What is the relationship between mentors' qualities and mentees successful progression in a Nursing PhD program?

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Background

Mentoring is an essential component of a doctoral student's success. Relationships develop, where both the mentor and the mentee experience professional growth. Mentorship has been shown to reduce students' anxiety (Hamrin et al., 2006), improve clinical outcomes (Dennison, 2010; Hamrin et al., 2006), increase retention of students (particularly those from underrepresented populations), and promote critical and diverse thinking (Brown et al., 1999). The Institute of Medicine report, *Future of Nursing: Leading Change, Advancing Health* (2010), called for the doubling of the number of nurses with a doctorate by 2020, with particular focus on increasing diversity (recommendation #6). Given the projection of severe nursing shortage, nurses with doctorates are needed to serve as leaders, teachers and mentors who are responsible for how nurses are educated, utilized and socialized into the profession. However, a limited pool of doctorally-prepared faculty hampers efforts to expand the registered nurse workforce and advance the discipline (Frederickson & Nickitas, 2014).

The Doctor of Philosophy (PhD) in Nursing Program at the Graduate Center, City University of New York prepares students for university faculty and research positions as well as those within healthcare settings. The Nursing PhD program focuses on underrepresented populations, and is helping to meet the need for a nursing workforce that reflects the diversity of our nation. One of the barriers for preparing doctoral-level faculty

is lengthy period between entry to the program and graduation, with an associated increased risk for drop-out (Grasso, Barry, & Valentine, 2007). Studies have shown that structured mentoring experiences increase student retention and degree completion (Mingo, 2008). However, evidence that identifies attributes of effective mentors—that is, those whose PhD student-mentees have high rates of retention, progression, and graduation—is scarce. Therefore, we conducted a descriptive correlational research study, which builds on a 2013-14 pilot study, to explore the relationship between mentors' qualities and key indicators of successful progression and completion of a nursing doctoral program.

Significance

The Institute of Medicine (IOM) report, *Future of Nursing: Leading Change, Advancing Health* (2010) called for the doubling of nurses with a doctorate by 2020, to add to the cadre of nurse faculty-researchers, with attention to increasing diversity. In light of a looming nursing shortage, doctorally prepared nurses are required to educate future generations of nurses. Doctoral faculty serve as leaders, teachers, and mentors who are responsible for how nurses are educated and socialized into the profession. The National Center for Health Workforce Analysis (2014) reports increased demand for nurses, particularly those who hold doctorates, as demand is projected to grow at 11% or more annually in every state (American Nurses Association [ANA], 2016), with especially high demand in the southern and western portions of the US. Despite such high demand for nurses, American Association of Colleges of Nursing data indicate that there is a national nursing faculty vacancy rate of 7.6%. Of unfilled positions, 88% were faculty positions requiring or preferring a doctoral degree (American Association of College of Nursing, 2012). The current generation of nurse educators is thus challenged to remediate the nursing shortage by preparing the next generation of nurses and nurse-educators with the

highest levels of leadership skills to provide evidence-based, patient-centered health care (IOM, 2010).

The Doctor of Philosophy in Nursing Program of the City University of New York Graduate Center is uniquely positioned to meet this critical need. As the first publicly funded PhD Nursing program at the Graduate Center, we provide affordable and accessible higher education to a diverse population of nursing students who will become leaders in their field. Nevertheless, one of the major barriers for preparing doctoral-level faculty is the time between entrance to a program and graduation, with an associated risk of drop-out (Grasso, Barry, & Valentine, 2007). Previous studies performed in the Graduate Center have shown the need for more structured mentoring interaction. However, in order to design effective mentoring programs, there is a need to explore mentors' qualities, and identify those skills and attributes that are related to mentee satisfaction and progression during the doctoral program. Development of research studies to deepen the understanding of mentor-mentee relationships could be key element to improving the quality of the overall educational experience of students during their doctoral studies.

