RESEARCH ARTICLE

Mentor vs. mentee perceptions of career mentoring partnerships and work outcomes: A multi-institutional study of faculty mentoring programs [version 2]

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Abstract
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Introduction: Formal mentoring programs are a professional development approach to help junior faculty develop an academic medicine career. This study investigated the perceptions of mentors versus mentees in formal career mentoring partnerships across multiple institutions.

Methods: The authors implemented departmental mentoring programs for junior faculty at four academic medical centers. They collected post-program data from mentors and mentees in order to examine the predictors of mentoring satisfaction, mentee outcomes, and work-related variables.

Results: The pattern of relationships between the variables differed for mentors versus mentees. Mentoring focus, mentor accessibility and mentee initiative predicted partnership satisfaction and mentee progress. Partnerships that used a mentoring agreement reported greater progress and satisfaction. There were some relationships between partnership outcomes and work-related outcomes. While partnership satisfaction predicted job and administrative/leadership satisfaction for mentors, it predicted positive perceptions of the department's mentoring culture and professional development opportunities for mentees.
Conclusions: The study identified unique antecedents and consequences of mentoring partnership satisfaction and mentee outcomes. The varying perspectives of mentors versus mentees indicated a need to clearly communicate partnership expectations and desired outcomes. Overall, the positive impact of formal mentoring programs on partnership and work-related outcomes was supported with implications for future programs and research.

Keywords
Faculty Mentoring Programs, Academic Physician Mentoring, Mentoring Partnership Outcomes, Mentor vs. Mentee Perceptions, Mentoring Outcomes
Introduction
Academic physicians have multi-faceted responsibilities including clinical care, scholarship, education and, often, leadership and administrative. These responsibilities can conflict with one another as academic physicians, especially junior faculty, attempt to balance the demands with the pressure of generating revenue (Blankenship and Slaw, 2015). These factors, coupled with a lack of mentoring, can impede physicians from progressing in their academic medicine career (Jackson et al., 2003; Chen et al., 2016).

Formal mentoring programs are a professional development approach to help junior faculty develop an academic medicine career, balance personal and professional responsibilities and pursue scholarship (Kashiwagi, Varkey and Cook, 2013; Giancola et al., 2018; Giancola et al., 2016). The literature lends support to the positive impact of formal mentoring programs, yet research is limited and tends to report results from one program at a single institution (Shollen et al., 2014). It is time to move beyond the question of “do formal mentoring partnerships have a positive impact on academic physicians” to examining “how” they do.

The purpose of the current study was to examine career mentoring partnerships in formal mentoring programs across multiple institutions including both the mentors’ and mentees’ perspectives. The mentoring literature is inconclusive regarding which and how mentoring variables are related to mentoring satisfaction and outcomes in a career mentoring partnership (Sng et al., 2017). Research focuses on the positive impact of mentoring partnerships/programs on mentee research outcomes (Bland et al., 2005; Shollen et al., 2014), yet junior faculty receive and desire mentoring in other areas of their job role as well (Feldman et al., 2010).

A common objective of formal mentoring programs is increasing faculty retention and satisfaction while promoting a culture of mentoring (Giancola et al., 2016). While the relationship between career/job satisfaction and having a mentor has been established (Feldman et al., 2010; DeCastro et al., 2014), this study took a more comprehensive approach by examining the relationship between mentoring outcomes and multiple domains of work satisfaction. We also examined how mentoring outcomes were related to perceptions of the department’s mentoring culture and opportunities for professional development. The research questions included the following.

1. How are communication frequency, mentoring focus, mentor behaviors, and mentee behaviors related to partnership satisfaction and mentee progress in research, teaching, clinical care, administrative/leadership development and personal growth? While higher frequency of partnership interaction has been shown to relate to positive mentor behaviors and mentoring benefits (Longo et al., 2011; Straus et al., 2013), other studies indicate that relationship variables may be more important to partnership outcomes (Aagaard and Hauer, 2003; Sng et al., 2017).

2. Do the mentoring variables have different relationships with partnership satisfaction versus mentee progress? Research indicates that satisfaction and productivity may have unique antecedents and consequences (Shollen et al., 2014).

