A Culture Conducive to Women's Academic Success: Development of a Measure

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Abstract

Purpose—The culture of the work environment inhibits women's career success in academic medicine. The lack of clarity and consistency in the definition, measurement, and analysis of culture constrains current research on the topic. The authors addressed this gap by defining the construct of a culture conducive to women's academic success (CCWAS) and creating a measure (i.e., tool) to evaluate it.

Method—First, the authors conducted a review of published literature, held focus groups, and consulted with subject matter experts to develop a measure of academic workplace culture for women. Then they developed and pilot-tested the measure with a convenience sample of women assistant professors. After refining the measure, they administered it, along with additional scales for validation, to 133 women assistant professors at the University of Pennsylvania. Finally, they conducted statistical analyses to explore the measure's nature and validity.

Results—A CCWAS consists of four distinct, but related dimensions: equal access, work-life balance, freedom from gender biases, and supportive leadership. The authors found evidence that women *within* departments/divisions agree on the supportiveness of their units but that substantial differences *among* units exist. The analyses provided strong evidence for the reliability and validity of their measure.

Conclusions—This report contributes to a growing understanding of women's academic medicine careers and provides a measure that researchers can utilize to assess the supportiveness of the culture for women assistant professors and that leaders can use to evaluate the effectiveness of interventions designed to increase the supportiveness of the environment for women faculty.

Much scholarly literature, spanning decades, has documented the fact that women in academic medicine are not reaching the same levels of career advancement, leadership responsibility, and compensation as their male counterparts.[1–8] In the ground-breaking report from the National Academies, *Beyond Biases and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*, the authors note that "the problem is not old-style, overt sex discrimination, but rather unrecognized features of the organizational culture that affect men and women differently."[9(pp 199)] In order to address these cultural issues, two key recommendations are to use research (1) to deepen the academic medicine community's understanding of the culture of the work environment and (2) to identify those salient cultural aspects that impact women's careers.

Many academic medicine researchers have attempted to assess the culture with respect to women's career success.[10–13] Yet, a lack of clarity and consistency in the definition, measurement, and analysis of culture has limited the research conducted to date. This inconsistency limits the community's ability both to draw meaningful conclusions across studies and to develop and implement evidence-based solutions. Therefore, the work reported herein fills a critical gap in the literature both by providing a conceptually and empirically sound assessment of the culture women experience in academic medicine and by examining how the culture impacts their career success. In this report, we define the construct of a culture conducive to women's career success in academic medicine, describe the process of creating a measure (or tool or survey instrument) to evaluate that culture, and discuss the validation results. We conclude with recommendations for assessing culture in future research and practice.

Culture Conducive to Women's Academic Success

To investigate the influence of work environment on the experiences of women faculty is to ask an inherently complex, multilevel question. Culture can be defined as "the normative beliefs and shared behavioral expectations in an organizational unit."[14] Using a multilevel framework, culture is considered a higher-order (i.e., aggregate) property of a unit, rather than a lower-level (i.e., individual) phenomenon. Therefore, researchers who investigate organizational culture must first specify the organizational unit of interest. Then, they should align the definition, measurement, and analysis of culture with this unit. For example, in the current study, the department/division is the unit of interest. Therefore, it was necessary to define, measure, and analyze culture at this level (in contrast to assessing individual satisfaction with the culture or the culture of the medical school at large). To do so, we

employ a "referent shift" which enables participants to describe their perceptions of the unit, rather than their own unique individual experiences.[15] Further, when aggregating participant perceptions to describe the culture of a unit, evidence of agreement among respondents is necessary.

Our review of the academic medicine literature suggests that the department/division level is the appropriate unit of analysis for understanding the impact of culture on women's career success. Departments/divisions have unique norms, policies, leadership, and resources that create a daily workplace culture which affects each faculty member's work. The authors of a recent Analysis in Brief analyzed actual retention rates, intent-to-leave rates, and job satisfaction from clinical faculty at 23 U.S. medical schools and found that the results varied significantly by department.[16] Further, the differences between departments with the lowest and highest intentions of turnover resulted primarily from differences in job satisfaction and in the perceived ability to provide high-quality patient care.[16] Other researchers have cited departmental leadership as a predictor of faculty satisfaction and as an important element in determining the perceived supportiveness of the local climate for women assistant professors.[17,18] In addition, the obstacles to satisfaction and retention that women report are often the same factors that are controlled at the department/division level: salary, space/ resources, access to administrative staff, and use of start-up funds.[13] In the current study, we focused on the departmental unit of analysis except in those cases where the department was so large (i.e., several hundred faculty), that the division-level culture was more likely to impact women's careers. Further, while we believe that the broader culture of the university or school of medicine affects women's careers, this effect is more distal and likely to be filtered through the lens of the department/division culture.