Conceptual Framework

The National Education Association (1993, p. 17) defines mentoring "as a process in which one person, usually of superior rank, achievement and prestige, guides the development of or sponsors another person." A mentor is therefore "a person who advises, guides, encourages, and inspires another person during an extended period of time" (Vance & Olson, 1998, p. 5). A mentee, or protégé, is the person who receives advice, guidance, encouragement, and inspiration from another more experienced person during an extended period of time. According to Jacobi (1991), there are five elements, or functions, in the mentoring relationship on which there is general agreement: 1) mentoring focuses on

achievement or acquisition of knowledge; 2) consists of emotional and psychological

support, direct assistance with career and professional development, and role modeling; 3)

is reciprocal, where both mentor and mentee derive emotional or tangible benefits; 4) is

personal in nature, involving direct interaction; and 5) emphasizes the mentor's greater

experience, influence, and achievement within a particular organization. Nonetheless, the

accomplishment of the aforementioned functions depends greatly on a theoretically broad

array of mentors' qualities.

For purposes of this study, mentors' qualities could be explained in terms of

attributes and skills. Both features have been the focus of many studies. For example, Zhao,

Gold and McCormick (2007) suggest that a good mentor may include such attributes as

supportiveness, high levels of interaction, purposeful assistance of students in a timely

manner, provision of regular review of progress and treatment of the student as a junior

colleague. However, the nature of mentoring makes the assessment of students' preferences

and perceptions of mentors a critical element, since mentors' behaviors and mentees'

expectations may differ according to the discipline. One of the most popular instruments to

assess mentors' attributes is the Ideal Mentor Scale (IMS), which could raise student and

faculty awareness about the type of mentoring that is most desired (Rose, 2003).

The theoretical background that underlie the IMS is Anderson and Shannon's

(1988) model of mentoring, which consists of relationship components (e.g. role modeling),

functions and activities (teaching, sponsoring, encouraging, counseling, and befriending),

and dispositions (e.g., expressing care and concern). Also involved in the development of

IMS was Levinson's model of adult development (Levinson et al., 1978), which highlights

the roles of mentors (teacher, advisor, sponsor, and counselor) and their importance in adult

development. An important aspect of evaluating mentors' attributes through the IMS is that,

unlike other instruments that evaluate actual mentor's characteristics, the IMS asks the participants to rate for their definition of the *ideal* mentor. This is significant because throughout the life of mentoring relationships, individuals' needs regarding their mentor may change (Tinto, 1993). Therefore, it was decided to compare the mentors' ideal attributes of according the peer mentors progress of nursing doctoral students.

On the other hand, mentors' skills are another aspect that has been studied by different disciplines. To be competent in a behavior is to possess the knowledge, skills, and attitudes that comprise that behavior (Carraccio, Wolfsthal, Englander, Ferentz, & Martin, 2002). Consequently, skilled mentors are critical to the training of new researchers (Silet, Asquith, & Fleming, 2010). Experts have proposed certain competencies and skills that mentors must have in order to be a good mentor. For example, Abedin et al. (2012) have identified eight major categories of skills that are relevant for research mentors (leadership, empowerment, strategic perspective, integrity skills, judgement skills, political skills, creative thinking and communication skills). However, although studies indicate that effective research mentors exhibit a variety of characteristics, there is limited information about how to determine and measure the competencies that may help mentors in the field of clinical science (Pfund et al., 2006).

Fleming et al. (2013) developed an instrument focused on measuring six main competencies found within research mentors. Those competencies are in line with the workshop Mentor training for Clinical and translational Researchers, which was based in previous studies performed by researchers from the University of Wisconsin (Pfund et al., 2013). They are: 1) maintaining effective communication, 2) aligning expectations, 3) assessing understanding, 4) fostering independence, 5) addressing diversity, and 6) promoting professional development.

Mentoring skills can be learned and improved using a formal structured curriculum. As with most learning experiences, learning to be an effective research mentor is best accomplished when the training combines participation in a formal course/curriculum and engagement in the practice of mentoring, itself (Pfund et al., 2013). Assessment of actual mentors' skills may facilitate the matching of graduate students with mentors. Moreover, matches that take into account the student's needs plus the mentor's qualities are preferable to those based exclusively on traditional criteria, such as shared academic interests (Rose, 2003). This is one of the reasons why the students' perception of mentor skills, rather than the mentor perception, could be a way to identify the relationship between mentees progression and mentors' qualities.

