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Perceptions in Mentorship: The Mentor-Mentee Competency Discrepancy

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This study evaluated faculty mentoring competencies of 94 mentor-mentee pairs across institutions using the Mentoring Competency Assessment (MCA-21). Results indicated consistent mentor self-assessments and mentee evaluations of mentors across sites, with no significant association of gender or race/ethnicity on competency scoring. Mentees rated mentors higher than mentor's self-assessments. The greatest self-assessment disparities were within the female clinical educator and female assistant professor mentor groups - they rated their competency lower than the male tenure track and male professor groups, identifying the influence of mentors' gender, rank, and track on self-assessment of their mentoring competency. Results highlight the subjective elements inherent in mentor competency evaluations. Additional multi-site, longitudinal studies of the mentor-mentee dyad could identify precise training needs to enhance mentoring.

Keywords: mentorship, mentoring, Faculty, Mentoring Competency Assessment (MCA-21), competency

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Introduction

The function of mentoring in the development of clinical and research professionals is indispensable, promoting the advancement and success of mentees through the expertise and support of experienced mentors (Feldman et al., 2010; Garman et al., 2001; McRae & Zimmerman, 2019; Shea et al., 2011). The relationship between mentor and mentee is crucial, offering a foundation for knowledge enhancement, skill development, and professional achievement (Misky et al, 2023; Spencer et al., 2018; Sambunjak et al., 2006). Particularly impactful is the role of mentoring for individuals in the early stages of their careers, especially those from underrepresented groups. Studies show that targeted mentoring training programs significantly improve mentoring abilities and facilitate attaining vital career objectives (Johnson & Gandhi, 2015; Soller et al., 2022).

Mentoring is rooted in the apprenticeship model and has evolved into health organizations to cultivate professional development within medicine and research (Barondess, 1995; Sambunjak et al, 2006). Both dyadic and network relationships are described as effective in specialized fields such as healthcare, academia, and STEM disciplines (Allen et al., 2024). The importance of mentored research and training initiatives has gained recognition from leading health agencies, including the National Institute of Health, as essential for professional growth. The NIH's investment in the National Research Mentoring Network (NRMN) underscores this, aiming to offer comprehensive mentoring and development programs across various scientific disciplines (NRMN, 2021). Moreover, scholarly efforts to dissect the intricacies of mentoring relationships, especially concerning diversity, inclusivity, and cultural sensitivity, are crucial. Such research supports the ongoing refinement of mentoring schemes to harness the full potential of a varied talent pool, ensuring that mentoring practices evolve to meet the needs of an increasingly diverse scientific community (Black et al, 2022; Branchaw et al., 2020).

The efficacy of mentoring hinges upon two pivotal components. First and foremost are the competencies of mentors, encompassing a spectrum of essential dimensions. Effective communication, alignment of expectations, assessment of mentees' understanding, promotion of professional development, acknowledgment of diversity, and fostering independence collectively form the bedrock of mentor competencies (Fleming et al., 2013). The second indispensable component is the active engagement by the mentee in the mentoring relationship, which depends upon the mentee's trust in their mentors' competencies (Berk et al., 2005; Reitz et al., 2017). When both are present, a relationship exists that empowers mentees to embrace challenges in clinic or research confidently and fosters the mutual respect necessary to question conventions and innovate within their fields (Myers et al., 2022; Reitz et al., 2017; Sood et al., 2020).

This study explored faculty mentors' competencies across five prominent academic and health sciences institutions situated in the Southwest and Mountain West regions of the United States. Sites included academic, clinical,

and research settings for mentoring as part of an NIH-sponsored NRMN mentoring research study. To this end, the study utilized the Mentoring Competency Assessment (MCA-21), a robust and validated tool explicitly designed to assess the mentoring skills exhibited by faculty mentors (Hyun et al., 2022). The MCA-21, a streamlined 21-item version of Fleming's original 26-question survey, facilitated the thorough evaluation of mentoring proficiency (Fleming et al., 2013). The MCA-21 has six subscales that encapsulate the essential dimensions of mentoring including aligning expectations, promoting professional development, maintaining effective communication, assessing understanding, addressing diversity, and fostering independence.

Building upon the foundational work of Fleming and drawing insights from other institutional studies, this investigation took a significant step forward in analyzing the multifaceted demographic characteristics of faculty members who may differentially assess mentoring competencies across these diverse institutions (Fleming et al., 2013; Mickel et al., 2019; Wiskur et al., 2020). Fleming et al. (2013) demonstrated that mentees assessed their mentor's competency the same or greater than their mentor's self-assessment in every category except addressing diversity. Fleming et al. (2013) established the viability of accurately assessing mentoring competencies across six subscales; however, a multivariate analysis that explored characteristics based on mentoring subscale characteristics was not conducted. In later studies, Mickel et al. (2019) and Wiskur et al. (2020) demonstrated mentoring assessment differences based on clinical or research settings and academic ranks. However, these studies did not assess mentors and mentee pairs simultaneously and were conducted at a single institution. There is a need to build empirical knowledge of demographic and professional characteristics most associated with the subjective experience of mentoring competency when simultaneously measured by both mentor and mentee using the most effective mentoring evaluation metric available.