We use the phrase culture conducive to women's academic success (CCWAS) to refer to the shared beliefs and expectations that contribute to the ability of women faculty to be successful in their careers. The measure described in this study derives from a thorough investigation into the aspects of the work environment, which research has shown to be associated with the career success of women in academic medicine. The next section describes how we determined the relevant facets of work culture and developed a measure based on those findings.

Method

Overview

In 2009, we took several steps toward developing and validating our measure. After receiving ethical approval for this project by the University of Pennsylvania Institutional Review Board, we conducted a review of the literature, held focus groups, and consulted with subject matter experts in order to develop items for our measure. Using these findings, we then developed and pilot-tested the measure with a convenience sample of women assistant professors. After refining the measure based on the results of our pilot-testing, in 2010 we administered the measure to women assistant professors at the University of Pennsylvania, along with demographic questions and additional scales for validation. Using these findings, we conducted several statistical analyses to explore the nature and validity of the measure.

Context

We have conducted this research as part of a larger National Institutes of Health (NIH) funded cluster-randomized controlled trial. The goal of the NIH trial is to evaluate whether a multi-leveled intervention improves the supportiveness of the culture and, ultimately, the success of women assistant professors in the school of medicine in intervention departments/

divisions relative to control departments/divisions. The data described herein emanate from the 2010 collection of baseline data that occurred prior to randomization and interventions.

Measure development

In 2009 we took multiple steps to develop a measure to evaluate the CCWAS construct. The first step was to identify aspects of the work environment critical to women's career success through a literature review. We adopted a cross-disciplinary approach to ensure that our review included scholarly work from several fields including academic medicine, psychology, and organizational behavior. We initiated our literature in September 2009 using a search in Google Scholar because of its capacity to search for articles across multiple academic disciplines. We utilized several key words including *women*, *career*, *culture*, *climate*, *academic medicine*, *academia*, *work-life*, *work-family*, *gender, bias*, and *support*. In addition to this broad search, we also conducted targeted searches within relevant journals (i.e., *Academic Medicine*, *Journal of Women's Health*, *Journal of Vocational Behavior*). In an effort to be thorough, we contacted leading experts for full copies of the surveys or measures they had used that focus on the academic work environment for women, and we queried women's career experts, asking them to identify any additional relevant publications.

We supplemented the findings from our literature review[10,13,19–57] with qualitative data collected at a peer academic medicine school. A tenured female professor from that institution sent an e-mail to women assistant professors inviting them to volunteer for the focus groups. A member of our research team (L.W.T.) conducted two focus groups, each consisting of six women assistant professors. The purpose of the focus groups was to identify additional aspects of the work environment critical for the support of women's careers. We developed broad, open-ended questions to encourage the participants to raise any issues that they felt affected their careers (rather than constraining participants to those cultural factors we identified in our literature review). A sample question is "In what ways do you think that your work environment helps or hurts the ability of women to be successful in academic medicine?" The focus group facilitator asked these open-ended questions and allowed all participants to share their opinions before moving onto the next question. The focus group sessions were recorded and transcribed. Several members of our research team (L.W.T., A.F.W., SA, J.A.G., P.S.) individually reviewed the focus group transcripts to identify factors affecting women's academic career success that either overlapped with or were in addition to those found through our literature review.

Finally, we gathered feedback from content experts knowledgeable in academic medicine, women's careers, and organizational psychology. We (the research team) identified the content experts and asked them via e-mail to provide insight into the facets of organizational culture that influence women's career success in academic medicine.

Through our literature review[10,13,19–57], focus groups, and expert feedback, we identified an extensive list of issues, themes, and potential items for our measure.

