

Relating Mentor Type and Mentoring Behaviors to Academic Medicine Faculty Satisfaction and Productivity at One Medical School

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Abstract

Purpose

To examine relationships among having formal and informal mentors, mentoring behaviors, and satisfaction and productivity for academic medicine faculty.

Method

In 2005, the authors surveyed full-time faculty at the University of Minnesota Medical School to assess their perceptions of variables associated with job satisfaction and productivity. This analysis focused on perceptions of mentoring as related to satisfaction with current position and productivity (articles published in peer-reviewed journals [article production] and role as a primary

investigator [PI] or a co-PI on a grant/contract).

Results

Of 615 faculty, 354 (58%) responded. Satisfied faculty were not necessarily productive, and vice versa. Outcomes differed somewhat for mentor types: Informal mentoring was more important for satisfaction, and formal mentoring was more important for productivity. Regardless of mentor type, the 14 mentoring behaviors examined related more to satisfaction than productivity. Only one behavior—serves as a role model—was significantly, positively related to article production. Although participants reported that formal and informal mentors performed the same

mentoring behaviors, mentees were more satisfied or productive when some behaviors were performed by formal mentors.

Conclusions

The results emphasize the importance of having both formal and informal mentors who perform mentoring behaviors associated with satisfaction and productivity. The results provide a preliminary indication that mentor types and specific mentoring behaviors may have different effects on satisfaction and productivity. Despite the differences found for some behaviors, it seems that it is more essential that mentoring behaviors be performed by any mentor than by a specific type of mentor.

Competent, vital faculty are essential to institutional effectiveness.¹ When such faculty pursue positions at other institutions or in nonacademic careers, the institutions they depart incur costs in the form of loss of human capital, disruption of course offerings and departmental planning, and expenses (monetary and time) required to recruit, hire, and develop new faculty.^{2,3} Mentoring for faculty is increasingly being used—and therefore studied—as a means to improve faculty satisfaction, success, and retention, particularly in academic medicine.^{4–7} Assessments of purposeful mentoring programs in academic medicine contexts provide preliminary

evidence that faculty who are mentored may be more likely to be retained.^{8,9} However, even with the wealth of research on mentoring, questions remain regarding which types of mentoring and mentoring behaviors yield the most beneficial results. The purpose of this analysis is to examine specific behaviors performed by formal and informal mentors and the relationships among those behaviors and the satisfaction and academic productivity of academic medicine faculty at one academic medical center.

Introduction

Productive faculty are not necessarily satisfied faculty.^{10,11} Further, satisfaction and productivity are not necessarily predicted by the same variables.^{8,12–14} Mentoring is one of the few variables associated with both satisfied and productive faculty, including academic medicine faculty.^{7,14–17} This commonality makes it crucial to thoroughly understand mentor types and mentoring behaviors that foster faculty satisfaction and productivity.

Mentor types are broadly classified as formal or informal. With *formal* mentoring relationships, mentor–mentee interactions are deliberate, structured, goal oriented, and supported by the organization.¹⁸ *Informal* mentoring relationships develop naturally based on mutual identification and are not structured or supported by a third party. Studies comparing formal and informal mentoring functions and outcomes in nonacademic settings have yielded inconsistent results: Some have shown that informal mentoring is more likely to provide psychosocial and career development functions and results in better outcomes (including satisfaction),^{19,20} whereas others have shown no difference between mentor types.²¹ Research comparing formal and informal mentoring for faculty is sparse, although some scholars are currently addressing this issue.²² A study that focused specifically on research productivity of academic medicine faculty found formal mentoring to be most predictive.¹⁴

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Acad Med. 2014;89:1267–1275.
First published online June 20, 2014
doi: 10.1097/ACM.0000000000000381

One factor relevant to comparing mentor types is the behaviors or functions associated with formal and informal mentors. Kram's²³ mentor role theory identifies two categories of mentor functions: career related and psychosocial. Career-related functions are those that assist the mentee with career advancement and include providing sponsorship, exposure, visibility, coaching, protection, and challenging assignments. Psychosocial functions deal with interpersonal aspects and ideally promote the mentee's sense of competence, self-efficacy, and development; these functions include role modeling, friendship, counseling, acceptance, and confirmation of professional self. Studies have compared Kram's mentoring functions in formal and informal mentoring contexts, both inside and outside academe, with mixed results on various outcomes.^{16–18,24}

In Jackson and colleagues'²⁵ mixed-methods study of mentoring for academic medicine faculty, the mentors who were the most highly rated by mentees performed the academic activities of helping mentees prepare for promotion and develop an independent academic identity. They performed the psychosocial activities of listening to mentees' ideas and concerns, setting high standards for mentees' performance, and having a sense of their mentees as people as well as professionals. Other optimal mentoring behaviors included the mentors being responsive and available; motivating mentees and engendering a sense of possibility while upholding high standards; recognizing potential in mentees; acting as advocates for, promoting, and protecting mentees; improving mentees' sense of self by providing positive feedback and constructive criticism; and helping mentees form networks.