Literature Review

The relationship between doctoral students and mentors may directly influence the quality of the doctoral education experience. The evidence indicates that mentorship has positive outcomes for students, including a supportive departmental environment (Hartnett, 1976), successful socialization into the department and discipline (Gerlhom, 1990), and timely completion of the degree (Girves & Wemmerus, 1988; Lovitts, 2001). On the other hand, negative mentoring is strongly implicated in many student's decisions to leave doctoral study (Lovitts, 2001).

Austin (2002) notes that disciplinary contexts may shape graduate experience and socialization, as well. Specifically, evidence suggest that there may be differences between the physical/biological sciences and the social sciences/humanities (Zhao, Golde, & McCormick, 2007). Also important is the notion that, throughout the life of a mentoring relationship, students' individual needs regarding their mentor may change (Tinto, 1993). Therefore, it is possible that the mentee's best fit with a mentor may change. Studying the

arc of mentoring relationships, Botma, Hurter, and Kotze (2013) found that mentors benefit from the use of multiple communication mediums, which nursing schools should work to develop, as well as the maintenance of mentoring relationships via feedback. Their evidence also suggests that nursing schools should match mentors with mentees using mutual interests.

Research has demonstrated wide-ranging benefits of peer mentorship in nursing education. Peer mentors have "proved invaluable" in identifying and addressing gaps between nursing education and ever-changing health care policies, procedures, supplies, and equipment (Dennison, 2010). Nursing education can be a stressful experience; as such, social support has been shown to be very helpful for students. For example, peer mentors act as collaborators or consultants to one another as they establish themselves as beginning scholars. Together, they learn to plan and implement problem-solving strategies in a milieu of sharing that overcomes defensive postures and promotes openness to each other's suggestions (Marshall, West, & Aitken, 2013; Vance & Olson, 1998). Student participation in peer mentoring has been shown to increase self-confidence and understanding of the role of the nurse leader (Ford 2015). Nursing student peer mentoring has also been shown to improve clinical skill mastery and retention (Ross, Bruderle, & Meakim, 2015).

Students benefit from a socially supportive relationship with senior peer mentors because the senior students have recently undergone the types of stressful experiences that junior students are experiencing. Within social support, students learn that they are not alone in their stressful experiences, that they can share feelings and experiences in an accepting environment (Hamrin et al., 2006). While peer-mentoring relationships are beneficial to all students, it provides role models and leadership for underrepresented groups in higher education, thereby increasing the retention of minority students (Good,

Halpin, & Halpin, 2000). In this regard, Welch et al. (2012) have shown that women in medicine experience gender-specific barriers that may be effectively mitigated by positive mentoring.

Previous experience.

It is important to note that The CUNY Graduate Center Doctor of Philosophy (PhD) in Nursing Program had experience in the study of this topic. During 2013-2014, faculty researchers piloted the "Doctoral Peer Mentoring Program," which consisted of pairing senior student mentors (second and third year students) with first-year student mentees. Part of the findings from the pilot study revealed that students' experiences were not universally positive. When asked if the Program achieved its stated goals, one mentor simply responded, *"[I] can't remember [the] stated purposes*." One mentee reflected cynically on the Program, "*I understand that you need data to support the grant, but it was difficult at times to meet the deadlines, with busy work/school/family schedules.*"

Lessons learned included the need for more structured interaction and fostering of some mentors' qualities. Participants expressed a need for a more convenient, streamlined way to communicate with each other and to report their experiences (e.g. via a blog). Taking into account the results of our pilot study, and considering the knowledge gap in nursing education, particularly at the doctoral level, we propose to deepen the study of mentors' characteristics in order to enhance the Doctoral Peer Mentoring Program for the 2015-2016 academic year and beyond. This research study may contribute to our understanding of the design and implementation of effective mentoring programs for doctoral nursing education.

