a mean of 50 and standard deviations of 10 to facilitate visual interpretation and comparison. This resulted in scales that ranged from zero to 100, representing a continuum of the degree of adoption of *organizational practices* and *managers' beliefs*.

2.4.2. Data analysis. STATA/SE (Version 11) was used to conduct all analyses. Multiple imputation was used to fill in missing values, as data were assumed

Table 1
Descriptive statistics and response format.

Variables	1995	Response format
Rasch – culturally competent practices		
Churches	72.43	1 = Unit has church follow-up
Spanish language	21.84	1 = Unit offers services in Spanish
Cross-cultural training > 6 h/year[a]	45.79	1 = Unit staff receive training beyond 6 hrs a year
African American director	9.01	1 = Unit has an African American director
Community leader	66.89	1 = Unit is connected with community leaders
Latino staff (f/t) >15%[a]	2.59	1 = Unit has Latino full time staff beyond 15%
Cross-cultural training > 50% staff[a]	60.84	1 = More than 50% of staff receive cross-cultural training
Ratio of minority staff clients 1:2[a]	30.10	1 = Unit has a ratio of minority staff to minority clients of 1:2
Ratio of AA staff/AA clients 1:7[a]	30.58	1 = Unit has a ratio of AA staff to AA clients of 1:7
Same-race counseling	45.62	1 = Unit offers matching staff and client by race
Single-race group	10.91	1 = Unit offers single-race group counseling
Latino supervisor	5.86	1 = Unit has a Latino supervisor
Outreach for minorities	41.22	1 = Unit offers outreach for racial/ethnic minority clients
African American staff (f/t) > 15%[a]	5.98	1 = At least 15% of unit staff are full-time AA
Latino director	7.28	1 = Unit has a Latino director
Ratio of Latino staff/clients 1:7[a]	28.92	1 = Unit has a ratio of AA staff to AA clients of 1:7
African American supervisor	13.77	1 = Unit has an African American supervisor
Bilingual staff	45.17	1 = More than 11% of staff are bilingual
Rasch – culturally sensitive beliefs		
Providing Latinos w/special services[a]	81.83	1 = Support special services for Latinos
Knowing Latino history[a]	86.08	1 = Support that staff should know Latino history
Matching African American dialect[a]	89.81	1 = Support that staff should know AA dialect
Matching African American staff/client[a]	60.67	1 = Support matching AA clients with AA staff
Matching Latino language[a]	93.52	1 = Support that staff serving Latinos should speak Spanish
Matching Latino staff/client[a]	67.79	1 = Support matching Latino clients with Latino staff
Regression model – dependent variables		
Access to treatment, *M* (SD)	9.31 (18.99)	# of days average client waits to enter treatment
Retention in treatment, *M* (SD)	9.38 (23.95)	# of months average client stays in treatment
Regression model – independent variables		
Unit's cultural competence, *M* (SD)	43.32 (10.85)	Rasch composite measure of 14 practices considered culturally
Supervisor's cultural sensitivity, *M* (SD)	56.28 (19.37)	responsive; measure is standardized ranging from 0 to 100. Rasch composite measure of 6 beliefs regarding the service needs of Latinos and AAs; measure is standardized ranging from 0 to 100.
% Public revenue, *M* (SD)	57.90 (37.52)	% of total budget
Unit size (number of clients), *M* (SD)	347 (754)	Number of total clients served past fiscal year
Staff resources, *Median* (SD)	0.2 (0.13)	Ratio of staff to clients
Number of services, *M* (SD)	12.48 (6.77)	Ranges from 0 to 26
Methadone (%)	30.10	1 = Unit is a methadone provider
Urban unit (%)	59.22	1 = Unit is within metropolitan area
For-profit (%)	13.60	1 = Unit is for-profit
Nonprofit (%)	58.45	1 = Unit is nonprofit
Public (referent) (%)	27.95	1 = Unit is public
Unit in hospital (%)	16.64	1 = Unit is affiliated with hospital
Unit in mental health facility (%)	21.49	1 = Unit is affiliated with mental health center
Free-standing unit (referent) (%)	61.87	1 = Unit is free standing

Note: AA, African American.

[a] Item was transformed to dichotomous scale.

to be missing at random (Little and Rubin, 1987; Rubin, 1987). Each missing value was replaced with five plausible values using the Markov Chain Monte Carlo (MCMC) method (Schaefer, 1997). The highest rate of missing data for any variable in the sample was approximately 16%. Five imputed data sets were developed, merged, and analyzed using STATA's ICE and MIM commands.

We examined the cross-sectional relationship between cultural competence and the two dependent variables, average retention and average wait time. Our preliminary analyses indicated two issues with the wait time measure: (1) significant variability, also referred as overdispersion, and (2) a high proportion of zero values reported (62% of sample). To address this issue, a Poisson distribution was assumed with a log link function, an overdispersion parameter, and a specification that allows for a higher-than-expected number of zero values. The zero inflated Poisson (ZIP) model estimates two separate processes—a logistic approach which attempts to estimate the probability of the event occurring or not (i.e., waiting for treatment or not), and a Poisson approach that attempts to explain variation in counts among those who experienced the event (i.e., number of days waiting among those individuals who waited to enter treatment). In other words, The ZIP model uses logistic regression to obtain the probability of whether or not a respondent reported zero wait, and a regular Poisson distribution to model variation in the number of days waited by those who reported wait time (Afifi et al., 2007). To estimate a model for the second outcome, retention, a regular Poisson model was used.