This research builds on the foundational work of Fleming et al. (2013) and incorporates insights from the institutional studies of Mickel et al. (2019) and Wiskur et al. (2020). While previous research has explored mentoring competencies, there remains to be a gap in understanding how mentors and mentees across different institutional settings perceive these. Utilizing the MCA 21, this study evaluates mentoring competencies from the perspectives of both mentors and mentees. It measures how mentoring is perceived across different demographics.

Methods

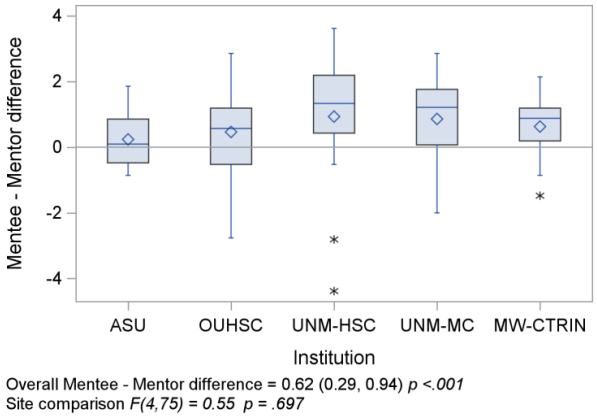
Sample

The sample included faculty mentor-mentee pairs that completed baseline data collection for a NRMN mentoring study sponsored by the NIH. We did not assign mentees to mentors. Although mentor A could theoretically supervise multiple mentees a, b, and c, this overlap was not found to occur in the recruited sample and, thus, did not affect our analytic strategy. Participants were recruited from five academic institutions: Arizona State University (ASU), the University of Oklahoma Health Sciences Center (OUHSC), the University of New Mexico Health Sciences Center (UNM-HSC), the University of New Mexico Main Campus (UNM-MC), and the Mountain West Clinical and Translational Research Infrastructure Network (MW CTR-IN), which is a consortium of twelve universities across six states. Although existing mentee-mentor dyads were recruited, these dyadic relationships could exist in the setting of a developmental network. The study did not determine the goals of the dyads. URM was defined as any participant who self-identified as African American or Black, Hispanic or Latino, American Indians or Alaska Natives, or Native Hawaiians and other Pacific Islanders. The study was approved by the UNM Health Sciences Center Institutional Review Board (HRPO 18-261).

Measures

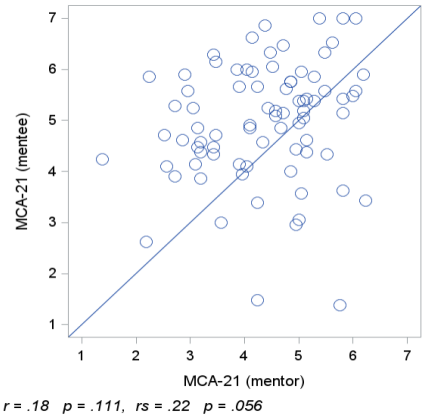
The methodology for the abbreviated Mentoring Competency Assessment-21 (MCA-21) scale employed in this study replicates that of Hyun et al. (2022). The MCA-21 questionnaire encompasses 21 items, each rated on a seven-point Likert-type scale. Respondents assessed mentoring skill levels using this scale, where 1 represents 'Not at all skilled,' 4 signifies 'Moderately skilled,' and 7 indicates 'Extremely skilled.' The six distinct mentor competency subscales measured included 1) maintaining effective communication [4 items], aligning expectations [4 items], assessing understanding [3 items], fostering independence [3 items], addressing diversity [3 items], and promoting professional development [4 items]. Our MCA survey instrument was based on the original Fleming et al. (2013) version, which allowed a "not observed" response coded as 0. To enable meaningful comparisons with other users of the MCA-21 instrument, which does not allow this response category, we assumed that "not observed" was closely equivalent to the lowest skill category and recoded these responses equal to 1, "Not at all skilled." This recoding increases the scale value to make the instrument more comparable to MCA-21 scoring (Hyun et al., 2022). We chose not to drop the "not observed" responses from scale calculation because this would induce a positive bias on scale values. The MCA-21 assessment was administered to mentors,

Figure 1
Comparison of Mentee-Mentor Differences in Faculty Mentoring Competency (MCA 21) by Institution



Note. Boxplots represent the distribution of paired mentor-mentee mentoring assessment score differences for each institution, with the central mark indicating the median, the diamond shape representing the mean, and the box extending from the 25th to 75th percentiles, which constitutes the interquartile range (IQR). Whiskers extend from the box to the smallest and largest values, excluding outliers, which are represented as individual asterisk (*) symbols. ASU=Arizona State University; OUHSC=University of Oklahoma Health Sciences Center, UNM-HSC=University of New Mexico Health Sciences Center, UNM-MC=University of New Mexico Main Campus, MW CTR-IN=Mountain West Clinical and Translational Research Infrastructure Network.

