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The Role of Mentoring in the Careers of Female Airline Transport Pilots

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Cover Page Footnote

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Women are underrepresented in commercial aviation today. In 2016, women accounted for 4.3 percent of airline transport pilots (ATPs) in the United States (FAA, 2017a). This is a 1 percent increase over the number of female ATPs listed in the FAA database in 2002.

This lack of gender diversity has long-term consequences for the aviation industry. A looming pilot is a major area of concern for commercial air carriers, especially among the so called regional airlines. The United States Department of Labor, Bureau of Labor Statistics (2017) estimates that "employment of commercial pilots is projected to grow 4 percent from 2016 to 2026." While the Federal Aviation Administration (FAA) warns, "regional airlines are facing pilot shortages and tighter regulations regarding pilot training. Their labor costs are increasing as they raise wages to combat the pilot shortage," with a predictable effect on their profitability (FAA, 2017b, p. 11).

Women comprise 50.8 percent of the U.S. population (United States Census Bureau, 2016). Additionally, they account for 60 percent of bachelor degrees awarded in the United States (Fischer, 2013). This is significant because a bachelor's degree is a prerequisite for being hired as a pilot by all of the major U.S. flagged air carriers. Suffice it to say, it will be very difficult to meet the future demands of the industry without an increased participation by women.

One possible intervention to increase the number of women in aviation is mentoring. The benefits of a positive mentoring relationship have been well documented (Allen, Eby, O'Brien, & Lentz, 2008; Kram, 1985; Ragins, 2012; Ragins & Cotton, 1999; Scandura, 1998). They include more promotions, higher wages, greater job satisfaction, and an increased sense of confidence and well-being by the protégé. More importantly, mentoring has been shown to increase recruitment and retention among underrepresented populations in traditionally male dominated industries (Johnson & Andersen, 2010; Leavey, 2016). Towards this end, the present study explored what role mentoring played in the lives and careers of female ATPs.

Literature Review

The term mentor comes from Greek mythology. In Homer's Odyssey, Mentor was the servant of King Odysseus who was entrusted with the education of his son, Telemachus, when Odysseus left to fight the Trojan War. "Mentor was described as providing both wise and sensitive counsel to the son to groom him to become king" (Russell & Adams, 1997, p. 1).

Today, the term mentoring "implies a relationship between a young adult and an older, more experienced adult that helps the younger individual learn to navigate in the adult world and the world of work. A mentor supports, guides, and counsels the young adult as he or she accomplishes this important task" (Kram, 1985, p. 2).

Kram (1985) identified two main areas mentors intervene for their charges: career development and psychosocial support. Under this model, each of these categories can be further subdivided into distinct behaviors. Career development functions are those that "help protégés learn the ropes and facilitate the protégé's advancement in the organization" (Ragins & Cotton, 1999, p. 530). Behaviors associated with career development include: sponsorship; coaching, teaching, and guiding; increased exposure and visibility within the organization; protection; and providing challenging assignments.

Psychosocial support are those behaviors that address interpersonal aspects of the mentoring relationship and "enhance the protégé's sense of competence, self-efficacy, and professional and personal development" (Ragins & Cotton, 1999, p. 530). Unlike career development functions, psychosocial support does not rely on the mentor's position within the organization. Rather, it is dependent upon the quality of the interpersonal relationship between mentor and protégé. Behaviors associated with psychosocial support include acceptance and confirmation, counseling, friendship, and role modeling.

Mentoring relationships also tend to fall into two broad categories: formal and informal. Formal mentoring relationships are developed within the context of the organization and require organizational support and intervention. One third of the nation's major companies have some form of a formal mentoring program (Ragins & Cotton, 1999). Conversely, informal mentoring relationships develop spontaneously. Although they occur within the context of the organization, they are not sponsored or supported by the administration (Ragins, 2012).

There are several key differences between formal and informal mentoring relationships. Formal mentoring relationships are assigned by a program coordinator and the participants often do not meet until the match has been made. Many formal mentoring relationships are contractual, with a specific set of goals and prearranged meeting times agreed upon at the outset. These relationships last between six months and one year and the termination is often preprogrammed into the relationship (Lentz & Allen, 2009; Ragins & Cotton, 1999).