The second step involved developing a list of questionnaire items, which comprised items from existing surveys as well as newly created items reflecting the results of the literature review[10,13,19–57], focus groups, and content-expert input. Items on the pilot survey covered the extent to which women had equal access to resources and opportunities, the extent to which women were included in formal and informal activities, the extent to which women received support in their effort to achieve work-family balance, and the extent to which women experienced either overt or subtle gender biases.

Then, we pilot-tested the items with a convenience sample of women faculty members from academic health centers across the United States. We recruited these volunteers all—women assistant professors—via e-mail using a snowball sampling strategy. Eighteen faculty contacts (associate and full professors) from 15 MD-granting medical schools across the United States each forwarded a link to a Web-based pilot survey to approximately 5 women assistant professors at their institution. The women assistant professor participants completed the questionnaire online. Each section of the survey ended with an item asking respondents to comment on that section's questions, specifically to suggest changes or note any concerns.

We examined the properties of the items in our measure (means and standard deviations) and the relationships among items (item-total correlations, Cronbach's alpha, exploratory factor analysis). Based on the findings from these analyses, we eliminated, merged, and re-worded items.

Measure implementation

In our main study, we invited 134 women from 27 units at the Perelman School of Medicine at the University of Pennsylvania to complete the final 46-item measure. Note that we used some respondents' division, rather than department, for the unit of analysis. Two departments, Medicine and Pediatrics, had over 300 faculty each; in contrast, the other departments had an average number of 46 faculty (ranging from 4 to 130). Based on our discussions with academic-medicine and career-development experts and women assistant professors, we posited that the divisions were the most important organizational level for the faculty in those two very large departments. Therefore, we replaced the term "department" with the term "division," and the term "chair" with the term "chief," as appropriate. For the purpose of exploring the validity of our measure evaluating culture (described in the Analysis section), we also utilized several additional measures from our larger assessment battery.

Validity measures

Department/division satisfaction—We used a single item to assess global satisfaction with Department/Division.[58] This item reads, "I am satisfied with my Department [Division]." We scored responses for this item on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree).

Department/division commitment—To assess affective commitment to the Department/Division, we adapted two items from the Allen & Meyer [59] affective commitment scale. A sample item reads, "I do not feel like part of the family in this Department [Division]." We scored responses on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). We reverse-coded these items so that higher scores indicate greater commitment.

Work-family conflict—We used four subscales from the Carlson, Kacmar, and Williams[60] multidimensional work-family conflict measure to assess work-family conflict. The four dimensions reflected two directions of conflict (work-interference-with-family and family-interference-with-work) and two types of conflict (time-based and strain-based). Time-based conflict occurs when the time demands of one role interfere with effective participation in the other role; strain-based conflict occurs when the stress or strain from one role inhibits effective participation in the other role. We assessed each of the four subscales with three items, and we scored all twelve items on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). Prior research has indicated that the four scales we selected are reliable and valid measures of facets of work-family conflict.[60]

Statistical analysis

We conducted several analyses to understand and examine the results of the CCWAS measure that we administered to women assistant faculty at Perelman School of Medicine. We first conducted several tests within each of the four subscales to exam item and scale adequacy. We used exploratory factor analyses, with no a priori assumptions, to investigate the dimensionality of each subscale.[61] We employed scree plots, which give a visual representation of the scale dimensionality that results from the factor analyses, to provide further information. By convention, identifying the number of eigenvalues greater than 1.0 (i.e., the "elbow," where the eigenvalues stabilize) provides insight into the number of meaningful factors in a scale.[62] We also used Cronchbach's alpha, the most common test of internal consistency among items, to assess scale reliabilities.[63]

We then used confirmatory factor analysis in structural equation modeling to test a hierarchical model of CCWAS. Confirmatory factor analysis allows researchers to test the fit of their data to a specified factor structure.

To assess agreement on culture, we utilized analysis of variance (ANOVA), reliability within groups index and intraclass correlations. We used these tests to investigate whether—in regards to the nature of the culture—agreement occurs within each department/division and if differences occur among departments/divisions.