3. Are there differences in the mentoring variables and outcomes for pairs who used a mentoring agreement versus those who did not? Many formal programs promote the use of contracts and mentoring agreements for pairs to outline goals and expectations, but the effectiveness of the agreements has not been established (Shollen et al., 2014; Sng et al., 2017).

4. How are partnership satisfaction and mentee progress (in the five areas) related to work-related satisfaction in the following domains: job, research, teaching, clinical practice, administrative/leadership development and career goal progress? Research indicates that formal mentoring may be more important for research productivity and that informal mentoring may be more important for job satisfaction (Shollen et al., 2014). We expanded this by examining the variables in formal mentoring partnerships that are related to multiple domains of work satisfaction.

5. What mentoring variables are related to the perception that the department supports professional development and a mentoring culture? In a previous study, those with a formal mentor reported more satisfaction with professional advancement, development opportunities, and their department and medical school (Mylona et al., 2016). We examined the specific mentoring variables that are associated with mentor and mentee perceptions of the department.
5. Do mentors’ and mentees’ perspectives vary on the mentoring variables and outcomes? Few studies in academic medicine have examined the differences between the perspective of the mentor and mentee or assessed both mentors and mentees in the same study (Longo et al., 2011). Past studies have focused on the characteristics of effective mentors (Cho, Ramanan and Feldman, 2011) as opposed to mentees (Straus et al., 2013).

Methods
Mentoring program participants and data collection
This study shares program evaluation results from formal, faculty mentoring programs implemented in four departments (three pediatrics and one internal medicine) at: University of South Dakota Sanford School of Medicine/Sanford Children’s Specialty Clinic, Medical College of Georgia at Augusta University, Penn State Health Milton S. Hershey Medical Center, and University of Missouri School of Medicine. The primary goal of the mentoring programs was to provide junior faculty with a career mentor in the areas of research, teaching, clinical care, administrative/leadership development and/or personal growth. Secondary goals included developing current and future mentors and cultivating a department culture of mentoring.

The programs were developed by a committee of junior and senior faculty with the assistance of an external facilitator from another institution. While there were some differences, the programs across institutions had many of the same components. Junior faculty received the program objective/expectations and were invited to voluntarily participate by completing a mentoring-needs form. The mentoring committee paired the mentee with an experienced faculty member who fit the mentor criteria and mentee’s needs. In most cases, one mentee was paired with one mentor.

The program provided participant support through mentor and mentee workshops, a program kickoff, ongoing communication and a one-year recognition event. Workshops were delivered by the external facilitator as well as institutional experts on topics relevant to the particular program. Examples of the topics include career planning and development, giving and receiving feedback, IRB preparation, educational portfolios, translational research etc. Participants also received a mentoring agreement template to codify meeting logistics, confidentiality, and mentoring goals. While each program rollout lasted 12-18 months, the pairs were free to meet where, when and as long as desired. Pairs were encouraged to schedule face-to-face meetings on a monthly basis for at least a year. Overall, the programs used a structured approach and included features that have been lacking in some formal programs (Straus et al. 2009; Kashiwagi et al. 2013). (The implementation of the programs is described in detail elsewhere; Giancola et al. 2016.)

Each department evaluated the program using a post-program survey for mentors and mentees. The survey was disseminated electronically by the external facilitator. The objectives were to obtain feedback on the mentoring partnerships, evaluate program success/challenges and inform future program rollouts. From 2008 to 2017, 161 pairs of mentors and mentees from the four departments received the surveys. The results were shared with the respective department, but were not published in full until this article. The data from the evaluations was compiled into one dataset to establish a meaningful sample size with more generalizable findings.

Measures
Based on the literature, the mentoring committees identified the desired process and outcome variables for the mentoring partnerships and program. The variables were operationalized in the post-program surveys. Many of the questions across the departments’ surveys were identical or had slight differences in syntax. Questions that were unique to one department’s program evaluation were not included in this study.