Feldman (1999) and Ragins and Cotton (1999) agree that for mentoring to be most effective, mentors and protégés should share not only work interests but deep bonds of liking and trust as well.

> However, it is almost impossible for firms to determine a priori which potential mentors and protégés would best be suited to each other in terms of needs, temperament, and personal style. Organizations cannot, by fiat, dictate trust and liking among colleagues … [stressing that] these deeper relationships take much longer to develop and consequently cannot be 'managed' in a top-down, 'timely' fashion (Feldman, 1999, p. 251).

Johnson and Ridley (2008) concur. Successful mentors are vigilant and discerning of the traits, talents, and interests of their junior personnel and careful to embark on mentorships only with those who match them well. The investment should pay dividends for both mentor and protégé" (p. 3). Since in formal programs perfect strangers may be paired with little communication about the matching process, "Finding a mentor in a formal program may be like trying to find true love on a blind date—it can happen, but the odds are against it" (Johnson & Andersen, 2010, p. 117).

The second major type of mentoring relationship is informal in nature. Because informal mentoring relationships develop organically, they are often more free form with less structured meeting arrangements and have goals that evolve over time. Informal relationships last longer than formal ones, three to five years on average, and often terminate when one person is transferred or leaves the organization. Informal relationships are also more concerned (at least initially) with the psychosocial aspects of the relationship. The mentor and protégé may develop a parent-child type relationship from which both benefit. For the mentor, an informal relationship may develop because he/she views their charge as a younger version of themselves and gain a sense of wellbeing from giving back to the future generation (Ragins & Cotton, 1999).

Informal mentoring relationships avoid many of the pitfalls of their more formalized counterparts since the relationship begins naturally. The parties sought each other out. They were not assigned. The importance of this dynamic cannot be overstated. In a military study involving 691 retired Navy flag officers (Admiral), "67% reported having at least one salient mentor during their careers as officers, and most had had at least three important mentors. In most cases, the mentorships formed due to the mentors' initiative or through mutual interest"

(Johnson & Andersen, 2010, p. 115); it is the organic genesis of these relationships, not their organizational context which makes them memorable.

Given these facts, it is not surprising that members of informal mentoring relationships report a higher degree of satisfaction as well as enjoying greater upward mobility and financial rewards than those who experienced only formal mentoring relationships (Kram, 1985; Ragins, 2012; Ragins & Cotton, 1999; Scandura, 1998).

Method

This study uses a cross sectional survey design to examine the role mentoring has played in the lives of female ATP. A cross sectional survey design, also known as a snapshot, is a design where the researcher gathers data at one point in time. These surveys are the mainstay of research efforts in the social sciences. Although it is not possible to prove causation using this method, their appeal lies in their ability to provide descriptive information regarding the target audience as well as provide a limited amount of generalizability to the larger population (Carlin & Hocking, 1999; Creswell, 2005).

The purpose of this study was to determine what effect, if any, mentoring played in the lives and careers of female ATP. The following research questions guided this study:

Research Question Number One:

Is there a difference in self-reported perceptions of success between female Airline Transport Pilots who report having been mentored and those who have not?

Research Question Number Two:

Is there a difference in the amount of career oriented assistance, as measured by the Mentor Role Instrument, given to female Airline Transport Pilots who report having an informal mentoring relationship compared to those who report a formal mentoring relationship?

Research Question Number Three:

Is there a difference in the amount of psychosocial support, as measured by the Mentor Role Instrument, given to female Airline Transport Pilots who

report having an informal mentoring relationship compared to those who report a formal mentoring relationship?

Instrument

To answer the research questions, this researcher chose the Mentor Role Instrument (MRI) developed by professors Ragins & McFarlin, (1990). "The questionnaire assesse[s] perceptions of career development (sponsorship, coaching, protection, challenging assignments, and exposure) and psychosocial (friendship, role modeling, counseling, and acceptance) mentor roles" as well as the perception of the mentor as parent as described by Kram, (1985) in her original research (Ragins & McFarlin, 1990, p. 326).