Although studies such as Jackson and colleagues'²⁵ have advanced the understanding of important mentoring behaviors in the academic context, connections among mentor type, mentoring behaviors, and outcomes are not yet well established. There also are questions about which categories specific mentoring behaviors fit into.²⁵ Further, most research on mentoring behaviors and outcomes has focused on nonacademic contexts and therefore

has not fully considered the needs and outcomes specific to faculty or to academic medicine faculty, who have unique needs given their clinical roles.

In this report, we seek to provide a greater understanding of the behaviors associated with formal and informal mentoring and their relationships with the outcomes of satisfaction and productivity for academic medicine faculty. The research question we examine is, What are the relationships among mentor type, mentoring behaviors, and the outcomes of satisfaction and productivity?

Method

Participants and survey

The data for this study are from a larger climate survey that was undertaken in 2005 at the University of Minnesota Medical School to identify faculty perceptions of variables associated with job satisfaction and productivity. The organizational climate survey was conducted for two purposes: (1) to determine interval changes in organizational climate following an earlier survey, and (2) to serve as a needs assessment for the development of faculty professional development programs. The study was requested by the University of Minnesota Center for Excellence in Women's Health and the medical school dean.

We constructed a Web-based questionnaire using SurveyMonkey (www.surveymonkey.com) to collect information on faculty perceptions of various areas related to their work and family lives. We selected particular variables to operationalize the constructs of interest, as described below. We adapted the questionnaire from one developed at Johns Hopkins University School of Medicine.²⁶ Our survey was piloted, revised, and repiloted with a subgroup of faculty; the final version comprised 72 questions and took approximately 20 minutes to complete. We e-mailed a link to the questionnaire to the 615 full-time, paid faculty (both tenured/tenure-track MD and PhD faculty and clinical scholars [MD and PhD clinician-educators]) at the medical school. We assured faculty that their individual responses would remain anonymous. Nonrespondents (who had not yet started the survey) received up

to three e-mailed reminders, sent two, three, and five weeks after the initial invitation. The University of Minnesota institutional review board approved the study as exempt.

Satisfaction

Although faculty satisfaction can be considered for many different areas, we chose satisfaction with position because we considered it to be the most relevant for examining the effects of mentoring without being too broadly or narrowly focused. We asked, "All things considered, how satisfied are you with your current position in the medical school?" The five-point response scale ranged from very dissatisfied (1) to very satisfied (5). We did not define *satisfied*. Although we gave respondents a limited number of response options, we treated the scale as continuous in our analysis because the options represented a range.

Productivity

On the basis of institution type and expectations, productivity measures may relate to research, teaching, clinical practice, or service. Although contributions in each of these areas are important, we defined productivity by the two measures most relevant to our sample: the total number of articles the faculty member published in refereed journals during calendar years 2003 and 2004 (article production), and whether the faculty member was a primary investigator (PI) or co-primary investigator (co-PI) during calendar year 2004 (role as a PI/co-PI). For the PI/co-PI analyses, we coded responses of "yes" as 1 and "no" as 0.

Mentor type

In the survey, we explicitly defined *mentor* as "one who assumes responsibility for actively advising, guiding, and promoting another person's career." Mentor types were indicated as formal or informal; we further described formal mentors as being "assigned." We asked a series of questions about the number and gender of current and past mentors. Specifically, respondents were asked to indicate the numbers of:

- a. male or female mentors who have been formally assigned to you since the period of time beginning after your formal training;

- b. informal male or female mentors you have had since the period of time beginning after your formal training;
- c. formally assigned male or female mentors you currently have; and
- d. informal male or female mentors you currently have.

Although respondents were not limited to considering their experiences with only one current or past mentor, throughout this article we use the singular “mentor.”