We utilized structural equation modeling with a chi-square difference test to evaluate whether the measure was equivalent when administered to departments/divisions.[64] Finally, we conducted several analyses to test criterion-related and convergent/divergent validity using generalized linear regression models which account for correlation among participants within each unit (departments/divisions). Variance estimates for the tests of association (regression coefficients) were adjusted for the clustering using a generalized estimating equations approach.[65]

Results

Measure development and pilot

Some of the broad topics we found through our literature review are gender bias and discrimination, leadership support, unequal distribution of resources, difficulty accessing mentoring, and challenges managing work and family.[10,13,19–57] Additional topics garnered from our focus groups include, for example, women's exclusion from informal social events, leadership expectations that work (as opposed to family) should always be the top priority, and concerns about the impact of taking time away from work on colleagues. Finally, all nine subject-experts we invited (100%) contributed information related to many of the issues described above, in addition to insights regarding promotion and tenure, compensation, and work overload. In the end we transformed these broad topics into 104 items for our pilot survey: 23 items regarding equal access, 15 items related to women's inclusion in formal and informal activities, 27 items about the support women receive in balancing work and family, and 39 items on gender biases (either overt or subtle).

Fifty-six women assistant professors completed the pilot version of the measure. Of these, 25 (44.6%) participants provided written feedback about the measure, which we used to revise and shorten it. In addition to their comments, we made revisions based on our analyses of their responses. Specifically, with regard to scale dimensionality, our analyses suggested that items related to support from chairs/chiefs was a distinct factor. Also, our findings suggested that women's equal access to support and resources was not empirically distinguishable from their inclusion in department/division activities. After revisions, the measure comprised 46 items and reflected four dimensions of support for women's careers:

equal access to opportunities, support for work-life balance, freedom from gender bias, and chair/chief support (see Appendix A).

Measure implementation

Participants—Of the 134 women assistant professors we invited to participate, 133 (99.3%) completed the survey. The respondents were from 27 units (departments/divisions), and were on average 40.92 years old (standard deviation 5.12). Table 1 provides further descriptive information regarding our sample.

Scale reliability—The Cronbach's alpha reliability of the two-item scale for department/division commitment was $\alpha = .87$. Cronbach's alpha reliability of the four sub-scales for work/family conflict were $\alpha = .69$ for time-based work-interference-with-family, $\alpha = .87$ for strain-based work-interference-with-family, $\alpha = .81$ for time-based family-interference-with-work, and $\alpha = .89$ for strain-based family-interference-with-work.

Exploratory factor analysis—In an exploratory factor analysis of the items reflecting "Equal Access to Opportunities," three factors emerged with eigenvalues greater than 1.0; however, the scree plot clearly indicates a strong first factor. Indeed, the first factor explained 47.55% of the variance. The Cronbach's alpha reliability of the 19-item "Equal Access to Opportunities" dimension was $\alpha = .94$, and deleting items would not have improved the reliability; therefore, we retained all 19 items. Eleven items assessed "Support for Work-life Balance." Again, although three factors were extracted with eigenvalues greater than 1.0, the scree plot and percentage of variance suggested a strong first factor. The reliability of the 11 items was $\alpha = .80$ and the deletion of items did not improve reliability. Therefore, we retained all items. Four items assessed "Freedom from Gender Bias." An exploratory factor analysis yielded a single factor. The reliability of the scale was $\alpha = .70$. Although this is considered adequate internal consistency, our analyses indicated that the removal of one item would increase the scale reliability to $\alpha = .78$. An examination of the content of this item indicated that it is distinct from the remaining three items. Therefore, we dropped this item from further analyses (and it is not included in Appendix A). The resulting section on "Freedom from Gender Bias" consists of 3 items. Finally, for "Chair/Chief Support," an exploratory factor analysis extracted two factors but the scree plot and percentage of variance indicated that a single factor solution was appropriate. The scale had a reliability of $\alpha = .92$ and the removal of items did not improve reliability. Therefore, we retained all items for Chair/Chief Support.

Confirmatory factor analysis

Based on our findings from the pilot study, we expected CCWAS to be a higher-order latent construct indicated by four distinct, but related dimensions (those facets of culture described above; see Figure 1). We used confirmatory factor analysis to verify the proposed factor structure of our measure evaluating CCWAS. The first step in conducting the confirmatory factor analysis was to create item parcels for the "Work-Life Balance," "Equal Access to Opportunities," and "Chair/Chief Support" scales.[66] We did not create parcels for the "Gender Bias" scale given its small total number of items (n = 3). For the remaining scales, we created 3 to 4 item parcels per dimensions. We created balanced parcels based on factor-loadings from the exploratory single-factor solution.