Partnership process. Twelve items assessed variables relevant to partnership success. 1) Participants were asked how often they communicated with their partner; and 2) the percent of time spent discussing the areas of research, teaching, clinical care, administrative/leadership development and personal growth. 3) They were asked if they created and used the mentoring agreement template. 4) Using a five-point scale (1 = never to 5 = always), the mentees rated the mentors on five behaviors: accessibility, content expertise, supportive, professional guidance and constructive feedback. 5) Mentors rated mentees on: accessibility, initiative, follow through and receiving feedback.

Partnership outcomes. The evaluations asked the mentors and mentees to rate partnership satisfaction (1 = very dissatisfied to 7 = very satisfied). In addition, participants rated the extent to which the mentee made progress in the areas of research, teaching, clinical care, administrative/leadership development, and personal growth (1 = not at all to 3 = a lot; or not applicable).
Scholarship outcomes. Mentees were asked six open-ended questions regarding how many research projects, presentation/publication submissions, peer-reviewed publications, peer-reviewed presentations, grant submissions, and grants received resulted from the mentoring partnership.

Work-related variables. Six domains of work satisfaction were measured including job, research, teaching, clinical practice, administrative/leadership development and career goal progress (1 = very dissatisfied to 7 = very satisfied). Also, participants rated the extent to which they had sufficient opportunities to expand skills and keep up in their field (labeled professional development opportunities; 1 = strongly disagree to 5 = strongly agree). Finally, we asked participants the extent to which the department’s environment supports mentoring relationships (labeled mentoring culture; 1 = strongly disagree to 5 = strongly agree).

Data analysis
We conducted statistical analyses using SPSS version 20.0. Research questions 1, 2, 4, and 5 were first tested by splitting the file between mentors and mentees, since mentors only completed items regarding mentee behaviors and vice versa, and then running correlations to determine significant relationships. Variables significantly related to the criterion variables were included as predictors in stepwise multiple regressions. Research questions 3 and 6 examined mean differences on the hypothesized variables using two-tailed t-tests.

Results/Analysis
A total of 83 mentors and 84 mentees completed the post-program evaluations (Table 1 depicts the numbers from each institution). The total response rate was 52% which is above the average (35%) for online survey research with physicians (Cunningham, Quan, Hemmelgarn, Noseworthy, Beck, et al. 2015). On average, mentors had been working in their field for 23.38 years (SD = 11.48) with an average of 11.32 years at their institution (SD = 8.31). Mentees had been working in their field for an average of 6.85 years (SD = 5.58) with 4.09 years at their institution (SD = 3.51). Most mentors were at a rank of associate (n = 21, 25.3%) or full professor (n = 48, 57.8%) while most mentees were assistant professors (n = 71, 84.5%).

Table 2 in Supplementary File 1 presents the correlations between the partnership process and outcome variables broken down by mentors and mentees. Results of the stepwise multiple regression using significant correlations are presented in Table 3 (Research Questions 1 and 2). For mentees, the results indicated that mentor behaviors had significant relationships with partnership satisfaction and mentoring progress. Mentor accessibility, in particular, was a key predictor of mentee progress in all five mentoring areas (21-46% of variance explained). While how mentoring time was spent was an important predictor of mentee progress, communication frequency did not predict partnership satisfaction or progress for mentees. Interestingly, time spent on research had a negative effect on mentee progress in teaching (r = -.281; p = .01) and clinical care (r = -.288; p = .01) indicating that more mentoring time spent on research activities meant less progress made in these areas.

For mentors, the mentee behaviors were strongly related to partnership satisfaction and mentee progress with mentee initiative emerging as a significant predictor in most of the regressions (with the exception of research and clinical care progress). Similar to mentees, spending mentoring time in a particular area was a predictor of progress in that area. The exception was research progress where communication frequency was the sole predictor.