Figure 2
Bivariate Association Between Faculty Mentoring Competency (MCA-21) Assessed by Mentors and by Their Mentees



Note. Scatterplot analysis represents the bivariate association between mentor self-assessment of their mentoring competency on the x-axis with mentee assessment of their mentor's competency on the y-axis. Symbols above the diagonal are most dyads, with the mentee giving the mentor a higher score than the mentor's self-assessment. Pearson's correlation (r) and Spearman's correlation (rs) for n = 80 dyads with MCA-21 data for both mentors and mentees. Spearman's correlation is less sensitive to potential outliers and nonlinearity than Pearson's correlation.

and instructions were given to rate how skilled they felt they were in each area of mentoring. Mentees responded to the same mentoring questions but were instructed to rate how skilled they felt their mentor was in these areas. MCA 21 scores for each participant were calculated as the average of the 21 items. To investigate within-dyad differences in perceived mentoring competency by mentors and mentees, we computed the difference between the overall MCA 21 based on mentee responses and the MCA 21 from mentor self-assessments. MCA 21 difference scores greater than zero represent mentees rating their mentors higher than mentors rated themselves, and difference scores less than zero represent mentors rating themselves higher than mentees rated their mentors.

Various respondent characteristics were collected to augment the MCA data, including

demographic information for career rank, level, and milestones. The integration of these two datasets allowed for a comprehensive and multivariate analysis of mentoring competencies and related factors within the study cohort.

Analysis

Analyses assessed potential sources of variation in perceived faculty mentoring competency across different institutional settings and faculty demographics where mentoring competency was assessed using the MCA-21. We also assessed whether differences in mentoring competency within dyads varied across institutions and faculty characteristics. Faculty were included in analyses if they answered >75% of the MCA-21 questions. Frequencies and percentages were used to summarize mentor and mentee characteristics, including institution, race, ethnicity, gender, age, track, and rank. A general linear models (GLM) approach was used for analyses because this analytic approach includes analysis of variance (ANOVA) for unbalanced data, linear and multiple regression, and models that include mixtures of continuous and categorical independent variables. Descriptive means and standard deviations were computed for the three mentoring competency variables (dependent variables): self-reported mentor MCA-21, mentee rating of their mentor's competency, and the within-dyad mentee-mentor difference in MCA-21 ratings. Separate bivariate GLM models assessed unadjusted associations between each mentoring competency variable and faculty characteristics and institution. We report Type III F-test p-values for main effects and p-values from Wald's tests for individual model coefficients, coefficient estimates, and standard errors. GLM models with institution, faculty characteristics, and two-way interactions between independent variables were developed to obtain a more comprehensive assessment of factors associated with mentoring competency and to assess potential confounding and effect modification. We evaluated the effects of faculty gender, race/ethnicity, track, and rank. A one-sample t-test was used to test whether the overall mean mentee-mentor difference was equal to zero. Scatter plots and correlation analyses (Pearson and Spearman) were used to assess further the bivariate relationship between mentor-reported MCA 21 and mentee rating of their mentor's mentoring competency. Normality and homogeneity of variance (HOV) from GLM models were assessed graphically, using Shapiro-Wilk tests for normality and O'Brien's test for the HOV assumption (O'Brien, 1979). To assess the potential sensitivity of results to suboptimal normality and homogeneity assumptions, we employed nonparametric tests (Wilcoxon tests and Kruskal-Wallis tests). A p value of <0.05 was considered statistically significant. We did not adjust for multiple comparisons, and readers are encouraged to use caution when interpreting small effect sizes. Data management and statistical analyses were conducted using SAS v9.4.

Results

A total of 94 faculty mentor-mentee pairs were recruited from all five institutions from January 2020 to November 2022 (Table 1). The alteration in the intended sample size from 256 to 94 dyads reflected the severe change in the working environment during the pandemic, affecting the ability to recruit. Sufficient representation of faculty members from the participating institutions ensured the multi-site analysis's feasibility with several noticeable comparisons (Table 1 see appendices). The data suggests female mentors and mentees generally outnumber their male counterparts - approximately 61% of mentors and mentees were female. Racial and ethnic diversity was represented across all categories, with white women forming the largest group among mentors and mentees. Although a higher proportion of mentees were Asian (19%) compared to mentors (10%), the frequencies of underrepresented minorities (URM) were similar (i.e., about 16-17%) in the mentor and mentee groups. Same-gender dyads characterized 52% of the study group, and 42% reported the same race/ethnicity group.

The overall within dyad mentee-mentor difference in mentor competency was positive, indicating that mentees rated their mentor's competency higher than the mentors rated themselves (mean difference = 0.62, 95% CI (0.29, 0.94) $p < .001$, N = 80). The mentee-mentor difference did not vary significantly across institutions ($F(4,75) = 0.55$ $p = .697$, Figure 1). Mentee-mentor differences were not significantly associated with whether the pairs had the same gender (same gender = 0.29 higher, SE = 0.34, $p = 0.393$), same race/ethnicity status (same race/ethnicity = 0.09 lower, SE = 0.32, $p = 0.789$) or other characteristics listed in Table 1 ($p > .05$ for all, data not shown). When examining the bivariate association between mentors' self-assessment of their mentoring competency and mentees' rating of their mentor's competency, Spearman's rank correlation coefficient suggests a weak correlation ($rs = .22$, $p = .056$, Figure 2).