In the confirmatory factor analysis, latent dimensions acted as indicators of a higher-order construct representing the CCWAS. The resulting model sufficiently fit the observed data as indicated by a chi-square of 65.84 ($P = .31$; df = 61, N = 130). All parcels/items had significant loadings onto the latent factor ($P < .001$ for all). Additionally, the latent dimensions loaded significantly onto the higher-order women's academic culture construct

($P < .001$ for all; see Figure 1). Other measurements confirmed excellent fit to the data (comparative fix index = .996, normative fit index = .947, root mean square error of approximation = .025). Based on these findings, we conclude that the CCWAS is best represented as a higher-order construct with four dimensions. The final CCWAS scale (45 items) had a reliability of $\alpha = .95$.

Agreement

Given the definition of culture as "shared beliefs" about the work environment for women, assessing whether individuals within departments/divisions agreed upon the nature of their department/division culture was important. Therefore, we conducted several tests to explore the extent to which unit-level agreement exists on the measure of CCWAS. The dataset represents a total of 27 units (departments/divisions), and 2 to 12 participants per unit (mean = 5 individuals per unit). The results of several analyses suggested significant within-group agreement and between-group differences. A one-way ANOVA showed significant between-group differences in perceptions of the culture (F = 2.167, $P = .003$). The intra-class correlation (ICC) was .189, indicating sufficient levels of within-group agreement.[67] The average reliability within group by unit was .87, also suggesting a high level of within-group reliability. Therefore, our data indicate that aggregating culture scores to the department/division level is appropriate.

Measurement invariance

As described in the Method section, we altered the unit of analysis (from department to division) for the two very large departments, and in order to confirm that the higher-order model was appropriate for the assessment of both departments and divisions, we tested for multi-group invariance using the four-factor structure described above (i.e., latent factors for equal access to opportunities, support for work-life balance, freedom from gender bias, and chair/chief support loading onto the higher-order culture construct). The estimated baseline model (with no constraints between groups) had a $\chi^2 = 148.17$ (df = 122). We tested a second model in which the paths from the higher-order culture construct to the four dimensions of culture were constrained to be equal across groups. This model had a $\chi^2 = 150.86$ (df = 125). The results of the χ^2 difference test indicate that the constrained model fits as well as the original model. Therefore, the two groups (department and division) can be said to be equivalent in their factor structure and loadings on to the higher-order culture construct. Given these findings, treating the measure as equivalent across these two groups is indeed appropriate.

Validity

Finally, we investigated the validity of our CCWAS measure. Given the results of our analyses above (i.e., confirmatory factor analyses, measurement invariance tests), we created an overall CCWAS score for each department/division. We calculated the mean score on the 45 CCWAS items for each participant. Then, we created a department/division CCWAS score that represents the average score for all of the participants in that unit. With regard to criterion-related validity, we hypothesized that women in departments/divisions with more supportive cultures would have higher levels of satisfaction with and commitment to their department/division. Our results support this notion in the hypothesized direction (see Table 2). CCWAS summaries (measured at the department/division level) were significantly associated with satisfaction with the department/division ($P < .0001$) and commitment to the department/division ($P < 0.0001$).

To explore convergent/divergent validity, we drew upon the theoretical model by Frone, Russell, and Cooper.[68] This model suggests that work characteristics are more strongly related to perceptions of work-interference-with-family than perceptions of family-

interference-with-work. In line with this theory, a more positive department/division culture was significantly, negatively associated to perceptions that the time demands and strain of work interfered with family ($P < 0.0001$ and $P = 0.006$ respectively). While culture was marginally related to perceptions that the time demands of family interfered with work ($P = 0.05$), it was not significantly related to perceptions that strain from family interfered with work ($P = 0.43$). In general, these findings lend support to the convergent/divergent validity of the measure to evaluate CCWAS.