### Table 1. Program Sample Sizes and Number of Respondents per Institution

| Institution                                                        | Program Sample Size | Number of Survey Respondents |
|--------------------------------------------------------------------|---------------------|------------------------------|
|                                                                    | Total Pairs         | Mentee (Response Rate)       | Mentor (Response Rate) | Total (Response Rate) |
| University of South Dakota Sanford School of Medicine/Sanford Children’s Specialty Clinic | 46                  | 30 (65%)                     | 27 (59%)              | 62%                   |
| Penn State Health Milton S. Hershey Medical Center                 | 18                  | 15 (79%)                     | 12 (63%)              | 71%                   |
| Medical College of Georgia at Augusta University                   | 54                  | 26 (48%)                     | 25 (46%)              | 47%                   |
| University of Missouri School of Medicine                          | 42                  | 13 (31%)                     | 19 (45%)              | 38%                   |
For both mentors and mentees, partnership satisfaction and mentee progress were strongly correlated. Mentors and mentees differed in regard to which progress variables predicted partnership satisfaction. For mentors, 41% of variance in partnership satisfaction was explained by mentees’ progress in administrative/leadership development and personal growth.

**Table 3. Stepwise Multiple Regressions Predicting Partnership Satisfaction and Progress for Mentors and Mentees**

| Mentor Model                       | R²   | Standardized Coefficient | P value | Mentee Model                       | R²   | Standardized Coefficient | P value |
|------------------------------------|------|--------------------------|---------|------------------------------------|------|--------------------------|---------|
| Partnership Satisfaction           | .529 | .00                      |         | Partnership Satisfaction           | .663 | .00                      |         |
| Mentee Follow-Through               | .469 | .00                      |         | Mentor Support                      | .597 | .00                      |         |
| Mentee Initiative                  | .307 | .03                      |         | Mentor Expertise                    | .303 | .00                      |         |
| Research Progress                   | .126 | .01                      |         | Research Progress                   | .352 | .00                      |         |
| Communication Frequency             | .355 | .01                      |         | Mentor Accessibility                | .463 | .00                      |         |
| Time-Research                       | .425 | .00                      |         |                                    |      |                          |         |
| Teaching Progress                   | .354 | .00                      |         | Teaching Progress                   | .208 | .00                      |         |
| Time-Teaching                       | .445 | .00                      |         | Mentor Accessibility                | .330 | .00                      |         |
| Mentee Initiative                   | .380 | .00                      |         | Time-Research                       | -.281| .01                      |         |
| Clinical Care Progress              | .266 | .00                      |         | Clinical Care Progress              | .318 | .00                      |         |
| Time-Clinical                       | .516 | .00                      |         | Time-Research                       | -.288| .01                      |         |
| Mentor Accessibility                | .269 | .01                      |         |                                    |      |                          |         |
| Time-Clinical                       | .257 | .02                      |         |                                    |      |                          |         |
| Administrative/Leadership Development Progress | .319 | .00                      |         | Administrative/Leadership Development Progress | .399 | .00                      |         |
| Time-Administrative/Leadership      | .409 | .00                      |         | Time-Administrative/Leadership      | .428 | .00                      |         |
| Mentee Initiative                   | .330 | .00                      |         | Time-Personal Growth                | .238 | .02                      |         |
| Mentor Accessibility                | .248 | .02                      |         |                                    |      |                          |         |
| Personal Growth Progress            | .414 | .00                      |         | Personal Growth Progress            | .462 | .00                      |         |
| Mentee Initiative                   | .494 | .00                      |         | Mentor Accessibility                | .463 | .00                      |         |
| Time-Personal Growth                | .293 | .01                      |         | Time-Personal Growth                | .392 | .00                      |         |
| Partnership Satisfaction            | .413 | .00                      |         | Partnership Satisfaction            | .299 | .00                      |         |
| Administrative/Leadership Development Progress | .456 | .00                      |         | Research Progress                   | .343 | .00                      |         |
| Personal Growth Progress            | .267 | .02                      |         | Personal Growth Progress            | .334 | .00                      |         |
growth. For mentees, research progress and personal growth progress explained 30% of the variance in partnership satisfaction.

A post hoc analysis was conducted in order to determine which type of scholarship outcomes impacted mentees’ perception of research progress. Research progress was significantly correlated with the number of research projects (r = .514, p = .00), grant submissions (r = .309; p = .03), and grants received (r = .384; p = .01) as a result of the partnership. Using stepwise regression, a significant amount of variance was explained in research/scholarship progress (R² = .264; p = .00) by research projects alone (r = .513; p = .00).

