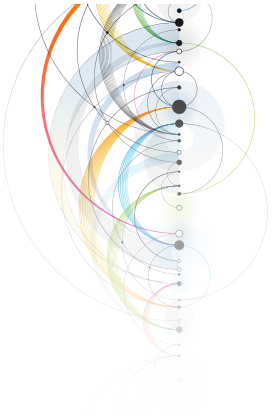

Abstract

Diversity is an increasingly important value for institutions of higher education. Yet, few measures exist to assess whether college and university faculty share in this objective and how their beliefs relate to specific aspects of their work. In this study, we gathered data from a sample of faculty at one American research university to develop a valid and reliable instrument useful for exploring how commitments to diversity are reflected in teaching, research and service. The resulting instrument, ACES, assesses four factors: (a) Attitude towards diversity, (b) Career activities and professional norms, (c) Environment conducive to diversity, and (d) Social interactions with diverse groups. Evidence for the validity and reliability of the scores produced by ACES is presented. How this psychometrically-sound instrument might benefit higher education research and practice in the assessment of diversity related goals is also considered.

AUTHORS

Jennifer Ng, Ph.D.
University of Kansas

William Skorupski, Ph.D.
University of Kansas

Bruce Frey, Ph.D.
University of Kansas

Lisa Wolf-Wendel, Ph.D.
University of Kansas

ACES: The Development of a Reliable and Valid Instrument to Assess Faculty Support of Diversity Goals in the United States

Diversity is an increasingly vital objective in American higher education. Although past rationales for this effort to emphasize diversity have focused upon the need to affirmatively remedy legacies of discrimination and prevent historically disadvantaged groups from remaining disadvantaged, colleges and universities now commonly relate diversity to broad statements of their institutional missions. They acknowledge the educational value of diversity in enriching perspectives within classrooms and across campus, and they recognize the social value of diversity in preparing students to live in a pluralistic and multicultural democracy (McGowan, 1996; Moses & Chang, 2006; Smith, 2009).

The ability of an institution to achieve its diversity goals arguably depends upon being able to accurately determine the willingness of its individual members to support and enact those same principles. Yet, no validated measures are currently available to assess whether university faculty share their institution's stated commitments to diversity and how these varied commitments are expressed in their teaching, research, and service. The purpose of this project is to gather psychometric data from a sample of faculty at one research university, and then develop a valid and reliable instrument intended to measure faculty beliefs and professional practices related to diversity goals in higher education.

CORRESPONDENCE

Email
jcng@ku.edu

Diversity is a challenging concept to capture narrowly enough for useful analysis. This is apparent both in scholarship that seeks to conceptualize its meaning and in studies that have sought to determine its significance. Whereas researchers commonly adopt the language of diversity to address race and ethnicity, others include gender and socioeconomic status, and still others include language, disability, sexual orientation, citizenship, and

religion. These multiple uses of the umbrella term "diversity" make it difficult to compare the results of one study with another and may also suggest implicitly or explicitly a hierarchy of importance where certain types of diversity are deemed more critical or worthy of consideration than others. Emphasis on diversity may simply refer to efforts that promote harmony across diverse ideas, lifestyles, dress, and other attributes or, it could mean paying particular attention to the legal principles of fair treatment and the historic struggles for equal opportunity particular to certain diverse groups (Edelman, Fuller, & Mara-Drita, 2001; Smith, 2009).

In designing the instrument for this project, we ultimately chose to define diversity as differences of race and ethnicity, national origin, and gender. Although this conceptualization is admittedly limited, our decision was guided by two primary rationales. First, generic and undifferentiated references to diversity obscure the fact that different groups have distinct experiences, perspectives, and needs. Clearly specifying groups of interest and related questions yielded more clarity in the items developed. Secondly, institutional policies and affirmative actions such as scholarships, admissions, and target hiring, for example, are typically made on the basis of certain types of diversity, but not other types of human difference. Whether the scope of diverse groups recognized by the university should ideally be more inclusive is beyond the scope of this study as our purpose was to explore whether faculty supported the existing diversity goals of the university where they worked.

Despite the assorted meanings of diversity, Terenzini, Cabrera, Colbeck, Bjorklund, and Parente (2001) posit that researchers tend to examine diversity in three relatively distinct ways: structural, in situ, and programmatic diversity. Researchers who focus on structural diversity look at the numerical makeup and proportional mix of diverse individuals within a given setting. This approach provides quantifiable evidence of access and representation in educational settings, especially as they relate to the involvement of historically marginalized groups in society. As Baird (1990) points out, examining the "differences between these 'is' and 'should be' ratings show how closely present campus goals match the goals that people prefer….and differences among groups of respondents on their preferred goals shows how much agreement exists about institutional purposes" (p. 38).

[Universities] acknowledge the educational value of diversity in enriching perspectives within classrooms and across campus, and they recognize the social value of diversity in preparing students to live in a pluralistic and multicultural democracy.

Researchers examining in situ diversity rely on participants' reports of the frequency or nature of their interactions with others who are different from themselves. This is important because a heterogeneous mix of individuals simply sharing a common physical space may be insufficient to yield the social and educational benefits of diversity that depend also on human interaction (Hurtado, 1992; McGowan, 1996). Understanding the psychosocial development, engagement, and identification of individuals contextualized by the institutional climates where they coexist provides valuable insight into how individuals interpret their experiences and perceive relevant relationships that ultimately influence behaviors and attitudes (Kossek & Zonia, 1993).

