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Cognitive Mentorship: Mediating Protégé Performance

Brian R. Mauntel

COGNITIVE MENTORSHIP: MEDIATING PROTÉGÉ PERFORMANCE

THESIS

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THESIS

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Abstract

The role of cognitive apprenticeship has been emphasized in facilitating individual performance in the classroom, but there is limited quantitative research directly linking cognitive behaviors to mentoring relationships and workplace performance. This study investigated the characteristics of mentoring behavior that influence group performance using archival data from 52 different organizations. A mediation model was developed and the results indicate that the group-level of mentors' cognitive behavior plays a central role in the mentor-protégé relationship. The findings suggest that the mentors' collective articulation of problem-solving processes fully mediate the unit's performance, while reflection and exploration partially mediate the relationship. The theoretical and practical implications of the findings are discussed.

Acknowledgments

I would like to express my sincere appreciation to my former Commanders, Col Charles Helwig and Col DeAnna Burt, for their leadership and endorsement to attend the Air Force Institute of Technology. I would like to thank my thesis advisor, Lt Col John Elshaw, for his guidance and support throughout the course of this thesis effort. The insight and experience were certainly appreciated. I would also like to thank my parents for their support and motivation for me to excel. Most importantly, I would like to express my love and adoration to my wife. Thank you for tolerating this demanding student lifestyle. I am truly excited to start our family and eager to see our first child grow up.

Brian R. Mauntel

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COGNITIVE MENTORSHIP: MEDIATING PROTÉGÉ PERFORMANCE

I. Introduction

General Issue

This thesis will start off with an example of teaching and learning methods, which will be further discussed in the following chapters. The terms apprenticeship, cognitive apprenticeship, and mentorship will be used frequently and their methods will be defined. Methods of teaching in a typical apprenticeship include modeling, scaffolding, and coaching. Modeling refers to a physical demonstration of the work by the mentor. Scaffolding is defined as the mentor providing support, such as checklists or offering hints. Coaching may involve giving feedback or evaluation. A protégé will undoubtedly learn from a typical apprenticeship, but authors suggest new methods of learning to improve the expertise.

The cognitive apprenticeship is an academic style of mentoring that adds additional methods of learning to the typical apprenticeship. In the cognitive apprenticeship, the mentor's actions (modeling, scaffolding, and coaching) are captured along with the learner's engagement. The cognitive apprenticeship makes thinking visible with the protégé's reflection, articulation, and exploration. Reflection refers to protégés comparing their problem-solving processes with an expert, or mentor. Articulation involves any method individuals articulating their knowledge. Exploration suggests that protégés are pushed into problem-solving methods of their own. The cognitive apprenticeship methods promote the development of expertise and account for the social interaction between the mentor and protégé.

As protégés mature and gain expertise, it is presumed they will one day become mentors. Therefore, this research will study the mentor's cognitive behaviors and observe if reflection, articulation, and exploration are present. If the cognitive behaviors are present, it will be determined if the mentor can use reflection, articulation, and exploration as teaching methods. Consequently, three methods of learning from the cognitive apprenticeship are applied to mentorship teaching methods that make knowledge visible to subordinates in order to increase performance.

Problem Statement

Due to increasing interest in leveraging human and social capital within organizations, informal and formal mentoring has gained significant attention as a critical development tool (Wanberg, Welsh, and Hezlett, 2003). This thesis utilized the Air Force mentoring policy to strengthen a few areas of interest on mentor-protégé relationships. First, a trend in literature illustrates the lack of research available discussing formal mentoring outcomes (Ragins, Cotton, and Miller, 2000; Wanberg, Kammeyer-Mueller, and Marchese, 2006). The Air Force Mentoring instruction implements a program that is applicable to commanders and supervisors, including all officers, enlisted, and civilian personnel (Department of the Air Force, 2000). The guidance mandates that all supervisors mentor their subordinates. The mentoring instruction also emphasizes various important aspects: supervisors should take an active role in professional development; provide realistic evaluation of performance and potential; and foster free communication by subordinates. The Air Force mentoring instruction was determined to meet the requirements of formal mentorship.

Second, a meta-analysis of 116 articles and reports found a deficient cross-disciplinary communication among mentoring scholars (Eby, Allen, Evans, Ng, and DuBois, 2007). The mentoring disciplines include youth, academic, and workplace settings and is mainly grouped into these categories based on certain life stages where mentoring may occur. This research takes an academic style of mentoring, called the cognitive apprenticeship, and applies it to the workplace setting in an effort to ease the cross-discipline communication deficiency.