3. Results

3.1. Measurement of organizational cultural competence

3.1.1. Culturally competent practices. The results of the Rasch analyses are presented in Table 2. The *organizational practices* measure produced an eigenvalue of 1.9, with an unexplained variance of 5.9%, as reported by the principal component analysis in WINSTEPS 3.0. Four items included in the initial measure were removed because their reported fit indexes, mean square residuals (MNSQ), were beyond the acceptable range of 1.4, thus violating the local independence assumption. These practices included Latino director, Latino staff/client ratio, African American supervisor, and bilingual staff. The item representing the presence of Spanish-speaking staff had a MNSQ value that was marginally outside the acceptable range. However, it was retained due to its conceptual importance for the study. After removing these items, the measure demonstrated adequate fit, with all Infit and Outfit MNSQs within the acceptable range of 0.6–1.4. In the final model, the Cronbach

Table 2
Fit and prevalence of culturally competent practices and culturally sensitive beliefs.

	Frequency (%)	Latent trait score	Infit		Outfit	
			MNSQ	ZSTD	MNSQ	ZSTD
Culturally competent practices						
Churches	72.43	29.09	1.09	1.7	1.21	2.5
Spanish language	21.84	45.84	1.07	1.8	1.17	2.9
Cross-cultural training > 6 h/year	45.79	35.75	1.06	1.6	1.09	1.6
African American director	9.01	67.44	1.05	0.5	0.96	−0.1
Community leader	66.89	32.20	1.02	0.5	1.03	0.5
Latino staff (f/t) >15%	2.59	50.01	1.02	0.6	0.98	−0.2
Cross-cultural training > 50% staff	60.84	43.94	1.01	0.3	0.99	−0.3
Ratio of minority staff/clients 1:2	30.10	51.08	0.99	−0.2	1.01	0
Ratio of AA staff/AA clients 1:7	30.58	50.81	0.96	−0.8	0.99	−0.1
Same-race counseling	45.62	42.72	0.93	−2.2	0.96	−0.9
Single-race group	10.91	64.34	0.95	−0.5	0.71	−1.8
Latino supervisor	5.86	71.52	0.94	−0.4	0.8	−0.7
Outreach for minorities	41.22	44.82	0.94	−1.8	0.89	−2
African American staff (f/t) 15%	5.98	49.49	0.93	−1.7	0.91	−1.3
Culturally sensitive beliefs						
Providing Latinos w/special services	81.83	47.12	1.33	5.3	1.41	5.9
Knowing Latino history	86.08	43.24	1.11	1.8	1.13	1.8
Matching African American dialect	89.81	38.20	0.97	−0.4	1.01	0.87
Matching African American staff/client	60.67	67.60	0.84	−2.9	0.88	−1.4
Matching Latino language	93.52	33.10	0.87	−2.1	0.72	−2.9
Matching Latino staff/client	67.79	61.76	0.82	−3.4	0.84	−2.4

Note: Lower score in the latent trait score column reflect practices more programs report using. Lower numbers are less representative of the concept of culturally competent practices or beliefs Infit and outfit MNSQ values between 0.60 and 1.40 reflect adequate fit to the Rasch model. AA, African American.

alpha was 0.79, and item separation was 11.10, meaning that participants were able to differentiate each practice in their responses. Proper fit can also be evaluated using standardized *Z* scores (Smith and Miao, 1994). While three items reported a *Z* score larger than 2 (follow up with churches, Spanish-speaking staff, and same-race counseling), they were retained because the items were conceptually relevant.

The final measures of organizational cultural competence are included in Figs. 1 and 2, which include a visual representation of three values regarding each practice or belief: (1) prevalence, (2) difficulty or likelihood of endorsement, and (3) measurement precision. The size of the "bubble" represents the percentage of managers who reported offering the practice or supporting a belief, with larger bubbles indicating more prevalent practices/beliefs. Scores in the *Y* axis indicate difficulty, or the item's likelihood to be endorsed by managers. Unlike the descriptive measure of prevalence, which represents the percentage of units offering the practice, difficulty or likelihood of endorsing an item is a psychometric measure that is weighted by respondents' pattern of endorsement of a latent trait. Hence, for culturally competent practices, more difficult to endorse practices or beliefs (higher values on axis *Y*) will receive a higher score representing endorsers' higher degree of cultural competence. Remember that this measure is analogous to measures of intelligence, in which the most challenging items are used to identify the most exceptional respondents. Finally, scores in the *X* axis show measurement precision represented by the psychometric fit of each practice and their proximity to one, the optimal value.

Fig. 1 highlights the final scale of culturally competent practices with all items falling close to the optimal measurement precision range. Endorsement of these practices ranged widely. From this range, three major categories of *organizational practices* tended to endorsed in tandem: (1) community services and cross-cultural training, (2) racial/ethnic representation among treatment staff, and (3) diversity within management-level positions. These services were most likely to be endorsed, followed by the cluster of items reflecting employment of minority treatment staff. Yet, employment of minorities in management positions (Latino super-

visor and African American director) were among the items least prevalent and least likely to be endorsed, while the most frequently adopted and endorsed practices included involving community leaders and offering cross-cultural training for staff.