Lastly, studies of programmatic diversity explore the impact of curriculum and coursework, professional development, and other existing or planned reforms to promote diversity (Terenzini et al., 2001). Measurement strategies using this approach evaluate the access that underrepresented students have to an institution's programs and resources; comparative retention rates for students; institutional receptivity to being accommodating and responsive; and excellence in achievement. Research on programmatic diversity can provide comprehensive awareness of existing inequities, interpretation of related data, and actions to strategically remedy such disparities in the institutional structures of a university (Bensimon, 2004).

Many measures of diversity in higher education exist, and they solicit responses from students, faculty, administrators, staff, and alumni on varied topics like general campus climate, overall satisfaction, intergroup relations, student learning and involvement, and curriculum, for example (see Association of American Colleges and Universities, 2005; Shenkle, Snyder, & Bauer, 1998; Smith, 2009; Smith, Wolf-Wendel, & Levitan, 1994). These instruments are typically generated by institutional task forces or offices of institutional research, and a closer review of select items indicates their main purpose is assessing the effectiveness of past efforts or identifying areas in need of future attention. Specifically, most available measures focus on gauging student attitudes or perceptions of campus climate. Additionally, little attention is paid

to the reliability and validity of the surveys themselves because they are primarily intended for internal use. In one notable exception, Pohan and Aguilar (2001) discussed the development of a statistically valid and reliable instrument suitable for measuring elementary and secondary educators' personal and professional beliefs about diversity. The context of K-12 schooling and teachers' work is quite unlike that of faculty in higher education, though, with faculty members who are tenured or in tenure-track positions being expected to teach, conduct research, and provide professional service (Clark, 1987). Thus, the instrument presented in this study is unique because it reflects these particular dimensions of faculty life, recognizing that faculty members embody and negotiate multiple institutional, departmental, and disciplinary norms and values in their daily work (Austin, 1990, 1994).

A heterogeneous mix of individuals simply sharing a common physical space may be insufficient to yield the social and educational benefits of diversity that depend also on human interaction.

Method

Participants

A pilot instrument consisting of 100 items was developed and assembled into an online format. Email invitations to participate in the study were sent to all tenure track, full time faculty members (n=1,205) at a large, Midwestern, public research intensive university. The study sample included 332 individuals, which represented a 28% response rate. This sample size was somewhat less than ideal, but at least larger than many recommended minima for conducting factor analysis suggested by researchers (e.g., Thompson, 2004).

Thirty-eight percent of the sample consisted of full professors (compared to 42% in the population), 35% were associate professors (compared to 33% in the population), and 26% were assistant professors (compared to 25% in the population). Women represented 47% of the sample (compared to 39% in the population), international faculty represented 14% (compared to 12% in the population), and 17% were racial/ethnic minorities (as compared to 15% in the population). Aside from the slight overrepresentation of women in the sample, the demographics of the sample are reflective of the population at the institution.

Instrument

Diversity for this instrument was defined as differences of race and ethnicity, national origin, and gender. We chose this limited definition of diversity in order to be acute with respect to our operational definition, and to mirror what many individuals treat as the typical definition of diversity. In choosing domains and constructing items for the instrument, the three approaches to operationalizing diversity identified by Terenzini et al. (2001) provided a useful framework. The structural diversity approach was reflected in attitudinal questions about the ideal composition and amount of attention that faculty thought ought to be given at a university with regard to the structural diversity of students, faculty, and administrators. The in situ contextual approach to assessing diversity with an emphasis on climate was represented by asking respondents to evaluate their interactions with individuals from diverse backgrounds and a large number of questions where respondents were asked to determine the extent to which diversity is a priority in their respective departments, university, and professional communities—domains within which faculty might encounter particular professional norms (Austin, 1990, 1994). Terenzini et al.'s third approach to assessing diversity addresses programmatic initiatives and faculty activities. Faculty engage in teaching, research, and service activities which are presumably integrally tied to the objectives of the university overall. Consequently, questions were included to consider not only whether faculty members support the university's diversity goals in principle, but also how they enact those commitments in various aspects of their actual individual and programmatic work. This framework of three assessment strategies produced questions about general attitudes and beliefs about diversity (21 items); perceptions of institutional climate for diversity, (12 items); inter-personal relationships (15 items); professional norms (9 items); research (10 items); teaching (19 items); and service (14 items). Each item on the instrument consisted of a statement which represented a perspective on diversity. Using a Likert-type format, every item was scored from 1 – *Strongly Disagree* to 5 – *Strong Agree*. A balance of items with positive and negative valences was included.

Procedures

Responses from the instrument were analyzed by means of an exploratory factor analysis (EFA) with principal components analysis (PCA) extraction and varimax rotation. EFA was chosen because our framework for item generation was a fairly informal way of organizing our thoughts for item writing. Our goal was to explore the data structure to determine an optimum factor structure, not test an a priori hypothesis about dimensionality. PCA was used for the initial extraction for the EFA because of its utility in determining an optimal number of components by using eigenvalues and a scree test (Cattell, 1966). Varimax rotation was employed to maintain orthogonality among the components, thus increasing their interpretability. Our goal was to identify those aspects of attitude towards diversity which were meaningful and independent of each other. By these means, an appropriate number of components was identified with a balance of efficiency and explanatory power for the observed data.

The instrument presented in this study is unique because it reflects these particular dimensions of faculty life, recognizing that faculty members embody and negotiate multiple institutional, departmental, and disciplinary norms and values in their daily work.

The criteria for decisions regarding the number of components in the final solution and item retention/deletion were as follows: using Cattell's (1966) scree test, an optimal number of components was identified. All components that were interpretable, based on the pattern of factor loadings for items, were retained. Items were retained if they demonstrated strong (> |0.3|) loadings on one and only one component. Any items with loadings less than |0.3| were deleted. Cross-loading items, those with loadings greater than |0.3| on multiple components, were also deleted. Our goal in these analyses were to arrive at a reduce set of very discriminating items to be included on the final instrument.

