Mentors Needed: Predictors of Self-Assessed Mentoring Competence in Agricultural Faculty

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Abstract

Despite an overwhelming amount of research in recent years on the importance of mentoring in higher education, little data exists on what factors predict faculty self-evaluations of mentoring competence in agricultural faculty. This is important because as research on mentoring has increased there has been a proliferation of different training programs for faculty in academia to improve mentoring outcomes, with little regard for what variables predict self-perceived mentoring skill. This study used a cross-sectional survey design to collect faculty self-evaluations of mentoring competence from a national sample of agricultural faculty. Regression analysis was used to determine what factors, identified as potentially important from prior research, predicted positive self-evaluations of mentoring competence. Results showed that discipline self-efficacy, feelings of impostorism, average mentoring frequency, and prior mentor training were all significant predictors, while gender was almost significant. The implications of these findings and avenues for future research for mentoring in higher education are discussed.

Keywords: Mentor, mentoring, mentorship, faculty, higher education, self-efficacy, impostor syndrome.

It is widely accepted that faculty mentorship is an essential developmental relationship for students in higher education (Johnson, 2015). However, few research studies in higher education have investigated mentoring from the perspective of the faculty advisor as the mentor (Johnson et al., 2007). In 1978, Daniel Levinson, one of the seminal scholars in mentoring research said, "Our system of higher education, though officially committed to fostering intellectual and personal development of students, provides mentoring that is generally limited in quantity and poor in quality" (p.334). Johnson (2015) has suggested that these issues persist today, with few academic leaders scrutinizing mentoring competence or efficacy in either new hires or during tenure and promotion despite an overabundance of evidence extolling the positive outcomes associated with effective mentoring in student-faculty relationships.

Studies have found that effective student-faculty mentoring relationships improved academic outcomes, fostered professional development, provided increased networking opportunities for mentees, encouraged program and institution related satisfaction, reduced stress and role conflict, and facilitated professional confidence and identity development (Campbell & Campbell, 1997; Dohm & Cummings, 2002; Dohm & Cummings, 2003; Johnson, 2015; Law et al., 2020; Schlosser et al., 2003; Tenebaum et al., 2001). Most importantly for the development of future faculty, graduate students who reported having a research mentor were three times more likely to pursue research in their career than those who did not identify a mentor (Dohm & Cummings, 2002; Dohm & Cummings 2003). Significant research has also supported the finding that effective mentoring inspires mentees to act as effective mentors themselves (Clark et al., 2000; Johnson, 2015; Ragins & Cotton, 1993). Unfortunately, research suggests that only about one-half to two-thirds of graduate students report having a mentor (Johnson et al., 2007; Johnson, 2015; Nettles & Millett, 2006).

It is also important to consider the power and influence of dysfunctional mentoring in higher education. Roughly half of graduate students have reported at least some conflict with a college or graduate school advisor (Kalbfleisch, 1997). Examples of conflict most notably identified by recent doctorates have included mentor unavailability, difficulty terminating the mentorship, inability to meet the mentor's expectations, unethical behavior by the mentor, the mentor having taken credit for mentees' work, or having had a mentor sexualize the mentorship (Harden et al., 2009). For mentors, faculty who experience negative outcomes when mentoring graduate students often lose their desire to engage in mentorship in the future (Merriam, 1983; Zey

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1984). Eby et al. (2010) reported that negative mentoring outcomes have been far more influential on mentoring than positive experiences, and previous research by Gottman (1994) has shown that negative interpersonal interactions were five times more influential than positive interactions.

Research has also revealed benefits of effective mentoring for the mentors as well, and include personal fulfillment and satisfaction, professional rejuvenation, increased networking, increased motivation, and greater professional recognition (Johnson, 2015). In a meta-analysis of 17 studies on benefits for mentors, Ghosh and Reio Jr. (2013) found that individuals who provided career mentoring, were more satisfied and committed at work, showed higher levels of job performance and career success, provided more psychosocial support which increased job satisfaction, organizational commitment, and career success, provided more role modeling which was also linked to higher job satisfaction and performance, and perceived that the quality of the mentoring they provided was related to their career success.

Higher education institutions also benefit from effective mentoring relationships. Donaldson et al. (2000) reported that individuals in high-quality mentoring relationships exhibited higher levels of positive organizational citizenship behavior compared to their coworkers not mentored or in negative supervisory relationships. Individuals who experience effective mentoring have stronger institutional and program commitment, lower rates of attrition, and were more likely to practice collegial behavior with their colleagues (Johnson, 2015).

Given these findings, training to improve faculty mentoring competence should be of critical importance to higher education institutions. Although previous research has confirmed the importance of mentor and mentee training, little is understood about what exactly to emphasize in training (Allen et al., 2006; Law et al, 2020). Research has suggested that at a minimum, training should include topics such as the benefits of mentoring, how to set realistic relationship expectations, trust building, conflict management, and how to recognize problems before they become too dysfunctional to manage (Eby et al., 2010). However, Gotian (2016) has suggested that many mentors are provided training, but few summative evaluations are ever conducted to determine that the training was useful or comprehended. A key part of this process should be faculty self-evaluations of mentoring competence to determine what skills potential mentors feel they need to improve (Johnson, 2015).