Aims

The purpose of this study is to determine the relationship between 1) mentors' skills performance (maintaining effective communication, aligning expectations, assessing understanding, addressing diversity, fostering independence, promoting professional development) and the number of times First examination was presented; 2) between mentors' skills performance and time to Second Examination (Defense of Oral Proposal); 3) between ideal mentor attributes (integrity, guidance and relationship) perceived by graduates and time to degree; and 4) additionally, to compare the perception of ideal mentor attributes among mentees from first, second, third year students and alumni.

Hypothesis.

There will be an association between perception of mentors' skills and students' doctoral education progression.

Method

Study design and participants.

The study was conducted at a public university in New York City. Design was descriptive correlational. Population consisted of students and alumni from a Nursing PhD Program ($N = 96$), who received or were receiving mentorship/peer mentorship during their doctoral education. Total nursing doctoral student population was invited. The final convenience sample consisted of 38 nursing doctoral students and 13 graduates who accepted to participate ($n = 51$). Non-response rate was 43.3%.

Administering the instruments.

The Institutional Review Board (IRB) at City University of New York approved the study. Once IRB approval was obtained, the researchers started by inviting the alumni to participate in survey via e-mail. Potential participants were instructed to click a link where

they read information about the study. If they accepted to participate, then completed a socio demographic form and two scales that were distributed through Survey Monkey.

The doctoral students were invited after they finished their classes. A research assistant provided an in-person 10-minute description of the study. During this brief session the potential participants received the consent form. Subjects who accepted to participate and signed the consent form completed a socio demographic form and paper-pencil version of the Mentoring Competency Assessment inventory and the Ideal Mentor Scale. Data collection took about 20 minutes and was conducted from December 2015 to March 2016.

Instruments.

Participants completed a socio demographic form and two scales. The instruments were administered either in paper-pencil and/or digital version through the Survey Monkey platform. The socio demographic form included questions regarding gender, age, ethnic origins, number of times First Comprehensive Examination was presented, time to Second Examination and time to degree. Fewer number of times the First Examination was presented is an indicator of success during the first year and was considered as ordinal data. Less time to Second Examination and time to degree were treated as ordinal data as well (measured in number of semesters).

To evaluate mentors' skills performance the Mentoring Competency Assessment inventory (MCA; Fleming et al., 2013) was selected. The MCA was developed to measure student's perceptions of the skills of their research mentors. This instrument comprises 26 Likert items and has six subscales that evaluate mentors' performance in the following competencies: maintaining effective communication (6 items), aligning expectations (5 items), assessing understanding (3 items), addressing diversity (2 items), fostering independence (5 items), and promoting professional development (5 items).

Responses are arranged in a seven-point scale in which 1 = '*Not at all skilled*', 4 = '*Moderately skilled*', and 7 = '*Extremely skilled*'. To calculate scores the researchers summed the responses' values. Scores for each competency were calculated. Cronbach's alpha coefficient for this instrument was satisfactory (α = 0.976). Reliability for the six competencies was as follows: maintain effective communication α = 0.914, aligning expectations α = 0.940, assessing understanding α = 0.961, fostering independence α = 0.917, addressing diversity α = 0.711, and promoting professional development α = 0.895.

To measure mentors' ideal attributes, the researchers used the Ideal Mentor Scale (IMS; Rose, 2003). The IMS was developed to measure the importance of selected attributes of an ideal mentor. This scale asks doctoral students to rate the importance of selected functions and characteristics for their definition of the ideal mentor. It comprises 34 Likert items and has three subscales aimed to measure three broad attributes of mentors: integrity, guidance and relationship. The Integrity dimension embodies respectfulness for self and others and empowers protégés to make deliberate, conscious about their lives (items 3, 5, 7, 8, 10, 12, 14, 17, 19, 21, 23, 26, 29, 32). Guidance represents aspect of the day-to-day work of a graduate student, such as solving research problems and planning presentation of one's work (items 1, 2, 6, 9, 13, 16, 27, 31, 33, 34). Relationship connotes a sharing of the aspects of oneself that are traditionally viewed as private or somewhat more intimate than is typically the case in student-faculty relationships —like personal problems, social activities, and worldview (items 4, 11, 15, 18, 20, 22, 24, 25, 28, 30).