3.1.2. Managers' culturally sensitive beliefs. Managers' culturally sensitive beliefs, the second measure of organizational cultural competence, reported adequate psychometric properties without having to exclude any item. In contrast to the *organizational practices* measure, this measure met the assumptions of unidimensionality and local independence, allowing the use of all six original items. The principal component analysis (not presented here) showed that the eigenvalue for the first factor of this model was 1.9 and the unexplained variance was 6%, suggesting unidimensionality. In addition, Pearson correlations were below 25%, indicating local independence. Except for providing Latinos with special services, the Infit statistics were all within the acceptable range (0.6–1.40), but reported a wider range than the better-fitting measure of *organizational practices*. Additionally, managers' beliefs achieved an item separation of 10, suggesting that managers adequately differentiated these beliefs. Also, while the measurement precision of *managers' culturally sensitive beliefs* spread more widely than those of *organizational practices*, beliefs reported a higher Cronbach reliability coefficient of 0.99.

Fig. 2 displays a second bubble chart highlighting the prevalence among culturally sensitive beliefs (bubbles of similar size) and the significant variability in measurement precision. The difficulty scale reveals that while matching language to serve Latinos and matching dialect to serve African Americans were the best-fitting and most prevalent beliefs, matching treatment staff and clients based on their racial/ethnic background was the least common and more difficult item to endorse.

3.2. Relationship of organization cultural competence to outcomes

Table 3 presents the results of regression models to predict average wait time and average retention in the NDATSS sample of OSAT
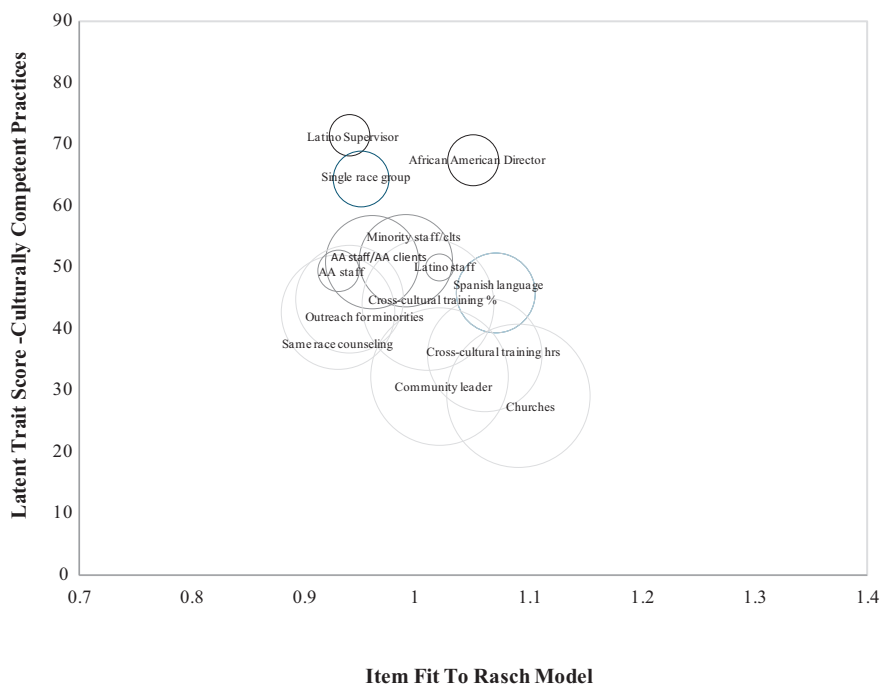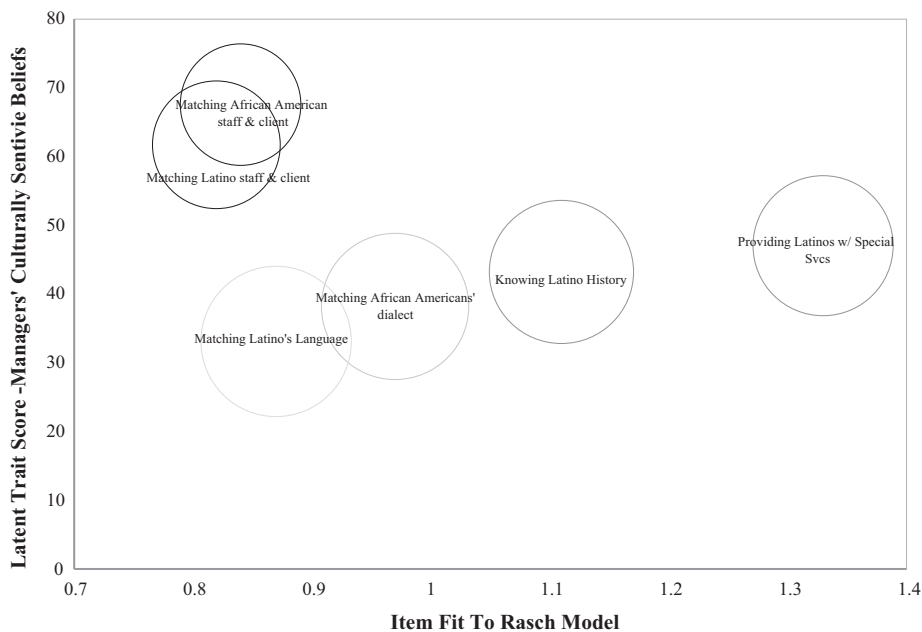
Fig. 1. Bubble chart of the 14 linguistic and culturally competent practices. *Note*: The size of the bubbles reflects the overall reported prevalence of the practice in the outpatient substance abuse treatment system. Greater scores in the vertical axis represent higher difficulty to endorse the practice, while Infit values closer to 1 in the horizontal axis indicate a more precisely measured item.

organizations. The results of the regression models provide only partial support for our study hypotheses. In the case of both outcomes, only the measure of *managers' culturally sensitive beliefs* was a significant predictor.