Given the current paucity of research on faculty self-assessment of mentoring ability and the importance of mentoring competence to faculty development, this current study seeks to:

1. Determine the self-perceived mentoring competency of faculty with membership in the North American Teachers and Colleges of Agriculture (NACTA),
2. Identify the relationship between self-assessed mentor competence, prior mentorship training, experience, gender, appointment, rank, teaching and research self-confidence (DSE), graduate school preparation, and feelings of the impostor syndrome (IP), and,
3. Use Multiple Linear Regression to determine the predictive value of these variables on NACTA faculty self-assessed mentoring competency.

Literature Review

In her seminal work, Kram (1985) conceptualized mentoring as an important relationship between an older, more experienced adult and a younger working adult that has traditionally included support, guidance, and counsel provided by the advanced adult for the subordinate adult's career development. At the time, studies on mentoring demonstrated a multitude of functions or roles that associated with the relationship (Clawson, 1979; Levinson, 1978). Kram (1985) identified and consolidated these various activities and skills into two primary categories of relevant functions that were typical of mentoring relationships (Table 1). Career functions included the parts of a professional relationship that improved career advancement, and psychosocial functions included tasks that enhanced competence, identity, and effectiveness of younger adults in their personal and professional lives (Kram, 1985). Although the research that described career and psychosocial functions is over thirty years old, researchers have continued to study mentoring relationships in the context of these career and psychosocial functions (Banerjee-Batist et al., 2019).

Table 1.

Kram's Mentoring Functions

Career Functions	Psychosocial Functions
Sponsorship	Role Modeling
Exposure-and-Visibility	Acceptance-and-Confirmation
Coaching	Counseling
Protection	Friendship
Challenging Assignments	

Note. Adapted from Kram, K. E. 1985). Mentoring at work: developmental relationships in organizational life. Scott, Foresman.

In academia, the term mentoring has been used to identify many different relationships and activities, depending on the department, college, or the people involved (Iwamsa et al., 1998; Johnson et al., 2007). The literature has identified many different definitions of the terms mentor, mentoring, and mentorship. In the higher education context, mentoring should not be confused with advising, supervising, teaching, or counseling, but instead signifies the intentional career development of a less-experienced student by a more experienced faculty member through an increasingly personal reciprocal relationship (Johnson, 2002; Johnson, 2015). However, many have argued that the term mentoring has become so superfluous that the lack of clear operationalization across disciplines has made it difficult to assess whether a survey instrument

can even capture the true meaning of mentorship (Jacobi, 1991; Dominguez & Kochan, 2020; Law et al., 2020). Additionally, the term mentoring has carried inherently positive connotations and has often been an honorific term, only awarded after a professor has been instrumental in the development of a younger faculty member or student, which has made any classification of "bad mentoring" difficult, since a bad mentor would not, in fact, be called a mentor at all (Bennetts, 2002; Johnson, 2015; Weil, 2001). Finally, how individuals identify "good" and "bad" mentoring is highly nuanced and assessments may be driven by a single critical incident or a number of less critical experiences (Eby et al., 2010).

Given the unique challenges of identifying mentoring in academia and the highly contextual nature of mentoring in graduate education, it has been important in the study of academic mentoring to select an appropriate instrument for assessment. The Wisconsin Mentoring Competency Assessment (MCA) sought to operationalize mentoring by identifying the following six competencies: maintaining effective communication, aligning expectations, assessing understanding, addressing diversity, fostering independence, and promoting professional development (Table 2) (Fleming, 2013). The skills that make up the six primary mentoring constructs of the MCA are supported in the literature by Johnson (2015) who identified eighteen functional competencies that mentors practice in order to provide career, psychosocial, and relationship support (Table 3).

Justification of Predictor Variables.

Given the complexities described herein, there are several potential predictor variables of faculty self-assessed mentoring competency (Johnson et al., 2007).

Average Mentor Experience.

One of the most consistent findings in mentoring

Table 2.

The Mentoring Competency Assessment MCA)

Maintaining effective communication
- Active listening
- Providing constructive feedback
- Establishing a relationship built on trust
- Identifying and accommodating different communication styles
- Employing strategies to improve communication with mentees
- Coordinating effectively with your mentees' other mentors

Aligning expectations
- Working with mentees to set clear expectations of the mentoring relationship
- Aligning your expectations with your mentees'
- Considering how personal and professional differences impact expectations
- Working with mentees to set research goals
- Helping mentees develop strategies to meet goals

Assessing understanding
- Accurately estimating your mentees' level of scientific knowledge
- Accurately estimating your mentees' ability to conduct research
- Employing strategies to enhance your mentees' knowledge and abilities

Fostering independence
- Motivating your mentees
- Building mentees' confidence
- Stimulating mentees' creativity
- Acknowledging your mentees' professional contributions
- Negotiating a path to professional independence with your mentees

Addressing diversity
- Taking into account biases/prejudices you bring to the relationship
- Working effectively with mentees whose personal background is different

Promoting professional development
- Helping your mentees network effectively
- Helping your mentees set career goals
- Helping your mentees balance work with their personal life
- Understanding your impact as a role model
- Helping your mentees acquire resources

Note. Adapted from the Wisconsin Mentoring Competency Assessment MCA): Fleming, M., House, S., Hanson, V. S., Yu, L., Garbutt, J., McGee, R., Kroenke, K., Abedin, Z., and Rubio, D. M. 2013). The Mentoring Competency Assessment: Validation of a new instrument to evaluate skills of research mentors. Academic Medicine, 887), 1002-1008. https://doi.org/10.1097/ACM.0b013e318295e298

Table 3.