T-test results comparing those partnerships who did versus did not use a mentoring agreement are in Table 4. There were significant differences between these two groups in terms of progress in all areas (except administrative/leadership) and partnership satisfaction; those who used a mentoring agreement reported greater progress and greater satisfaction. No differences were found for communication frequency or time spent in the mentoring areas.

The correlations and regressions for partnership outcomes and the work-related variables can be found in Table 5 in Supplementary File 2 and Table 6 below (Research Questions 4 and 5). There were several unique predictors of work-related satisfaction for mentors versus mentees. For mentors, partnership satisfaction predicted job satisfaction and administrative/leadership satisfaction. The mentees’ research progress negatively predicted clinical care satisfaction for mentors. For mentees, administrative/leadership development progress significantly predicted job, administrative/leadership and career goal satisfaction. Research progress predicted research satisfaction.

Mentoring variables that correlated with the department’s mentoring culture and professional development opportunities were used as predictors in stepwise regressions (Research Question 5; Table 6). For mentors, 53.9% of the variance in mentoring culture was significantly predicted by job satisfaction (r = .734; p = .00). For mentees, partnership satisfaction (r = .408; p = .01) and personal growth progress (r = .336; p = .02) significantly predicted 41.3% of the variance in mentoring culture. In regard to development opportunities, career goal satisfaction (r = .608; p = .00) was a significant predictor for mentors (R² = .370; p = .00), and partnership satisfaction (r = .482; p = .02) was a significant predictor for mentees (R² = .08; p = .02).

Research Question 6, asking if mentors’ and mentees’ perceptions differed, was examined using t-tests and looking at the pattern of relationships between the variables (as previously discussed). There were two significant mean differences between mentors and mentees. Mentors reported significantly higher satisfaction with research activities (t(126) = 2.261; p = .03) and higher satisfaction in administrative/leadership activities (t(130) = 2.043; p = .04).

| Study Variables | Did Not Use a Mentoring Agreement | Did Not Use a Mentoring Agreement | Significance Test |
|-----------------|----------------------------------|----------------------------------|------------------|
| Research Progress | n=69 | Mean=2.16 | SD=0.76 | n=79 | Mean=1.71 | SD=0.88 | t=3.31 | p=.00 |
| Teaching Progress | n=76 | Mean=1.93 | SD=0.85 | n=78 | Mean=1.38 | SD=1.02 | t=3.63 | p=.00 |
| Clinical Care Progress | n=75 | Mean=1.44 | SD=1.54 | n=82 | Mean=0.99 | SD=1.00 | t=2.61 | p=.01 |
| Administrative/Leadership Development Progress | n=75 | Mean=2.04 | SD=0.81 | n=80 | Mean=1.79 | SD=0.92 | t=1.81 | p=.07 |
| Personal Growth Progress | n=75 | Mean=2.09 | SD=0.86 | n=80 | Mean=1.74 | SD=1.02 | t=2.36 | p=.02 |
| Partnership Satisfaction | n=78 | Mean=6.00 | SD=1.32 | n=83 | Mean=5.05 | SD=1.70 | t=3.98 | p=.00 |
| Percentage of Time-Research | n=77 | Mean=30.39 | SD=24.96 | n=81 | Mean=32.69 | SD=30.58 | t=-0.52 | p=.60 |
| Percentage of Time-Teaching | n=78 | Mean=16.83 | SD=15.23 | n=79 | Mean=14.23 | SD=15.70 | t=1.05 | p=.29 |
| Percentage of Time-Clinical | n=73 | Mean=11.09 | SD=16.73 | n=78 | Mean=10.92 | SD=16.79 | t=0.06 | p=.95 |
| Percentage of Time-Administrative/Leadership | n=75 | Mean=19.30 | SD=17.42 | n=74 | Mean=20.62 | SD=21.60 | t=-0.41 | p=.68 |
| Percentage of Time-Personal Growth | n=74 | Mean=17.30 | SD=15.39 | n=79 | Mean=15.72 | SD=16.36 | t=0.62 | p=.54 |
| Communication Frequency | n=64 | Mean=1.86 | SD=0.75 | n=68 | Mean=1.71 | SD=0.90 | t=1.06 | p=.29 |
Discussion