Mentoring behaviors

We included in the survey 14 mentoring behaviors reflecting those most commonly considered in the literature and on mentoring assessment forms. We asked faculty who reported currently having a mentor to indicate the frequency with which their mentor performed each behavior—never (0), seldom (1), occasionally (2), or frequently (3)—regardless of the extent to which the behavior was perceived as beneficial. Again, we treated this response scale as continuous in our analyses because the responses represented a range.

Data analysis

We based some of our analyses on the entire sample, some on only those respondents who reported currently having a mentor, and some on a split of respondents into categories based on the type of mentoring reported. The sample analyzed is explicit in the description of each analysis in the Results and in the table titles. Although for the larger analysis^{27,28} we examined differences by tenure status, gender, race, age, degree type, and faculty type (clinical scholar versus tenured/tenure-track), that is beyond the scope of this article.

We used SPSS 13.0 (SPSS, Inc., Chicago, Illinois) for data analysis. We analyzed the relationships among mentor type, mentoring behaviors, satisfaction, and productivity using correlation, *t* tests, *z* tests, multiple regression, and one-way analysis of variance (ANOVA). All tests were performed using parametric statistics. In no instance were Bonferroni adjustments used to control for experiment-wise error rate. Instead, because 1 out of 20 independent tests are expected to be significant by chance alone, we chose to attend to patterns in the results rather than to individual items.

Results

Respondents

Of the 615 faculty invited to participate, 354 (58%) responded. Respondent demographics and ranks (Table 1) mirror those of the University of Minnesota Medical School faculty. Only 9% (*n* = 33) of respondents indicated that they were very likely to leave the university in the next three years, and 58% (*n* = 207) indicated that they were somewhat or very satisfied with their current position. The faculty in our sample—which included both clinical scholars and tenured/tenure-track faculty—on average published five articles in refereed journals in the span of calendar years 2003–2004. Further, 58% (*n* = 206) reported roles as PIs, and 43% (*n* = 152) reported roles as co-PIs on grants or contracts during 2004. With regard to mentors, 7% (*n* = 24) reported having had only a formal mentor, 35% (*n* = 125) having had only an informal mentor, and 38% (*n* = 133) having had both types of mentor; 14% (*n* = 51) reported that they had never had a mentor (21 respondents did not answer the question). Of the 210 respondents with a current mentor, 8% (*n* = 17) reported having a formal mentor, 59% (*n* = 123) having an informal mentor, and 33% (*n* = 70) having both mentor types.

Satisfaction and productivity

We tested the correlation between faculty satisfaction and productivity to determine whether our sample aligns with previous research that shows no relationship. Considering all respondents, we found no significant relationship between satisfaction with current position and article production ($r = 0.00$) or role as a PI/co-PI ($r = -0.57$) (Table 2).

Mentor type, satisfaction, and productivity

We used *t* test analyses to determine the relationships between mentor type and satisfaction and productivity. First, we divided all respondents who reported experience with mentors into two nonexclusive categories based on the mentor types they had experienced: (1) informal and (2) formal. We included faculty who had experienced both types of mentors in both categories. Second, we divided all respondents who reported experience with mentors into three exclusive categories based on the types of mentor they had experienced:

Table 1

Demographics and Ranks of the 354 Faculty Respondents to the Institutional Climate Survey of Faculty, University of Minnesota Medical School, 2005

Category and subcategory	No. (%) of respondents
Rank/track (n = 313)	
Professor	105 (33.5)
<i>Tenured/tenure-track</i>	103 (32.9)
<i>Clinical scholar^a</i>	2 (0.6)
Associate professor	73 (23.3)
<i>Tenured/tenure-track</i>	53 (16.9)
<i>Clinical scholar</i>	20 (6.4)
Assistant professor	86 (27.5)
<i>Tenured/tenure-track</i>	58 (18.5)
<i>Clinical scholar</i>	28 (8.9)
Other	49 (15.7)
Sex (n = 349)	
Female	111 (31.8)
Male	238 (68.2)
Race/ethnicity^b (n = 306)	
White	255 (83.3)
Faculty of color	51 (16.7)
Age (n = 277)	
<50 years	146 (52.7)
≥50 years	131 (47.3)

^aFaculty on the clinical scholar track are physician clinician–educators or PhD clinician–educators; clinical patient care responsibilities account for 60% to 80% of their time.

^bFaculty of color includes 51 faculty who self-reported their race/ethnicity as Asian (*n* = 34; 66.7%), black (*n* = 3; 5.9%), Native American (*n* = 2; 3.9%), Hispanic (*n* = 8; 15.7%), and other (*n* = 4; 7.8%).