Items on this instrument are rated on a five-point scale ranging from 1 ('*Not at all important*') to 5 ('*Extremely important*'). The researchers calculated scores by adding the points specified in every response. As for this study, reliability was α = .942. Cronbach's alphas for the three dimensions were as follows: Integrity α = .871, Guidance α = .928 and

Relationship α = .913. Responses to the items were treated as ordinal data.

Data analysis.

Data obtained through Survey Monkey and the paper-and-pencil instruments were combined into a data set in order to conduct the data analysis. Data analyses for the socio demographics included descriptive statistics (percentages, measures of central tendency and dispersion). Kolmogorov-Smirnov test was performed in order to select the appropriate inferential statistic tests. Non-parametric tests were selected, as the outcome variables' residuals were not normally distributed. For aims 1, 2 and 3 Spearman Correlation Coefficient was used. To respond to aim 4, Kruskal-Wallis test was performed. Further statistical testing of the MCA and IMS included reliability analysis (Cronbach Alpha Coefficient). All data analyses were performed using the Statistical Package for Social Sciences (SPSS) for Mac OSX version 20.0.

Ethics.

To ensure ethical clearance, all participants were fully informed about the nature and purpose of the study. Students were informed that refusal of the research would not affect their progress in any form. Informed consent was obtained and content forms were signed prior data collection. In the case of the surveys distributed through Survey Monkey, a message indicated that by completing the survey they were consenting to participate in the study. Anonymity and confidentiality in treatment of the information were strictly observed

Findings

Most participants were identified as female (84.3%) and a minority preferred not to answer (7.8%). More than half of the sample was older than 46 years (76.5%). The majority of participants identified themselves as Caucasian/white (45.1%), followed by black or

African American (21.6%) and by those who decided not to answer (15.7%). Regarding the

alumni, 38.5% (5) of the participants studied in the Doctor of Nursing Science (DNS)

program, and 61.5% (8) graduated from the PhD program. On the other hand, current

students averaged 2.68 years (SD = 1.21) in the doctoral program. Current semester and

date of entrance to the program varied, as summarized in table 1.

Table 1

Current semester and date of entrance to the PhD program.

	F	%
Current semester		
1st semester	9	17.6
2nd semester	1	2.0
3rd semester	5	9.8
4th semester	0	0
5th semester	2	3.9
6th semester	8	15.7
7th semester	6	11.8
8th semester	0	0
9th semester	1	2.0
10th semester	2	3.9
11th semester	1	2.0
12th semester	2	3.9
20th semester and later	1	2.0
Alumni	13	25.5
Date of entrance to the program		
1st cohort	2	3.9
2nd cohort	5	9.8
3rd cohort	4	7.8
4th cohort	2	3.9
5th cohort	5	9.8
6th cohort	3	5.9
7th cohort	5	9.8
8th cohort	9	17.6
9th cohort	3	5.9
10th cohort	5	9.8
11th cohort	5	9.8
Prefer not to answer	3	5.9

To answer aims 1 and 2, Spearman's rank correlation coefficient was performed.

According to aim 1, there were three moderate-intensity significant coefficients indicating a

negative relationship between number of times First Examination was presented, and

Maintaining effective communication, aligning expectations, and addressing diversity

competencies (Table 2). Those coefficients suggest that when participants presented more

13

times the First Examination (indicator of delayed progression in the PhD or DNS

programs), they also referred lower scores on the aforementioned mentors' competencies.

Regarding aim 2, there were not significant relationships between mentors' competencies

and time to Second Examination (more time is an indicator of delayed progression in the

doctoral program.

Table 2

Spearman's rank coefficient between indicators of successful progression in the PhD

program and mentors' competencies.