Third, new opportunities for mentoring communication should be addressed. Research suggests that a focus on cognitive skill development through participation in authentic learning experiences may strongly influence mentoring outcomes (Dennen, 2004); however, relatively little research has been devoted to understanding how individuals' abilities and skills affect their experiences as protégés, considering the nature of mentoring functions they receive (Wanberg et al., 2003). The quality of the mentoring relationship has an important influence on outcomes and cognitive apprenticeship attempts to develop densely textured concepts out of, and through, continuing authentic activity (Noe, Greenberger, and Wang, 2002; Ragins et al., 2000; Brown, Collins, and Duguid, 1988). This research will discuss the cognitive apprenticeship theory to fully understand whether the display of cognitive behaviors is related to teaching in the workplace.

Research Objective

The primary goal of this research was to clarify the characteristics of mentoring behavior that facilitate protégé performance in organizations. This study focused on the

primary contributory factors of cognitive apprenticeship methods in the mentoring process. It investigates the cross-disciplinary gap (Eby et al., 2007) between cognitive apprenticeship learning and mentorship teaching behavior by exploring different dimensions of mentoring functions and the mediating effects on the relationship. In this article, cognitive mentorship describes supervisor behaviors that facilitate teaching in the workplace.

Research Focus

Air Force organizations were selected for this research because (1) supervisors are required to mentor subordinates and (2) the Air Force Mentoring Policy provides a defined, formal mentoring relationship. These characteristics enable us to explore mentors' behaviors and test hypothesized associations with organizational outcomes.

Teaching and learning through cognitive apprenticeship require making tacit knowledge visible to protégés so they can observe and practice problem-solving methods (Collins, Brown, and Holum, 1991). The specific mentor behaviors for this research were derived from the cognitive apprentice methods of learning. These cognitive behaviors include reflection, articulation, and exploration (Dennen, 2004; Chan, Miller, and Monroe, 2009). Dennen (2004) defines the following methods to develop expertise: reflection occurs when students assess and analyze their performance; articulation takes place when students put the results of reflection into verbal form; and exploration arises when students form new hypotheses, ideas, and viewpoints on their own. We will determine if mentors engage in these behaviors and how they affect the mentor-protégé relationship.

Research Model

Figure 1 represents the three-variable model developed by Baron and Kenny (1986), which depicts the two causal paths affecting the outcome variable. Path *c* tested the direct impact of mentorship on performance. The impact of the mentorship on the cognitive behaviors was tested along Path *a*. The cognitive behavior impacts were tested against performance along Path *b*. To meet the conditions of mediation, the variable relationships must be significant on Paths *a* and *b*. Moreover, when Paths *a* and *b* are controlled, ed or no longer sigr

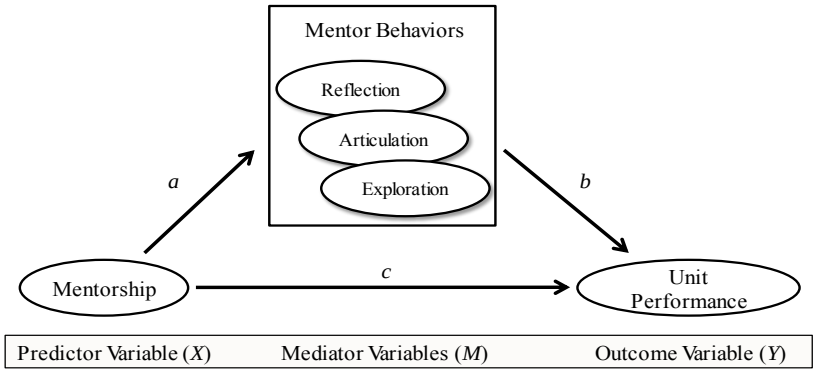

Figure 1. Cognitive Mentorship Mediation Model

Implications

This study broadens the previous research on mentorship and cognitive apprenticeship. From a theoretical perspective, the main contribution is clarifying the role of articulation in the mentor-protégé relationship. Additionally, reflection and exploration demonstrate noteworthy mediation, albeit not a necessary condition for an

effect to occur (Baron and Kenny, (1986). From a managerial perspective, the cognitive skill foundation is set for organizations to foster robust mentor-protégé relationships.

Preview

The subsequent chapter will address the primary theoretical mechanisms linking mentorship and cognitive apprenticeship. This theoretical discussion builds specific hypotheses that are tested using data collected from 52 distinct organizations. The results are followed with an assessment of the findings and their role within existing mentorship models. This study will conclude with proposed directions for future research.

II. Literature Review

Mentorship

Despite the fact that definitions emphasize mentoring as involving intense, interpersonal relationships, research on how mentors and protégés interact is limited (Wanberg et al., 2003). To gain a better understanding of the interaction in the mentor-protégé relationship, certain aspects must be addressed. The following mentorship aspects will be discussed: the mentor and protégé's position in the relationship; mentoring outcomes; aspects of collective mentorship; the difference between mentoring settings; the difference between formal and informal relationships; and the importance of cognitive style in the mentoring approach.