The overall mentor self-reported baseline MCA-21 scale averaged 4.36 (N = 86, SD = 1.08, 95% CI (4.13, 4.59)), and the mentee rating of their mentors averaged 4.98 (N = 88, SD = 1.21, 95% CI (4.73, 5.24)). Summaries by subgroup for mentors and mentees and results from bivariate GLM analyses are shown in Table 2. The analyses included the mentor's self-assessment reported by the mentor's demographics, the mentees' assessment of their mentor's competency reported by the mentee's demographics, and the mentee's assessment of their mentor's competency based on the mentor's demographics. Type III tests for main effect p-values determine whether subgroup means are equal. Coefficient p-values are for the subgroup tests compared to the referent condition. Significant main effects for mentors'

self-ratings were found for track (p = 0.003), rank (p = 0.028), and combinations of Gender-Rank (p = 0.04) and Gender-Track (p = 0.01). Mentors who were clinician educators had lower ratings compared to tenure track faculty (0.79 SE = 0.23, p <.001), and mentors who were assistant professors rated their mentoring competency -1.05 points lower than professors (SE = 0.35, p = .003). In the variables that combined Gender-Rank and Gender-Track, female assistant professors' mentors rated themselves lower (-1.02 SE = 0.45, p = .024) than male professors and female clinician educators rated themselves lower (-1.02 SE = 0.33, p = .002) than male tenure track faculty. On the other hand, the mentee assessment of their mentor's competency indicated that the latter did not differ by mentor demographic characteristics. Mentors' self-assessment scores did not correlate significantly with other demographic factors, including institution, gender, age group, URM (under-represented minority) groups, or gender (Table 2). Mentor MCA-21 mentor r atings were not associated with mentee or mentor characteristics (Table 2, p > 0.1 for all comparisons). Within dyad, mentee-mentor differences also were not associated with mentee or mentor characteristics (p > 0.05 for all comparisons, data not shown).

The final multivariable GLM model for baseline MCA-21 self-reported mentor scores is summarized in Table 3. The mentor's institution, age group, combination of Gender-Track, and race/ethnicity categories best account for the variance. The adjusted R2 of 0.29 indicates that the model can explain approximately 29% of the variance in mentoring competency scores. The Root MSE of 0.97 suggests the standard deviation of the residuals is close to one unit of the competency score. No statistically significant difference in competency scores compared to the referent groups was noted for the institution, age group, and race/ethnicity categories. A significant effect was found for combinations of Gender-Track. Female clinician educator mentors reported lower competency scores than male tenure track mentors (Coefficient = -1.06, SE = 0.36, p = 0.010). No multivariable GLM models had significant effects when analyzing mentee ratings of their mentors or for within dyad mentee-mentor differences (data not shown). Regression diagnostics for multivariable GLM models did not detect violations in normality or HOV.

Discussion

The primary focus of this investigation was to explore mentor and mentee perceptions of faculty mentors' competencies across multiple academic and health science institutions in the United States Southwest and Mountain West regions. Using the MCA-21, this study sheds light on the consistency of mentor competency levels across diverse academic, research, and clinical environments (Hyun et al, 2022). Although our results demonstrated that mentees rate their mentors as more competent than mentors rate themselves, this pattern seemed consistent. There was no significant difference in the mean score differences between mentors and mentees among participating institutions. This finding suggests uniformity in mentor competencies across the studied sites, highlighting the collective potential of these institutions for a longitudinal, multi-site study of mentoring outcomes (Sood et al, 2020).

Numerous studies have advanced the concept that congruence in mentor-mentee demographics correlates with enhanced outcomes in mentoring dynamics. Blake-Beard et al. (2011) underscored the significance of racial and gender concordance for mentoring role models, notably among female and minority students. Ragins and Cotton's (1999) work asserted that demographic parity between mentor and mentee augments psychosocial backing and professional growth. Collectively, these investigations support the importance of matching mentors and mentees based on gender and ethnicity in terms of satisfaction, effectiveness, and professional advancement. Contrastingly, our study findings using the MCA-21 scale diverge from this established narrative, indicating that similarity or differences in faculty mentor-mentee dyad gender and race/ethnicity do not markedly influence mentor competency perceptions by either mentors or mentees. This divergence may reflect an evolving landscape in academic and health sciences institutions where traditional barriers have been and are being addressed by institutional leadership and effective mentor training programs (Dominguez & Hager, 2013). Our competency perceptions differ from previously studied outcome variables and align with findings from the National Academies of Sciences, Engineering, and Medicine (NASEM) consensus report on mentorship in Science, Technology, Engineering, Mathematics, and Medicine (STEMM). NASEM highlights the concept of "deep similarities" as crucial for the effectiveness of mentoring relationships and refers to shared values, interests, experiences, and professional aspirations between mentors and mentees (NASEM, 2019). Our results, revealing that mentees appraise their mentors' competencies more favorably than the mentors' own assessments, suggest a high valuation of the mentoring received, potentially underscoring the pivotal role of "deep similarities" in enhancing the perceived quality of mentorship. This observation aligns with the notion that the essence of a productive mentor-mentee relationship extends beyond mere demographic parallels, delving into the profound connections of shared values, goals, and professional journeys. The findings of this study illuminate the intricate nature of mentor-mentee connections, suggesting that alternative factors — such as relational synergy, mentoring approach, or the prevailing institutional climate — may more fundamentally affect mentoring efficacy. Despite methodological differences from preceding studies, including participant academic advancement and temporal scope, the present

findings offer significant implications for the design and emphasis of mentoring programs.