Variables	1	2	3	4	5	6	7	8
1. Times presented First Examination	-							
2. Time to present Second Examination	$r_s = .177$ $p = .675$	-						
3. Maintaining effective communication	**$r_s = -.438$** **$p = .022$**	$r_s = -.089$ $p = .833$	-					
4. Aligning expectations	**$r_s = -.449$** **$p = .019$**	$r_s = .019$ $p = .964$	$r_s = .840$ $p = .001$	-				
5. Assessing understanding	$r_s = -.215$ $p = .283$	$r_s = .103$ $p = .809$	$r_s = .633$ $p = .001$	$r_s = .711$ $p = .001$	-			
6. Fostering independence	$r_s = -.131$ $p = .515$	$r_s = -.167$ $p = .693$	$r_s = .710$ $p = .001$	$r_s = .695$ $p = .001$	$r_s = .790$ $P = .001$	-		
7. Addressing diversity	**$r_s = -.382$** **$p = .049$**	$r_s = -.109$ $p = .797$	$r_s = .660$ $p = .001$	$r_s = .785$ $p = .001$	$r_s = .575$ $P = .001$	$r_s = .646$ $p = .001$	-	
8. Promoting professional development	$r_s = .110$ $p = .587$	$r_s = .562$ $p = .147$	$r_s = .424$ $p = .008$	$r_s = .504$ $p = .001$	$r_s = .560$ $P = .001$	$r_s = .627$ $p = .001$	$r_s = .429$ $p = .007$	-

In order to determine the relationship between ideal mentor attributes perceived by

graduates and time to degree (in years), Spearman's rank correlation coefficient was

performed. Table 3 shows a strong positive coefficient between IMS Relationship subscale

and the semester the graduate was enrolled when degree was awarded ($r_s = .639$, $p = .019$).

This means that participants that took more time to degree are those who scored higher in

the relationship subscale.

Table 3

Spearman's rank coefficient between time to degree and IMS subscales.

Variables	1	2	3	4
1. Time to degree	-			
2. Integrity	$r_s = .284$ $p = .347$	-		
3. Guidance	$r_s = .408$ $p = .166$	$r_s = .600$ $p = .030$	-	
4. Relationship	**$r_s = .639$** **$p = .019$**	$r_s = .630$ $p = .021$	$r_s = .340$ $p = .256$	-

Aim 4 consisted of comparing the perception of ideal mentor attributes among mentees from first, second, third year and alumni. As reported in table 4, only scores of Guidance subscale achieved statistical significance ($\chi^2 = 9.545$, $p = .048$). Note that the more advanced are students in the doctoral program, the lower scores of guidance they expect of their ideal mentor. This indicates a preference for a mentoring style characterized by formation of a personal relationship at the beginning of the doctoral program.

Table 4

Kruskal-Wallis test for IMS subscales according mentees' PhD status.

IMS Subscale	Mentees' PhD status	Mean rank	Median	SD	Kruskal-Wallis test
Integrity	First year	26.25	61.00	10.01	
	Second year	26.10	60.00	7.59	
	Third year	30.65	64.00	8.89	$\chi^2 = 2.884$,
	Fourth year and more	27.62	64.00	7.43	$p = .577$
	Alumni	20.58	59.00	6.53	
Guidance	First year	32.45	45.50	5.57	
	Second year	30.00	44.00	3.91	
	Third year	33.7	47.00	5.49	$\chi^2 = 9.545$,
	Fourth year and more	19.62	40.00	11.88	$p = .048$
	Alumni	19.96	39.00	7.24	
Relationship	First year	27.10	26.00	13.06	
	Second year	28.90	27.00	13.27	
	Third year	27.55	28.500	9.39	$\chi^2 = 1.580$,
	Fourth year and more	27.23	28.00	7.97	$p = .812$
	Alumni	21.62	26.00	7.02	

Conclusion

The outcomes of this study on the relationship between mentors' qualities and mentees successful progression in a Nursing PhD program demonstrate that there is value in providing mentoring and promoting successful relationships for students who are pursuing advanced doctoral education in nursing. These findings coincide with those of Nelhs et al. (2016), who identified that student-faculty mentoring relationship was an important factor on progression and attrition of PhD programs. However, is important to note that specific factors like mentors' assistance and, research and interpersonal connection may play a critical role in doctoral progression as well. Alternative approaches and further analyses are required to know our students' perceptions regarding their mentoring relationship.