Based on these results, a final solution was determined. The item pool was then revised to eliminate any items that did not have strong loadings on any component or had strong loadings on multiple components. As stated, for the purposes of this analysis, a factor loading was considered "strong" if it was greater than or equal to |0.3|, which is a common criterion (e.g., Thompson, 2004). After the final set of retained items was identified, all items with negative valences were reverse-scored to align the direction of all items. All items were then used to create reliable, independent scales to assess the multiple dimensions of attitude towards diversity among faculty in higher education.

In addition to questions about attitudes towards diversity, a number of demographic questions such as gender, ethnicity, academic discipline, and rank were included on the instrument for the purpose of comparing groups after scales were identified. The purpose of these analyses was to help validate the dimensional structure of the items, given prior research that shows there are important differences among respondents based on race, ethnicity and gender (Conley & Hyer, 1999; D'Augelli & Herschberger, 1993; Hurtado, 1992; Kossek & Zonia, 1993) as well as time in rank and disciplinary background (Austin, 1990, 1994; Somers et al., 1998). After the creation of scales, a series of demographic analyses were conducted to statistically compare group mean differences across scale scores. These comparisons were conducted using Multivariate Analysis of Variance using the four subscale scores as dependent variables, with appropriate follow-up pairwise comparisons.

Results

Preliminary Analyses

To determine the factorability of the inter-item correlation matrix, Bartlett's (1954) test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1974) were calculated. Bartlett's test of sphericity is a chi-squared statistic which tests the null hypothesis that the population inter-item correlation matrix is an identity matrix (a square matrix with 1s for the diagonal elements, and 0s for all off-diagonal elements). If a correlation matrix is not statistically different than an identity matrix, it indicates that the variables are not substantially interrelated. This null hypothesis was rejected ($\chi 2 = 7459.94$, df=1770, $p < 0.01$). The KMO measures the extent to which the items measure a common component or components by determining their shared variance after accounting for their partial correlations. Results of this analysis indicated a very high degree of shared variability (KMO = 0.87), indicating that a factor analysis would account for a large portion of the overall

variability in the data. It was therefore determined that an exploratory factor analysis was appropriate and would provide meaningful results.

Exploratory Factor Analysis

Results of the initial solution from Principal Components Analysis indicated that four components would be appropriate for explaining the observed data. Based on this criterion, and the previously mentioned criteria of removing items with strong factor loadings on multiple dimensions, or without any strong factor loadings, a final set of 60 from the original 100 pilot items was retained. Of the 40 items removed, six item had factor loadings less than 0.3 on all four factors, and 32 others were removed for cross-loading 0.3 or greater on two or more factors. The results of the scree test for the final set of 60 items demonstrated an "elbow" after the fourth eigenvalue, indicating that these data could be efficiently summarized by four components. These first four components collectively explained 48% of the variance in observed item responses. Adding a fifth component only explained an additional 3% of the variance and made the final solution much less interpretable. Examination of the pattern of factor loadings from the exploratory factor analysis indicated a clear pattern for simple interpretation based on the four-component solution.

Questions were included to consider not only whether faculty members support the university's diversity goals in principle, but also how they enact those commitments in various aspects of their actual individual and programmatic work.

The four components were identified as (a) Attitude towards diversity (containing general attitude questions), (b) Career activities (containing research, teaching, service, and some professional norms questions), (c) Environment (containing perceptions of institutional climate for diversity), and (d) Social interactions with diverse groups (containing questions about inter-personal relationships and several items from the teaching, research and service

Table 1

Factor Loadings, Communalities, and Descriptive Statistics for Items on the Attitude Scale

