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How Mentors Affect Workers' Interests and Involvement at Work

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Abstract

Survey data about experiences with mentors were collected from 95 workers at NASA's Jet Propulsion Laboratory. Whereas much existing research has focused on mentors' impact on technical or organizational knowledge, this analysis focused on their shaping of protégés' work interests. Mentors' communication of their goals and values, use of modeling as the chief mode of influence, and supervisory responsibility over the protégé – all features of ongoing, face-to-face relationships - were associated with greater perceived influence by the mentor upon the protégé's work interests. Furthermore, strength of attributed influence was associated with the protégés' experience of deep involvement (flow) in everyday work tasks. The findings raise questions about reliance on formal mentorships unconnected to protégés' daily work experience and discouragement of supervisor-mentor relationships

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Kram's seminal work on organizational mentoring in 1985 identified two main areas, career and psychosocial development, where mentors guide their protégés. Since that time, much research has been conducted investigating the variables and conditions that lead to the most beneficial outcomes for mentors (Edlind & Haensly, 1985; Haensly & Parsons, 1993; Buhler, 1996), protégés (Haensly & Parsons, 1993; Newby & Heide, 1992; McManus & Russell, 1997; Turban & Dougherty, 1994; Edlind & Haensly, 1985) and the organization as a whole (Corzine et al, 1994; Buhler, 1996). According to Ostroff and Kozlowski (1993), at an employee's early stage in an organization, "there is probably no meaningful substitute for a mentor for learning about organizational issues" (p.174).

It appears from our findings that face-to-face interaction lends benefits to the protégé that other methods of interaction do not. The conditions below were found to have a significant influence on the ascription by the protégé of their work related interests onto their mentor of their work related interests. The common thread of these various conditions is that, as mentioned above, they all occur more frequently during face-to-face interactions. These conditions include; the use of modeling by the mentor as the chief mode of influence, the mentor possessing supervisory influence over the protégé, the sharing of interests between mentor and protégé, the mentors' communication of their professional commitments to the protégé, and the trend of informality as the basis for the relationship.

This paper expands on the mentoring literature by identifying a new consequence to the mentoring paradigm. When the mentoring dyad exhibits characteristics of the aforementioned criteria, the protégé will, as mentioned above, be more apt to attribute to their mentor their work

related interests, and subsequently experience a deeper involvement at work. They will experience Flow (Csikszentmihalyi, 1975).

In exploring the sparking of workers' interests by a mentor, we are focusing on the cultivation of worker motivation. Interest in a given activity is likely to foster long-term investment of attention and effort in it. It is thus important to study mentors' impact on protégés' interests just as it is important to study mentors' impact on acquisition of technical expertise or knowledge about the organization.

The quality of the protégé's involvement at work is defined in this study by the protégé's level of Flow while participating in his or her most frequent task at work. The concept is defined by Csikszentmihalyi (1990, p. 4) as, "the state in which people are so involved in an activity that nothing else seems to matter," it is, according to Csikszentmihalyi (1990), "an optimal experience."

Supervisors, managers and mentors

Senge (1990) stresses the need for managers and leaders to become teachers and transform their organizations into ones of continuous learning. Leaders, according to Senge must become designers, teachers and stewards in order to bring the organization to a level where managers can best motivate, reward, train, educate and help to improve their employees. This helps employers retain their employees since "quality supervisory relationships make the difference in bonding young and culturally diverse employees to their organization" (Dixon-Kheir, 2001, p. 139).

One process by which organizations can create and maintain a competitive edge is through the use of mentoring (Aryee, Chay, & Chew, 1996). It is apparent that the role of a mentor clearly relates to the roles of leader and supervisor as defined above. What is the task of

a mentor? Kram (1985) first posited, and has been repeated in a plethora of articles since, a mentor's charge is to guide his or her protégés in psychosocial and/or career related issues with the aim of bettering the protégé. It is, according to Haensly and Parsons (1993), to help protégés reach their goals and modify their skills and attitudes by evaluating the protégés' progress throughout the relationship. Mentors are charged with acting as a role model, coaching, protecting their protégés within the organization (McManus & Russell, 1997) and providing information to the protégés on organizational issues (Ostroff & Kozlowski, 1993). It is with the help of a mentor that a protégé can avoid many organizational pitfalls and can gain insights that might otherwise take far longer to achieve (Newby & Heide, 1992).