Johnson's Functional Mentoring Competencies

- Be realistic and thoughtful in allocating time and resources to mentees
- Be accessible to those you mentor
- Provide strong encouragement and support
- Clarify your expectations of mentees up front
- Don't hesitate to engage in direct teaching and training to build competence
- Sponsor mentees for important opportunities
- Give your mentees information about politics, landmines, and allies
- Challenge mentees to master activities and take on greater responsibility
- Help mentees identify and articulate a career dream and affirm it
- Heighten mentee's visibility and expose them to important people
- Be intentional about role modeling competence and professionalism
- Protect mentees when necessary, but do not overprotect
- Assist your mentees in constructing networks of mentors
- Socialize mentees into the norms and customs of the discipline
- Deliver feedback with honesty and kindness
- Self-disclose only when the disclosure is likely to help the mentee
- Stand prepared to provide care and counseling in difficult times
- Welcome increasing mutuality and collegiality over time

Note. Adapted Johnson, W. B. 2015). *On being a mentor: A guide for higher education faculty*. Routledge.

literature is that previous experience as a mentor positively relates to motivation to mentor (Ragins & Scandura, 1999; Johnson, 2015). Research has also shown that faculty with increased student interactions are more likely to engage in mentorship (Morales et al., 2017). Further, faculty with externally funded grants generally had more mentoring experience and were more likely to be willing to mentor again in the future (Eagan et al., 2011). Perhaps most relevant to this current study, recent research has demonstrated that faculty with more mentoring experience improve their mentorship competency, occupational skills, and relational abilities (Astrove, 2017).

Prior Mentor Training.

Mentor training has been a consistent practice of universities in attempting to improve mentorship outcomes (Law et al., 2020). Campbell (2010) identified mentor training as one of six best practices of university mentoring programs. Previous research has also confirmed that mentor training increases mentor competence and satisfaction with the process (Sheri et al., 2019). However, increasing student persistence is generally the goal of formal mentor programs and many universities fail to assess how these programs influence mentor competence (Law et al., 2020).

Faculty Rank.

Ragins and Cotton (1993) found that rank was an important predictor for intention to mentor. Later, Vandermaas-Peeler et al. (2015) found that faculty of different rank (assistant, associate, and full professor) had different opinions about how level of engagement in scholarly work influenced their mentoring ability. In mentorships between junior and senior faculty, faculty rank was associated with different views of mentoring needs and areas of importance (Blood et al., 2012). Finally, Carpenter et al. (2015) found that mentor confidence, academic rank, and experience were important predictors of faculty engaging in mentoring behavior.

Gender.

In 1993, Ragins and Cotton found that women expressed similar intentions as men to engage in mentorship but anticipated greater obstacles and drawbacks to assuming a mentoring role. Later research suggested power differences influenced how men and women approached mentoring and that women had more relational skills than men (Fletcher & Ragins, 2007). O'Brien (2010) confirmed prior research that men were more likely to report being a mentor than women, and that there were significant differences in the self-assessed career and psychosocial support provided, depending on the gender of the mentor. Research has suggested this is because women are more likely to self-disclose, particularly with other women, and managing self-disclosure is a key aspect of effective mentoring behavior (Cronan et al., 2019; Horne & Johnson, 2018; Johnson, 2015; Young et al., 2006). Finally, it is generally accepted that women receive less effective career mentoring than men, have more negative mentoring experiences, and have less access to informal mentoring experiences (Flores et al., 2021).

Primary Appointment.

Wasserstein et al. (2007) found that mentoring was more prevalent among faculty in tenure track appointments. Follow up research looking at academic hospitals found that teaching faculty were less likely to have a mentor than research faculty (Reid et al., 2012). In addition, Daumiller and Dresel (2020) found that achievement striving and motivation in university faculty could only be understood through domain-specific investigations of teaching and research tracks, separately. Finally, Stupnisky et al. (2019) affirmed that teaching and research faculty have different emotional predictors for perceived career success, which would suggest that perceived value of mentoring would be different across appointment types.

Discipline Self-Efficacy (DSE).

Recent research has shown that being a mentor provides opportunities for people to engage in leadership behaviors and learning experiences that build generativity and enhanced self-efficacy (Lee et al., 2020). Studies from colleges of medicine indicate that professional students serving as mentors benefitted from the experience by reflecting on their role and fostering a positive professional identity (Roche et al., 2021). Hudson (2013) found that mentoring acts as professional development not only for the mentee but also the mentor. Hall et al. (2019) also noted that higher levels of career self-efficacy in faculty corresponded with less emotional exhaustion and greater psychological well-being, which would suggest improved mentoring capabilities. Finally, Ismayilova and Klassen (2019) found a positive relationship between faculty DSE, job satisfaction, university climate, and collegial relations.

Perceptions of Graduate School Preparation.