Traditionally, mentors have been defined as more senior, experienced, and knowledgeable employees who provide support related to career and personal development (Noe et al., 2002). The protégé is the less experienced individual who is engaged with the mentor in positive work behaviors and development (Eby et al., 2007). These more-experienced individuals contribute to a protégé's subjective and objective outcomes (Allen et al., 2004; Eby et al., 2007). However, authors examined conflicting data on the most influential outcomes. Some authors have focused on extrinsic influences, such as objective career success indicators as promotion and compensation (Allen et al., 2004; Wanberg et al., 2003). Other scholars have concluded that mentoring is more strongly related to protégés' intrinsic outcomes, such as job satisfaction, career satisfaction and commitment, attitudes, health, and life satisfaction (Eby et al., 2007; Wanberg et al., 2003). Unique protégé benefits also include psychosocial support in the

form of friendship, acceptance-and-confirmation, and counseling (Eby and Lockwood, 2005). While there are many individual characteristics and benefits of mentorship, researchers must observe the significance of collective mentorship and organizational level aspects.

Much attention to mentorship has focused on an individual model of exchange between the mentor and protégé. However, this may be incompatible with integrated teams in complex organizations. To help determine unit effectiveness, role theory takes collective mentoring as a shared role across unit members (Hiller, Day, and Vance, 2006). Hiller et al. (2006) assessed that collective leadership is related to team effectiveness when teams are engaged in complex tasks that require large amounts of interdependence. Whereas the Air Force defines each supervisor as a mentor, and supervisors may have numerous subordinates, research suggests that collective mentorship might indeed enhance unit performance. The ability to motivate subordinates to perform beyond standard expectations for performance is linked to the supervisor's transformational leadership. When a transformational leader articulates what his or her followers need to accomplish for the good of the team, team members are more likely to feel a high level of group cohesiveness (Jung and Sosik, 2002). The role theory and transformational leader theory are applied to the cognitive mentorship model as the aggregate social interaction focused on the interdependence between supervisors and subordinates.

The underlying assumption in this study is that the group-level exchange between leaders and subordinates influences unit performance. Therefore, Hypothesis 1 is based on the reciprocal nature of a mentoring relationship. If the leader's mentoring behavior is

appealing, the unit will reciprocate with greater than required expenditures of time and energy, assumption of greater responsibility and risk, and increased concern for the organization (Sherman, Kennedy, Woodard, and McComb, 2012). Thus, the mentoring relationship contributes to the protégé's performance and indirectly to overall group performance.

H1: Mentorship quality will be positively related to group performance.

Another interesting aspect of mentorship appears across three different settings: youth, academic, and workplace. The distinctive mentoring settings have gained a lot of research attention, mainly due to individuals who experience mentoring at different stages of life. Youth mentoring involves a relationship between a caring, supportive adult and a child or adolescent, which is important for personal, emotional, cognitive, and psychological growth (Rhodes, 2002). Academic mentoring typifies the apprentice model of education where teachers impart knowledge to provide support and guidance on classroom performance and non-academic issues, such as personal problems (Eby et al., 2007). Lastly, workplace mentoring occurs in an organizational setting and focuses on personal and professional growth. Workplace mentoring separates itself from academic mentoring because the workplace is a unique learning environment where organizations can develop their intellectual capital to remain competitive (Watt, 2004). Research found the absolute value of the effect size was strongest with academic mentoring at .11 to .36, while workplace and youth mentoring ranged from .03 to .19 and .03 to .14, respectively. These results suggest that academic mentoring has stronger associations with outcomes than does youth or workplace mentoring (Eby et al, 2007). For that reason, this research examines an academic style of mentoring, the cognitive apprenticeship, to gain greater

benefits in the workplace. There are two types of workplace mentoring relationships, informal and formal, which will be discussed in more detail.

Researchers must focus on the type of mentor-protégé relationship and determine which type may provide larger gains. An informal mentoring relationship is often driven by developmental needs and mutual identification; in contrast, a formal mentoring relationship is usually assigned through a third party (Ragins et al., 2000). Whether a protégé is developed formally or informally, recent research suggests that formal mentoring relationships can potentially obtain the same benefits as informal mentoring relationships (Wanberg et al., 2006; Ragins et al., 2000). Wanberg, Welch, and Hezlett (2003) suggest that continued research on formal mentoring is needed to differentiate between "quality" and poorly planned mentoring programs. Data gathered for this study will identify the quality of group level mentoring within the formal bounds of Air Force mentoring and attempt to determine whether there is a link to performance at the group level.