Item	R.S.	Factor Loadings				Com.	Descriptive Statistics			
		A	C	E	S		M	SD	Sk.	Ku.
Hiring a more diverse faculty should be a priority at my university.		**0.869**	0.209	-0.085	0.038	0.807	3.97	1.01	-0.89	0.32
A more diverse faculty would enhance my university.		**0.844**	0.123	-0.100	0.107	0.750	4.17	0.90	-1.22	1.71
Hiring a more diverse staff should be a priority at my university.		**0.837**	0.196	-0.060	-0.034	0.744	3.85	1.00	-0.70	0.04
Creating a diverse campus environment should be a priority at my university.		**0.825**	0.186	-0.072	0.078	0.726	4.17	0.85	-1.07	1.25
Recruiting a more diverse student body should be a priority at my university.		**0.822**	0.152	-0.086	0.071	0.711	4.13	0.86	-1.08	1.43
A diverse student body enhances the educational experience of all students.		**0.803**	0.076	-0.046	0.024	0.654	4.43	0.71	-1.67	4.69
The institutional mission of my university should include an explicit statement about its commitment to diversity.		**0.760**	0.149	-0.041	0.005	0.602	4.03	0.96	-0.95	0.65
Diversity should be a factor considered in student admissions to my university.		**0.717**	0.195	-0.038	0.054	0.557	3.69	1.08	-0.92	0.34
The promotion of gender equity among faculty should be a priority at my university.		**0.711**	0.158	-0.028	0.189	0.567	4.02	0.96	-0.89	0.40
Discriminatory practices still exist in American higher education because they have been institutionalized.		**0.689**	0.035	-0.064	0.102	0.491	4.48	0.70	-1.66	4.16
The leadership of my university should be representative of the racial and ethnic diversity of the United States.		**0.652**	0.273	-0.114	0.069	0.517	3.56	1.05	-0.48	-0.20
Gender discrimination is a major contemporary problem.		**0.647**	0.119	-0.263	0.155	0.526	3.72	1.07	-0.67	-0.18
Improving access to higher education for racial and ethnic minorities is important to compensate for the historical legacy of discrimination.		**0.610**	0.210	-0.153	-0.046	0.442	3.77	1.09	-0.72	-0.24
Racial discrimination is a major contemporary problem.		**0.579**	0.164	-0.253	0.071	0.432	4.00	0.99	-1.08	0.82
Too much attention on diversity can divide the campus community.	X	**-0.554**	0.222	-0.062	0.007	0.360	3.33	1.09	-0.18	-0.75
Diversity is relevant to the future professional lives of my students.		**0.533**	0.292	0.033	-0.036	0.372	4.22	0.73	-0.92	1.73
Efforts should be made to ensure my university is welcoming of people from all backgrounds.		**0.510**	0.021	-0.022	0.179	0.293	4.58	0.65	-2.15	7.64
Regardless of students' background characteristics, everyone in the U.S. should have an equal opportunity to attend college.		**0.492**	-0.059	0.004	0.005	0.246	4.31	0.93	-1.41	1.58
Female faculty members are given preferential treatment at my university.	X	**-0.477**	0.233	-0.062	0.034	0.286	3.86	0.92	-0.73	0.45
Racial and ethnic minority faculty members are given preferential treatment at my university.	X	**-0.436**	0.022	-0.254	-0.020	0.255	3.55	1.00	-0.39	-0.37
I am sensitive to the existence of institutionalized racism.		**0.409**	0.287	-0.230	0.045	0.304	3.81	0.84	-0.79	1.01
It is important that female faculty members serve as leaders in my university and field.		**0.365**	0.203	0.073	0.284	0.261	4.10	0.77	-0.58	-0.04
The university's goal to achieve greater diversity on this campus is a responsibility shared equally by all faculty members.		**0.357**	0.122	0.025	0.095	0.152	3.61	1.16	-0.45	-0.80
I get frustrated when I cannot understand what non-native English speakers are saying.	X	**-0.331**	0.105	0.057	0.066	0.128	3.53	1.09	-0.36	-0.88

Note. R.S. = Items marked with an "X" were reverse-scored before scale scores were calculated.
Com. = Communality, Sk. = skewness, Ku. = kurtosis.

Table 2

Factor Loadings, Communalities, and Descriptive Statistics for Items on the Career Scale

Item	R.S.	Factor Loadings				Com.	Descriptive Statistics			
		A	C	E	S		M	SD	Sk.	Ku.
Racial and ethnic diversity is represented in the curriculum of my courses.		0.174	**0.838**	0.046	0.001	0.735	3.44	1.20	-0.48	-0.64
There are frequent discussions about diversity in the classes I teach.		0.213	**0.792**	-0.112	-0.043	0.688	2.89	1.30	0.08	-1.13
I strive to expand students' knowledge of racial and ethnic minority groups.		0.269	**0.763**	-0.022	-0.059	0.658	3.61	1.12	-0.40	-0.75
I explore questions related to gender in my research.		0.123	**0.730**	-0.130	0.111	0.578	2.94	1.35	0.01	-1.24
I explore questions related to race and ethnicity in my research.		0.177	**0.709**	-0.200	0.188	0.610	2.89	1.40	0.09	-1.28
Women are represented in the curriculum of my courses.		0.075	**0.688**	0.051	0.190	0.518	3.81	1.01	-0.77	0.15
Diversity is irrelevant to my research interests.	X	0.228	**-0.684**	-0.139	0.122	0.555	3.41	1.31	-0.35	-1.04
Diversity is a central component of my research agenda.		0.269	**0.682**	-0.230	0.214	0.636	2.64	1.30	0.45	-0.91
Issues of diversity are unrelated to the content of my courses.	X	0.253	**-0.633**	-0.053	-0.054	0.470	3.41	1.33	-0.43	-1.07
I regularly participate in professional development activities related to diversity on campus.		0.196	**0.544**	-0.198	0.178	0.405	2.50	1.02	0.49	-0.37
I am familiar with resources to assist in revising my curriculum so it is more inclusive of diverse perspectives.		0.129	**0.543**	-0.094	0.077	0.327	3.05	1.13	0.10	-0.86
My faculty colleagues routinely consider issues of race, ethnicity, and gender in their work.		0.162	**0.490**	0.295	-0.100	0.364	3.01	1.14	0.00	-0.88
Accrediting bodies in my field state that diversity is a priority.		0.182	**0.472**	0.180	0.148	0.310	3.65	0.92	-0.43	0.24
Increasing the participation of people from diverse backgrounds is a priority in my field.		0.266	**0.469**	0.197	0.155	0.353	3.66	0.95	-0.48	-0.17
I serve on committees that promote racial and ethnic diversity at my university.		0.099	**0.433**	-0.049	0.186	0.234	2.75	1.15	0.34	-0.87
Funding agencies in my field support research related to diversity.		-0.024	**0.338**	0.179	0.056	0.150	3.38	1.04	-0.50	-0.19

Note. R.S. = Items marked with an "X" were reverse-scored before scale scores were calculated.
Com. = Communality, Sk. = skewness, Ku. = kurtosis.