(1) informal, (2) formal, and (3) both informal and formal.

Using the nonexclusive categorization, we found that faculty who reported currently or ever having an *informal* mentor were significantly more satisfied (*n* = 254, mean = 3.73, SD = 1.21) with their current position than were faculty who had never had an informal mentor (*n* = 71, mean = 3.08, SD = 1.19) ($t = -3.99, P < .001$). We found no relationship between currently or ever having a *formal* mentor and satisfaction. Faculty who reported currently or ever having a *formal* mentor were significantly more likely to report a role as a PI/co-PI (*n* = 145, mean = 0.83, SD = 0.38) than were those who had never had a formal mentor (*n* = 162, mean = 0.72,

Table 2

Descriptive Statistics and Correlations of Satisfaction, Productivity, and Mentoring Behaviors for 210 Faculty Respondents (With a Current Mentor), Institutional Climate Survey of Faculty, University of Minnesota Medical School, 2005^a

Variables	Mean ^b	SD	Correlation with		
			Satisfaction	Article production	Role as a PI/co-PI
Satisfaction	3.59	1.24	—		
Article production	4.21	5.16	0.00	—	
Role as a PI/co-PI	0.77	0.42	-0.57	-0.03	—
Mentoring behaviors					
Serves as a role model	2.33	0.76	0.20 ^d	0.17 ^e	-0.06
Promotes career through networking	1.61	0.93	0.30 ^c	0.06	-0.06
Advises about preparation for advancement	1.61	0.98	0.26 ^c	0.09	0.09
Invites to networking events	1.54	1.03	0.31 ^c	0.08	0.03
Advises about getting published	1.60	0.94	0.12	0.09	0.01
Advises about department politics	1.45	0.95	0.29 ^c	0.05	-0.04
Advocates for mentee	1.96	0.93	0.33 ^c	0.02	0.12
Critiques scientific/research/scholarly work	1.79	0.99	0.17 ^e	0.10	-0.03
Critiques teaching/education work	1.23	0.99	0.14	0.03	-0.24 ^d
Critiques clinical work	1.07	1.04	0.08	-0.02	-0.22 ^e
Promotes participation in professional activities	1.50	1.01	0.31 ^c	0.02	-0.09
Advises about criteria for promotion and progress toward achievement	1.37	1.00	0.28 ^d	0.00	0.09
Annually reviews career development	1.67	1.23	0.23 ^d	0.06	0.02
Advises about balancing work and personal life	0.85	0.90	0.21 ^d	0.04	-0.22 ^d

^aPairwise N ranges from 96 to 196.

^bMean for satisfaction is based on a five-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied) with regard to faculty reports on how satisfied they were overall with their current position. Mean for article production is based on the number of articles faculty produced in refereed journals during 2003–2004. Mean for role as a PI/co-PI is based on a dichotomy of 0 (no) and 1 (yes) with regard to whether faculty reported being a primary investigator (PI) or co-PI on a grant or contract in 2004. Means for mentoring behaviors are based on a four-point scale—0 (never), 1 (seldom), 2 (occasionally), and 3 (frequently)—with regard to faculty perceptions of how frequently their current mentor performed the behavior.

^cDifference is significant at the level of $P \leq .001$.

^dDifference is significant at the level of $P \leq .01$.

^eDifference is significant at the level of $P \leq .05$.

SD = 0.45) ($t = -2.21$, $P < .05$). We found no relationship between currently or ever having a *formal* mentor and the number of articles published in refereed journals. We also found no relationship between currently or ever having an *informal* mentor and article production or role as a PI/co-PI.

The exclusive categorization allows us to understand the effects of experience with *only* an informal or formal mentor. One-way ANOVA tests with a Tukey B post hoc test show that faculty who reported currently or ever having only an informal mentor or both mentor types were significantly more satisfied than were faculty who reported currently or ever having only a formal mentor or never having had a mentor (Table 3). One-way ANOVA tests showed no differences

between faculty with experience with different types of mentors for either article production or role as a PI/co-PI (Table 3).

Considering the results from both categorization approaches, informal mentoring appears to be related to greater mentee satisfaction compared with formal mentoring or no mentoring. We found partial support for formal mentoring being related to greater productivity compared with informal mentoring. Our results using the exclusive categorization should be interpreted with caution because just 7% ($n = 24$) of faculty reported experience with only a formal mentor, whereas 73% ($n = 258$) reported experience with only an informal mentor or with both types of mentors.