Who can function as a mentor? The *manager* as a mentor has been discussed; Eby (1997) recognized that the manager-mentor could meet protégés' psychosocial needs, and Burke, McKeen and McKenna (1993) showed that mentors whose protégés were under their direct supervision were provided with significantly more psychosocial and career development than those protégés not under their direct supervision.

Professional development performed by the mentor includes training in technical skills and in how to perform specific parts of the protégé's job. These are things, according to Benabou and Benabou, which are sought by employees of their supervisors. Another task of the manager-mentor is to help the protégé avoid failures by guiding him or her in the right direction (Newby & Heide, 1992). In terms of providing support, Noe, Noe and Bachhuber (1990) explain that when managers offer support to their subordinates, the subordinates have more career motivation and also are more apt to participate in developmental activities (Noe & Wilk, 1993) such as mentoring or career development.

Eby (1997) suggests that when supervisors mentor their subordinates they may be in the “most natural” position to help the protégé meet his or her specific goals, and since managers are typically involved in career planning (Leibowitz, Farren & Kaye, 1986), this pairing may be a natural union. Managers, according to Eby (1997) are charged with providing work assignments and with introducing their subordinates to others in the organization. They have also been shown to provide organizational information to new employees during their introductory period (Feldman, 1989). The latter parallels Haensly and Parsons (1993) research, which tells that one of the jobs of a mentor is to “open doors” for the protégé to meet people in the field and allow them to make contacts with “people, situations, and events that have been part of the mentor’s strength” (p.205).

Loyalty, support and trust are vital in both supervisor – subordinate relationships and mentor – protégé relationships; Dienesch and Liden (1986) observe that strong bonds are often (yet selectively) established between supervisor and subordinate within organizations. In these interactions, “higher quality” relationships with their supervisor may cause protégés greater levels of expectancy, efficacy and instill a desire to be a part of future “high quality” relationships (Allen, Poteet, Russell & Dobbins, 1997), thus leading to future mentoring relationships where the current protégé becomes a supervisor and mentors his or her subordinates. It is these types of relationships that may develop into informal mentoring pairs as the inspiration of supervisors to mentor others comes as a result of their previous experience as a mentor or protégé (Willbur, 1987; Ragins & Scandura, 1999; Ragins & Cotton, 1993; Allen et al, 1997).

Starcevich and Friend (1999) found that over half of the respondents to their “Effective Mentoring Survey” felt that their most effective mentor was their direct supervisor. Some of the

things these “effective” mentors did for the protégés included: stimulation of learning, listening to them, explaining things thoroughly, coaching and challenging, and teaching by example. Why is it that organizations, as well as researchers, feel that supervisors should not mentor their subordinates? Kram and Isabella (1985) cite the hierarchical relationship between supervisor and subordinate as a challenging factor in communication, even though subordinates who have close relationships with their supervisors have been shown to receive greater information about their jobs than those who do not (Kozlowski & Doherty, 1989). Allen, Day and Lentz (2001) surveyed 32 formal mentoring programs within vastly different organizations regarding their mentoring programs. Of the 32 programs, 27 reported that the protégé must be outside the mentor’s chain of command.

In the abstract, workers view the roles of mentor and supervisor quite differently, the mentor as someone who is “personally involved, a friend who cares about you and your long term development” and the supervisor as one who “focuses on performance management, getting the job done as teller, director and judge” (Starcevich & Friend, 1999, p.3). Despite a definition of supervision that might seem to make mentoring difficult, in practice the majority of Starcevich and Friend's respondents named their supervisor as their own "most effective mentor. Consistent with this is Shea's (1995) view that supervisor–mentors are people who “invest in another person by going beyond their managerial job requirements” (p. 4).