A noteworthy finding in this study is that mentees rated their mentors' competency higher than their mentors' self-ratings. This discrepancy suggests that mentees may assess their mentors by utilizing factors not captured by the MCA. The discrepancy also underscores the complexity of mentor-mentee interactions and the potential for mentors to self-doubt their mentoring competency. This phenomenon, potentially attributed to imposter syndrome, needs to be more adequately studied in the field of mentoring (Clance & Imes, 1978). The pressures and expectations placed on faculty mentors, especially in highly competitive environments such as clinical settings, may contribute to feelings of inadequacy and self-doubt. This discrepancy is particularly evident in mentor subgroups, whereby assistant professor and clinician educator mentors rated themselves lower than their counterparts in professors and tenure-track positions. Female assistant professors and female clinician educator mentors rated themselves notably lower than their male counterparts. On the other hand, the mentee assessment of their mentor's competency indicates that there is no basis for the overcritical assessment by these mentor subgroups. Our observations contribute to the ongoing discourse in the field by shedding light on the potential influence of mentors' gender, rank, and track on mentors' self-assessment of mentoring competency and suggest that the direct measure of imposter syndrome may contribute to this discourse (Chakraverty, 2022; Cho et al, 2011; Clance & Imes, 1978; Mak, 2019).

In discussing mentor competencies in academic, research, and clinical settings, it is important to acknowledge several study limitations. Firstly, the research examined mentor-mentee relationships across multiple institutions in the Southwest and Mountain West regions and many in underserved and historically underfunded IDeA (institutional development awards) states, which, while providing valuable insights, may not capture the full spectrum of mentoring experiences found in other geographic areas, types of institutions, or nationally. Secondly, the sample size was limited and may not entirely represent the institutions. Those with missing data were excluded. Although missing data may contribute to bias, this was unlikely given that only 9% of mentors and 7% of mentees did not complete the MCA-21 instrument. Thirdly, this study relied on self-reported mentor competencies and mentee ratings, which could be subject to social desirability bias (Bozionelos et al, 2004; Eby et al., 2008) and may only partially reflect the objective abilities of mentors. Additionally, using MCA 21 as the sole tool for evaluating mentor competencies may not encompass all relevant dimensions of effective mentoring and other unmeasured factors, such as the previously mentioned social desirability bias as well as a mentor's personality characteristics which may contribute to the mentor-mentee dynamic (Bozionelos et al, 2004; Kumari et al, 2022). Fourthly, mentors might score themselves lower based on an awareness of their limitations, aligning with intellectual humility in mentoring. Such humility is associated with a willingness to view oneself accurately, including recognizing one's limitations, which is beneficial for mentoring relationships (Hook et al., 2013). Fifthly, videotaped recordings of mentor-mentee behavioral interactions may give a more objective assessment of mentoring competency than achieved using a questionnaire. Lastly, the study's cross-sectional design provides a snapshot of mentor competencies at a single point in time, and longitudinal research could offer a more comprehensive understanding of how these competencies evolve in mentor-mentee relationships. Despite these limitations, the findings of this study offer valuable insights into the importance of mentor competencies and their potential impact on the mentoring experience for both mentors and mentees.

In conclusion, this study has provided valuable insights into evaluating faculty mentors' competencies, utilizing the MCA-21 instrument to assess the consistency of perceptions in mentor competency across diverse academic, research, and clinical settings. Our results underscore the need for further investigation into the dynamics of mentoring, particularly within specific subgroups of mentors across multiple institutions. By exploring the impact of mentors' gender, rank, and career track on their self-assessment of mentoring competency, we can continue to tailor mentoring programs to advance further the fields of teaching, clinical practice, and research. These insights have far-reaching implications for the future of healthcare and scientific progress, highlighting the importance of effective mentoring practices that benefit mentor-mentee relationships and, ultimately, advance knowledge and innovation in these respective domains.

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Appendix

Table 1

Summary of Baseline Mentor and Mentee Counts Across Demographic and Institutional Categories

	Mentor (N=94)		Mentor (N=94)	
Faculty Characteristic	**N**	**(%)**	**N**	**(%)**
Institution				
ASU	15	(16.0)	15	(16.0)
OUHSC	30	(31.9)	30	(31.9)
UNM-HSC	20	(21.3)	20	(21.3)
UNM-MC	13	(13.8)	13	(13.8)
MW CTR-IN	16	(17.0)	16	(17.0)
Gender				
No Answer	7	(7.4)	5	(5.3)
Male	29	(30.9)	31	(33.0)
Female	58	(61.7)	57	(60.6)
Transgender	0	(0)	1	(1.1)
Age				
No Answer	6	(6.4)	5	(5.3)
<=30	0	(0)	4	(4.3)
31-40	15	(16.0)	54	(57.4)
41-50	29	(30.9)	22	(23.4)
51+	44	(46.8)	9	(9.6)
Track				
No answer	6	(6.4)	5	(5.3)
Tensure track	46	(48.9)	32	(34.0)