Table 3

Factor Loadings, Communalities, and Descriptive Statistics for Items on the Environmental Scale

Item	R.S.	Factor Loadings				Com.	Descriptive Statistics			
		A	C	E	S		M	SD	Sk.	Ku.
My university sets a high priority on diversity.		-0.030	-0.011	**-0.784**	0.098	0.625	3.40	0.88	-0.36	-0.04
My university supports the professional needs of racial and ethnic minority faculty members.		-0.123	0.019	**-0.775**	0.032	0.618	3.27	0.84	-0.20	-0.11
Faculty members of different races and ethnicities are treated unfairly at my university.	X	-0.263	-0.124	**0.723**	0.067	0.612	3.57	0.92	-0.53	0.47
My faculty peers are receptive to diversity issues.		0.019	0.153	**-0.714**	-0.193	0.571	3.60	0.96	-0.85	0.51
There is a lot of rhetoric about diversity at my university, but not enough action.	X	-0.279	-0.168	**0.668**	-0.061	0.557	2.74	1.02	-0.03	-0.71
Faculty members from other countries are treated unfairly at my university.	X	-0.124	-0.181	**0.653**	0.022	0.474	3.57	0.89	-0.43	0.27
My faculty colleagues are ambivalent about the importance of diversity.	X	-0.070	0.116	**0.650**	-0.156	0.464	3.21	1.06	-0.31	-0.70
My university supports the professional needs of faculty members from other countries.		0.060	-0.106	**-0.631**	0.076	0.419	3.29	0.77	-0.07	0.64
My university upholds respect for the expression of diverse perspectives.		0.081	0.042	**-0.626**	0.007	0.400	3.76	0.82	-0.96	1.50
There is a great deal of racial tension on this campus.	X	-0.129	-0.279	**0.623**	-0.037	0.485	3.80	0.85	-0.72	1.00
My university supports the professional needs of female faculty members.		-0.247	-0.094	**-0.615**	0.005	0.448	3.30	1.01	-0.47	-0.34
Faculty members in my department support the use of strategic hiring to promote diversity.		0.111	0.287	**-0.594**	-0.165	0.474	3.38	1.03	-0.49	-0.32
Female faculty members are treated unfairly at my university.	X	-0.219	-0.131	**0.552**	0.004	0.370	3.44	0.98	-0.41	-0.08
Committees to address diversity issues exist, but they get very little done.	X	0.019	0.136	**0.359**	-0.196	0.186	2.78	0.89	-0.19	-0.01

Note. R.S. = Items marked with an "X" were reverse-scored before scale scores were calculated.
Com. = Communality, Sk. = skewness, Ku. = kurtosis.

Table 4

Factor Loadings, Communalities, and Descriptive Statistics for Items on the Social Scale

Item	Factor Loadings				Com.	Descriptive Statistics			
	A	C	E	S		M	SD	Sk.	Ku.
Mentoring female students in research is an important part of my work.	0.133	0.121	-0.063	**0.796**	0.669	3.89	1.05	-0.70	-0.28
Mentoring racial or ethnic minority students in research is an important part of my work.	0.142	0.229	-0.128	**0.760**	0.666	3.54	1.15	-0.38	-0.75
Mentoring international students in research is an important part of my work.	0.066	-0.009	0.016	**0.754**	0.573	3.62	1.15	-0.47	-0.70
I assist in the recruitment of prospective female students to my academic program.	0.046	0.177	0.002	**0.711**	0.539	3.69	1.12	-0.74	-0.16
I assist in the recruitment of prospective students from racial and ethnic minority backgrounds to my academic program.	0.087	0.170	-0.049	**0.647**	0.458	3.58	1.18	-0.60	-0.58
I collaborate on research with people who are a different race or ethnicity than I am.	0.142	0.121	-0.052	**0.530**	0.319	3.69	1.18	-0.77	-0.29

Com. = Communality, Sk. = skewness, Ku. = kurtosis.

Table 5
Scale Descriptive Statistics (N=235)

Scale	Sample Item	N of Items	M	SD	Sk.	Ku.	α
Attitude towards diversity	Hiring a more diverse faculty should be a priority at my university.	24	3.98	0.59	-0.72	0.62	0.94
Career activities related to diversity	Racial and ethnic diversity is represented in the curriculum of my courses.	16	3.20	0.78	-0.05	-0.61	0.91
Environment of diversity	My university sets a high priority on diversity.	14	3.37	0.59	-0.59	1.21	0.89
Social interaction with diverse groups	Mentoring female students in research is an important part of my work.	6	3.66	0.83	-0.39	-0.25	0.82

Table 6
Correlations among Scales (N=220)

	Attitude	Career	Environment	Social
Attitude	1.00			
Career	0.50*	1.00		
Environment	-0.26*	-0.12	1.00	
Social	0.28*	0.33*	-0.14	1.00

* $p \leq .01$.

categories focused on relationship building). Given these resulting components, we refer to the instrument as ACES. Tables 1–4 contain factor loadings, communalities after rotation, and descriptive statistics for every item on the Attitude, Career, Environment, and Social scales, respectively.

Those holding a positive Attitude towards diversity goals tended to be female, untenured, and at their institution for less than 15 years.

Descriptive statistics for each of the four scales, including an example item, number of items, mean across scale items, SD, skewness, kurtosis, and internal reliability estimates (coefficient alpha) are contained in Table 5. Table 6 presents a pattern of moderate to low correlations among the four scales.

Construct Validity Analysis

A series of statistical analyses were conducted to explore whether scores on any scale were related to particular demographic characteristics of faculty. Descriptive statistics, obtained values and effect sizes are shown for the statistically significant analyses in Table 7. All results significant at the 0.05 level are shown, but due to the large number of statistical significance tests conducted, only those analyses with p-values less than or equal to 0.001 should be considered. It should be further noted that some of these factors may represent overlapping sources of variability (that is, the results of some significance tests may be confounded with others). Effect sizes are reported and interpreted using Cohen's d and eta-squared (e.g., Keppel & Wickens, 2004). Levene's Test for Homogeneity of Variance was conducted for all analyses and the assumption of equal variance was upheld.