Discussion

This research addresses the call from *Beyond Biases and Barriers* [9] for increased attention to the cultural factors that shape women's careers in academic medicine. In the past, there has been little consensus regarding what a culture to support women's careers would entail. Our findings demonstrate four distinct but related facets of culture that are conducive to women's careers: such a culture provides equal access to opportunities and resources, encourages work-life balance, facilitates the discussion and elimination of gender biases, and has a chair/chief that is supportive. Importantly, we have provided evidence that women within departments/divisions agree on the supportiveness of their unit and that significant cultural differences exist among departments/divisions. Notably, these differences emerged within a single school of medicine. Across academic health centers, an even greater variance may occur in the supportiveness of the department/division culture for women's careers. We recommend that other researchers further test this measure to assess cultural differences within and among medical schools. Note that the full CCWAS measure is provided in Appendix A and is available for public use. For practical purposes, researchers may use department and/or division as the target unit (depending on the size of the units). Additionally, although we recommend that researchers evaluate all four dimensions of culture for women's careers, the subscales can be administered independently if not all of them are relevant to the research question at hand.

Using a multilevel model, we have also provided evidence for the reliability and validity of the measure. As expected, women working in academic cultures more conducive to their career success were more satisfied with and more committed to their departments/divisions. In other words, simply by knowing about the culture of the department/division (without knowing the individuals' unique personalities and experiences) we were able to explain a significant amount of variance in satisfaction/commitment.

Our research provides valuable empirical evidence for the importance of change efforts targeted at the culture at the department/division-level. Though change efforts targeted at the individual level (e.g., one-on-one mentoring) and those that address broader organizational issues (e.g., institutional policies and practices), are important, this research highlights the unique impact of the local culture. It remains to be seen whether improving the CCWAS scores will be associated with enhancing the scholarly success and leadership of women in academic medicine. In our cluster-randomized intervention trial, we will evaluate changes in the CCWAS scores after four-years of a multi-leveled and multi-faceted intervention.

The limitations of this research deserve mention. As noted, we administered this measure to women assistant professors within a single school of medicine. Thus, the findings may not be generalizable to other contexts or populations. Addressing other aspects of the department/division culture beyond women's careers was beyond the scope of this research. In particular, we acknowledge the need for research that explores cultural support for the careers of minority faculty members (particularly with regard to race and sexual orientation) as well as understanding the common cultural attributes that affect the success of all faculty. For instance, although we focus on women assistant professors, we certainly acknowledge

that many of these issues are also relevant to other populations (e.g., men or tenured faculty members). However, given that we focused on women's careers at each stage of the measure's development and validation process (i.e., in the focus groups, literature reviews, expert reviews, item development), to conclude that the measure would be equivalent for other populations would be inappropriate. Unique cultural factors might be relevant to the career success of other groups.[69] Future research on the influence of culture on academic success would be important to identify the distinct cultural factors relevant to each population and to identify common cultural factors, if any, relevant to all populations. Regardless of the approach selected, we hope that scholars employ the same rigorous methodological standards utilized in the current study.

Another potential limitation is that respondents provided self-report data for all study variables at a single point in time. While this raises a concern regarding common-method biases, this concern is mitigated because our main variable, culture, is aggregated to the group level.[70] In the future, we intend to explore the influence of culture on a broader range of outcomes over time using longitudinal data collection (e.g., productivity, retention).

Despite these limitations, this research makes important advances in the definition and measurement of the culture of departments/divisions for women careers. We recommend that investigators utilize this measure, thus enabling progress toward establishing a coherent body of knowledge regarding the impact of department/division culture on the career success of women (and potentially others) in academic medicine.

Acknowledgments

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Appendix Measure of Culture Conducive to Women's Academic Success (CCWAS)*

Dimensions of CCWAS: Equal access

The extent to which women faculty have equal access to the resources that contribute to career success, compared to men.