Clinician educator	37	(39.4)	34	(36.2)
Other[2]	5	(5.3)	23	(24.5)
Rank				
Other	9	(9.6)	23	(24.5)
Assistant Professor	13	(13.8)	61	(64.9)
Associate Professor	46	(48.9)	10	(10.6)
Professor	26	(27.7)	0	0
Gender-rank				
No Answer	7	(7.4)	6	(6.4)
F-Other	2	(2.1)	12	(12.8)
F-Assistant	9	(9.6)	38	(40.4)
F-Associate	33	(35.1)	7	(7.4)
F-Professor	14	(14.9)	0	(0)
M-Other	1	(1.1)	6	(6.4)
M-Assistant	3	(3.2)	22	(23.4)
M-Associate	13	(13.8)	3	(3.2)
M-Professor	12	(12.8)	0	(0)
Race/Ethnicity				
American Indian or Alaskan Native	3	(3.2)	3	(3.2)
Black or African American	5	(5.3)	3	(3.2)
Asian	9	(9.6)	18	(19.2)
Middle Eastern or North African	0	(0)	1	(1.1)
Hispanic, Latinx, or Spanish Origin	8	(8.5)	9	(9.6)
White	63	(67.0)	55	(58.5)
Some other	6	(6.4)	5	(5.3)
Under-Represented Minority (URM)[3]				
No answer	6	(6.4)	5	5.3
Not URM	72	(76.6)	74	(78.7)
URM	16	(17.0)	15	(16.0)
Race/Ethnicity-Gender				
No Answer	7	(7.4)	6	(6.4)
Non-White-Female	16	(17.0)	25	(26.6)
Non-White-Male	8	(8.5)	8	(8.5)
White-Female	42	(44.7)	32	(34.0)
White-Male	21	(22.3)	23	(24.5)

[1] ASU =Arizona State University; OUHSC=University of Oklahoma Health Sciences Center, UNM-HSC=University of New Mexico Health Sciences Center, UNM-MC=University of New Mexico Main Campus, MW CTR-IN=Mountain West Clinical and Translational Research Infrastructure Network.
[2] Other Faculty includes lecturers, instructors, no answer, or Flex. Flex tracks are given a few years to decide whether to go to the tenure track or stay in a clinical track.
[3] Under-represented minority (URM) was defined as any participant that self-identified as African American or Black, Hispanic or Latino, American Indians or Alaska Natives, or Native Hawaiians and other Pacific Islanders.

Table 2 (See Following Page)
Bivariate GLM Analysis of Mentor and Mentee Competency (MCA-21) by Institution and Faculty Characteristics

[1] ASU =Arizona State University; OUHSC=University of Oklahoma Health Sciences Center, UNM-HSC=University of New Mexico Health Sciences Center, UNM-MC=University of New Mexico Main Campus, MW CTR-IN=Mountain West Clinical and Translational Research Infrastructure Network.
[2] Under-represented minority (URM) was defined as any participant that self-identified as African American or Black, Hispanic or Latino, American Indians or Alaska Natives, or Native Hawaiians and other Pacific Islanders.
[3] Other Faculty include lecturers, instructors, no answer, or Flex. Flex tracks are given a few years to decide whether to go to the tenure track or stay in a clinical track.
Note: A negative coefficient implies lower self-reported mentoring competency by a group, compared to the referent group. Type III p-values test whether at least one of the coefficients for a factor is not equal to zero. Total sample sizes vary slightly due to missingness patterns for faculty characteristics (--) = not applicable.