The transition to doctoral study from undergraduate education is challenging, and the presence of effective structures and mentorship in graduate programs is critical to assisting new doctoral trainees with the transition from a taught system to one driven by independent study (Elliot et al., 2020). Further, Elliot et al. (2020) suggested that a hidden curriculum of informal learning channels in doctoral education exists that provides additional benefits over formal coursework to graduate students who can find it. Further, in a study investigating professional identity development of graduate students, Liddell et al. (2014) found that out-of-class experiences were more influential than in class experiences as it related to students' understanding of institutional politics, culture, professional networks, and professional expectations.

Impostor Phenomenon (IP).

Jaremka et al. (2020) reported that IP is a common experience among faculty in academia. IP is important to consider in self-evaluations of mentoring competence because one of the primary symptoms is fear of being discovered as a fraud (Chandra et al., 2019; Williams, 2020). Aparna and Menon (2020) developed a conceptual model of IP that establishes a relationship between IP and sustainable leadership behaviors. According to McCann and Holt (2011), sustainable leadership can be conceptualized as creating capital (social, financial, etc.) for an organization while improving the lives of those who work there. Unfortunately, leaders who experience IP avoid sustainable leadership behaviors such as managerial decision-making, innovative work behaviors, and organizational citizenship behavior (Aparna & Menon, 2020; Mak et al., 2019). Organizational citizenship behavior is most relevant to the current study, as mentoring is often a part of these informal behaviors that promote an effective organization and individuals with high levels of IP will often avoid these behaviors especially because of their self-perceived incompetence (Aparna & Menon, 2020; Kolligian & Sternberg, 1991; Vergauwe et al., 2015).

Materials and Methods

This study on faculty self-perceived mentoring competence was part of a larger study investigating the overlap between mentoring and teamwork as overarching interpersonal constructs using a cross-sectional survey design. The current study utilized responses from the mentoring section of the larger study's online survey instrument to investigate only the relationship between demographic variables and self-assessed mentoring competency. The study employed an online survey-based quantitative approach because the purpose of the research was to describe the relationship between mentoring and critical covariates.

Population and Sample

The North American Colleges and Teachers of Agriculture (NACTA) organization was selected as a convenient sampling frame for this study given its focus on agricultural scholarship and the size of its membership. NACTA currently has 1,085 faculty members. NACTA is a professional society formed in 1955 and focuses on teaching and learning in agriculture. NACTA has three missions, to provide a forum for teachers of agriculture to engage in discussion regarding the advancement of agriculture, to improve the teaching of agriculture, and to support research in supporting the instruction of agriculture. The NACTA journal includes research articles on teaching, research, and extension in agriculture and suggests a diverse membership of agriculture faculty. Given the breadth of articles and the stated mission of the organization, the NACTA membership was believed to be an acceptable sample for the greater agriculture faculty population. Further supporting this case was the fact that NACTA membership is highly diverse, with survey respondents indicating their connection to 86 institutions over 49 states.

Data Collection Procedures

One combined questionnaire was created that included both the MCA and a teamwork questionnaire from the larger overarching mentoring and teamwork study. A single instrument was developed to reduce non-response error, given that research has indicated that multiple surveys with the same population can depress the response rate (Porter, 2004). Because the research design included a quantitative comparative analysis, the researcher sought to collect as many responses as possible from the faculty, to improve the accuracy and reduce the error of the statistical analysis. The initial survey invitation was disseminated to NACTA members on September 18, 2020. After the initial email invitation, the survey was also advertised in the NACTA October 2020 newsletter. Non-respondents were sent five different weekly reminders to complete the questionnaire each week after the October 2020 newsletter was released. The questionnaire remained open for 8 weeks. The questionnaire was designed using Qualtrics®, a web-based, free survey platform that allowed for easy collection and transmission of results to analytic software. Each participant

was provided a unique survey link through the online survey software Qualtrics to eliminate the likelihood of duplicate responses. Respondents were sent an invitation email describing the study and the nature of the questionnaire, and weekly reminder emails to increase response rate. The survey was sent to the entire member email listserv which included 1,085 individual contacts. The response rate was 37.51% (407) of which 338 were completed and usable.

Instrumentation

The instrument used to measure mentoring in this study was the Mentoring Competency Assessment (MCA) designed by Fleming et al. (2013) to specifically measure faculty mentoring skill of graduate students in a higher education context. The mentor version of the MCA is a self-assessment that uses a 7-point Likert scale in which 1 = "not at all skilled," 4 = 'moderately skilled," and 7 = "extremely skilled," to assess faculty mentoring competency (Fleming et al., 2013). Fleming et al. (2013) used confirmatory factor analysis to demonstrate that the MCA was an acceptable model fit for mentors and mentees working in academic research settings (Fleming et al., 2013).

The coefficient alpha scores for the 26 items on the MCA were 0.91 for mentors and 0.95 for mentees. The 26 items resulted in an acceptable fit to the data for mentors (X^2 = 663.2; df = 284, p < 0.001) and the correlations among the six factors ranged from 0.49 to 0.87, with standardized factor loadings ranging from 0.32 to 0.81. Confirmatory factor analysis indicated a confirmatory fit index (CFI) was 0.85 and root mean square error of approximation (RMSEA) was 0.069.