This study indicates a preference for a mentoring style characterized by formation of a personal relationship at the beginning of the doctoral program. The mentoring relationship is considered as central to mentee satisfaction and success (Nehls et al., 2016), and improvement of communication skills has been recognized as a way to enhance mentor and mentee understanding (Abedin et al., 2012). Clear communication is essential early in the development of the mentor-mentee relationship; thus, early conversations should revolve around helping mentees identify their own goals and what they are seeking from the mentoring relationship. This may help not only to the establishment of shared understanding, but also for developing trust (Abedin et al., 2012). In order to address the lack of mentor-mentee communication and overall students' experience in the PhD program, adequate teacher preparation will be crucial. Of particular importance are matching mentors on the importance of selected functions according students' ideal mentor

attributes.

We have realized that maintaining effective communication, aligning expectations, and addressing diversity competencies are essential components to promote academic success and a pathway towards professional growth. Future studies are needed to build on the framework of mentoring by assessing of students' preferences and perceptions of an ideal mentor or peer mentor a critical element, as mentors' behaviors and mentees' expectations may differ. By improving the aforementioned mentoring-related elements we will contribute to reduce time to degree for doctoral nursing students and to meet the projected demand for increased nursing services.

Limitations and recommendations.

A limitation of this study is the generalization of the findings because the participants were selected by convenience. Thus our findings may be generalizable only to other similar populations. In this regard it is not possible to know whether individuals who rejected and those who participated had a comparable experience during their doctoral education.

Additionally, non-response rate was high. Alternative strategies must be considered in order to retain more participants and ensure a bigger sample. Finally, another limitation is the fact that the study cannot determine causal relationships because of the cross-sectional nature of the design. We recommend for future studies to measure mentees' perception and mentors' attributes along the doctoral program, so decisions may be taken in order to improve student's experiences.

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Appendices

Appendix A

Mentoring Competency Assessment

Instructions: Please rate how skilled you feel your mentor in each of the following areas: [we understand that you can only speak from your personal experience. Please try to rate whenever possible, reserving the 'not observed' category for cases where you have no basis for assessment]. Please mark (×) your response.

	Not at all skilled		Moderately skilled			Extremely skilled		Not observed
	1	2	3	4	5	6	7	
1. Active listening	☐	☐	☐	☐	☐	☐	☐	☐
2. Providing you constructive feedback	☐	☐	☐	☐	☐	☐	☐	☐
3. Establishing a relationship based on trust with you	☐	☐	☐	☐	☐	☐	☐	☐
4. Identifying and accommodating different communication styles	☐	☐	☐	☐	☐	☐	☐	☐
5. Employing strategies to improve communication with you	☐	☐	☐	☐	☐	☐	☐	☐
6. Coordinating effectively with other mentors with whom you work	☐	☐	☐	☐	☐	☐	☐	☐
7. Working with you to set clear expectations of the mentoring relationship	☐	☐	☐	☐	☐	☐	☐	☐
8. Aligning his/her expectations with your own	☐	☐	☐	☐	☐	☐	☐	☐
9. Considering how personal and professional differences may impact expectations	☐	☐	☐	☐	☐	☐	☐	☐
10. Working with you to set research goals	☐	☐	☐	☐	☐	☐	☐	☐
11. Helping you develop strategies to meet research goals	☐	☐	☐	☐	☐	☐	☐	☐
12. Accurately estimating your level of scientific knowledge	☐	☐	☐	☐	☐	☐	☐	☐
13. Accurately estimating your ability to conduct research	☐	☐	☐	☐	☐	☐	☐	☐
14. Employing strategies to enhance your understanding of the research	☐	☐	☐	☐	☐	☐	☐	☐