In general, in my department, compared to men faculty…

1. Women faculty have equal access to career development opportunities.

2. Women faculty get as much mentoring from senior faculty.

3. Women faculty are as frequently considered for leadership positions.

4. Women faculty receive as much feedback regarding their performance.

5. Women faculty receive as much guidance about potential research opportunities.

6. Women faculty receive equitable salaries.

7. Women faculty get as much research space/equipment.

8. Women faculty get as much office space.

9. Women faculty have equal access to administrative support.

10. Women faculty have LESS protected time for research. (r)

11. Women faculty are as frequently recognized for their work.

12. Women faculty are as often asked to sit on prestigious committees.

13. Women faculty are as frequently nominated for awards and honors.

14. Women faculty are more likely to have others take credit for their work. (r)

15. Women faculty are as frequently included in discussions of division policies and administration.

16. Women faculty play equally important roles in decision-making.

17. The comments made by women faculty in meetings are given as much credit and attention.

18. Women faculty are as frequently included in professional social gatherings (e.g., dinners with guest scientists).

19. Women faculty are as often included in informal social gatherings (e.g., sporting events, happy hours).

Dimension of CCWAS: Support for work-life balance

The extent to which women faculty are supported in their efforts to balance work and family for the achievement of both personal and professional success.

In general, in my department…

1. Colleagues are supportive when women faculty members take time for family life.

2. Colleagues are supportive when women faculty members talk about work-family issues.

3. Attending to personal needs, such as taking time off for sick children, is frowned upon. (r)

4. Women faculty who reduce their work load are viewed by their colleagues as less committed to their careers. (r)

5. Family demands are considered when the division schedules events and/or meetings.

6. Family demands are considered when the division schedules teaching and clinical hours.

7. An obstacle for full-time women faculty is the expectation of a minimum of a 60 hour work week. (r)

8. Reducing their work load hurts the chances that women faculty will succeed in their careers. (r)

9. Women faculty who temporarily reduce their work load for parenting responsibilities are expected to take on extra work when they return to full-time. (r)

10. Work is expected to be the primary focus of faculty members' lives. (r)

11. It is possible for women faculty to get promoted working 50 hours per week or less on a regular basis.

Dimension of CCWAS: Freedom from gender bias

The extent to which women are able to work in an environment in which they are able to voice concerns regarding subtle and overt gender biases.

In general, in my department…

1. Women faculty members are comfortable raising issues about the supportiveness of the work environment for women.

2. Women are encouraged to raise concerns about biases against women, even if those biases are subtle.

3. When women faculty raise concerns about gender issues, they are seen as "whiners." (r)

Dimension of CCWAS: Chair/chief support

The extent to which the unit leader supports important aspects of women's careers.

In general, in my department…

1. My chair tries to ensure that women faculty have equal access to support and resources (e.g., space, administrative support, career development opportunities) to help them in their careers compared to men faculty.

2. My chair tries to ensure that women faculty are equally recognized and rewarded for their work compared to men faculty.

3. My chair tries to ensure that women faculty are included in FORMAL division events.

4. My chair tries to ensure that women faculty are included in INFORMAL division gatherings (e.g., coffee, lunches, sporting events, etc).