The study findings suggest that one of the two dimensions of organizational cultural competence—*managers' culturally sensitive beliefs*—was significantly associated with average wait time to entry to substance abuse treatment. The *managers' beliefs* scale was related to decreased average wait time to substance abuse

treatment entry ($\beta = -0.008$, $p < 0.05$). No association was found between *organizational practices* and average wait time to treatment entry. The variables included in the ZIP model to predict the probability of a program having no wait time showed that methadone programs were less likely to report no wait time than non-methadone-based programs ($\beta = -0.466$, $p < 0.05$). Public programs were also less likely to report no wait than for-profit treatment organizations ($\beta = 0.913$, $p < 0.05$). Among control variables in the model predicting wait time among programs reporting

Fig. 2. Bubble chart of the six managers' culturally sensitive beliefs. *Note*: The size of the bubbles reflects the overall reported prevalence of the culturally sensitive belief in the outpatient substance abuse treatment system. Greater scores in the vertical axis represent higher difficulty to endorse the belief, while Infit values closer to 1 in the horizontal axis indicate a more precisely measured item.

Table 3
Poisson regressions on clients' wait time and retention in treatment in 1995.

	Outcome variables					
	Wait time (number of days waiting)			Retention (number of months)		
	β (SE)	C.I.		β (SE)	C.I	
Independent variables						
Culturally competent practices	−0.001 (0.009)	−0.019	0.018	0.001 (0.001)	−0.002	0.002
Culturally sensitive beliefs	−0.008 (0.004)[*]	−0.016	−0.001	0.002 (0.001)[**]	0.001	0.004
Control variables						
% Public revenue	0.129(0.296)	−0.461	0.721	0.025 (0.043)	−0.060	0.111
Unit size (number of clients)	0.063(0.141)	0.215	0.341	0.013 (0.007)[*]	−0.001	0.028
Staff resources	−1.146(0.726)	−2.572	0.280	0.126(0.089)	−0.049	0.301
Number of services	0.029(0.015)[+]	−0.002	0.059	−0.004 (0.002)[**]	−0.008	0.001
Methadone	−0.082(0.177)[*]	−0.430	0.266	−0.174(0.040)[***]	−0.254	0.094
Urban unit	0.468(0.197)	0.081	0.855	−0.024 (0.019)	−0.063	0.015
Ownership						
For profit[a]	−0.305 (0.478)	−1.278	0.667	0.006(0.041)	−0.074	0.086
Non-for profit[a]	0.313(0.179)[+]	−0.038	0.665	−0.019 (0.028)	−0.075	0.035
Affiliation						
Unit in hospital[b]	−0.278 (0.354)	−0.977	0.420	−0.048 (0.046)	−0.139	0.044
Unit in mental health facility	−0.369 (0.206)	−0.776	0.039	0.017(0.025)	−0.032	0.066
Constant	2.91 (0.472)	1.979	0.039	−0.051 (0.075)	−0.199	0.097
Observation	363			363		

Note. Unstandarized parameter estimates, with robust standard errors in parentheses from two tailed tests.

[a] Public is the referent.
[b] Free standing unit is the referent.
[+] $p < .10$.
[*] $p < .05$.
[**] $p < .01$.
[***] $p < .001$.

at least one day of wait, the number of services provided by OSAT organizations was marginally positively associated with wait time ($\beta = 0.029$, $p < 0.10$), suggesting that the more comprehensive the treatment program, the longer the average wait time to enter it.

Similar to the findings for wait time, only one of the two dimensions of organizational cultural competence—*managers' culturally sensitive beliefs*—was significantly associated with average length of retention in substance abuse treatment. The *managers' beliefs* scale was associated with an increase in average retention ($\beta = 0.002$, $p < 0.01$). The *organizational practices* measure was not associated with average retention. Three of the study's control variables were significantly related with average retention. Unit size was positively associated with average retention ($\beta = 0.013$, $p < 0.05$) while number of services provided and the provision of methadone were negatively associated with average retention in treatment (respectively, $\beta = −0.004$, $p < 0.01$; $\beta = −0.174$, $p < 0.001$).

4. Discussion

4.1. Measurement of cultural competence

In this study, we developed measures that aimed to gauge OSAT organizations' cultural competence along two dimensions: *organizational practices* and *managers' culturally sensitive beliefs*. This measurement process enabled us to identify the specific culturally sensitive beliefs and culturally responsive practices, included in this study, that were most likely to be endorsed by managers. At the same time, we identified the set of practices that tend to be offered in tandem by OSAT organizations. While earlier measures of organizational cultural competence have tended to rely on index count measures that weigh each practice equally and assume no measurement error, the Rasch model allows for a more sophisticated evaluation of items that considers how likely a particular practice or belief is to be used by an organization and with what other practices or beliefs it will most likely be used in tandem.

Our results find that OSAT organizations were most likely to offer a cluster of practices that included training staff on cross-

cultural issues, matching race/ethnicity and language of staff and clients, and community involvement in treatment. In contrast, racial/ethnic minority representation at the management level was the cluster of practices least likely to be present in OSAT. These findings are not particularly surprising. Cross-cultural training and community involvement are practices that many organizations may find easier to implement, while research suggests that recruiting qualified racial and ethnic minority staff to management positions is a challenge for many organizations in social services organizations (Howard, 2003a,b). Yet, the need to increase the representation of racial and ethnic minority leadership in OSAT organizations remains a concern, as research suggests that it can improve implementation of culturally competent practices (Guerrero, 2010; Harper et al., 2009; Office of Applied Studies, 2009). Moreover, our results indicate that while many organizations reported using race/ethnic matching of staff and clients, relatively few reported having racial and ethnic minority staff representation greater than 15%. It is unknown whether OSAT organizations with a short supply of staff members from racial and ethnic minority groups face difficulties in consistently implementing race/ethnic matching.