Mentoring behaviors, satisfaction, and productivity

We examined the relationships between 14 mentoring behaviors and faculty satisfaction and productivity. Correlation analyses using only the 210 respondents who reported currently having a mentor (of any type) show that 11 of the 14 behaviors are significantly, positively related to satisfaction (Table 2). Only 3 behaviors—advises about getting published, critiques teaching/education work, and critiques clinical work—are not related to satisfaction. While 1 behavior—serves as a role model—is significantly, positively related to article production, none of the behaviors are positively related to role as a PI/co-PI. Further, 3 behaviors—critiques clinical work, critiques teaching/education work,

Table 3

Univariate Tests for the Effect of Experience With Different Mentor Types on Satisfaction and Productivity for All 354 Faculty Respondents (Grouped Into Exclusive Categories), Institutional Climate Survey of Faculty, University of Minnesota Medical School, 2005

Experience with mentor type by dependent variable	n	Mean ^a	SD	SS	df	MS	F
Satisfaction (n = 325)				24.56	3	8.19	5.64 ^b
Informal only	121	3.65 _c	1.26				
Formal only	23	3.00 _d	1.31				
Both	133	3.80 _c	1.15				
Neither	48	3.13 _d	1.14				
Article production (n = 320)				127.89	3	42.63	1.56
Informal only	116	3.86	5.10				
Formal only	23	2.57	2.89				
Both	131	4.81	5.64				
Neither	50	4.56	5.19				
Role as a PI/co-PI (n = 307)				1.01	3	0.34	1.92
Informal only	118	0.71	0.46				
Formal only	22	0.82	0.40				
Both	123	0.83	0.38				
Neither	44	0.77	0.42				

Abbreviations: SS indicates sum of squares; MS, mean square.

^aMeans having the same subscript—"c" or "d"—are not significantly different at $P < .05$ in the Tukey-B comparison. Mean for satisfaction is based on a five-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied) with regard to faculty reports on how satisfied they were overall with their current position. Mean for article production is based on the number of articles faculty produced in refereed journals in 2003–2004. Mean for role as a PI/co-PI is based on a dichotomy of 0 (no) and 1 (yes) with regard to whether faculty reported being a primary investigator (PI) or co-PI on a grant or contract in 2004.

^bDifference is significant at the level of $P \leq .01$.

and advises about balancing work and personal life—are significantly, *negatively* related to role as a PI/co-PI. However, this result may reflect the fact that the faculty most involved in clinical or purely educational work would not measure their productivity by published work. Overall, many more behaviors are positively related to satisfaction than to productivity.

Mentor type and mentoring behaviors

We examined the relationship between mentor type and mentoring behaviors performed. We asked faculty who reported currently having a mentor to indicate the frequency with which their mentor performed each of the 14 behaviors—never, seldom, occasionally, or frequently—regardless of the extent to which they perceived the behavior as beneficial. Because respondents could have had both formal and informal mentors at the time of the study, we also asked them to specify whether their

answers primarily reflected the efforts of a formal or an informal mentor.

Our results indicate that formal and informal mentors tend to perform similar mentoring behaviors. The means for the frequency with which formal and informal mentors performed each behavior are significantly different for only two behaviors, which formal mentors performed more frequently than did informal mentors: advises about criteria for promotion and progress toward achievement, and annually reviews career development (Table 4). Although we do not have benchmarks for appropriate frequency of performing mentoring behaviors, the means are strikingly low for all behaviors for both mentor types except two: serves as a role model (both formal and informal mentors), and annually reviews career development (formal mentors). Respondents reported that their current mentors—formal or informal—advised

them about preparation for advancement, getting their work published, and department politics, or promoted their careers through networking less than occasionally.

Mentor type performing mentoring behaviors, satisfaction, and productivity

Using only responses from the faculty who reported currently having a mentor, we examined the extent to which the type of mentor performing a given behavior affects satisfaction and productivity. To test whether the correlations between mentoring behaviors and satisfaction and productivity differed by mentor type, we converted the Pearson correlation coefficients into standard z scores using a Fisher r -to- z transformation. We compared the z scores between formal and informal mentors for each behavior using a Fisher z test.²⁹

We found significant differences in correlations between mentoring behaviors performed by informal versus formal mentors and satisfaction for only two behaviors: Respondents were more satisfied when formal rather than informal mentors advised them about getting their work published and critiqued their scientific/research/scholarly work (Table 5). We also found significant differences in correlations between mentoring behaviors performed by formal versus informal mentors and article production for four behaviors: Respondents produced more articles when formal rather than informal mentors advised them about preparation for advancement, about department politics, and about promotion criteria/progress toward achievement, and acted as advocates for them. For role as a PI/co-PI, we found no significant differences in correlations when mentoring behaviors were performed by formal versus informal mentors (data not shown). Overall, it seems that some behaviors are more effective when performed by formal mentors, particularly for mentee article production and, to a lesser extent, mentee satisfaction.