5. My chair is supportive when women faculty talk about work-family issues.

6. My chair encourages women faculty to take advantage of policies/practices for managing work and family.

7. My chair ensures work coverage for women faculty on maternity leave.

8. My chair sends a message that parenthood is an expected part of life.

9. My chair tries to ensure that women faculty are able to manage the demands of work and family.

10. My chair tries to ensure that women faculty feel free to express concerns regarding the treatment of women.

11. My chair tries to ensure that women faculty are not sexually harassed.

12. My chair tries to ensure that women faculty are not subject to subtle gender-based biases.

*All items rated on a 5-point scale from 1 ("Strongly disagree") to 5 ("Strongly agree"). (r) indicates a reverse-scored item. When divisions were the focal unit of analysis, the word "division" replaced "department" and "chief" replaced "chair" throughout the survey.
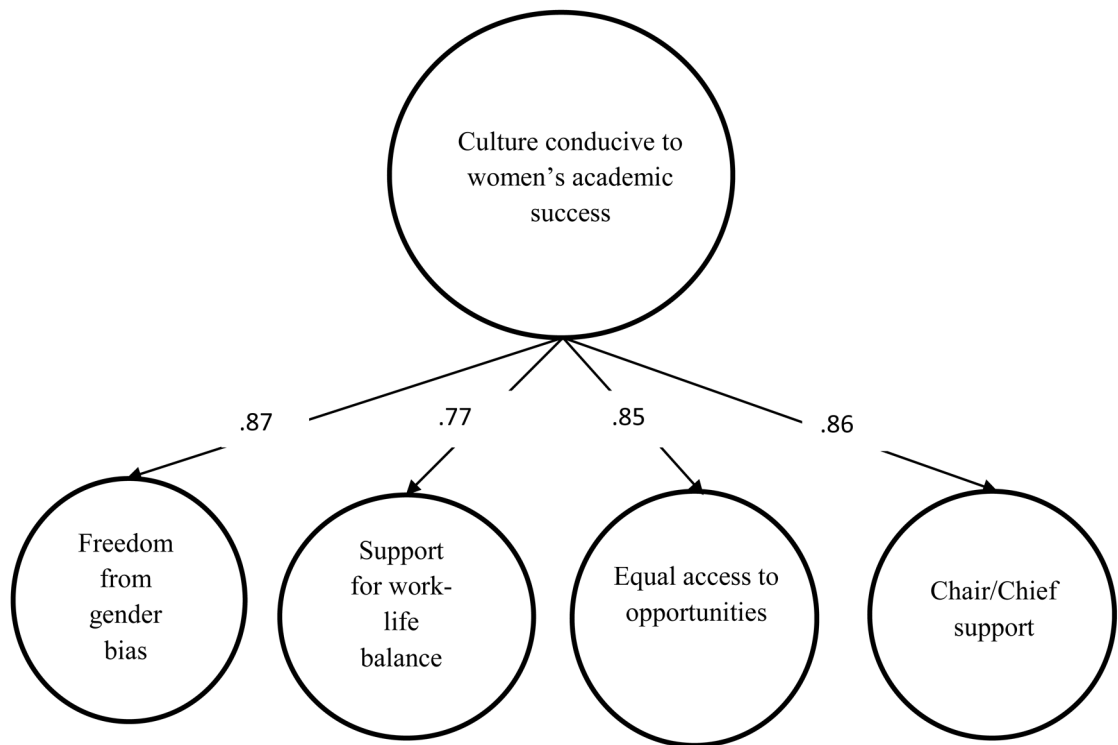
Figure 1.
Standardized regression weights for higher-order factor loadings in confirmatory factor analysis of a new measure to *evaluate* cultural factors in the workplace that are conducive to the academic success of women, 2010 ($P < .001$ for all; $\chi^2 = 85.295$, $P = .022$, df = 61. Manifest variables and error terms not pictured).

Table 1

Characteristics of 133 Participants Completing a Survey Instrument Measuring Cultural Factors in the Workplace That Are Conducive to the Academic Success of Women, 2010

Characteristic	N (% of 133[*])
Number of children	
0	19 (14.3)
1	24 (18.0)
2	59 (44.4)
3 or more	18 (13.5)
Didn't answer the question	13 (9.8)
Marital status	
Single	12 (9.0)
Married or domestic partnership	112 (84.2)
Divorced	4 (3.0)
Other	4 (3.0)
Didn't answer the question	1 (.8)
Race	
White/Caucasian	79 (59.4)
Asian	37 (27.8)
Black/African American	10 (7.5)
Other	5 (3.8)
Didn't answer the question	2 (1.5)
Appointment	
Full-time	123 (92.5)
Part-time	6 (4.5)
Didn't answer the question	4 (3.0)
Track	
Academic clinician	2 (1.5)
Clinician educator	91 (68.4)
Research	21 (15.8)
Tenure	18 (13.5)
Didn't answer the question	1 (0.8)

[*] Percentages may not equal 100 due to rounding.

Table 2

Associations Between Scores on the Culture Conducive to Women's Academic Success Tool and Validation Measures, 2010

Validation measures[*]	Regression coefficient	95% confidence interval	P value
Satisfaction	0.32	0.25, 0.40	<0.0001
Commitment	0.20	0.13, 0.27,	<0.0001
Time WIF	−0.24	−0.35, −0.15	<0.0001
Strain WIF	−0.16	−0.27, −0.05	0.006
Time FIW	−0.10	−0.19, 0.00	0.05
Strain FIW	−0.05	−0.19, 0.08	0.43

[*] WIF = Work-interference-with-family. FIW = Family-interference-with-work.