Air Force Instruction (AFI) 36-3401 implements the Air Force Policy Directive (AFPD) 36-34, *Air Force Mentoring Program*. This instruction was designed as a development program to help individuals reach their maximum professional potential (Department of the Air Force, 2000). Most importantly, this document describes the assignment of mentors, mentoring responsibilities, and academic education enhancement. Commanders are responsible for promoting a robust mentoring program and an immediate supervisor or rater is designated as the primary mentor (Department of the Air Force, 2000). This document describes the mentor's role in professionally developing his or her subordinates, but it does not illustrate best practices that will ultimately influence

the protégé. Wanberg et al. (2003) describe this type of structured program as a formal mentoring relationship because it provides guidelines on how often individuals should meet, possible topics to discuss, a goal setting process, and a specified duration for the relationship.

Allen et al.'s (2004) meta-analysis describes the proliferation of empirical research on mentoring relationships beginning in 1985. It is not surprising that several Air Force research projects have examined mentorship, dating back to the early 1980s. Lewandowski (1985) found a disparity in mentoring functions as perceived by mentors and protégés. In her research, the primary roles of the mentor, as perceived by the mentor, were that of Advisor and Teacher. However, the protégés perceived the mentor as a Role Model and Sponsor (Lewandowski, 1985). Lewandowski's research presented an inconsistent view of mentorship, which guides this study examine specific mentor behaviors for teaching their protégés.

A decade after the first Air Force research on mentoring, the Air Force enacted a formal mentoring program under AFPD 36-34 on 1 November 1996. Following the Air Force's guidelines, Gibson (1998) evaluated the effectiveness and characteristics of assigned mentoring against voluntary mentoring. He concluded that mentors who were comfortable with their job-related duties and identified with their duty expectations were more likely to demonstrate their skills (Gibson, 1998). The demonstration of skills is relevant because it directs research on which skills the supervisors are actually exhibiting. The Air Force needs supervisors who demonstrate and articulate their job skills, with emphasis on the cognitive skill set. As mentors develop their cognitive skill set, practice those behaviors, and receive feedback, it is presumed they will ultimately gain confidence

in their capacity to teach. Confidence and fluency of explicit knowledge is particularly dependent on feedback and social interaction present in the mentor-protégé relationship (Eraut, 2000). Skills can be developed, and Gheesling (2010) concluded that supervisors seeking "higher level" exchanges with their subordinates should increase their influence in decision-making and open communication with protégés. Improved communication can be accomplished by focusing on cognitive behaviors to facilitate learning and the transfer of tacit knowledge.

Armstrong, Allinson, and Hayes (2002) discussed the importance of idea-generation in mentoring relationships, which can be attributed to a cognitive approach to communication. Tennant (1988) defined the cognitive style as an individual's characteristic and consistent approach to organizing and processing information. A formal mentoring system, such as an Air Force instruction, could create a consistent approach to mentoring communication. In fact, authors suggest that cognitive similarity in the way dyad members analyze events and articulate their knowledge will increase communication effectiveness (Armstrong et al., 2002). Therefore, it is important to study whether or not the sample of supervisors collectively demonstrate the cognitive apprentice style of communication.

This research expected the sample of supervisors to express problem-solving skills. Research has shown that leaders engage in social exchanges with followers in order to accomplish tasks (Olsson, Hemlin, and Pousette, 2012). Therefore, Hypotheses 2a-c focused on the social interaction and cognitive skills of the supervisor. These

hypotheses will determine if the supervisors analyze the leader's decision-making, articulate problem-solving methods, and explore innovative avenues of investigation.

H2a: Mentorship quality will be positively related to the mentors' reflection.
H2b: Mentorship quality will be positively related to the mentors' articulation.
H2c: Mentorship quality will be positively related to the mentors' exploration.

Cognitive Apprenticeship

Cognitive apprenticeship is described as academic mentoring, which uses the apprentice model to support learning in the cognitive domains such as reading, writing, and mathematics (Dennen, 2004). Individuals must recognize that these domains are central to integrating skills and knowledge in order to accomplish meaningful tasks (Collins et al., 1991). Further, the apprentice model can be correlated to the mentorship principle, where expert practice in these cognitive domains is communicated to a less experienced individual.

The cognitive apprenticeship model stems from traditional apprenticeship, which includes these important aspects: modeling, scaffolding, and coaching (Collins et al., 1991). These aspects are essential to understanding the master's role in an apprenticeship. In traditional apprenticeship, the process of carrying out the task is usually easily observable (Collins et al., 1991). In modeling, the protégé observes the master demonstrating how the work is completed. For example, a supervisor may demonstrate how to complete an explicit checklist for a task. Scaffolding is the support the master gives the protégé. For example, the supervisor could complete checklist steps for an inexperienced individual (the protégé) or offer hints regarding how to complete a task. Finally, coaching comprises of a wide range of activities: choosing tasks,

evaluating activities, challenging protégés, and giving feedback (Collins et al., 1991). For example, a supervisor can direct a subordinate to complete a specific activity, evaluate the performance, and give feedback. These functions are central to the mentor's behavior as the protégé observes the process to carry out a task. A significant aspect of the mentors' roles not discussed in traditional apprenticeship is the cognitive reasoning behind the actions. In today's world of complex problems and decision-making, it is difficult to replicate the same performance in another scenario when observations are made without the reasoning behind them.