Participants

Participants were all female aviators who hold a Airline Transport Pilot (ATP) certificate from the Federal Aviation Administration (FAA), or the international equivalent issued by the International Civil Aeronautics Organization (ICAO). The ATP is the "FAA's highest certificate and includes training in: aerodynamics, automation, adverse weather conditions, air carrier operations, transport airplane performance, professionalism, and leadership and development" (Federal Aviation Administration, 2013).

The ATP certificate is required by law to act as either the Pilot in Command (PIC) or Second In Command (SIC) on a commercial air carrier authorized under 14 CFR Part 121 (*14 CFR Part 121, Subpart M-Airman and Crewmember* Requirements). Part 121 air carriers are more commonly known as commercial or regional airlines. They provide scheduled service within the National Airspace System (NAS).

The ATP was chosen as the entry point for this study because those who have achieved this milestone have established themselves in their career and are among the upper eschelons of the profession. Since the total population we are dealing with is small, attmempts to contact these women was, by necessity, very focused. "The International Society of Women Airline Pilots," a selective group of female aviators who must be CFR Part 121 pilots and hold an ATP to join, posted our announcement on their website and social media. The University of North Dakota Alumni Association also sent out an email to over 1100 female alumni asking for their participation.

Results

Participant Demographics

There were 158 eligible participants in this study. Members of the study shared similar demographics. Age, years of flying professionally, and total number of hours as Pilot in Command (PIC) all correlated across the three main mentoring groups. Those respondents who were older tended to have more years in the profession and a greater total number of hours as PIC. The majority of participants were between 26 -40 years old, had 6-10 years of professional flying experience, and had accumulated between 2,501 – 5,000 hours as PIC. The second largest group were more mature, reporting their ages to be between 41-55 and having over twenty years of professional flight experience and greater than 10,000 hours as PIC.

As would be expected from this population (female ATP), most respondents have at least a bachelor's degree (a bachelor's degree is required by all large scheduled airlines, but not by smaller, regional airlines). It is interesting to note that this is not universal. A minority of pilots in each category reported their highest level of education to be either a high school diploma or associate's degree.

Research Question Number One

Research Question Number One asks: "Is there a difference in self-reported perceptions of success between female Airline Transport Pilots who report having been mentored and those who have not?" The dependent variable for this question was "How successful do you view yourself in your profession?" Using a slider, the subject chose a number between 0 and 100 to indicate their response.

The means between the two groups were evaluated using an independent sample t-test. Homogeneity of variance was assessed for both groups by Levene's Test for Equality of Variances. An independent t-test was run on the data with a 95% confidence interval (CI) for the mean difference. It was found that there was no significant difference in the means of the two groups $t(144) = -.063$, $p = .950$. Given these findings Research Question Number One we fail to reject the null hypothesis. There is no statistically significant difference between the two main groups.

Ten Mentoring Functions

Ragins & McFarlin, (1990) designed the MRI to explore the ten main functions of a mentor originally described by Kram (1985). In this instrument,

three Likert style questions evaluated each function. For this study, the answers for each question in the MRI were grouped according to their function as identified by Ragins & McFarlin, (1990). This resulted in ten new variables. The means for each of these new variables was compared between the two main subgroups of mentored participants as described above. The means were compared using an Independent Sample T test. Homogeneity of variance was assessed for both groups by Levene's Test for Equality of Variances. Where Levene's test was significant, the degrees of freedom were adjusted using the Welch-Satterthwaite method as calculated by SPSS©.

Research Question Number Two

Research Question Number Two asks: "Is there a difference in the amount of career oriented assistance, as measured by the Mentor Role Instrument, given to female Airline Transport Pilots who report having an informal mentoring relationship compared to those who report a formal mentoring relationship?" To answer this question those areas of the MRI associated with career guidance were examined. Independent sample *t*-tests were conducted to assess for significance. The results are displayed in Table 2.