Modes of communication

Research on communication styles relating to the mentoring process is scarce. What we do know is that behavior modeling is a successful form of training and development (Klewer, Shaffer & Binnig, 1995). Bandura (1977) concluded that even without reinforcements, an observer will learn by simply observing someone who is trusted or valued. It is no surprise that

the present study reveals that when a mentor uses modeling as the primary means of conveyance as opposed to oral/written communication, the protégé will ascribe his or her interests to the mentor in greater frequency. This may occur consciously by the protégé, or unconsciously, following Nonaka and Takeuchi's (1995) assumptions that learning takes place oftentimes unconsciously. Workers, it has been shown, tend to take note of how other employees, especially senior employees, act on the job (Stevens, 1999), and will learn a great deal from simply watching the behavior of an expert (Swap, Leonard, Shields & Abrams, 2001). As for mentor-protégé interactions, Hegstad (1999) informs that the content of communication between mentor and protégé is a moderator of the mentoring process. Relationships that concentrate on presenting guidance and advice to the protégé are those in which the protégé benefits most. (Fagenson, 1994).

Shared interests between mentor and protégé

The sharing of interests between mentor and protégé is something that can be expected on many (but not all) occasions. Haensly & Parsons (1993) emphasize that through the mentoring relationship protégés will often take on many of the mentor's characteristics in work and lifestyle. Further research has shown that when individuals perceive similarities with another, they will be more attracted to that person than to a person with dissimilar interests (Bynre, 1971). This theory holds true in mentoring as well (Lee, Dougherty, & Turban, 2000). Burke, McKeen and McKenna (1993) demonstrated that mentors offer more mentoring to those protégés who are seen to be similar to them "in terms of intelligence, approach to procedures, personality, background, ambition, education and activities outside of work" (Allen, Poteet & Burroughs, 1997). Alternately, protégés who report having dissimilar positions to those of their mentor were

more likely to report negative mentoring experiences than those who report similar interests (Eby, McManus, Simon, & Russell, 2000).

Method

Subjects

An email was circulated asking every employee of NASA's Jet Propulsion Laboratory to respond to a survey if they had any experience as a mentor or a protégé. Survey responses were received from 147 employees (3% of the workforce), with 95 of those reporting that they had a mentor while at JPL. It is the responses of these 95 people that will be explored in the present paper. The 3% response rate is not uncommon in this organization since JPL circulates numerous surveys over the course of a year. Of those respondents who had a mentor, 55 (58%) reported that the relationship was informal while 40 (42%) reported having been involved in a formal relationship.

The protégé sample (n=95) was representative of JPL as a whole in terms of organizational status, tenure and placement within organizational divisions. Respondents belonged to a variety of organizational "families", (Administration, Engineering, Information systems, Management, Science, Technical and support), they were dispersed through the organizational hierarchy from staff to senior managers and executives, and they held various levels of job tenure (up to 4 years, 32%; 4 to 10 years, 38%; over 11 years, 30%).

Procedure

The study was conducted to investigate the prevalence of formal and informal mentoring within the organization. As part of the study, a 30 item questionnaire was developed to understand where and how mentoring occurs. The questionnaire asked respondents to answer how they became involved in the relationship, what their goals of the relationship were as well as the manners used by mentors to convey their messages. The questionnaire also probed the work-

related interests of the respondents in hopes of ascertaining how the presence of shared interests factors into the mentoring process. Two types of tasks were investigated, those tasks that the respondent performs most often at work and those tasks that the subject finds most interesting at work. Eight items were constructed based on the components of the intrinsically rewarding experiential state of flow (Csikszentmihalyi, 1975) to determine the respondents' level of flow while performing these tasks.

The questionnaire was web-based and posted on the organization's intranet server. It was introduced to employees via an organization-wide email asking employees to complete the questionnaire if they had any first-hand experience in a mentoring relationship while working at the organization. The email was reinforced with a reminder posted on the home page of the laboratory for a period of three days (See Appendix -). The following definition of mentoring was included in all correspondence:

A mentor will be defined as a JPL employee who helps another employee progress in his or her career and / or understand the JPL culture.

Measures

The mentoring questionnaire consisted of four sections: (a) background, (b) questions for those who had a mentor, (c) questions for those who had at least one protégé, and (d) questions regarding the subjects' work.

The questionnaire measured two aspects of the protégés' work experience: their self-reported frequency of deep involvement, or flow (1) in their most interesting work activity and (2) in their most frequent work activity. The first of these provides a measure of how much flow is experienced in the work activity that is most likely to produce flow. The second provides a rough indicator of how much flow is experienced in daily work life.