A number of readily-interpretable findings resulted from these analyses. Those holding a positive Attitude towards diversity goals tended to be female, untenured, and at their institution for less than 15 years. Respondents who believed their teaching or research activities reflected issues of diversity (Career scale) were more likely to be female, new to their university, and specializing in the humanities, not in the sciences. Statements that their institution promoted diversity (Environment scale) were more likely to be endorsed

Table 7
Group Comparisons by Demographic Variables

	N	Attitude		Career		Environment		Social	
Faculty		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Female	109	4.20	0.47	3.51	0.71	3.19	0.60		
Male	120	3.79	0.61	2.95	0.74	3.52	0.53		
t		5.62***		5.77***		-4.46***			
d		0.74		0.75		-0.58			
Non-white	50					3.14	0.76		
White	185					3.43	0.52		
t						-2.50*			
d						-0.40			
Tenured	158	3.93	0.61			3.45	0.53		
Not Tenured	66	4.12	0.51			3.18	0.69		
t		2.24*				2.85**			
d		0.33				0.42			
Full	85					3.49	0.51		
Associate	86					3.38	0.55		
Assistant	58					3.14	0.69		
F						4.24**			
h^2						0.05			
0-5 Years at this University	72	4.10	0.52	3.38	0.76	3.25	0.68		
6-10 Years	39	4.18	0.49	3.29	0.81	3.28	0.63		
11-15 Years	26	4.06	0.51	3.18	0.72	3.34	0.49		
More than 15 Years	92	3.81	0.62	3.02	0.76	3.50	0.49		
F		5.79***		3.18*		2.88*			
h^2		0.07		0.04		0.04			
0-5 Years in Higher Education Overall	41					3.31	0.62		
6-10 Years	46					3.16	0.63		
11-15 Years	24					3.23	0.58		
More than 15 Years	121					3.49	0.53		
F						4.46**			
h^2						0.06			
Sciences	55			2.53	0.63			3.96	0.76
Social Sciences	44			3.40	0.63			3.65	0.72
Humanities	56			3.62	0.67			3.77	0.84
Professional Schools	55			3.30	0.73			3.43	0.82
F				27.65***				4.68**	
h^2				0.29				0.06	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.
Note. The effect size of Cohen's *d* is typically interpreted as: .2, small, .5, medium, .8, large (Keppel & Wickens, 2004). The effect size of eta-squared (η^2) is typically interpreted as: .01, small, .06, medium, .14, large. The *tenured-not tenured* comparison included only faculty in a tenure-track. The comparison by discipline defined disciplines in this way: *Sciences* included engineering, pharmacy and the natural sciences; *Humanities* included Fine Arts; *Professional Schools* included architecture, business, education, social welfare, journalism and law. A second analysis which did not include architecture, journalism or law in the analysis found similar results.

Statements that their institution promoted diversity (Environment scale) were more likely to be endorsed by males, white faculty and staff, tenured faculty, veteran faculty, and those who had spent more time in higher education overall.

by males, white faculty and staff, tenured faculty, veteran faculty, and those who had spent more time in higher education overall. Those who reported that they interacted with diverse populations as part of their working activities (Social scale) were most likely to be in the sciences and least likely to be in a professional school. In addition to the comparisons shown, we compared faculty born in the United States with faculty born outside the United States, and we compared administrators with non-administrators. In both analyses we found no statistically significant differences.

Table 8 provides comparisons between faculty who taught courses or published research on issues of diversity and those who did not. As would be expected, those who taught or conducted research in areas relevant to diversity issues scored higher on the Career scale than those who did not. They also tended to have more positive attitudes toward institutional diversity goals (Attitude scale). They also scored highly on the Social scale. Additionally, those who had not written about or conducted research in areas of race, ethnicity or gender were less likely to believe that their institution promoted diversity (Environment scale).

Discussion

The central objective of this study was to create a valid and reliable instrument with which to assess faculty support of diversity goals in higher education. In the process of development, we investigated preliminary findings and formulated key questions of interest that warrant further consideration. The instrument presented here is relevant to future research and policy considerations of diversity in higher education as well.

Most existing instruments of institutional diversity focus on attitudes or perceptions of campus climate (see AACU, 2005; Shenkle et al., 1998; Smith et al., 1994). The scales that

Table 8
Group Comparisons by Teaching and Research Experience

		Attitude		Career		Environment		Social	
Faculty	N	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Taught course on global issues	72			3.55	0.71			3.88	0.78
Has not	161			3.03	0.74			3.58	0.82
t				4.99***				2.64**	
d				0.71				0.37	
Taught course on racial/ethnic issues	58	4.20	0.62	3.96	0.47			4.02	0.66
Has not	171	3.90	0.55	2.93	0.68			3.55	0.84
t		3.48***		10.74***				3.98***	
d		0.54		1.65				0.61	
Taught course on women/gender issues	50	4.26	0.61	4.01	0.54			4.08	0.73
Has not	180	3.91	0.55	2.97	0.68			3.55	0.82
t		3.84***		10.23***				4.15***	
d		0.61		1.64				0.66	
Researched global issues	85	4.08	0.61	3.50	0.71				
Has not	145	3.92	0.56	3.01	0.75				
t		2.03*		5.01***					
d		0.28		0.69					
Researched racial/ethnic issues	80	4.19	0.57	3.81	0.60	3.22	0.69	3.86	0.80
Has not	152	3.88	0.56	2.89	0.67	3.43	0.51	3.56	0.83
t		4.03***		10.25***		-2.42*		2.70**	
d		0.55		1.42		-0.36		0.37	
Researched women/gender issues	74	4.23	0.55	3.79	0.66	3.24	0.68	3.90	0.84
Has not	156	3.86	0.56	2.92	0.67	3.41	0.52	3.55	0.81
t		4.72***		9.16***		-2.12*		3.02**	
d		0.67		1.29		-0.30		0.43	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.
Note. The effect size of Cohen's *d* is typically interpreted as: .2, small, .5, medium, .8, large (Keppel & Wickens, 2004).