Several of the preceding predictor variables in this study included items collapsed into a single independent variable. Four questions were asked regarding respondent self-confidence in teaching and research ability to measure discipline self-efficacy (DSE). The items were all measured on a 5-point Likert-scale from 1 (not at all confident) to 5 (extremely confident). The combined index variable had a Cronbach's alpha of 0.77. Two items taken from the Clance Imposter Phenomenon Scale were used to measure faculty perceptions of the impostor syndrome (IP)(Clance, 1985). These questions regarding fear of being found out as fraudulent were measured on a 7-point Likert-scale with 1 (strongly disagree) to 7 (strongly agree). The Cronbach's alpha of these two items was 0.92. Finally, two items determining the amount of time faculty spent in mentoring relationships with graduate students and junior faculty were included. These questions were measured on a 6-point scale, with 0 = "never" and 5 = "several times each week." These two items were collapsed as an average into a single overall mentoring frequency variable. The dependent variable in this study was mentoring competence. This variable was calculated using the average of all 26-items on the MCA and is referred to in the study as overall MCA scores.

Research Ethics and Human Subject Protection

The study was approved through the behavioral/non-medial IRB02 office in the University Institutional Review Board (IRB). IRB201903241 was approved on 01/16/2020 as an exempt submission [46.104(d)(2)].

Data Analysis and Results

Quantitative data was analyzed using SPSS version 27. Outliers were analyzed using Cook's distance, difference in fits (DFFITS), and difference in Beta (DFBEATS) and zero data points were removed (Aguinis et al, 2013; Stevens, 1984). Missing data was minimal and missing at random, with the entire dataset having only 0.58% missing values. Tabachnick and Fidell (2013) suggest that 5% or less missing values is acceptable, and that data can be considered missing at random when it is likely the missing responses would be similar in distribution to the observed responses. Missing values were handled with listwise deletion. To address multiple regression assumptions, multicollinearity among independent variables was analyzed using variance inflation factor (VIF) and tolerance statistics (Hair et al, 2014). VIF was below 1.50 for all variables suggesting no multicollinearity. Normality, linearity, and homoscedasticity were assessed by examining residual scatterplots (Tabachnick & Fidell, 2013). Evaluation of the assumptions associated with multiple regression indicated that all assumptions were met.

The first objective in this study was to use descriptive statistics to determine the self-perceived mentoring competence of NACTA faculty using the average of all 26-items on the MCA (M = 5.52, SD = 0.80). The full descriptive statistics for the key demographic variables can be reviewed in Table 4 across all MCA competency areas. Men (M = 5.55, SD = 0.81) and women (M = 5.48, SD = 0.79) scored similarly. Lecturers consistently self-assessed lower than all other faculty ranks in overall mentoring competence (M = 4.87, SD = 0.60) while distinguished professors consistently self-evaluated highest (M = 6.01, SD = 0.71). Research faculty (M = 5.73, SD = 0.68) self-evaluated slightly higher, on average, than teaching (M = 5.47, SD = 0.83) or extension faculty (M = 5.50, SD = 0.73).

The second objective was to identify the relationship between self-assessed faculty mentoring competence and critical covariates identified in the literature as needing more investigation. Mean, standard deviations, and intercorrelations were measured for these variables in Table 5. Cohen (1988) provided guidance for interpreting correlations in the behavioral sciences, which suggested that coefficients of .10 are small, those of .30 are moderate, and anything greater than .50 are large. Faculty perceptions of mentoring competence on the MCA were significantly positively correlated with DSE (r = 0.55, p <.01), average mentoring frequency (r = 0.33, p <.01), prior mentor training (r = 0.24, p <.01), faculty title (r = .13, p <.05), and graduate preparation (r = .25, p<.01).

The impostor phenomenon (IP) was significantly negatively correlated (r = -0.33, p < .01) with faculty scores on the MCA. Gender was not significantly correlated

Table 4.

Mean and Standard Deviation of Faculty Self-Assessed Mentoring Competency Assessment MCA) Scores Across Key Demographic Variables