Essential aspects of cognitive apprenticeship refer to the learner's engagement in the mentor-protégé relationship. The methods of protégé learning include reflection, articulation, and exploration. By participating in the learning experience, protégés will: consider and analyze their performance compared to an expert; articulate their knowledge or problem-solving process; and find new ideas and viewpoints on their own (Dennen, 2004; Chan et al., 2009). The cognitive apprentice strategy was developed for school-based environments, where students could prepare themselves for real-world projects. However, research in the 1990s indicated that cognitive apprenticeship was compatible with learning generic skills of the modern workplace (Berryman, 1991).

The skills portrayed by the protégé in the cognitive apprentice model could in fact be illustrated by the mentor. A mentor's cognitive skills may be seen in high-quality mentor-protégé relationships with strong communication between the two individuals. Brown et al. (1989) point out the importance for protégés of learning their craft in the appropriate community of practice. They suggest that protégés will excel when learning in the workplace, rather than learning abstract ideas in the educational domain of a

school. Therefore, it is important for a mentor to understand the relevant tools available to develop intense social interaction. A cognitive mentorship model will fully engage mentors and protégés with similar tools in similar authentic activity to make tacit processes visible to learners (Brown et al., 1989; Dennen, 2004).

Learning is always situated in a particular context, which comprises not only of a location and activities in which knowledge contributes, but also a set of social relations which give rise to those activities (Eraut, 2000). The supervisor's cognitive behaviors facilitate this social exchange in the workplace and Hypotheses 3a-c determine their influence on unit performance.

H3a: Overall mentor reflection will be positively related to group performance.
H3b: Overall mentor articulation will be positively related to group performance.
H3c: Overall mentor exploration will be positively related to group performance.

The cognitive behaviors of reflection, articulation, and exploration act as knowledge transfer mechanisms that eventually elicit positive mentoring results. In short, mentors reflect upon their countless experiences in a variety of contexts, drawing upon the tacit dimensions of expertise (Swap, Leonard, Shields, and Abrams, 2001). Furthermore, researchers found that the capability to articulate more explicitly about work knowledge is related to mentoring relationships in which explanations were expected (Eraut, Alderton, Cole, and Senker (1998). The articulation of knowledge is crucial to successful mentorship because even the most complete, explicit account of expertise from an ideal observer will still lack aspects of tacit knowledge which remain unrecalled and undisclosed (Eraut, 2000). Finally, researchers concluded that the degree to which mentors generated ideas in their mentoring relationship was very influential to

protégé outcomes (Armstrong et al., 2002). The mentor may have a higher degree of influence on protégé performance when more exploratory ideas are generated. A mentor-protégé relationship devoid of cognitive behaviors will decelerate a protégé's expertise attainment.

Novices cannot be expected to leap directly to becoming experts. All experts pass through levels of knowledge acquisition (Swap et al., 2001). Ultimately, Hypotheses 4a-c will conclude if the supervisors' reflection, articulation, and exploration mediate the knowledge exchanged between leaders and followers to influence performance.

H4a: Reflection mediates the relation between overall mentorship and group performance.
H4b: Articulation mediates the relation between overall mentorship and group performance.
H4c: Exploration mediates the relation between overall mentorship and group performance.

Summary

Over the last few decades, research has concluded that mentoring creates positive outcomes for individuals and organizations. The Air Force has created mentoring and training programs to reap the benefits of this learning process. However, the current Air Force mentoring instruction lacks a focus on cognitive behaviors and ways to transfer knowledge. This research studied the mentors' behaviors and determined if cognitive mentorship affected workplace outcomes. A key benefit of the cognitive mentorship model of teaching is that it does not require a significant investment of additional training resources; it capitalizes on existing organizational reporting structures and job-related tasks (Backus, Keegan, Gluck, and Gulick, 2010).

III. Methodology

Sample and Data Collection

The archival data for this research were collected as part of a previous leader-member dyad study. Surveys were available from 1,561 participants in 52 different Air Force units approved by the Air Force Survey Office. The response rate was 49.2 percent, with 413 surveys providing complete data from supervisors for this research effort. Only 413 of 1,561 surveys were used for the purpose of collecting information on mentor behaviors in formal mentor-protégé relationships.