most closely resemble these two areas of interest are the Attitudes component, which measures general views about racial/ethnic and gender diversity, and the Environment component, which assesses faculty perceptions of how well the institution is doing relative to its diversity goals. The ACES, however, includes two other important dimensions to the consideration of faculty views on diversity – namely a Social component measuring interaction with people different from oneself and a Career component related to faculty efforts in teaching, research, and service. By having four separate components, the present instrument allows for institutions and researchers to look not only at broad aspects of faculty attitudes and perceptions of their diversity environment but also at the more nuanced and essential translation of these perspectives into action.

By having four separate components, the present instrument allows for institutions and researchers to look not only at broad aspects of faculty attitudes and perceptions of their diversity environment but also at the more nuanced and essential translation of these perspectives into action.

While we initially sought to produce an instrument that could be adjusted to reflect the varied teaching, research, and service loads of faculty at different institutional types, the data collected in this study indicate that participant responses to questions about teaching, research, and service coalesce together. In other words, at least in the context of the single university from which we collected data, faculty members' engagement in research about diversity was highly correlated with the likelihood that they taught or performed service related to diversity as well. Rather than creating separate scales for each component of faculty work, we developed a single Career scale instead. This initial finding has interesting implications for thinking about how faculty can and do shape institutional diversity climates by integrating the primary aspects of their work.

Our results suggest that faculty demographics are also important to consider when assessing diversity. It is important not to conceive of the faculty body as one monolithic group (Somers et al., 1998). For example, we found that women, people of color, newer faculty, and not yet tenured faculty were more likely to have positive attitudes about the importance of diversity (Attitude scale), be engaged in diversity related work (Career scale), and be more critical of their institution's existing diversity climate (Environment scale) than their male, white, and more senior counterparts. These patterns are consistent with other studies comparing the views of racial minority and majority students (D'Augelli & Hershberger,

1993; Hurtado, 1992) as well as faculty perspectives across race, ethnicity, and gender in higher education (Conley & Hyer, 1999; Kossek & Zonia, 1993). Notably, however, faculty who researched and taught about diversity issues—regardless of their individual demographic characteristics—were more likely to have positive attitudes about diversity and positive social interactions with people different from themselves than their peers who were not engaged in such work. And similarly, faculty who researched issues of gender or race and ethnicity were more likely to have critical views about the campus commitment to diversity irrespective of their own demographic backgrounds. This is a new finding and deserves future exploration.

Given the varied scholarly pursuits of faculty across the university, one might also expect disciplinary differences with regard to diversity. Indeed, we found that faculty in the sciences were the least likely to engage in research and teaching about diversity (Career scale) but the most likely to have social interactions with people who are different from themselves (Social scale). These findings make sense considering the nature of science and what is studied on the one hand, and the internationalization of the faculty and graduate students in many science fields on the other. As recent publications have documented, international faculty constitute nearly one third of all new faculty hires in math, science, and engineering fields (Institute for International Education, 2006; Nelson & Rogers, 2005), and they are disproportionately found at research universities (National Science Board, 2003). This study shows that faculty attitudes, perceptions, and behaviors vary by characteristics such as demographics and academic discipline. Thus, future uses of the ACES instrument should be accompanied with information that captures these important differences among respondents.

Limitations

This study is based upon data gathered from faculty at just one research university in the United States with about a 25% response rate and a limited sample size. The representativeness of the results for this particular institution is not known, nor is it known how well results generalize to other colleges and universities. Administering the ACES to a wider array of institutions would help determine if variables such as control (public/private), size, selectivity, resources, geographic region, or even composition of the institution (in terms of representation of diverse students and/or faculty) lead to different results. Also unknown is the generalizability of the psychometric characteristics of the instrument for other populations. It would be useful to administer the instrument to faculty at other comparable universities and further establish evidence of its validity and reliability across institutions. A cross-validation study using confirmatory factor analysis would be valuable to judge the stability of the factor analytic solution to other institutions. Gathering data from other populations would explore whether the ACES scales are suitable in their current form or need modification for different institutional contexts.

An important distinction between these narrow and broader forms of diversity is the extent to which an institution's policies go beyond simply ensuring fair treatment of all but are affirmative in their efforts to expressly recruit, represent, and support these types of diversity.

A second study limitation affects our conclusion that ACES is valid and reliable. While the evidence we collected is supportive of validity and reliability, there exists a broad range of strategies for estimating the reliability of a measure and for developing a validity argument. Our reliability conclusion is based on a coefficient alpha analysis of the internal reliability of our subscales. Other aspects of reliability, such as test-retest (stability across time), were not examined in this study. Our belief that the ACES scores are a valid indicator of attitude or support for institutional diversity goals is based on an initial decision to match items to a theoretical framework, the ease of interpretation of clean factor analysis results, and predictable relationships between ACES scores and demographic (and other descriptive) variables. This study produced only limited or no evidence from other accepted validity sources, such as correlations with other measures of attitude toward diversity or diversity goals, evidence of how the construct measured by these scales is distinct from similar constructs, or how items might be tied to aspects of diversity support which would be identified by a more formal concept analysis.