MCA Competencies (Mean and SD)	N	MEC	AE	AU	FI	AD	PPD	Ovr MCA
Full Sample	332	5.78 (.80)	5.33 (1.05)	5.28 (1.08)	5.66 (.88)	5.37 (1.00)	5.48 (.97)	5.52 (.80)
Men	184	5.72 (.83)	5.40 (1.03)	5.41 (1.03)	5.69 (.81)	5.42 (1.04)	5.51 (.94)	5.55 (.81)
Women	146	5.86 (.75)	5.26 (1.08)	5.14 (1.09)	5.61 (.84)	5.30 (.93)	5.43 (1.00)	5.48 (.79)
Dist. Prof.	7	5.94 (.71)	6.13 (.79)	6.00 (.91)	6.03 (.79)	5.81 (1.33)	6.05 (.67)	6.01 (.71)
Professor	118	5.85 (.71)	5.37 (.96)	5.49 (.85)	5.76 (.74)	5.40 (.99)	5.51 (.95)	5.60 (.72)
Assoc. Prof	83	5.86 (.73)	5.39 (.98)	5.25 (1.12)	5.61 (.89)	5.52 (.80)	5.55 (.90)	5.56 (.77)
Ast. Prof	56	5.63 (.96)	5.49 (.99)	5.30 (1.08)	5.60 (.77)	5.21 (1.13)	5.43 (1.03)	5.49 (.83)
Lecturer	20	5.43 (.89)	4.07 (1.07)	4.26 (1.28)	5.29 (.76)	4.79 (.77)	4.94 (.86)	4.87 (.60)
Other/Admin	46	5.83 (.83)	5.34 (1.14)	5.15 (1.14)	5.67 (.92)	5.41 (1.09)	5.50 (1.10)	5.53 (.93)
Teaching	256	5.78 (.82)	5.25 (1.09)	5.18 (1.12)	5.59 (.85)	5.32 (.96)	5.43 (1.00)	5.47 (.83)
Research	45	5.73 (.75)	5.64 (.89)	5.80 (.73)	5.93 (.66)	5.53 (1.10)	5.66 (.82)	5.73 (.68)
Extension	21	5.74 (.75)	5.33 (1.00)	5.24 (.80)	5.69 (.72)	5.50 (1.15)	5.32 (.97)	5.50 (.73)

Note. MEC – maintaining effective communication, AE – aligning expectations, AU – assessing understanding, FI – fostering independence, AD – addressing diversity, PPD – promoting professional development

Table 5.

Mean, Standard Deviation, and Intercorrelations for Overall MCA Score and Independent Variables

Measures	Mean	SD	1	2	3	4	5	6	7	8
1. MCA score	5.52	0.80	x							
2. Discipline self-efficacy	3.92	0.72	.55**	x						
3. Feelings of Impostorism	3.73	1.64	-.33**	-.40**	x					
4. Average Mentoring Frequency	2.86	1.30	.33**	.35**	-.12*	x				
5. Prior Mentoring training	0.35	0.45	.24**	.14*	-.04	.12*	x			
6. Faculty Title	3.53	1.35	.13*	0	-.19**	-.04	.13*	x		
7. Primary Appointment	2.73	0.58	-.04	.04	.06	-.05	-.12*	-.09	x	
8. Gender	0.55	0.50	.05	.18**	-.25**	.02	.10	.13*	-.10	x
9. Graduate Preparation	3.75	0.96	.25**	.33**	-.23**	.13*	.07	-.01	.14**	.18**

Note. ** Correlation is significant at the 0.01 level 2-tailed)
* Correlation is significant at the 0.05 level 2-tailed)
Prior Mentoring Training: 0=no, 1=yes
Faculty title: 1=lecturer, 2=assistant professor, 3=associate professor, 4=professor, 5=distinguished professor, 6=other
Primary appointment: 1=extension, 2=research, 3=teaching
0=female reference), 1=male
Average mentoring frequency: 0=never, 1=about once per semester, 2=about once per month, 3=two or three times per month, 4=about once per week, 5=several times per week
Graduate preparation: 1=not at all prepared, 2=slightly prepared, 3=somewhat prepared, 4=moderately prepared, 5=extremely prepared

Table 6.

Independent Samples T Test Comparing Discipline Self-Efficacy (DSE) Feelings of Impostorism (IP), Perceptions of Graduate Preparation, Faculty Title, and MCA Scores by Gender

Variable	Gender	N	M	SD	t	p	Cohen's D
Discipline self-efficacy (DSE)	Women	149	3.77	0.70	-3.36	<.01	-0.37
	Men	185	4.03	0.72			
Feelings of Impostorism (IP)	Women	149	4.18	1.54	4.72	<.01	0.52
	Men	185	3.37	1.62			
Graduate Preparation	Women	147	3.56	1.01	-3.25	<.01	-0.36
	Men	185	3.90	0.90			
Faculty Title	Women	148	3.33	1.54	-2.35	0.02	-0.27
	Men	184	3.69	1.17			
MCA Scores	Women	149	5.48	0.79	-0.92	0.36	-0.10
	Men	184	5.55	0.81			

with MCA scores, but was positively correlated (1=male, 2=female) with IP (r = 0.25, p < .01) and negatively correlated with DSE (r = -0.18, p < .01), faculty title (r = -0.13, p <.05) and feelings of graduate school preparation (r = -0.18, p < .01). Follow up t-tests comparing DSE, IP, faculty title and graduate preparation also showed that significant differences existed between self-assessed scores based on gender (see Table 6).

DSE was also positively correlated with levels of graduate school preparation (r = 0.33, p < .01), average mentoring frequency (r = 0.35, p < .01), and prior mentor training (r = 0.14, p < .05), suggesting that the presence of practice, preparation, and training was related to faculty perceptions of self-confidence in teaching and research and had a moderating effect on the relationship between gender and MCA scores. IP was negatively correlated with levels of graduate preparation (r = -0.23, p < .01), average mentoring frequency (r = -0.12, p < .05), and faculty title (r = -.19, p < .01), but had no significant relationship with prior mentor training. This suggests experience may be a more influential predictor of IP and training may be more important for DSE and overall MCA scores.