From the supervisor data, 80 percent were male and the average age was 36.6 with a standard deviation (*SD*) of 6.1. The average number supervisors per organization was 8.26 (*SD* = 4.1). Five aspects of the mentor-protégé relationship were assessed with self-report data from the supervisor. Wanberg et al. (2003) recognize the value of self-report data and the argument that the self sometimes is in the best position to report his or her own behavior or experience. Consequently, each mentor questionnaire was considered usable to collect predictor, mediator, and criterion data for each of the variables.

An effort was made to minimize some of the method biases. First, respondent anonymity was protected to reduce people's evaluation apprehension (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). Another remedy used to control for priming effects and biases related to the question context, was counterbalancing the variable items (Podsakoff et al., 2003). Because one of the major causes of common method variance is obtaining measures of both the predictor and outcome variables from the same source

(Podsakoff et al., 2003), all variables were aggregated. The aggregation of variables minimizes the impact of an individual bias.

Measures

The variable scales for this research effort were captured in the archival data and can be viewed in the Appendix. To note, each supervisor was responding as a mentee when answering the mentorship, reflection, articulation, and exploration questions. Following that perspective, the mentee's responses conformed to the cognitive apprenticeship principle of learner engagement. The specific survey items were chosen because they fulfill Chan's (2009) definitions of reflection, articulation, and exploration. The performance variable was calculated with the same-source supervisors, which rated their units' collective performance. Additionally, the Cronbach's alpha value was used to measure the internal consistency of the variables. As indicated by Nunnally (1978), all constructs met the acceptable reliability coefficient of 0.70.

Mentorship.

To determine the supervisors' relationship with their mentors, an eight-item construct (Bauer and Green, 1996) measuring leader-member exchange (LMX) was used as a proxy for mentorship. A high-quality LMX relationship would include exchanges of both material and non-material goods beyond what is required by the formal employment contract (Le Blanc and González-Romá, 2012). While some authors may suggest that leadership is distinct from mentoring, LMX may be a function of being mentored by a leader (Graen and Scandura, 1986; Godshalk and Sosik, 2000). Therefore, the LMX proxy would determine the quality of the leader-supervisor relationship. Sample items

include: “I usually know where I stand with my supervisor” and “I would view my working relationship with my supervisor as extremely effective.” Aggregated mentorship was measured on a seven-point Likert-type scale and obtained a Cronbach’s alpha value of .95 (n = 406).

Reflection.

The mentor cognitive behavior of reflection was defined as individuals comparing their problem-solving processes with those of an expert, a colleague, and ultimately, an internal cognitive model of expertise (Chan, 2009). To operationalize this variable, a four-item construct was developed from the data. Sample items include: “I am very familiar with how my supervisor makes decisions” and “Through my past experience with my supervisor, I understand what he/she expects.” Aggregated reflection was measured on a seven-point Likert-type scale and obtained a Cronbach’s alpha value of .91 (n = 413).

Articulation.

The mentor cognitive behavior of articulation was defined as individuals verbalizing their knowledge or problem-solving process (Chan, 2009). To operationalize this variable, a six-item construct was developed from the data. Sample items include: “I make clear what one can expect to receive when performance goals are achieved” and “I talk enthusiastically about what needs to be accomplished.” Aggregated articulation was measured on a seven-point Likert-type scale and obtained a Cronbach’s alpha value of .75 (n = 399).

Exploration.

The mentor cognitive behavior of exploration was defined as pushing individuals into a mode of problem-solving on their own (Chan, 2009). To operationalize this variable, a six-item construct was developed from the data. Sample items include: "I suggest new ways of looking at how to complete assignments" and "I get others to look at problems from many different angles." Aggregated exploration was measured on a seven-point Likert-type scale and obtained a Cronbach's alpha value of .80 (n = 393).

Performance.

Unit performance was measured using thirteen items (Elshaw, 2010) completed by the supervisors within the organization. A five-point Likert-type scale was used to reduce method biases caused by commonalities in scale endpoints and anchoring effects (Podsakoff et al., 2003). The five-point scale ranging from 1 (never true) to 5 (always true) indicated how true statements were reflecting performance of individuals within their unit. Sample items include: "—develops creative solutions to problems," "—gets positive results," "—efficiently gets tasks done," and "—gets tasks done effectively." The Cronbach's alpha value was .95 (n = 413).