Frequency of flow was measured by averaging the respondents' ratings on six dimensions adapted from the Mayers (1978) Flow Scale (have control, receive feedback, task contains goals, get distracted when performing the task [reverse scored], lose track of time, and enjoy the task regardless of the outcome). Respondents rated the level of challenge, their level of skill, and each of the six flow dimensions on a six-point scale (1=Agree, 6=Disagree).

Results

Mentors in the sample report having a stronger influence on their protégés' work interests (on a 6-point scale with 1=completely and 6=not at all, $X=3.34$, $s.d.=1.70$, $n=88$) than protégés in the sample ascribe to their mentors ($X=4.53$, $s.d.=1.54$, $n=95$). Indeed, the protégés tend not to attribute much influence on their work interests to their mentor. (This asymmetry is consistent with attribution theory.) Taking this as our baseline, there are nevertheless qualities of the mentoring relationship that are associated with the strength of the mentor's impact on the protégé's work interests. Because we are dealing with a subjective phenomenon, the protégé's interests, we report the *protégé's* perspective on the mentoring relationship.¹ The elements of the relationship which were found to be most influential on the protégés' attribution of interests to their mentor include the transference of professional commitments by the mentor, the primary tool for conveying messages, the strength of shared interests, and the mentor holding supervisory influence over the protégé. A last item that proved to be influential, though not significant (.06),

¹ When we focused on the subjects responding as mentors ($n=88$; note that 42 subjects responded to the survey both as a mentor and as a protégé), we found no significant differences in perceived impact on protégés' interests under the following conditions: supervisor or not, high vs. low shared interests, mode of communication, communication of professional commitment or not, formal vs. informal mentor. It is possible that there is more noise in mentors' attributions about their protégés than in protégés' self-reports. The protégé appears to be a fairly sensitive instrument in detecting the impact of the different mentoring conditions.

was the relationship being an informal one as opposed to being established through a formal mentoring program.

The influence of the mentor, as reported by the protégé

Respondents were presented with ten items and asked to identify the three most important things they felt their mentors did for them during the course of the relationship. The items can be grouped into three categories: (1) professional identity (goals, values, interests, etc.), (2) mastery of the *domain* (the body of knowledge, expertise, practices, and views associated with the job), and (3) mastery of the *social field* (the organization, colleagues, gatekeepers, etc.). The attribution of interests to the mentor was compared for those who did vs. didn't endorse each item. Extent of attribution differed significantly on two items and it approached significance on a third. All three items fall into the category of professional identity (See Table 1).

Of the 95 respondents who claimed to have had a mentor while employed at JPL, 66 (70%) reported that one of the most important things their mentor did for them was to share their professional identity, 78 (82%) included an item from the category of domain mastery among the most important things their mentor conveyed, and 67 (71%) reported that one of the primary things fostered by their mentor was related to the protégé's growth within the organization.

When subjects reported that one of the most important things their mentor did for them was their sharing of their goals and priorities, they showed a significantly higher level of interest attribution to their mentor, $t=2.39$, $p<.05$. This finding as well as the next relate to the protégé's assimilation of their mentor's ideology into their own work. When subjects reported that their mentors "Made (them) aware of their interests" they also reveal that making them aware of their interests was a factor in their ascribing their own interests to their mentor, suggesting that the mentor developed these interests in the protégé as opposed to the protégé entering the

relationship with the shared interests preexisting. In the present study the number of protégés who report that their mentor shares all or most of their interests (n=65) is more than twice the number who report that their mentor shares few or none of their interests (n=25, 5 respondents omitted). Regardless of whether the relationship was formal or informal, as this finding was not significant, protégés attribute their interests to their mentor more when they feel the mentor shares all or most of their interests, $t= 2.015, p<.05$. When respondents reported that their mentor “made (them) aware of their interests” they ascribed their interests to the mentor to a greater extent than those who did not report this ($t= 2.10, p<.05$). From the perspective of the protégés responding to the survey, this suggests that in a mentoring relationship not only can skills and knowledge be transferred between mentor and protegee, but interests are transferred as well.