Overall, these findings indicate that partnership satisfaction and mentee progress are strongly correlated, but have unique antecedents and consequences. While there were few mean differences between mentors and mentees, they reported different predictors of partnership satisfaction and mentee progress. For mentors, partnership satisfaction was determined by mentee initiative and follow-through and mentee progress in administrative/leadership development and personal growth. For mentees, partnership satisfaction was predicted by mentor support and expertise and their progress in research and personal growth. Such differences could lead to conflict in mentoring partnerships as the mentor and mentee each pursue their own interests. Hence, it is important that pairs articulate their expectations and desired outcomes at the beginning of the partnership to ensure mutual fit and satisfaction. A mentoring agreement was supported as a valuable tool for mentors and mentees to codify expectations and increase satisfaction and progress in the partnership. (The partnership agreement can be found elsewhere; Giancola et al., 2016).

The mentor and mentee behaviors assessed in this study were strongly related to partnership satisfaction and mentee progress. In particular, mentee initiative and mentor accessibility appear to be key to partnership success. We intend to

| Model                              | Mentor          | Model                              | Mentee          |
|------------------------------------|-----------------|------------------------------------|-----------------|
|                                    | R^2             | Standardized coefficient | P value | R^2             | Standardized coefficient | P value |
| Satisfaction Job                   | .077            | .03                               |          | .065            | .04                               |          |
| Partnership Satisfaction           | .277            | .03                               |          | .254            | .04                               |          |
| Satisfaction Clinical Care         | .104            | .01                               |          | .104            | .01                               |          |
| Research Progress                  | -.323           | .01                               |          | .346            | .01                               |          |
| Satisfaction Administrative/Leadership | .062          | .05                               |          | .166            | .00                               |          |
| Partnership Satisfaction           | .250            | .05                               |          | .407            | .00                               |          |
| Departmental Support for Mentoring | .539            | .00                               |          | .255            | .03                               |          |
| Satisfaction Job                   | .734            | .00                               |          | .113            | .63                               |          |
| Personal Growth Progress           | .425            | .08                               |          |                  |                                  |          |
| Development Opportunities          | .370            | .00                               |          | .413            | .00                               |          |
| Satisfaction Career Goals          | .608            | .00                               |          | .408            | .01                               |          |
| Personal Growth Progress           | .336            | .02                               |          |                  |                                  |          |
| Development Opportunities          | .080            | .02                               |          |                  |                                  |          |
| Partnership Satisfaction           | .283            | .02                               |          |                  |                                  |          |
emphasize these behaviors in our mentoring program training. Future academic medicine studies need to test measures of both effective mentor and mentee behaviors for programs and research.

How the mentoring pairs spent their time was generally more important in determining mentee progress than how frequently pairs communicated. The exception was that mentors reported that communicating more frequently led to higher mentee research progress. Our programs recommend that pairs meet at least once a month, but we may need to stress quality and focus over the quantity of meeting time. The assumption is that there is a minimum threshold for communication frequency, but it may be higher for research mentoring. Nonetheless, this study supports other mentoring variables as more important in determining satisfaction and progress than communication frequency (Sng et al., 2017).

Although the formal mentoring programs are focused on career mentoring across the five areas, the participants reported important research relationships and outcomes. Research progress was positively related to number of projects, grant submissions and grants received as a result of the partnership; this contradicted prior studies (Shollen et al., 2014) and is surprising given partnership length. For mentees, research progress was one of two predictors of partnership satisfaction. Interestingly, when pairs spent mentoring time on research, mentees also reported lower clinical care progress and teaching progress. These results are not surprising given the sometimes conflicting clinical, teaching and research responsibilities of academic physicians (Blankenship and Slaw, 2015). Perhaps this suggests that a research oriented mentoring partnership should deliberately consider the other domains of academic development to ensure balance.

Mentees’ personal growth was a common predictor of partnership satisfaction for both mentors and mentees. Personal growth progress also predicted career goal satisfaction and department’s mentoring culture for mentees. This demonstrates that mentoring participants are impacted by more than work-focused factors and that non-work factors are important in establishing satisfactory mentoring relationships and outcomes for both parties.