Analysis

A confirmatory factor analysis was performed to assess the properties of the cognitive behavior constructs established by the cognitive apprenticeship theory. This analysis included three underlying constructs of cognitive behavior: reflection (4 items), articulation (6 items), and exploration (6 items). The fit statistics for this model suggested an adequate fit to the data: χ^2 = 284.02, degrees of freedom (df) = 85,

comparative fit index (CFI) = 0.94, incremental fit index (IFI) = 0.94, and root mean square error of approximation (RMSEA) = 0.078. Fit refers to the ability of a model to reproduce the data. The CFI indicates that 94 percent of the covariation in the data can be reproduced by the given model. The IFI compared the discrepancy per *df* for the most restricted model relative to the target model. The RMSEA indicates an acceptable fit based on the non-centrality parameter. In view of the fact that the cognitive behavior constructs were developed from an archival data set, these results provide support for the three dimensions used in our hypotheses.

The mediational analysis followed the causal step, multiple regression approach outlined by Baron and Kenny (1986), which was conducted with SPSS Statistics software. iation relationshi

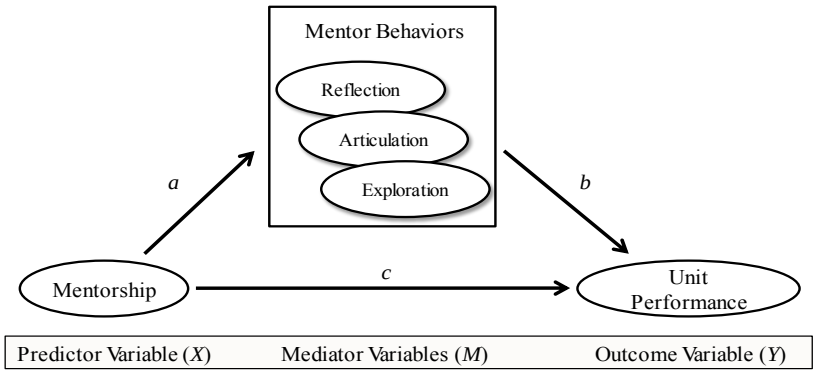

Figure 1. Cognitive Mentorship Mediation Model

It assumes a three-variable system such that there are two causal paths feeding into the outcome variable (Baron and Kenny, 1986). Hypothesis 1 tested the direct impact of the independent variable (Path *c*). Furthermore, the impact of the independent variable (IV)

on the mediators was tested with Hypotheses 2a-c (Path *a*). The mediator impacts (Path *b*) were tested against the dependent variable (DV) as Hypotheses 3a-c. To meet the conditions of mediation, the variable relationships must be significant on Paths *a* and *b*. Moreover, when Paths *a* and *b* are controlled, the previously significant relationship between the independent and dependent variables is reduced or no longer significant (this condition was tested with Hypotheses 4a-c).

IV. Results

Descriptives, Reliabilities, and Correlations

Table 1 presents the descriptive statistics, reliabilities, and correlations of the variables. The Cronbach's alpha coefficients used to measure construct reliability are depicted on the diagonal. Table 1 shows that mentorship was positively related to performance ($r = .51$, $p < .01$). The significant relationship between mentorship and performance satisfies the first mediation test step (Path *c* in the model), whereby the significant relationship between the independent variable and dependent variable is established. Furthermore, because each of the cognitive behavior constructs (reflection, articulation, and exploration) proved significant with the IV and DV, the mediation testing could proceed.

Table 1. Descriptive Statistics, Reliabilities, and Correlations

Variable	Number of Items	Mean	Standard Deviation	1	2	3	4	5
1 Mentorship	8	5.56	0.62	(0.95)				
2 Reflection	4	5.25	0.45	0.81**	(0.91)			
3 Articulation	6	4.88	0.34	0.77**	0.74**	(0.75)		
4 Exploration	6	5.16	0.32	0.36*	0.26*	0.53**	(0.80)	
5 Performance	13	4.21	0.26	0.51**	0.44**	0.61**	0.52**	(0.95)

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Numbers in parentheses are Cronbach alpha coefficients.

Results of Regression Testing

As mentioned in the methodology section, mediation was tested using Baron and Kenny's (1986) approach. First, performance was regressed on mentorship to establish that there is an effect to mediate. Second, mediators (reflection, articulation, and exploration) were regressed on mentorship to establish Path *a*. Third, performance was

regressed on the mediators to test whether reflection, articulation, or exploration were related to the outcome variable. Finally, performance was regressed on both the predictor and mediators, controlling for the cognitive behaviors, to determine if the previously significant relation between mentorship and performance is reduced or no longer significant.

On the following page, Table 2 lists the path coefficients and variance explained for the unit performance. Each of the first three mediation steps showed significant relationships on Paths *a*, *b*, and *c*. The Step 4 results indicated that the unstandardized regression coefficient (β) associated with the mentorship-performance relationship decreased with each mediator and became nonsignificant in one of the equations. The β describes the relative importance of mentorship in predicting performance. Therefore, if mediation is present, the importance of mentorship will decrease. The decrease in β, when controlling for the cognitive behaviors, provides calculated support for mediation.