The mentor's technique

As was discussed above, different styles of communication produce diverse results in the workplace. The mentoring relationship, because of its (ideally) intimate structure, is heavily dependent on the mentor's style of communication. Protégés who reported that their mentor modeled behavior as their primary means of conveying their messages are more likely to attribute their work-related interests to them than those who stated that their mentor used oral or written communication as the primary tool ($t=2.517, p<.02$). We also found that modeling behavior is used more often by those mentors who are also their protégé's supervisor, $X^2 (1, n=94) = 7.062, p < .01$.

The use of stories was also examined to discern whether it impacted protégé attribution of work-related interests. This component is of interest due to the heightened interest in storytelling in the workplace today. This variable, measured with a likert type scale, “Did your mentor use

stories or personal experiences to convey their messages” (1=Always, 6=Not at all), did not correlate significantly with the attribution of interests to the mentor, $r=.134$, $p>.05$.

The process by which the mentor shows approval for the work of the protégé also proved to be a mediating factor in protégés' ascription of their interests to the mentor. The analysis of variance revealed a significant difference, $F(4,93)=3.28$, $P=.015$ (See Table 2). Protégés chose the “most meaningful way (their) mentor demonstrated approval for (their) work” from several choices: (a) broadcasting (i.e. told others of your achievements), (b) formal recognition, (c) gave more responsibilities / listened to ideas, (d) [gave] praise, and (e) mentor did not show approval for the work. Results show that those protégés who chose either of the following independent options, “gave me more responsibilities / listened to my ideas” ($t=2.96$, $p<.005$) or “my mentor did not show approval for my work” ($t=-2.54$, $p<.05$) differed significantly on their level of interest attribution to their mentor (See Table 3).

Post hoc comparisons using the Tukey HSD test revealed that respondents who chose “Gave me more responsibilities and / Listened to my ideas” showed a significantly greater ascription of their work interests to their mentor than those who reported that their mentor did not show approval for their work ($p<.05$), other comparisons using Tukey HSD within this variable were not significant.

Structure of the relationship between mentor and protégé

A grouping of mentoring which we are interested in is those mentors who had supervisory influence over their protégé at the time of the relationship. Within the organization 39 protégés reported that their mentor had supervisory influence over them, while 56 reported that they did not.

In the sample of those people who have had a mentor at JPL (n=95), those whose mentor was also their supervisor were more apt to attribute their work-related interests to their mentors ($t = -1.995$, $p < .05$) than those for whom the mentor was not their supervisor. As mentioned above, this also relates to the communication style chosen by the mentor, modeling versus oral / written communication.

Also near significant, those protégés who were involved in informal relationships were also more apt to ascribe to their mentor their work-related interests, $t=-1.905$, $p < .10$. One factor that need be mentioned is that at within the host organization it is not common practice to assign to a protégé a mentor who is also their supervisor.

Deep involvement of protégés at work

The preceding analyses identify several qualities of the mentoring relationship that were associated with impact on the work interests formed by the protégé. We turn next to the relationship between the degree of this perceived impact, and the character of the protégé's current working life.

Pearson correlations were conducted to see if attributing one's interests to a mentor was associated with the composite measure of Flow, with task Challenge level, or with Skill level in relation to the task. For the protégés' *most interesting* work activity, none of the correlations proved significant; no association was found between how much one felt that a mentor had influenced one's work interests and how frequently one reports finding deep involvement, challenge, or skill in one's *most interesting* current work activity.

In contrast, a small but significant association was found between how much protégés felt a mentor had affected their work interests and how much Challenge they find now in their *most frequent* work activity ($r=.265$, $p=.01$). In addition, attribution of work interests to a mentor is

significantly correlated with how often protégés experience Flow in this most frequent work activity ($r=.237$, $p=.029$). An isolated flow dimension did not drive the pattern; rather, the correlation at least approached significance for all but one of the flow dimensions measured (see Table 4).

Discussion

Shared interests, a mentors' communication of his or her professional commitments (goals, values, etc.), modeling as the chief mode of influence, supervisory responsibility by a mentor, and (perhaps) informality of the mentoring role were associated with the mentor having greater influence on the protégé's work interests. Correlational relationships of course can be only suggestive with respect to mechanism. We speculate that the perception of affinities, indexed here by shared interests, including influence on the protégé's interests, creates receptiveness to influence by the mentor. Characteristics of the mentor–protégé relationship that make it more like a traditional apprenticeship – face-to-face relationship, shared focus of effort – enable a mentoring supervisor to influence a sphere as personal as the protégé's work interests. The specific means of influence may be the mentor's *active communication* of his or her interests (as opposed to the protégé's keen observing alone, for example): the protégé's attribution of interests to a mentor was associated with the mentor's role modeling and the mentor's conveying of his or her goals, values, and interests.