Characteristic		Mentor Self Assessment					Mentee Assessment of Mentor Based on Mentee's Characterisistics					Mentee Assessment of Mentor, Based on Mentor's Characteristics				
		N	Mean (SD)	Coefficient (SE)	Coefficient p-value	Type III p-value	N	Mean (SD)	Coefficient (SE)	Coefficient p-value	Type III p-value	N	Mea (SD)	Coefficient (SE)	Coefficient p-value	Type III p-value
Institution[1]	ASU	13	4.71 (0.80)	0.86 (0.38)	.023	.148	14	4.83 (1.49)	-0.06 (0.44)	.890	.874	14	4.83 (1.49)	-0.06 (0.44)	.890	.874
	MW CTR-IN	15	4.61 (0.67)	0.76 (0.37)	.038		15	5.21 (0.89)	0.31 (0.43)	.469		15	5.21 (0.89)	0.31 (0.43)	.469	
	OUHSC	27	4.46 (1.09)	0.61 (0.32)	.054		28	4.91 (1.19)	0.02 (0.37)	.966		28	4.91 (1.19)	0.02 (0.37)	.966	
	UNM-HSC	19	3.85 (1.36)	0.00			18	4.89 (1.42)	0.00			18	4.89 (1.42)	0.00		
	UNM-MC	12	4.29 (1.06)	0.45 (0.39)	.252		13	5.18 (1.07)	0.29 (0.45)	.525		13	5.18 (1.07)	0.29 (0.45)	.525	
Gender	Female	56	4.22 (1.14)	-0.42 (0.25)	.091	.095	55	5.01 (1.15)	0.14 (0.27)	.599	55	56	4.95 (1.37)	-0.04 (0.30)	.895	
	Male	27	4.63 (0.84)	0.00			31	4.87 (1.31)	0.00		31	25	4.99 (0.90)	0.00		
	Transgender	0					1	5.14 (.)	0.27 (1.23)	.824	1	0				
Age	31-40	15	3.80 (1.05)	-0.70 (0.32)	.026	.090	54	5.02 (1.06)	0.02 (0.45)	.966	.226	15	4.85 (1.43)	0.10 (0.37)	.786	.134
	41-50	27	4.37 (0.95)	-0.14 (0.26)	.593		22	4.65 (1.48)	-0.35 (0.49)	.476		27	5.35 (0.93)	0.60 (0.30)	.047	
	51+	42	4.51 (1.11)	0.00			8	5.00 (1.29)	0.00			40	4.75 (1.30)	0.00		
	≤30	0					3	6.11 (0.43)	1.11 (0.81)	.169		0				
Race/Ethnicity	Asian	9	4.86 (0.85)	0.55 (0.39)	.155	.515	17	5.12 (0.90)	0.24 (0.34)	.478	.670	9	4.62 (1.72)	-0.33 (0.44)	.453	.517
	Hispanic	8	4.17 (1.21)	-0.13 (0.41)	.742		9	5.04 (1.91)	0.15 (0.44)	.726		6	5.00 (0.72)	0.05 (0.52)	.919	
	Other	10	4.41 (1.21)	0.10 (0.37)	.781		6	5.47 (1.05)	0.59 (0.53)	.266		14	5.37 (1.02)	0.43 (0.36)	.238	
	White	59	4.31 (1.07)	0.00			56	4.88 (1.19)	0.00			59	4.95 (1.21)	0.00		
URM[2]	No	68	4.38 (1.06)	0.00		.441	73	4.94 (1.13)	0.00		.686	68	4.90 (1.28)	0.00		.326
	Yes	16	4.15 (1.14)	-0.23 (0.30)	.439		14	5.08 (1.57)	0.14 (0.35)	.685		14	5.26 (0.98)	0.36 (0.36)	.323	
Track3	Clinician educator	35	3.88 (1.15)	-0.79 (0.23)	<.001	.003	32	4.79 (1.24)	-.05 (0.30)	.861	.174	34	4.87 (1.26)	-0.12 (0.28)	.667	.671
	Other	5	4.63	-0.04	.936		23	5.36 (1.02)	0.52 (0.33)	.111		4	5.44 (1.01)	0.45 (0.65)	.491	

	Tenure track	44	4.67 (0.89)				32	4.84 (1.26)	0.00			44	4.99 (1.25)	0.00		

		Mentor Self Asessment					Mentee Assessment of Mentor Based on Mentee's Characterisistics					Mentee Assessment of Mentor, Based on Mentor's Characteristics				
Characteristic		**N**	**Mean (SD)**	**Coefficient (SE)**	**Coefficient p-value**	**Type III p-value**	**N**	**Mean (SD)**	**Coefficient (SE)**	**Coefficient p-value**	**Type III p-value**	**N**	**Mea (SD)**	**Coefficient (SE)**	**Coefficient p-value**	**Type III p-value**
Rank	Assistant Professor	13	3.67 (1.16)	-1.05 (0.35)	.003	.028	59	4.96 (1.21)	-0.33 (0.32)	.306	.271	12	4.58 (1.60)	-0.25 (0.43)	.565	.420
	Associate Professor	44	4.33 (1.03)	-0.39 (0.26)	.131		10	4.53 (1.50)	-0.76 (0.47)	.107		44	5.11 (0.95)	0.28 (0.31)	.369	
	Other	2	4.10 (1.41)	0.10 (0.56)	.853		12	5.24 (1.15)	0.00			3	5.43 (1.31)	0.49 (0.48)	.306	
	Professor	25	4.72 (0.96)	0.00			0					12	4.58 (1.60)	-0.25 (0.43)	.565	.420
Gender-Rank	F-Assistant	9	3.51 (1.26)	-1.02 (0.45)	.024	.044	36	4.91 (1.27)	-0.15 (0.52)	.770	.185	9	4.50	-0.75	.190	.570
	F-Associate	33	4.17 (1.07)	-0.35 (0.34)	.306		7	5.10 (1.01)	0.04 (0.66)	.954		32	5.23 (0.97)	-0.03 (0.45)	.946	
	F-Other	1	3.10 (--)	-1.43 (1.06)	.177		12	5.26 (0.85)	0.20 (0.59)	.739		2	5.45 (1.85)	0.20 (0.97)	.840	
	F-Professor	13	4.90 (0.94)	0.37 (0.41)	.359		0					13	4.50 (1.74)	-0.76 (0.53)	.149	
	M-Assistant	3	4.37 (0.83)	-0.16 (0.66)	.809		22	5.04 (1.17)	-0.02	.971		2	4.60 (0.37)	-0.66 (0.97)	.495	
	M-Associate	11	4.78 (0.73)	0.26 (0.42)	.541		3	3.19 (1.79)	-1.78 (0.84)	.026		12	4.80 (0.85)	-0.46 (0.54)	.391	
	M-Other	1	5.10 (--)	0.57 (1.06)	.589		6	5.06 (1.22)	0.00			1	5.38 (--)	0.12 (1.31)	.925	
	M-Professor	12	4.52 (0.99)	0.00			0					10	5.26 (1.05)	0.00		
Gender-Track	F-Clinical	24	3.73 (1.21)	-1.02 (0.33)	.002	.011	22	4.82 (1.17)	0.30 (0.45)	.507	.465	25	4.86 (1.45)	-0.15 (0.41)	.705	.975
	F-Other	3	4.13 (1.02)	-0.62 (0.63)	.329		13	5.34 (0.99)	0.82 (0.50)	.098		3	5.40 (1.24)	0.38 (0.80)	.632	
	F-Tenure	29	4.63 (0.96)	-0.12 (0.32)	.706		20	5.00 (1.24)	0.48 (0.45)	.290		28	4.98 (1.35)	-0.03 (0.40)	.942	
	M-Clinical	10	4.31 (0.95)	-0.43 (0.41)	.292		10	4.73 (1.44)	0.20 (0.53)	.699		8	4.87 (0.51)	-0.14 (0.55)	.796	
	M-Other	2	5.38 (0.13)	0.63 (0.75)	.400		10	5.39 (1.11)	0.86 (0.53)	.103		1	5.57 (--)	0.56 (1.32)	.671	
	M-Tenure	15	4.75 (0.75)	0.00			11	4.52 (1.34)	0.00			16	5.01 (1.08)	0.00		