Discussion and Conclusions

Our study shows that although informal and formal mentors may perform similar mentoring behaviors, having certain types of mentors and having specific behaviors performed by a certain type

Table 4

Tests of Significance for Differences in Frequency of Behavior Performance Between Formal and Informal Mentors for 210 Faculty Respondents (With a Current Mentor), Institutional Climate Survey of Faculty, University of Minnesota Medical School, 2005^a

Mentoring behavior	Current formal mentor			Current informal mentor			t
	n	Mean	SD	n	Mean	SD	
Serves as a role model	57	2.39	0.84	114	2.31	0.73	0.63
Promotes career through networking	57	1.56	1.05	113	1.67	0.88	-0.73
Advises about preparation for advancement	57	1.75	1.09	109	1.50	0.94	1.54
Invites to networking events	57	1.63	1.11	114	1.52	0.98	0.69
Advises about getting published	56	1.59	1.09	111	1.56	0.84	0.20
Advises about department politics	57	1.28	1.01	113	1.47	0.91	-1.23
Advocates for mentee	57	2.00	0.93	112	1.92	0.91	0.54
Critiques scientific/research/scholarly work	53	1.87	0.96	101	1.70	1.03	0.97
Critiques teaching/education work	46	1.26	1.02	92	1.14	0.93	0.69
Critiques clinical work	29	1.31	1.07	53	0.89	1.05	1.73
Promotes participation in professional activities	56	1.50	1.04	112	1.50	1.01	0.00
Advises about criteria for promotion and progress toward achievement	49	1.59	1.02	80	1.11	0.97	2.68 ^b
Annually reviews career development	57	2.25	1.02	109	1.17	1.20	5.79 ^c
Advises about balancing work and personal life	53	0.77	0.85	109	0.83	0.91	-0.35

^aMeans are based on a four-point scale for which 0 = never, 1 = seldom, 2 = occasionally, and 3 = frequently; n values represent the number of faculty who responded to each item.

^bDifference is significant at the level of $P \leq .01$.

^cDifference is significant at the level of $P \leq .001$.

of mentor may contribute differently to faculty mentees’ satisfaction and productivity. Our results support previous findings that faculty who are productive are not necessarily satisfied, and vice versa.^{10,11} Further, our results emphasize the importance of both informal and formal mentors performing specific mentoring behaviors to foster faculty satisfaction and productivity.

Faculty in our study experienced different outcomes from different types of mentoring. Having an informal mentor seemed to be more important for satisfaction, whereas having a formal (assigned) mentor who performed particular behaviors seemed to be valuable for productivity and somewhat valuable for satisfaction. However, selection bias may have played a role in these results: Just 7% of respondents reported having experience with a formal mentor only, so conclusions regarding the benefit of formal mentoring are made with caution. Faculty would likely gain the most benefit from having multiple mentors, including at least one formal and one informal mentor.^{15,30,31} Bland and colleagues¹⁸ have explained how to implement and support an effective, formal faculty mentoring program.

Faculty should be encouraged to seek informal mentors, which the literature suggests may be challenging for women and minority faculty.^{32,33}

The mentoring behaviors we examined were largely related to satisfaction and less so to productivity. It makes sense that mentees would derive satisfaction from the behaviors they reported, given that the mentor’s efforts are directed at providing support. It is interesting that only one behavior—serves as a role model—was positively related to article production, and that no behaviors were positively related to role as a PI/co-PI. Mentors may inspire and support efforts toward publishing and successful grant writing, but following through requires dedication from the mentee. Publication decisions are beyond the control of mentors and mentees, and other forms of published work were not included in this analysis. Further, although certain academic medicine faculty, such as clinician–educators, may benefit from an array of mentoring behaviors, they may not have been captured as “productive” in our analysis because they are not focused on traditional published, peer-reviewed scholarship as evidence of productivity. For such faculty, the lack of relationship

between the mentoring behaviors we examined, and the mentee’s article production and role as PI/co-PI may reflect use of the wrong “yardsticks” to measure productivity.