	Not at all skilled		Moderately skilled			Extremely skilled		Not observed
	1	**2**	**3**	**4**	**5**	**6**	**7**	
15. Motivating you	☐	☐	☐	☐	☐	☐	☐	☐
16. Building your confidence	☐	☐	☐	☐	☐	☐	☐	☐
17. Stimulating your creativity	☐	☐	☐	☐	☐	☐	☐	☐
18. Acknowledging your professionals contributions	☐	☐	☐	☐	☐	☐	☐	☐
19. Negotiating a path to professional independence with you	☐	☐	☐	☐	☐	☐	☐	☐
20. Taking into account the biases and prejudices s/he brings to your mentor/mentee relationship	☐	☐	☐	☐	☐	☐	☐	☐
21. Working effectively with mentees whose personal background is different from his/her own (age, race, gender, class, region, culture, religion, family composition, etc.)	☐	☐	☐	☐	☐	☐	☐	☐
22. Helping you network effectively	☐	☐	☐	☐	☐	☐	☐	☐
23. Helping you set career goals	☐	☐	☐	☐	☐	☐	☐	☐
24. Helping you balance work with your personal life	☐	☐	☐	☐	☐	☐	☐	☐
25. Understanding his/her impact as a role model for you	☐	☐	☐	☐	☐	☐	☐	☐
26. Helping you acquire resources (e.g. grants, etc.)	☐	☐	☐	☐	☐	☐	☐	☐

Appendix B

The Ideal Mentor Scale

Instructions: Please do not rate an actual person in your life (if you currently have a mentor).

Rather, please indicate how important each attribute or function is to your definition of

the ideal mentor. Please mark (×) your response.

Right now, at this stage of my program, my ideal mentor would…	Not at all important 1	2	Moderately important 3	4	Extremely important 5
1 – Show me how to employ relevant research techniques	☐	☐	☐	☐	☐
2 – Give me specific assignments related to my research problem	☐	☐	☐	☐	☐
3 – Give proper credit to graduate students	☐	☐	☐	☐	☐
4 – Take me out for dinner and/or drinks after work	☐	☐	☐	☐	☐
5 – Prefer to cooperate with others than compete with them	☐	☐	☐	☐	☐
6 – Help me to maintain a clear focus on my research objective	☐	☐	☐	☐	☐
7 – Respect the intellectual property rights of others	☐	☐	☐	☐	☐
8 – Be a role model	☐	☐	☐	☐	☐
9 – Brainstorm solutions to a problem concerning my research project	☐	☐	☐	☐	☐
10 – Be calm and collected in times of stress	☐	☐	☐	☐	☐
11 – Be interested in speculating on the nature of the universe or the human condition	☐	☐	☐	☐	☐
12 – Treat me as an adult who has a right to be involved in decisions that affect me	☐	☐	☐	☐	☐
13 – Help me plan the outline for a presentation of my research	☐	☐	☐	☐	☐
14 – Inspire me by his or her example and words	☐	☐	☐	☐	☐
15 – Rarely feel fearful or anxious	☐	☐	☐	☐	☐
16 – Help me investigate a problem I am having with research design	☐	☐	☐	☐	☐
17 – Accept me as a junior colleague	☐	☐	☐	☐	☐
18 – Be seldom sad or depressed	☐	☐	☐	☐	☐
19 – Advocate for my needs and interests	☐	☐	☐	☐	☐
20 – Talk to me about his or her personal problems	☐	☐	☐	☐	☐

Right now, at this stage of my program, my ideal mentor would…	Not at all important 1	2	Moderately important 3	4	Extremely important 5
21 – Generally try to be thoughtful and considerate	☐	☐	☐	☐	☐
22 – Be a cheerful, high-spirited person	☐	☐	☐	☐	☐
23 – Value me as a person	☐	☐	☐	☐	☐
24 – Have coffee or lunch with me on occasion	☐	☐	☐	☐	☐
25 – Keep his or her workspace neat and clean	☐	☐	☐	☐	☐
26 – Believe in me	☐	☐	☐	☐	☐
27 – Meet with me on a regular basis	☐	☐	☐	☐	☐
28 – Relate to me as if he/she is a responsible, admirable older sibling	☐	☐	☐	☐	☐
29 – Recognize my potential	☐	☐	☐	☐	☐
30 – Help me to realize my life vision	☐	☐	☐	☐	☐
31 – Help me plan a timetable for my research	☐	☐	☐	☐	☐
32 – Work hard to accomplish his/her goals	☐	☐	☐	☐	☐
33 – Provide information to help me understand the subject matter I am researching	☐	☐	☐	☐	☐
34 – Be generous with time and other resources	☐	☐	☐	☐	☐