Interestingly, OSAT organizations showed much less variation in their endorsement of specific beliefs regarding cultural competence than in their use of particular culturally competent practices. This may reflect the reality that OSAT organizations may not be able to actually implement all of the practices they feel would be beneficial to racial and ethnic minority clients. Yet, although rather subtle differences, managers were more likely to believe that specific knowledge about racial and ethnic minority groups was more important for successful treatment than the actual race/ethnic background of the treatment staff. For example, managers were more likely to endorse the need to provide treatment in clients' language and/or dialect than the need to match clients and staff by race and ethnicity. This finding is of particular interest in light of the finding that matching staff and clients by race and ethnicity was one of the most commonly used practices among OSAT organizations. Perhaps this suggests that while managers do not believe that

providing same race/ethnic matching is essential for effective treatment of a racial or ethnic minority client, same race/ethnicity staff may be more likely to have in-depth knowledge of the language, culture, and history of the client.

Overall, the study findings indicate the need to increase the overall adoption of culturally competent practices in OSAT. Best estimates suggest that while more than 50% of clients belong to an ethnic minority group, 85% of treatment staff are white (Mulvey et al., 2003). In addition, less than one half of organizations train their staff on cross-cultural issues and less than a third offered treatment in Spanish. In light of the growing racial and ethnic diversity in OSAT clients, there is a continuing need to enhance cultural competency—as reflected in more aggressive recruitment of racial and ethnic minorities to positions among treatment staff and investment in programs' capacity to recruit and retain promising culturally diverse leaders. It is also necessary to increase cross-cultural training for the non-minority workforce—both staff and leadership.

4.2. Relationship of cultural competence to treatment outcomes

The study findings suggest that organizational cultural competence may play an important role in reducing wait time and increasing retention in OSAT organizations serving Latinos and African Americans. *Managers' culturally sensitive beliefs*—one of two dimensions of organizational cultural competence included in the study—was linked to both average client wait time and retention. There are at least a few possible reasons why only managers' culturally sensitive beliefs proved important in predicting these outcomes.

One possibility is that managers' beliefs serve as a kind of proxy for the quality of implementation of culturally competent practices in OSAT organizations. Managers who more strongly endorsed belief in the importance of culturally competent practices may also be more committed to their adoption and implementation in their organizations. Whereas the scale of *organizational practices* measures what practices have been adopted, the scale of *managers' culturally sensitive beliefs* gauges how important organizational leaders believe implementation of such practices is for effective treatment with racial and ethnic minority clients (Guerrero, 2010). This line of thinking relates to recent literature examining the implementation of evidence-based practice in substance abuse treatment, which has made an important distinction between adoption and implementation of evidence-based practices (Roman and Johnson, 2002). Whereas adoption indicates organizational use of given practice, implementation gauges the extent to which the practice is received by clients for whom it is appropriate.

It also possible that the relationship we found between managers' beliefs and client outcomes is a spurious one. Because our analysis was cross-sectional, we cannot eliminate the possibility that some other unmeasured organizational factor could be related to both managers' beliefs about cultural competence and our outcomes of interest. Despite having controlled for many organizational factors that have been linked to wait time and retention in the literature, it is possible that certain organizations—perhaps due to some unmeasured aspect of quality—could be more likely to employ culturally sensitive managers and to have better treatment outcomes.

The findings that managers' beliefs about the importance of cultural competence in influencing wait time and retention are congruent with prior research. Organizations with greater levels of cultural competence may be able to better assist clients in navigating the intake process and facilitating quick entry to treatment. As research suggests that members of racial and ethnic minority groups may face special barriers to treatment, including linguistic challenges and limited knowledge of payment systems and

processes (see Institute of Medicine, 2003; Agency for Healthcare Research and Quality, 2008), programs that are better attuned and responsive to client needs may be more likely to produce shorter wait times. Moreover, the finding that increased organizational cultural competence is associated with retention is congruent with studies in other areas of health care, which have found that staff investment in culturally responsive treatment was linked to successful retention for racial and ethnic minorities (Betancourt, 2006; Sue et al., 1991).

4.3. Study limitations

One limitation of this study relates to the use of data aggregated at the organizational level. The NDATSS survey did not collect data on individual clients, but instead obtained reports by supervisors of client averages. This impacts our analysis in at least two ways. First, collection of data via supervisor reports of mean client estimates is a rough indicator of outcomes and provides no information regarding client-level variability in each organization. Second, we are unable to disaggregate client data by race and ethnicity. As such, we could not limit our analysis to African Americans and Latinos, the populations of interest in this study. While we could not exclude whites, non-Latinos, and other racial groups from the study, we were able to limit our sample to include only organizations that reported a past-year client base of at least 20% African American or 15% of Latino clients. Collection of data via supervisors also increases the bias associated with social desirability, which can compromise the validity of responses. To reduce the effect of inaccurate responses, survey administrators corroborated responses between supervisors and directors (Adams and Herringa, 2001). Another potential limitation of the study is the age of the data; Wave IV of NDATSS was collected in 1995. Yet, this is the only national survey with comprehensive data on cultural competence in substance abuse treatment. These data allowed us to offer preliminary baseline measures of practices and beliefs to inform future directions for measurement of cultural competence. Finally, it is important to note that the two outcomes of interest—wait time and retention—are aggregate measures based on supervisor estimates. Survey administrators made several efforts to encourage accurate reporting of these variables, including providing questions to respondents in advance of the interview; checking for clear discrepancies across questions (for example, comparing reports of wait time with reports of wait lists); and following up with respondents to address these issues. Despite these efforts, it remains possible that some supervisors made inaccurate estimates.