The third objective was to determine which variables were critical predictors of faculty self-assessment of mentoring competence. OLS multiple regression was conducted to determine the predictors of faculty mentoring scores (Table 7). The overall results of the regression analysis were significant, F(8,310) = 24.23, p < .01. with R^2 at 0.39 and adjusted R^2 at 0.37 indicating that 37% of the variability in faculty self-perceived mentoring competence is determined by the eight variables in the model. A linear model analysis confirmed that the presence of mentor training F(1, 305) = 9.52, p < .01, average mentoring frequency F(1, 305) = 6.35, p = .01, discipline self-efficacy (DSE) F (1(305) = 57.72, p < .01, and feelings of impostorism (IP) F(1,305) = 6.63, p = .01 were all significant predictors of faculty self-assessed mentoring scores on the MCA. Gender was almost significant F(1,305) = 3.67, p = .056, and is reported here for further discussion.

Discussion

Using an OLS multiple regression (MLR) research design, the purpose of this study was to explore what variables act as predictors for faculty mentoring competence. The general conclusion of this analysis was that discipline self-efficacy (DSE) was the most important predictor of self-perceived mentoring competence in NACTA faculty. Feelings of impostorism, average mentoring frequency, and prior mentor training were also significant predictors, while gender was almost significant.

DSE in this study was calculated using four questions that asked respondents to score their level of confidence in their ability to teach and conduct research, two core responsibilities of almost all university faculty. Given that mentors in higher education are expected to role model these core behaviors, past research supports the idea that faculty who do not feel confident in their professional abilities may self-assess as weaker mentors because they do not feel they can teach their mentees appropriately (Hall et al., 2019; Hudson et al., 2019; 2013; Lee et al., 2020; Roche et al., 2021). Carpenter et al. (2015) found that productive and confident research mentors were more likely to seek out mentoring opportunities with student mentees. In this study, average mentoring frequency was significantly and moderately correlated with DSE, suggesting that faculty who were more confident in their professional abilities were more likely to have engaged in mentoring relationships. Whether it was the mentoring experiences that increased DSE or the DSE that increased the number of mentoring experiences is unclear, and highlights one of the weaknesses of cross-sectional survey research. Further research should explore the nature of this relationship.

DSE was also positively correlated with perceptions of graduate preparation and prior mentor training. This is consistent with previous research, but it is interesting to note

Table 7.

MLR Coefficients and t-tests of Independent Variables Predicting Overall MCA Scores

Dependent	Independent	B	SE	β	t	p
Overall MCA Scores	Discipline self-efficacy	0.47	0.06	0.44	7.60	<.01
	Feelings of Impostorism	-0.07	0.03	-0.13	-2.57	0.01
	Average Mentoring Frequency	0.08	0.03	0.13	2.52	0.01
	Graduate Preparation	0.06	0.04	0.07	1.38	0.17
	Prior Mentoring Training					
	No	-0.24	0.08	-0.31	-3.09	<.01
	Yes	0				
	Faculty Title					
	Lecturer	-0.52	0.19	-0.64	-2.78	<.01
	Assistant Professor	-0.15	0.14	-0.19	-1.10	0.27
	Associate Professor	-0.16	0.13	-0.19	-1.19	0.23
	Professor	-0.15	.013	-0.19	-1.20	0.23
	Distinguished Prof	0.01	.026	0.02	0.05	0.96
	Other admin	0				
	Primary Appointment					
	Extension	0.06	0.15	0.07	0.41	0.68
	Research	0.05	0.11	0.06	0.47	0.64
	Teaching	0				
	Gender					
	Male	0.15	0.08	0.19	1.92	0.06
	Female	0				
	R^2	0.39				
	Adjusted R^2	0.37				

Note. Prior Mentoring Training: 0=no, 1=yes reference)
Faculty title: 1=lecturer, 2=assistant professor, 3=associate professor, 4=professor, 5=distinguished professor, 6=other reference)
Primary appointment: 1=extension, 2=research, 3=teaching reference)
Gender: 0=female reference), 1=male
Average mentoring frequency: 0=never, 1=about once per semester, 2=about once per month, 3=two or three times per month, 4=about once per week, 5=several times per week
Graduate preparation: 1=not at all prepared, 2=slightly prepared, 3=somewhat prepared, 4=moderately prepared, 5=extremely prepared

that graduate preparation was not a significant predictor of overall MCA scores (Prieto & Altmaier, 1994). Graduate preparation is important to self-assessed mentoring scores only as it relates to feelings of DSE. In addition, prior mentor training was a more significant predictor of overall mentoring scores but only weakly positively correlated with DSE, which intuitively makes sense as DSE measured teaching and research self-confidence in this study and mentor training should not influence those skills as significantly as graduate school preparation.

Faculty with high DSE were also likely to have lower IP, which supports findings from previous research about the relationship between self-efficacy and IP (Aparna & Menon, 2020; Fast et al., 2014; Parkman, 2016; Vergauwe et al., 2015). Previous research has shown that respondents with high IP practiced fewer organizational citizenship behaviors, like mentoring (Aparna & Menon, 2020; Mak et al., 2019). This aligns with the results in this study, where average mentoring frequency decreased as IP increased (r = -0.12, $p < .05$).