As Table 2 clearly shows, there is statistical significance in each of the five mentoring functions associated with career advancement. In each case the mean for the informal mentor group was significantly higher than the formal mentor group. Also, in each of these areas homogeneity of variance was shown by Levene's test.

Research Question Number Three

Research Question Number Three deals with psychosocial support within the context of the mentoring relationship. It asks, "Is there a difference in the amount of psychosocial support, as measured by the Mentor Role Instrument, given to female Airline Transport Pilots who report having an informal mentoring relationship compared to those who report a formal mentoring relationship?"

As with previous data, homogeneity of variance was assessed for both groups by Levene's Test for Equality of Variances. Where Levene's test was significant, the degrees of freedom were adjusted using the Welch-Satterthwaite method as calculated by SPSS©. An independent *t*-test was run on the data with a 95% confidence interval (CI) for the mean difference. The results are displayed in Table 3.

Statistical significance was found in three out of five factors concerning interpersonal relationships (Role Modeling, Counseling, and Parent). Acceptance and Friendship did not demonstrate significance when the smaller degrees of freedom were used to address the significant Levene's Test.

Table 1
Mentoring Functions Associated with Career Advancement

		n	M	SD	M Diff	*t*	*df*	*p*
Sponsor					-96.28	-3.07	62	.003*
	Formal	10	67.60	94.82				
	Informal	54	163.88	90.38				
Coach					-93.19	-3.44	60	.001*
	Formal	10	110.00	99.54				
	Informal	52	203.19	73.98				
Protect					-92.75	-2.78	63	.007*
	Formal	9	44.22	77.4				
	Informal	56	136.98	94.64				
Challenge					-106.15	-2.97	62	.004*
	Formal	10	72.60	92.16				
	Informal	54	178.75	105.42				
Exposure					-64.92	-2.42	73	.018*
	Formal	13	106.15	95.46				
	Informal	62	171.08	86.04				

Table 2
Mentoring Functions Associated with Psychosocial Concerns

	n	M	SD	M Diff	t	df	p
Friendship (≠V)				-51.25	-2.06	12.87	.060
Formal	13	218.53	88.08				
Informal	68	269.79	38.26				
Parent				-82.99	-2.50	66	.015*
Formal	10	74.80	79.25				
Informal	58	157.79	99.37				
Role Model				-47.46	-3.14	76	.002*
Formal	13	208.07	72.28				
Informal	65	255.53	44.12				
Counseling				-105.44	-4.88	73	.000*
Formal	12	108.75	71.25				
Informal	63	214.19	68.03				
Acceptance (≠V)				-41.64	-1.77	12.92	.100
Formal	13	236.38	83.09				
Informal	67	278.08	36.66				

* Indicates statistical significance, *p*<.05
≠V = Equal Variance Not Assumed

Discussion

Research Question Number One

This study explored what role, if any, mentoring had on the lives female ATP. There was no statistically significant difference in the perceived feelings of success between those female ATP who had been mentored and those who had not.

One possible reason for this result is the women themselves. Many of the older women in this study were among the fist female ATP hired by their respective airlines. These women were hired in the late 1970s and early 1980s; a time when their presence was unique. There were only 480 female ATP in the FAA Database in 1980 (Douglas, 2015). These women did not have more senior women to act as role models; they were the first.

Research Question Number Two

Research Question Number two asked if there was a difference in the amount of career oriented assistance offered between those who reported an informal mentoring relationship and those who reported a formal relationship. For the female ATP involved in this study the answer was unequivocally yes. There was a statistically significant difference in the amount of career oriented assistance given to female ATP who had reported an informal mentoring relationship when compared to those who reported a formal mentoring experience. Significance was reached in each of the five factors associated with career advancement. For the female ATP who participated in this study, it was clear that those who reported an informal mentoring relationship found it superior when compared to their formal counterparts.