4.4. Conclusions and implications for further research and policy development

In this paper, we developed empirically derived measures of organizational cultural competence and, using a nationally representative sample, tested its utility in predicting important treatment outcomes in OSAT. Cultural competence in the OSAT system relies on providing cross-cultural training, involving spiritual and other community leaders connected to racial and ethnic minority populations in treatment, and matching staff and clients based upon racial and ethnic background when possible. Fewer OSAT organizations reported significant representation of racial and ethnic minorities in staff and leadership positions, potentially reflecting difficulties in hiring and retaining such staff. While programs may adopt culturally competent practices, managers' culturally sensitive beliefs appear to have limited but significant influence on treatment outcomes. Cultural sensitivity may represent a domain-specific capacity in managers to reduce the barriers that clients from racial and ethnic minority groups face to enter and remain in outpatient substance abuse treatment. Such findings

are of particular importance when considered within the context of prior research, which has documented the importance of rapid entry to treatment in facilitating access and the role of retention in reducing addiction severity.

Further research is required to corroborate and expand upon the findings of the current study. It could be useful to examine the testing and application of these measures with other samples of treatment organizations, with varying treatment modalities and populations. Further, there is a need for additional research to understand the mechanisms by which managers' culturally sensitive beliefs are related to client wait time and retention in OSAT organizations. While this paper has demonstrated a relationship between managers' beliefs and these outcomes, the reasons for this relationship are not revealed in this study. We suspect that managers' beliefs may moderate the relationship between use of culturally competent treatment practices and outcomes by influencing the quality of implementation of these practices. Although such moderational analysis was beyond the scope of the current paper, testing these interactions, as well as multilevel program–client effects would allow for a more explicit examination of the impact of the context of OSAT programs on the response of racial and ethnic minorities to treatment.

Role of funding source

Contributors

Dr. Guerrero designed the study and conducted the statistical analysis. Ms. Andrews managed the literature searches and summaries of previous related work, contributed to the statistical analysis and helped draft the initial drafts of the manuscript. Both authors contributed to and have approved the final manuscript.

Conflict of interest

Authors declare that they have no conflicts of interest.

Acknowledgements

References

Aarons, G.A., Palinkas, L.A., 2007. Implementation of evidence-based practice in child welfare: service provider perspectives. Adm. Policy Ment. Health 34, 411–419.

Afifi, A.A., Kotlerman, B.J., Ettner, L.S., Cowan, M., 2007. Methods for improving regression analysis for skewed continuous or counted responses. Annu. Rev. Public Health 28, 95–111.

Adams, T.A., Herringa, S.G., 2001. Outpatient Substance Abuse Treatment Surveys (OSATSS): Technical Documentation for OSATSS-5 – 1999–2000. Institute for Social Research, University of Michigan, Ann Arbor, MI.

Agency for Healthcare Research and Quality, 2008. National Healthcare Disparities Report. Rockville, MD.

Andrulis, D.P., Siddiqui, N.J., Purtle, J.P., Duchon, L., 2010. Patient Protection and Affordable Care Act of 2010: Advancing Health Equity for Racially and Ethnically Diverse Populations. Joint Center for Political and Economic Studies, Washington, DC.

Appel, P.W., Ellison, A.A., Jansky, H.K., Oldak, R., 2004. Barriers to enrollment in drug abuse treatment and suggestions for reducing them: opinions of drug injecting street outreach clients and other system stakeholders. Am. J. Drug Alcohol Abuse 30, 129–153.

Betancourt, J.R., 2006. Improving quality and achieving equity: the role of cultural competence in reducing racial and ethnic disparities in health care. The Commonwealth Fund, New York, NY.

Betancourt, J.R., Green, A.R., Carillo, J.E., Anaheh-Firempong, O., 2003. Defining cultural competence: a practical framework for addressing racial/ethnic disparities in health and health care. Public Health Rep. 118, 293–302.

Brach, C., Fraser, I., 2000. Can cultural competency reduce racial and ethnic health disparities? A review and conceptual model. Med. Care Res. Rev. 57, 181–217.

Campbell, C.I., Alexander, J.A., 2002. Culturally competent treatment practices and ancillary service use in outpatient substance abuse treatment. J. Subst. Abuse Treat. 22, 109–119.

Carr, C.J.A., Xu, J., Redko, C., Lane, D.T., Rapp, R.C., Goris, J., Carlson, R.G., 2008. Individual and system influences on waiting time for substance abuse treatment. J. Subst. Abuse Treat. 34, 192–201.

Center for Substance Abuse and Treatment, 2009. Implementing change in substance abuse treatment programs. Treatment Improvement Protocol, TIP Series 31 DHHS Publication No. (SMA) 09-4377. Substance Abuse and Mental Health Administration, Rockville, MD.

Claus, R.E., Kindleberger, L.R., 2002. Engaging substance abusers after centralized assessment: predictors of treatment entry and dropout. J. Psychoactive Drugs 34, 25–31.

Cross, T., Bazron, B., Dennis, K., Issacs, M., 1989. Towards a Culturally Competent Systems of Care, vol. 1. CASSP Technical Assistance Center for Child Mental Health Policy, Washington, DC, p. 13.

Daley, M.C., 2005. Race, managed care, and the quality of substance abuse treatment. Adm. Policy Ment. Health 32, 457–476.