The lack of positive relationships found between specific mentoring behaviors and the productivity measures we selected differs from previous research showing that, for academic medicine faculty, mentoring in general is related to article production and being a PI.^{14,16,17} This contrast may simply reflect population differences between study cohorts. Given that a small number of our respondents reported having experience with only a formal mentor, we cannot be conclusive about the merits of formal versus informal mentoring on productivity in this cohort.

We did not find evidence that formal and informal mentors perform different mentoring behaviors. Although we did not categorize behaviors as career related or psychosocial per Kram’s²³ mentor role theory, it seems that both mentor types perform behaviors situated in each category. Although we found that formal and informal mentors perform similar behaviors, our data do not allow us to

Table 5

Tests of Significance Using Fisher z Test for Differences in Relationships Between Satisfaction and Mentoring Behaviors, and Between Article Production and Mentoring Behaviors, Compared by Mentor Type for 210 Faculty Respondents (With a Current Mentor), Institutional Climate Survey of Faculty, University of Minnesota Medical School, 2005

Mentoring behavior	Satisfaction							Article production						
	Formal mentor			Informal mentor			z	Formal mentor			Informal mentor			z
	r	z'	n	r	z'	n		r	z'	n	r	z'	n	
Serves as a role model	0.37	0.39	57	0.08	0.08	114	1.83	0.27	0.27	56	0.11	0.11	107	1.01
Promotes career through networking	0.35	0.36	57	0.15	0.15	113	1.25	0.10	0.10	56	-0.01	-0.01	106	1.04
Advises about preparation for advancement	0.35	0.36	57	0.20	0.20	109	0.98	0.27	0.28	56	-0.10	-0.10	102	2.22 ^a
Invites to networking events	0.36	0.38	57	0.21	0.21	114	1.01	0.22	0.22	56	-0.03	-0.03	107	1.48
Advises about getting published	0.38	0.41	56	-0.04	-0.04	111	2.63 ^a	0.31	0.32	55	0.02	0.02	104	1.76
Advises about department politics	0.43	0.46	57	0.15	0.15	113	1.86	0.20	0.20	56	-0.19	-0.19	106	2.30 ^a
Advocates for mentee	0.40	0.42	57	0.23	0.24	112	1.08	0.24	0.25	56	-0.13	-0.14	105	2.26 ^a
Critiques scientific/research/scholarly work	0.51	0.56	53	0.08	0.08	101	2.76 ^a	0.26	0.26	52	0.03	0.03	96	1.29
Critiques teaching/education work	0.35	0.37	46	0.01	0.01	92	1.93	0.08	0.08	45	-0.14	-0.14	88	1.16
Critiques clinical work	0.32	0.33	29	0.02	0.02	53	1.27	0.07	0.07	28	-0.15	-0.15	52	1.09
Promotes participation in professional activities	0.43	0.46	56	0.18	0.18	112	1.68	0.09	0.09	55	-0.13	-0.13	105	1.29
Advises about criteria for promotion and progress toward achievement	0.41	0.43	49	0.24	0.25	80	1.00	0.19	0.20	48	-0.20	-0.20	76	2.11 ^a
Annually reviews career development	0.33	0.35	57	0.33	0.34	109	0.01	0.18	0.18	56	-0.12	-0.12	103	1.78
Advises about balancing work and personal life	0.25	0.25	53	0.18	0.18	109	0.40	0.00	0.00	52	-0.04	-0.04	102	0.26

Abbreviations: r represents the Pearson correlation coefficient; z' represents the standard z score using Fisher r-to-z transformation.

^aA test statistic of $z < -1.96$ or $z > 1.96$ indicates a significant difference (two-tailed test). Difference is significant at the level of $P \leq .05$.

distinguish any differences in how these types of mentors *carry out* the behaviors. Further, although faculty in our sample perceived their current formal or informal mentor as not performing important mentoring behaviors frequently, neither the relationship between frequency and outcomes nor perceptions of adequacy regarding frequency were measured. Future research may address the relationship between frequency of mentoring behaviors performed by different mentor types and perceived benefits; it should consider that appropriate frequency may be best determined by the mentee's specific situation and needs. The behaviors

we examined are some of the most important, but mentors and mentees may identify other beneficial behaviors.¹⁸

Although we found that experience with informal rather than formal mentoring enhanced faculty satisfaction, we also found that faculty reported greater satisfaction when two of the important mentoring behaviors were performed by formal mentors. Again, selection bias may have influenced these results, as only a small number of respondents indicated having experience only with a formal mentor. Thus, the results tentatively demonstrate the efficacy of both informal and formal mentoring with regard to faculty satisfaction.