Research Question Number Three

Research Question Number three dealt with psychosocial support within the context of the mentoring relationship. The answer to this question was less clear. Significance was found in 3/5 factors associated with psychosocial concerns and support. The factors associated with Parent, Role Model, and Counseling all reached significance, while the factors for Acceptance and Friendship both fell short when the smaller degrees of freedom necessitated by the unequal variances were used to lessen the chance of a Type I error. For three out of five factors, the respondents felt that informal mentoring was superior to formal mentoring relationships.

The lack of significance in the last two factors was a surprise to this researcher. In the literature, informal mentoring relationships are often associated more closely with psychosocial factors than career advancement. For the female ATP in this study that is not necessarily the case. The data supports an argument that both protégé groups felt equally valued and cared for by their mentors. It is possible that for the women involved in this study, when it came to the constructs of acceptance and friendship, they were fortunate to have a very high quality formal and informal mentoring relationships.

A contributing factor may also be the pilot lifestyle. Airline pilots lead two separate lives: one nomadic and one more grounded. While flying, the female ATP is gone from home for three to seven days on average. During that time, they may be with several different flight and cabin crews. Working with the same group of people on a routine basis is not the industry norm. For this reason, work relationships are harder to develop and maintain than those experienced in a more

geographically confined profession. Rather than looking to a mentor or colleagues for acceptance and validation, these functions may be met while at home.

Additionally, as mentioned above, these women are experienced professionals with a record of accomplishment. While the need for acceptance and friendship does not disappear as you mature in your profession, it does diminish. Their need for external validation may very well be less than a novice pilot flying the line for the first time.

Limitations and Implications for Further Research

Small sample size limits the generalizability of this research. Not every participant answered every question. Those that did not answer were not included in the calculations for that question. The effect of these dropped subjects becomes more apparent as you proceed through the statistical testing. For the ten function tests the number available for the informal group was 52-67 and 9-13 for the formal group. Dwindling sample sizes reduces the power and hampers generalizability.

Another limitation was the narrow scope of the research. While it is important to prevent compounding variables from invalidating the study results, restricting the study to only women pilots ignores the larger aerospace industry. Air Traffic Control, airport management, maintenance, flight ops, cabin crew, dispatch, corporate management, etc. all are areas where women are making contributions to the industry. How are their mentoring needs different from female ATP? Are their concerns similar or widely divergent? These are important questions that are left unanswered by the present research.

The generalizability of this study is further hampered by the focus on perception. Such perceptions may or may not be representative of actual mentor relationship behaviors (Ragins & McFarlin, 1990). Further research that more adequately associates actual mentoring behavior with measurable occupational outcomes would be beneficial.

A longitudinal approach with any future research would be valuable. While the cross-sectional study design is the mainstay of much social science research, its greatest weakness is the inability to reflect change in the subject over time. The present research was not able to address how the mentoring needs of female ATP change throughout their careers. Specifically, are the mentoring needs of a new line pilot different from those of a senior captain nearing retirement?

Similarly, of concern to employers, is there a time in their careers where female ATP benefit more from a formal mentoring process than others? Are specific interventions more effective at certain stages in a female ATP's career than others? A longitudinally arranged repeated measures design would provide a sensitivity and sophistication not available in a snapshot study.

Conclusion

Women have been traditionally underrepresented among the ranks of commercial airline pilots. This disparity continues today. Issues of diversity aside, changing demographics indicate that it will be increasingly difficult to meet the future personnel needs of the profession without greater participation of women. Mentoring represents one possible intervention to help achieve this goal.

This study was concerned with the role mentoring had in the lives and careers of female ATP. While there was no statistically significant difference in the self-reported feelings of success between those women who were mentored, and those who were not; there was significance between those who had an informal versus a formal mentoring relationship. This latter difference is in keeping with previous mentoring research. Informal mentoring relationships develop organically, last longer, and are on average more intense and satisfying than their formal counterparts.

An interesting departure from previous mentoring research was found in the area of psychosocial support. Previous research has consistently identified informal mentoring relationships as superior in this area. The results of this study were not as conclusive. Only 3/5 of the variables associated with psychosocial support were statistically significant between the two mentoring groups. The reason for this difference is not clear and would be a fruitful subject for future research.

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