It appears then, to be selectively, in ongoing, face-to-face relationships that mentors go beyond the transmission of domain knowledge and field knowledge to shape the interests of their protégés. And, in today's organization, these characteristics tend to be located in the supervisory relationship. As shown by Allen, Day and Lentz (2001), as well as within the host organization of this study (JPL), organizations do not promote using supervisors as the mentors of their

subordinates. The data reported here suggest that there is an unintended cost of discouraging mentoring by supervisors.

The strength of the mentor's perceived impact also was positively associated with the depth of involvement, or flow, that the protégé reported experiencing in his or her most frequent task at work. For the individual, the depth of involvement in everyday work tasks is one measure of the quality of work life and is important in and of itself. In addition, because flow is intrinsically rewarding and occurs only when activities stretch an individual's capacities, frequency of flow may be associated with task persistence and performance at work. Research on another sphere of productive activity, *academic work*, supports this. In both correlational and longitudinal studies, students' frequency of flow has been associated with persistence, commitment, and achievement (e.g., Carli, Delle Fave, & Massimini, 1988; Csikszentmihalyi, Rathunde, & Whalen, 1993; Heine, 1996; Mayers, 1978). This second significance of flow at work is of importance to both workers and the organizations that employ them.

Limitations

Several limitations exist in the present study. First is the reliance on self-report data. The data discussed come from a single vantage point, that of the protégé. Although the study did include responses from mentors as well, the mentors and protégés were not pairs, thus only a single perspective on any given relationship is exposed. Second, the questions in the study could have been more precise. When asking about ways the mentor conveyed his or her message, was the modeling an intended action or did the protégé take it upon him or herself to observe the mentor unobtrusively? Another important factor is sample size. For organizational reasons only, one electronic message asking people to participate in the study was posted. A reminder message

remained on the organization's intranet server for only three days. It is probable that with a second (and possibly third) reminder a much larger n may have been received.

Practical implications

What is the significance of protégés attribution of their interests to their mentors? Why are we as practitioners concerned with employees experiencing flow in their work related tasks? The answers to these questions are quite forthcoming. Organizations, educational institutions, government agencies, profits, non-profits, parents, teachers, and executives all want to succeed. They want to perform optimally. They want to be on top of their game. Through the mentoring literature to date, we have seen ways to learn from our mentors. We have seen ways to properly train our employees. What we have yet to see is how to best absorb our mentors interests. In many organizations formal mentoring programs are being constructed without the benefit of theory (Ragins & Cotton, 1999), and for this reason, perhaps the interests of pioneers may be lost. These visionaries take with them not only their technical knowledge and skill, but also the excitement and interests they hold for their work. It is those interests that we want to duplicate in future generations. As has been shown, when protégés ascribe their work related interests to their mentor, they are more apt to experience flow for their work related tasks. They will be more deeply involved in their work, they will perform more efficiently and productively thus helping to advance the organization as a whole.

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Table 1: Means and significances for the protégés' perspective of what the mentor did for them and the attribution of their interests to their mentor

Item	n	mean	sd	t	df	sig. (2 tail)
<i>Professional Commitments</i>						
Acted as a role model						
Yes	48	4.21	1.43	1.87	91	.064
No	45	4.80	1.62			
Shared with me their goals and priorities						
Yes	25	3.88	1.64	2.39	91	.019*
No	68	4.72	1.45			
Made me aware of their interests						
Yes	19	3.84	1.89	2.10	91	.038*
No	74	4.66	1.41			
Taught me values and ethics						
Yes	7	3.57	1.62	1.66	91	.100
No	86	4.57	1.52			
<i>Domain Knowledge</i>						
Provided me with technical expertise						
Yes	35	4.17	1.47	1.58	91	.117
No	58	4.69	1.57			
Showed me how to solve problems						
Yes	34	4.18	1.64	1.52	91	.132
No	59	4.68	1.47			
Shared with me their perspectives						
Yes	59	4.46	1.72	-3.91	91	.697
No	34	4.41	1.31			
<i>Field Knowledge</i>						
Taught me the ins and outs of JPL						
Yes	53	4.53	1.56	-.241	91	.810
No	40	4.45	1.54			
Prepared me for advancement						
Yes	23	4.43	1.56	.213	91	.832
No	70	4.51	1.55			
Introduced me to others in my field at JPL and elsewhere						
Yes	35	4.49	1.35	-.095	91	.925
No	58	4.48	1.66			