D'Aunno, T.A., Pollack, H.A., 2002. Changes in methadone treatment practices: results from a national panel study, 1988–2000. JAMA 288, 850–856.

Embretson, S.E., Reise, S.P., 2000. Item Response Theory for Psychologists. Lawrence Erlbaum Associates, Mahwah, NJ.

Farabee, D., Leukefeld, C.G., Hays, L., 1998. Accessing drug-abuse treatment: perceptions of out-of-treatment injectors. J. Drug Issues 28, 381–394.

Festinger, D.S., Lamb, R.J., Kountz, M.R., Kirby, K.C., Marlowe, D., 1995. Pretreatment dropout as a function of treatment delay and client variables. Addict. Behav. 20, 111–115.

Fisher, T.L., Burnet, D.L., Huang, E.S., Chin, M.H., Cagney, K.A., 2007. Cultural leverage: interventions using culture to narrow racial disparities in health care. Med. Care Res. Rev. 64, 243s–282s.

Friedmann, P.D., Lemon, S.C., Stein, M.D., D'Aunno, T.A., 2003. Accessibility of addiction treatment: results from a national survey of outpatient substance abuse treatment organizations. Health Serv. Res. 38, 887–903.

Garnick, D.W., Lee, M.T., Chalk, M., Gastfriend, D., Horgan, C.M., McCorry, F., McLellan, A.T., Merrick, E.L., 2002. Establishing the feasibility of performance measures for alcohol and other drugs. J. Subst. Abuse Treat. 23, 375–385.

Garnick, D.W., Lee, M.T., Horgan, C.M., Acevedo, A., 2009. Adapting Washington Circle performance measures for public sector substance abuse treatment systems. J. Subst. Abuse Treat. 36, 265–277.

González-Calvo, J., González, V.M., Lorig, K., 1997. Cultural diversity issues in the development of valid and reliable measure of health status. Arthritis Rheum. 10, 448–456.

Gonzalez, M.H., Vega, A.W., Tarraf, W., 2010. Health care quality perceptions among foreign-born Latinos and the importance of speaking the same language. J. Am. Board Fam. Med. 23, 745–752.

Grella, C.E., Hser, Y.–I., Joshi, V., Anglin, M.D., 1999. Patient histories, retention, and outcome models for younger and older adults in DATOS. Drug Alcohol Depend. 57, 151–166.

Guerrero, G.E., 2010. Managerial capacity and adoption of culturally competent practices in outpatient substance abuse treatment. J. Subst. Abuse Treat. 39, 329–339.

Harper, M., Hernandez, M., Nessman, T., Mowery, D., Worthington, J., Issacs, M., 2009. Organizational cultural competence: a review of assessment protocols. In: Making Children's Mental Health Services Successful. Research and Training Center for Children's Mental Health/Florida Mental Health Institute, University of South Florida, Tampa, FL.

Henderson, E.C., Taxman, S.F., Young, W.D., 2008. A Rasch model analysis of evidence-based treatment practices used in the criminal justice system. Drug Alcohol Depend. 93, 163–175.

Howard, D.L., 2003a. Culturally competent treatment of African American clients among a national sample of outpatient substance abuse treatment units. J. Subst. Abuse Treat. 24, 89–102.

Howard, D.L., 2003b. Are the treatment goals of culturally competent outpatient substance abuse treatment units congruent with their client profile? J. Subst. Abuse Treat. 24, 103–113.

Hubbard, R.L., Craddock, S.G., Flynn, P.M., Anderson, J., Etheridge, R.M., 1997. Overview of 1-year follow-up outcomes in the drug abuse treatment outcome study (DATOS). Psychol. Addict. Behav. 11, 261–278.

Institute of Medicine, 2001. Crossing the Quality Chasm: A New Health System for the 21st Century. National Academies Press, Washington, DC.

Institute of Medicine, 2003. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. National Academies Press, Washington, DC.

Jackson, K.R., Booth, P.G., McGuire, J., Salmon, P., 2006. Predictors of starting and remaining in treatment at an alcohol clinic. J. Subst. Use 11, 89–100.

Jacobson, J.O., Robinson, P., Bluthenthal, R.N., 2007. Racial disparities in completion rates from publicly funded alcohol treatment: economic resources explain more than demographics and addiction severity. Health Serv. Res. 42, 773–794.

Lewin Group, 2001. Health Resources and Services Administration Study on Measuring Cultural Competence in Health Care Delivery Settings. Prepared for the Health Resources and Services Administration. Retrieved from http://www.hrsa.gov/culturalcompetence/measures/default.htm (accessed 2.12.2007).

Linacre, J.M., Wright, B.D., 1999. WINSTEPS Rasch-model Computer Program [Computer Software]. MESA Press, Chicago.

Little, R.J., Rubin, D.B., 1987. Statistical Analysis With Missing Data. John Wiley and Sons, Inc., New York.

Lundgren, L.M., Amodeo, M., Ferguson, F., Davis, K., 2001. Racial and ethnic differences in drug treatment entry of injection drug users in Massachusetts. J. Subst. Abuse Treat. 21, 145–153.

McCaughrin, W., Howard, D., 1996. Variation in access to outpatient substance abuse treatment: organizational factors and conceptual issues. J. Subst. Abuse 8, 403–415.

Marsh, J.C., Cao, D., Guerrero, E., Shin, H.C., 2009. Need-service matching in substance abuse treatment: racial/ethnic differences. Eval. Program Plann. 32, 43–51.