Regarding productivity, for 4 of the mentoring behaviors, faculty who indicated that these behaviors were performed by a formal rather than an informal mentor produced more published articles. For all but 3 of the 14 behaviors, the relationship between the behavior and article production is in the *opposite* direction when compared by mentor type: The correlation is positive when the behavior was performed by a formal mentor and negative when performed by an informal mentor. These results support earlier research that found formal mentoring to be most predictive of research productivity in academic medicine faculty.¹⁴ In our sample, mentoring behaviors performed

by informal mentors did not matter for article production, which emphasizes the need for both formal and informal mentoring.

It generally appears to be more important that mentoring behaviors are performed by any mentor rather than by a certain type of mentor. Ragins and colleagues³⁴ found that a mentee's level of satisfaction with the mentoring relationship—regardless of mentor type—is the key to mentoring outcomes. We did not assess perceptions of the *quality* of the mentoring relationship. Also, formal and informal mentors may perform the same behaviors but in different ways. Perhaps mentees behave differently when they have an assigned mentor and there is a structured relationship. Further, differences in respondents' faculty type (e.g., clinician–educators versus research-focused faculty) may affect the outcomes the mentoring relationship is focused on. If a mentee is involved in a mentoring program supported by the department or institution, there may also be more support in areas that could affect outcomes (e.g., research resources, rewards for good teaching). Finally, a critical issue that we did not examine is that there may be a self-selection bias: Faculty who are assigned mentors may be more likely to be research intensive a priori and may be a different population than faculty who develop informal mentoring relationships by their own initiative.

Our study contributes to the literature that supports the use of mentoring for academic medicine faculty development, but also suggests that this is an area for further prospective study.³⁵ It is important that faculty have mentors—ideally both formal and informal—to perform mentoring behaviors relevant to the mentee's needs. Bland and colleagues¹⁸ have emphasized the integral role that institutions and departments play in creating a culture that supports both formal and informal mentoring. Their work was based in an academic medicine context, but it can be applied broadly to other faculty and department types.

Given that mentoring is one of the few variables that has been found to be associated with both faculty satisfaction and productivity,^{7,14–17} our study makes a useful contribution to understanding the relationships among mentor type, mentoring behaviors, and these outcomes.

However, fostering faculty satisfaction and productivity is complex—numerous other variables have been shown to contribute to these outcomes.^{8,12–14} Future research should examine the ways in which the relationships we found in this study may directly affect or moderate other influences on faculty satisfaction and productivity.

Our study has limitations. It is a post hoc analysis of selected data from a survey that collected a wide range of data relevant to organizational climate, and it was not a result of hypothesis-directed research on mentoring. Because the survey was conducted at one medical school, the results may not be generalizable to other medical schools or other types of schools and faculty. Future research that addresses the applicability of our findings to different medical schools and contexts would be useful. In addition, our data are based on self-reports of experiences and perceptions. Further, we do not analyze outcomes by faculty type; thus, article production and role as a PI/co-PI may not be appropriate productivity measures for all faculty. Despite these limitations, our study contributes to the ongoing work to understand the complex relationships among mentor type, mentoring behaviors, and outcomes for academic medicine faculty. Future research that addresses the extent to which formal and informal mentors perform similar or distinct behaviors that contribute to academic medicine faculty satisfaction and productivity is warranted.

Dedication: We dedicate this report to our dear colleague and friend Carole Bland, who passed away on August 23, 2008, from pancreatic cancer after a struggle marked by courage, dignity, and grace. Carole devoted her extraordinary career to the professional development and productivity of faculty, administrators, and institutions of higher education. Her passion for cultivating faculty vitality—whether through mentoring, leadership development, or institutional change—was exceeded only by her vast scholarly contributions to the same field. She leaves behind a legacy of scholarship and programs that will continue to inform and inspire faculty and administrators for years to come. We are grateful for having had the privilege of working with her.

Funding/Support: None reported.

Other disclosures: None reported.

Ethical approval: This study was approved as exempt by the University of Minnesota institutional review board.

Previous presentations: Data from this study were previously presented in less refined form at the annual meeting of the Association for the Study of Higher Education; Louisville, Kentucky; November 2007.

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