A third limitation of this study is the relatively narrow definition of diversity we chose. An instrument more inclusive of diversity classifications beyond race, ethnicity, national origin and gender, such as religion, disability, and sexual orientation, for example, might lead to different conclusions. An important distinction between these narrow and broader forms of diversity is the extent to which an institution's policies go beyond simply ensuring fair treatment of all but are affirmative in their efforts to expressly recruit, represent, and support

these types of diversity. If different forms of diversity are in fact treated differently, then there are practical and ethical questions that must be addressed. Future studies using a revised ACES instrument could help determine whether these additional forms of diversity fit well into the existing format, or whether they generate new scales and categories. And, the results of such studies should be accompanied by institutional reflection and discussion about what it means to value diversity in its many manifestations.

Conclusions

There are many benefits to having a valid and reliable instrument for the assessment of faculty support for diversity. Institutions can establish baselines for themselves over time and compare these measures against the effects of diversity related initiatives before and after their implementation. The use of such an instrument can also standardize measures across different institutions so that more meaningful comparisons, collaborations, and modeling might be fostered than previously possible. Utilization by researchers could include determining how the ACES scales are linked to important outcome variables like faculty performance (research productivity or teaching ratings, for example) and faculty satisfaction. Further, by pairing the ACES instrument with other institutional data, one could determine the extent to which faculty views about diversity and institutional climate are linked to student outcomes at the institution such as retention, engagement, or overall satisfaction. This linkage of faculty support for institutional diversity goals to core institutional outcomes would make an important addition to the research literature.

The ability of a university to realize its diversity goals depends significantly upon those individuals who carry out its mission. Thus, it is important to understand how faculty who work in higher education share their institution's stated commitment to diversity and consider how these varied beliefs might be expressed in particular aspects of faculty work. While institutions often develop surveys internally to assess such issues, a review of existing instruments underscores a problematic lack of attention to developing evidence for the validity and reliability of the instruments themselves. Our study addresses the need for such an instrument so that future studies of diversity might be conducted in a more disciplined manner of inquiry.

References

Association of American Colleges and Universities. (2005). *Campus diversity initiative evaluation project resource kit*. Retrieved from www.aacu.org/irvinediveval

Austin, A. (1990). Faculty cultures, faculty values. *New Directions for Institutional Research, 84*, 47-64.

Austin, A. (1994). Understanding and assessing faculty cultures and climates. *New Directions for Institutional Research, 68*, 61-74.

Baird, L. (1990). Campus climate: Using surveys for policy making and understanding. *New Directions for Institutional Research, 68*, 35-45.

Bartlett, M. S. (1954). A note on multiplying factors for various chi-squared approximations. *Journal of the Royal Statistical Society, Series B, 16*, 296-298.

Bensimon, E.M. (2004). The diversity scorecard: A learning approach to institutional change. *Change, 36*(1), 44-52.

Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research, 1*(2), 245-276.

Clark, B. (1987). *The academic life: Small worlds, different worlds*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Conley, V. M., & Hyer, P. B. (1999). *A faculty assessment of the campus climate for diversity*. Annual Meeting of the Association for the Study of Higher Education, San Antonio, TX.

D'Augelli, A.R., & Hershberger, S.L. (1993). African American undergraduates on a predominantly white campus: Academic factors, social networks, and campus climate. *Journal of Negro Education, 62*(1), 67-81.

Edelman, L.B., Fuller, S.R., & Mara-Drita, I. (2001). Diversity rhetoric and the managerialization of law. American *Journal of Sociology, 106*(6), 1589-1641.

Hurtado, S. (1992). The campus racial climate: Contexts of conflict. *Journal of Higher Education, 63*(5), 539-569.

Institute for International Education. (2006). *Open doors: Report on international educational exchange*. Washington D.C. Bureau of Educational and Cultural Affairs of the U.S. Department of State.

Kaiser, H.F. (1974). An index of factorial simplicity. *Pschometrika, 39*, 31-36.

Keppel, G., & Wickens, T.D. (2004). *Design and analysis: A researcher's handbook (4th ed.)*. Upper Saddle River, NJ: Prentice Hall.

Kossek, E.E., & Zonia, S.C. (1993). Assessing diversity climate: A field study of reactions to employer efforts to promote diversity. *Journal of Organizational Behavior, 14*(1), 61-81.

McGowan, M.O. (1996). Diversity of what? *Representations, 55*, 129-138.

Moses, M.S., & Chang, M.J. (2006). Toward a deeper understanding of the diversity rationale. *Educational Researcher, 35*, 1, 6-11.

National Science Board. (2003). *The science and engineering workforce: Realizing America's potential*. Washington, DC: National Science Foundation.

Nelson, D. J., & Rogers, D.C. (2005). *A national analysis of diversity in science and engineering faculties at research universities*. Norman, OK: University of Oklahoma.

Pohan, C.A., & Aguilar, T.E. (2001). Measuring educators' beliefs about diversity in personal and professional contexts. *American Educational Research Journal, 38*(1), 159-182.

Shenkle, C.W., Snyder, R.S., & Bauer, K. (1998). Measures of campus climate. *New Directions for Institutional Research, 98*, 81-99.

Smith, D. G. (2009). *Diversity's promise for higher education: Making it work*. Baltimore, MD: Johns Hopkins University Press.

Smith, D.G., Wolf-Wendel, L.E., & Levitan, T. (1994). Studying diversity in higher education. *New Directions for Institutional Research, 81*.

Somers, P., Cofer, J., Austin, J., Inman, D., Martin, T., Rook, S., Stokes, T., & Wilkinson, L. (1998). Faculty and staff: The weather radar of campus climate. *New Directions for Institutional Research, 98*, 35-52.

Terenzini, P.T., Cabrera, A.F., Colbeck, C.L., Bjorklund, S.A., & Parente, J.M. (2001). Racial and ethnic diversity in the classroom: Does it promote student learning? *The Journal of Higher Education, 72*(5), 509-531.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.