McCarty, D., Gustafson, D.H., Wisdom, J.P., Ford, J., Choi, D., Molfenter, T., Capoccia, V., Cotter, F., 2007. The Network for the Improvement of Addiction Treatment (NIATx): enhancing access and retention. Drug Alcohol Depend. 88, 138–145.

Mertens, J.R., Weisner, C.M., 2006. Predictors of substance abuse treatment retention among women and men in an HMO. Alcohol. Clin. Exp. Res. 24, 1525–1533.

Mulvey, K.P., Hubbard, S., Hayashi, S., 2003. A national study of the substance abuse treatment workforce. J. Subst. Abuse Treat. 24, 51–57, doi:10.1016/S0740-5472(02)00322-7.

National Center of Cultural Competence, 2007. Definition of Objectives for Organizational Cultural Competence and Service Efficacy. Georgetown University – National Center of Cultural Competence. http://gucchd.georgetown.edu/nccc (accessed 27.05.2006).

Office of Minority Health, 2001. National Standards for Culturally and Linguistically Appropriate Services in Health Care. U.S. Department of Health and Human Services, Washington, DC. http://minorityhealth.hhs.gov/assets/pdf/checked/executive.pdf (accessed 02.04.2011).

Pollack, H.A., D'Aunno, T., Lamar, B., 2006. Outpatient substance abuse treatment and HIV prevention. J. Subst. Abuse Treat. 30, 39–47.

Pollini, R.A., McCall, L., Mehta, S.H., Vlahov, D., Strathdee, S.A., 2006. Non-fatal overdose and subsequent drug treatment among injection drug users. Drug Alcohol Depend. 83, 104–110.

Prince Inniss, J.P., Nessman, T., Mowery, D., Callejas, L.M., Hernandez, M., 2009. Serving Everyone at the Table: Strategies for Enhancing the Availability of Culturally Competent Mental Health Service (Making Children's Mental Health Services Successful Series). University of South Florida, College of Behavioral and Community Sciences, Louis de la Parte Florida Mental Health Institute, Department of Child and Family Studies, Research and Training Center for Children's Mental Health, Tampa, FL.

Roman, P.M., Johnson, J.A., 2002. Adoption and implementation of new technologies in substance abuse treatment. J. Subst. Abuse Treat. 22, 211–218.

Rubin, D.B., 1987. Multiple Imputation for Non-response in Surveys. John Wiley and Sons, Inc., New York.

Saha, S., Komaromy, M., Koepsell, T.D., Bindman, A.B., 1999. Patient-physician racial concordance and the perceived quality and use of health care. Arch. Intern. Med. 159, 997–1004.

Saha, S., Taggart, S., Komaromy, M., Bindman, A.B., 2000. Do patients choose physicians of their own race? Health Aff. (Millwood) 19, 76–83.

Substance Abuse and Mental Health Administration (SAMSHA), 2007. Treatment Episode Data Set (TEDS) 1994-1999: National Admissions to Substance Abuse Treatment Services. Substance Abuse and Mental Health Administration, Rockville, MD, Retrieved from http://www.oas.samhsa.gov.

Schaefer, J.L., 1997. Analysis of Incomplete Multivariate Data. Chapman and Hall, New York.

Simpson, D.D., Joe, G., Brown, B., 1997. Treatment retention and follow-up outcomes in the drug abuse treatment outcome study (DATOS). Psychol. Addict. Behav. 11, 294–307.

Smith, L.S., 1998. Concept analysis: cultural competence. J. Cult. Divers. 5, 4–10.

Smith, R.M., Miao, C.Y., 1994. Assessing unidimensionality for the Rasch measurement. In: Wilson, M. (Ed.), Objective Measurement: Theory into Practice, vol. 2. Ablex, Norwood, NJ, pp. 316–327.

Sue, S., Arredondo, P., McDavis, R.J., 1992. Multicultural counseling competencies and standards: a call to the profession. J. Couns. Dev. 70, 477–486.

Sue, S., Fujino, D.C., Hu, L., Takeuchi, D.T., Zane, N.W.S., 1991. Community mental health services for ethnic minority groups: a test of the cultural responsiveness hypothesis. J. Consult. Clin. Psychol. 59, 533–540.

Wade, P., Berstein, B.L., 1991. Culture sensitivity training and counselor's race: effects on Black female clients' perceptions and attrition. J. Couns. Psychol. 38, 9–15.

Wells, K.B., Klap, R., Koike, A., Sherbourne, C.D., 2001. Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. Am. J. Psychiatry 158, 2027–2032.

Wu, L.T., Kouzis, A.C., Schlenger, W.E., 2003. Substance use, dependence, and service utilization among the US uninsured nonelderly population. Am. J. Public Health 93, 2079–2085.

Weech-Maldonado, R., 2002. Organizational Support Standards for Culturally and linguistically Appropriate Services (CLAS): Core Concepts, Content Knowledge, and Core Skills. Concept Paper Commissioned for the Development of Cultural Competence Curricular Modules. Office of Minority Health, U.S. Department of Health and Human Services, Washington, DC.

Wright, B.D., Masters, G.N., 1982. Rating Scale Analysis. MESA Press, Chicago, IL.

Zane, N.W.S., Gordon, C.N.H., Sue, S., Young, K., Nunez, J., 2004. Research on psychotherapy with culturally diverse populations. In: Lambert, M.J. (Ed.), Bergin and Garfield's Handbook of Psychotherapy and Behavior Change. , 5th ed. John Wiley and Sons, Inc., Danvers, MA.

Zhang, Z., Friedmann, P.D., Gerstein, D.R., 2003. Does retention matter? Treatment duration and improvement in drug use. Addiction 98, 673–684.