Attribution: Do you attribute your work-related interests to your mentor 1=Completely, 6=Not at all

Table 2: The attribution of interests by the protégé to the mentor BY the method the mentor used to show approval for the protégé's work

ATTRMENT

	N	Mean	Std. Deviation
Gave me more responsibilities / listened to my ideas	33	3.91	1.53
Praise (good job)	28	4.89	1.34
Broadcasting (told others of my achievements)	12	4.25	1.66
Formal recognition	2	4.50	.71
My mentor did not show approval of my work	18	5.33	1.53
Total	93	4.54	1.56

ANOVA

ATTRMENT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28.962	4	7.241	3.282	.015
Within Groups	194.156	88	2.206		
Total	223.118	92			

Table 3: Do you attribute your work related interests to your mentor? (*1=completely, 6=not at all*)

<i>The mentor...</i>	n	mean	sd	t	df	sig. (2 tail)
Had supervisory influence over S						
Yes	39	4.15	1.46	-1.995	93	.049
No	56	4.79	1.56			
Shared S's strongest work interests						
All/Most	65	4.38	1.52	2.015	92	.047
Few/None	25	5.08	1.32			
Conveyed lessons via						
Modeling	23	3.83	1.37	2.517	92	.014
Oral / Written Communication	71	4.73	1.54			
Conveyed professional commitments						
Yes	66	4.21	1.60	2.865	91	.005
No	27	5.19	1.14			
Showed approval by giving more responsibilities / listening to ideas						
Chosen as most meaningful manner	33	3.91	1.53	2.96	93	.004
Not chosen	62	4.85	1.46			
My mentor did not show approval for my work						
Chosen	18	5.33	1.53	-2.54	93	.013
Not chosen	77	4.34	1.49			
Served as an informal/formal mentor						
Informal	55	4.27	1.48	-1.905	93	.060
Formal	40	4.88	1.57			

Supervisory influence: Did your mentor have supervisory influence over you? [Yes, No]

Shares Interests: If you had a mentor, do you think your mentor shares those work related interests you mentioned above? [All, Most, Few, None]

Conveyed lessons via: Please select the most common way your mentor conveyed the above to you. [Modeled for me the way to do things (they acted and I observed), Oral communication, Written communication. We combined oral and written communication.]

Conveyed professional commitments: Respondents chose the three most important things their mentor did for them from a list of 10 items. "Yes" was coded if any of the following items were chosen: Acted as a role model, Made me aware of their interests, Shared with me their goals and priorities, Taught me values and ethics. The remaining items might be thought of as tapping 1) Domain knowledge (Provided me with technical expertise, Showed me how to solve problems, Shared with me their perspectives) and 2) Field knowledge (Introduced me to others in my field at JPL and elsewhere, Prepared me for advancement, Taught me the ins and outs of JPL).

Showed approval: Respondents were asked to choose the most meaningful way their mentor showed approval for their work. They chose between the above as well as the following insignificant choices: Broadcasting (told others of accomplishments), formal recognition, or praise.

Informal / Formal: Respondents indicated whether the relationship was part of one of the three formal JPL mentoring programs, or "informal."

Table 4: Correlation of Flow in most frequent task with Attribution of interests to mentor

<i>Flow Dimension</i>	<i>r</i>	<i>sig.</i>
Challenge	.265	.010
Skill	.151	.126
Flow composite*	.237	.029
Component items:		
Have control	.201	.050
Receive feedback	.208	.043
Task contains goals	.186	.072
Get distracted when performing the task (reversed)	.209	.055
Lose track of time	.192	.063
Enjoy the task regardless of the outcome	.151	.145

*The six components (scale=1 to 6) are added and an average is calculated for most frequent task at work (the lower the value, the more flow-like).