The formal mentoring partnerships had a positive impact on work-related satisfaction with unique predictors for mentors versus mentees. For mentors, partnership satisfaction predicted their job satisfaction and administrative/leadership satisfaction. For mentees, progress in research, administrative/leadership development and personal growth had the strongest effect. Since mentoring is less about knowledge and skill building for mentors, it makes sense that mentee progress is less important for their work-related satisfaction. These findings support continuing to measure multiple domains of work satisfaction in future research (Shollen et al., 2014).

Mentors and mentees also reported different predictors of professional development opportunities and the department’s mentoring culture. For mentors, these variables were predicted by job satisfaction and career goal satisfaction, respectively. Partnership satisfaction was an important predictor of both mentoring culture (along with personal growth progress) and professional development for mentees. Highlighted here is the focus on the relational aspect of the mentoring partnership for mentees and how this relationship can impact their view of the department and opportunities to expand their skills. In contrast, mentors’ perspectives in this case seem to be more career- or job-oriented. Although the relationships are different for mentors versus mentees, mentoring partnership satisfaction appears to have a positive impact on work-related outcomes for both and could, ultimately, impact faculty retention (Mylona et al., 2016).

Conclusion
Based on the results, future research should examine different types of mentoring partnerships and look at variables separately for mentors versus mentees. While a strength of our study is the inclusion of multiple institutions, it is limited by the use of survey data collected at one point in time that may be confounded by self-report and selection biases. Pre-post, mixed methods and longitudinal studies are needed. The impact of gender and underrepresented minority status on mentoring relationships should be analyzed (Kosoko-Lasaki, Sonnino and Voytko, 2006).

Our findings support the positive impact of formal mentoring programs on academic physicians including work-related perceptions and outcomes. Our findings point to the need for different types of mentoring to meet individual needs of junior faculty especially as it relates to research mentoring. Both mentors and mentees can benefit from a structured program that offers training on the characteristics of effective mentors, mentees and partnerships, and provides resources like mentee career plans and mentoring agreements.

Take Home Messages
- Mentors and mentees report different predictors of partnership satisfaction and progress; individual expectations should be discussed.
- Junior faculty require mentoring in multiple areas including personal growth.
• Mentee initiative and mentor accessibility are key to partnership success.

• Research mentoring is important to mentees’ satisfaction, yet could affect other satisfaction and progress.

• Formal mentoring positively affects work perceptions and outcomes.

Notes On Contributors
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Declarations
The author has declared that there are no conflicts of interest.

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Migrated Content

Version 2

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Judy McKimm
Swansea University

This review has been migrated. The reviewer awarded 4 stars out of 5

This is an interesting study on mentoring exploring the relationship between mentors and mentees and other aspects of satisfaction and progress. Strengths include the multi centre approach and also the study questions with their specific focus. It is also well written and described, although I also found the number of study questions perhaps over ambitious for one study. However, the results are interesting and certainly raise more questions for research and practice in this area. I would liked to have seen some practice points or recommendations for setting up and managing formal mentoring schemes from this study, in other words, how do we implement the findings from this study? I think this would make it more useful to people who perhaps don't know the mentoring literature so well but are looking for guidance as a mentor or mentee, or who are responsible for setting up or managing a scheme.

Competing Interests: No conflicts of interest were disclosed.

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Subha Ramani
Harvard Medical School, Brigham and Women's Hospital
This review has been migrated. The reviewer awarded 4 stars out of 5