Table 3
Final multivariable model for factors associated with mentor self-assessed mentoring competence (MCA-21)

Parameter	Level	Coefficient	Standard Error		F num df, denom df	F-value	Type III p value
Intercept		4.55	0.43	***			
Institution	ASU	0.47	0.38		4,68	1.74	.150
	MW	0.39	0.38				
	CTR-IN	0.39	0.33				
	OUHC	-0.40	0.42				
	UNM-MC	0.00	0.00				
Age group	31-40	-0.47	0.32		2,68	1.24	.296
	41-50	-0.24	0.25				
	51+	0.00	0.00				
Gender Track	F-Clinical	-1.06	0.36	***	5,68	3.27	.010
	F-Other	-0.57	0.65				
	F-Tenure	-0.04	0.32				
	M-Clinical	-0.47	0.42				
	M-Other	1.07	0.76				
	M-Tenure	0.00	0.00				
Race/Ethnicity	Asian	0.51	0.37		3,68	1.09	.359
	Hispanic	0.20	0.40				
	Other Race/Ethnicity[2]	0.54	0.42				
	White	0.00	0.00				
R2 adjusted		.29					
Root MSE		0.97					

[1] ASU=Arizona State University; OUHSC=University of Oklahoma Health Sciences Center, UNM-HSC=University of New Mexico Health Sciences Center, UNM-MC=University of New Mexico Main Campus, MW CTR-IN=Mountain West Clinical and Translational Research Infrastructure Network.
[2] Other race/ethnicity was defined as any participant that self-identified as African American or Black, American Indians or Alaska Natives, or Native Hawaiians and other Pacific Islanders or some other race/ethnicity (Table 1).
Note: A negative coefficient implies lower self-reported mentoring competency by a group, compared to the referent group. *** represent statistically significant Wald's tests for whether the regression coefficient = 0, p <.001. Type III p-values from F-tests are for whether at least one of the coefficients for a factor is not equal to zero after controlling for other effects in the model. Root MSE = Square Root Mean Square Error

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Dr. Beth Tigges is a Professor and Regents' Professor at The University of New Mexico (UNM) College of Nursing. She teaches in the PhD in Nursing program with an emphasis on dissertation work and quantitative methods. She helped to start and taught in the Family Nurse Practitioner and Nurse-Midwifery concentrations for over 17 years. Tigges is the immediate past president (2017-2019) of Sigma Theta Tau International Honor Society of Nursing (Sigma) and was on the Sigma Board for over ten years. She has given over 20 presentations around the world about the application of team science research to leadership in nursing. Tigges has been funded as a co-investigator or principal investigator on multiple U.S. National Institutes of Health (NIH) initiatives, including the U.S. National Children's Study. She serves as the Director of Evaluation for four NIH grants including: (1) As the founding director and member of the Executive Leadership Committee for the UNM Clinical and Translational Science Center since 2010; (2) Two NIGMS-funded COBREs to develop the UNM Center for Brain Recovery and Repair, and the Center for Autophagy, Inflammation and Metabolism; and 3) Interim Director for the Evaluation Core for the Mountain West Clinical and Translational Research Infrastructure Network to support clinical and translational research at 13 universities across 7 western US states. She is co-chair of Program Evaluators' Group for the U.S. NIH Clinical and Translational Science Consortium. In addition, she is a Co-Investigator on the NIGMS-funded project: Effectiveness of Innovative Research Mentor Interventions among Underrepresented Minority Faculty in the Southwest.