Although gender was not a significant predictor (p = .056) of self-perceived mentoring competence in this study, it is still important to discuss because of the relationship with critical covariates. Women in this study had significantly lower feelings of DSE, felt less prepared by their graduate education, had lower faculty rank than men, and had higher feelings of IP but despite these disadvantages, had similar MCA scores to men (Table 6). In prior research, O'Brien et al. (2010) had found that women self-assessed providing the same levels of career support as men, but also significantly more psychosocial support, resulting in higher overall mentoring self-assessments. Fletcher and Ragins (2007) suggested that this was because women can have higher-quality relationships because of their greater relational skills. In this study, men scored slightly higher in every mentoring category except for maintaining effective communication, which is predominantly psychosocial behavior that included building trust and being a good listener (Fleming et al., 2013; Johnson, 2015; Kram, 1985). This finding is critical because the presence of high IP, low DSE, lower ranking positions, and perceptions of less effective graduate preparation may be suppressing self-assessed mentor competence of women faculty in agriculture.

There are two practical implications from this study. First, mentor training alone is not sufficient to increase faculty self-assessed mentoring competence. Faculty must also feel confident in their discipline specific abilities. This means reducing feelings of IP and increasing DSE. This is especially important for women in agriculture, who perceive higher levels of IP and lower levels of DSE, both of which are further influenced by perceptions of less preparation from their graduate education. This suggests that in addition to mentor training, continued professional development is extremely important, especially for women. Given previous findings that women in academia are more likely to receive higher levels of psychosocial support than men if they are given access to a mentor, it may be worthwhile for academic leaders to be more purposeful in intentionally providing all faculty, but especially novice female faculty, with mentors to help reduce feelings of IP and to specifically increase DSE (Aparna & Menon, 2020; O'Brien et al., 2010). Second, these findings confirm that mentor training increases faculty self-assessed mentoring competence. However, only 32.80% of faculty in this study had any access to mentor training at any point in their careers, which is remarkable when one considers that participants in this study averaged over 17 years of experience as a faculty member. Academic leaders must strive to provide additional mentor training to faculty, not only in research roles, but also in teaching and extension roles so that they are more prepared to serve as mentors in academic settings. This suggests that higher education institutions may require a cultural shift that changes tenure and promotion to place more emphasis on training in soft-skills and evaluations of mentoring effectiveness. Without this change in emphasis, faculty without effective soft skills will still be allowed to advance in academia without access to training and may perpetuate issues related to weaker mentoring self-assessment, lower DSE, and higher IP in academic institutions.

There are several avenues for further research identified in this study. First, more research is needed to understand how low DSE influences faculty likelihood to engage in mentoring relationships. In addition, how does self-assessed DSE and peer-assessed DSE align, and is this alignment similar to self-assessed mentoring and peer-assessed mentoring scores? Cross sectional survey research using self-assessment can be limited, and therefore peer and mentee assessment of faculty DSE and mentor competence are essential to better understand the relationship between these two constructs. Second, more research is needed to elucidate the relationship between IP and self-assessed mentoring competence. Mixed methods approaches using full IP instruments and follow up interviews could better explain the relationship between IP and mentoring competence. Finally, further research should attempt to identify the exact relationship between mentoring frequency and mentor skill. Does experience as a mentor universally improve mentoring competence or does it only improve a respondent's mentoring efficacy? Also, researchers should investigate the interaction between mentor training and mentor experience. More research is needed to understand if is training more useful for inexperienced mentors and whether or not a combination of training and mentoring experience provides better outcomes than training or experience alone.

Limitations

There are several limitations to this study. First, this is a cross-sectional survey and therefore causation cannot be determined. Second, the population was limited to agricultural faculty, and was skewed towards teaching faculty. Third, the concept of faculty experience was measured using faculty title. Future researchers should consider combining years of experience and faculty title to provide a more accurate picture of faculty professional experiences which may be important in understanding perceptions of discipline self-efficacy and teamwork competency. Fourth, only two items were borrowed from the Clance Impostor Scale to measure feelings of impostorism in this study due to the already extensive length of the survey instrument. Future research should include the full Clance Impostor Scale to better understand how feelings of impostorism influence self-perceived teamwork skills among faculty and across gender. Finally, the psychometric properties of the MCA suggest that model specification may be an issue, and further research must be conducted to optimize these models across contexts.

Summary

This study found that discipline self-efficacy, feelings of impostorism, average mentoring frequency, prior mentor training, and gender were important predictors of agricultural faculty self-assessed mentoring competence. Although the findings in this study confirm the importance of training in improving faculty self-perceived mentoring competence, discipline self-efficacy was a more influential predictor. This finding suggests that leaders in agricultural higher education need to take a more holistic approach

to improving mentoring outcomes that involves improving graduate student perceptions of the quality of their graduate education and by increasing the rate of mentoring interactions. One critical finding was that female faculty reported significantly lower discipline self-efficacy, lower levels of graduate school preparation, and higher levels of impostorism than their male peers. This finding suggests that agricultural curriculum in higher education may need to be reviewed to confirm equity and inclusion in graduate studies. Higher education leaders must be willing to assign resources to critically investigate the long-term outcomes of their programs on former graduates to ensure faculty are not entering the academic workforce unprepared for mentoring due not only to a lack of mentorship training but also due to a lack of confidence in their professional abilities.

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