This is a well done study investigating the impact of formal mentoring relationships across multiple institutions. The authors have, as they state, taken on a more comprehensive approach by examining the relationship between mentoring outcomes and multiple domains of work satisfaction. In addition, they examined the correlation between mentoring outcomes and perceptions of the department's mentoring culture. It is interesting but not surprising that mentors and mentees had varied perspectives of what predicted success in their relationship. This study underscores prior study findings that mentor-mentee relationships are important determinants of positive outcomes. The authors have listed limitations of their study and what next steps in research could overcome these limitations. The paper is well written and well references, study methodology is appropriate for an initial exploration and could form the basis of an in-depth mixed methods study in the future. One thing I may have missed is what happens if there is mismatch among the dyads or incompatibility. If relationships are the core of satisfaction and outcomes, what could be result of relationships that just do not work. I had trouble assimilating the study questions. I realize that the authors have included other study results against each question, but this took me some time to actually understand each of them. I also wonder whether these are too many study questions for a cross-sectional study, could one study really answer all the questions posed? Regardless, these results move the needle forward our understanding about formal mentoring relationships and I recommend it as a useful paper for leaders establishing mentoring programmes, and a reminder to mentors and mentees to establish expectations for their dyadic relationship. The study understandably does not address a variety of newer mentoring models, hopefully other investigators would undertake such scholarly inquiry.

**Competing Interests:** No conflicts of interest were disclosed.

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Felix Silwimba
University of Lusaka

This review has been migrated. The reviewer awarded 5 stars out of 5

very important study on mentor-ship. young faculty staff require the support of seniors. the findings are well articulated.

**Competing Interests:** No conflicts of interest were disclosed.
Judy McKimm  
Swansea University  
This review has been migrated. The reviewer awarded 3 stars out of 5  
I enjoyed reading this and the research aims and findings are interesting and welcome, the questions asked were very topical also and this has the potential to contribute meaningfully to the literature on mentoring. Where I think the article needs strengthening is in terms of the program itself and the numbers of mentors/mentees from various departments in a table maybe. I would also reiterate and add to Balaji's comments and queries, namely:What was the duration of this formal mentorship program?  
What key aims/instructions were provided?  
How did the selection and matching of both mentors and mentees happen and by whom?  
Were the mentors trained and, if so, how and by whom?  
Were the objectives of the program given to the mentors/mentees before the initiation of the formal mentoring prog?  
How many mentees per mentor? One mentor with one mentee or did some mentors have a few mentees?  
How long and how often and in what medium did they meet?  
How and by whom the post prog survey was conducted?  
Why was the non response rate 52%? (for post prog survey) because if the sample size had been larger - the study results would have been more significant! I hope this is helpful!  
Judy  

Competing Interests: No conflicts of interest were disclosed.

P Ravi Shankar  
American International Medical University  
This review has been migrated. The reviewer awarded 4 stars out of 5
This is an interesting manuscript and the authors have examined mentoring from the perspective of both the mentor and mentee from multiple institutions. They have examined the different areas where junior faculty may require mentoring. They have also highlighted the need for balancing research mentoring against mentoring in the areas of teaching and healthcare. The response rate was reasonable and the authors have identified the limitations of their study. Most medical educators will find this article to be of interest.

**Competing Interests:** No conflicts of interest were disclosed.

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**Felix Silwimba**
University of Lusaka

This review has been migrated. The reviewer awarded 5 stars out of 5

very important and informative study on mentorship. it is a neglected area of medical education in low and middle income countries.

**Competing Interests:** No conflicts of interest were disclosed.

Reviewer Report 03 December 2019

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**BALAJI ARUMUGAM**
TAGORE MEDICAL COLLEGE AND HOSPITAL

This review has been migrated. The reviewer awarded 3 stars out of 5

Thank you for the invite to review this wonderful research article. This multi institutional study was done as a program evaluation results from formal, faculty mentoring programs implemented in four
departments by using a post-program survey for mentors and mentees and focused on mentorship program Partnership process, and Partnership outcome and work related variables. To my knowledge this is the first of its kind which has the all the dimensions analysed and presented as a single research paper especially for a longitudinal mentorship program for junior faculty development. The study methodology and the utilization of the statistical tests to assess the predictors of mentor and mentee satisfaction was clearly explained. But my queries to the authors are 1. What was the duration of this formal mentorship program? 2. Whether the objectives of the program was given to the mentors and mentees before the initiation of the formal mentoring prog? 3. How many mentees per mentors? Was it paired with each mentor with one mentee? 4. How and by whom the post prog survey was conducted? 5. Why was the non response rate 52%? (for post prog survey) 6. If the sample size would have been more - the study results might be more accurate.

**Competing Interests:** No conflicts of interest were disclosed.