When regressing performance onto mentorship while controlling for reflection, the direct effect of mentorship was reduced, but remained significant (β = .189, p = .043), which suggests partial mediation. Therefore, Hypothesis 4a is supported. By regressing performance on mentorship while controlling for articulation, we found that mentorship was no longer significant (β = .038, p = .623). Therefore, Hypothesis 4b is supported. When the direct effect of mentorship on performance becomes nonsignificant, it suggests that articulation fully mediates the relationship. The third mediation equation regressed performance on mentorship while controlling for exploration, and suggested partial mediation (β = .156, p = .004). Therefore, Hypothesis 4c is supported.

Table 2. Mediation Testing Steps

Variable	β	*t*	*p*
Step 1. Independent variable (IV) to dependent variable (DV)			
(H_1) Mentorship → Performance	.214	4.095	.000
Step 2. IV to mediator			
(H_{2a}) Mentorship → Reflection	.771	9.702	.000
(H_{2b}) Mentorship → Articulation	.426	8.413	.000
(H_{2c}) Mentorship → Exploration	.186	2.657	.011
Step 3. Mediator to DV			
(H_{3a}) Reflection → Performance	.195	3.386	.001
(H_{3b}) Articulation → Performance	.466	5.366	.000
(H_{3c}) Exploration → Performance	.419	4.198	.000
Step 4. *IV on DV (Total effect with mediation)*			
(H_{4a}) Mentorship → *Reflection* → Performance	.189	2.079	.043
(H_{4b}) Mentorship → *Articulation* → Performance	.038	.495	.623
(H_{4c}) Mentorship → *Exploration* → Performance	.156	3.035	.004

In addition to the mediation testing, the multiple regression of performance on the cognitive behavior variables was calculated. On the following page, Table 3 lists the Adjusted R^2 and significance of each model. Adjusted R^2 indicates the loss of predictive power of the regression model if the model had been derived from the Air Force population, rather than the sample itself (Field, 2009). In Model 1, performance was regressed on reflection, resulting in an Adjusted $R^2 = .176$ and $p = .001$. Model 2 included reflection and articulation, resulting with the most significant jump in Adjusted $R^2 = .349$ and $p = .001$. Model 3 included each cognitive behavior variable (reflection, articulation, and exploration), resulting in an Adjusted $R^2 = .428$ and $p = .046$. As each model was concluded to be significant, it is interesting to note that reflection became nonsignificant when articulation and exploration were added to the model.

Table 3. Multiple Regression of Cognitive Behaviors

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
1	(Constant)					.000
	Reflection	.439	.193	.176	.236	.001
2	(Constant)					.000
	Reflection					.871
	Articulation	.613	.375	.349	.210	.001
3	(Constant)					.011
	Reflection					.744
	Articulation					.035
	Exploration	.654	.428	.390	.203	.046
a. Dependent Variable: Performance						

V. Conclusions and Recommendations

Theoretical Implication

Broadening previous research on mentorship and cognitive apprenticeship, this study clarifies the role of cognitive skills in mentor behavior to affect unit performance. Wanberg et al. (2003) noted that little attention is given to mentoring at an organizational, or aggregate, level of analysis. For that reason, this research aggregated 413 supervisors into their 50 separate units to determine the overall affect of mentorship on unit performance. The collective group of supervisors had a high LMX quality mean, which demonstrated that leaders enhanced performance within their units (Le Blanc and González-Romá, 2012). Thus, this mechanism of personal development was concluded to be a significant predictor of each unit's performance. Additionally, a post-hoc analysis further evaluated the relationship between supervisors and non-supervisors. The non-supervisors' aggregated LMX data was regressed on the performance variable, while controlling for reflection, articulation, and exploration. The near significant results (p = .059) confirmed a strong relationship between mentorship and performance.

To further differentiate the LMX-mentoring relationship, this research examined if supervisors were allowed to participate in decision-making, were talked to and listened to about their concerns, and delegated important unit tasks (Le Blanc and González-Romá, 2012). Hypotheses 2a-c regressed the supervisors' cognitive behaviors onto mentorship and found them as significant predictors. These results may certainly be tied to the conceptualization of cognitive learning as a proximal mentoring outcome (Kraiger, Ford, and Salas, 1993). The mentoring process results with a protégé learning new

cognitive strategies, such as problem-solving or decision-making. For that reason, as the protégé becomes the expert and begins to develop his or her subordinates, it was concluded that these cognitive strategies will play an important role in organizational outcomes.

While empirical research is lacking on the cognitive attributes of mentors (Wanberg et al., 2003), this study demonstrates that mentors' cognitive behavior will influence protégés and ultimately the organization. Swap et al. (2001) presume that individuals who are mentored perform better because they have learned and absorbed knowledge from their mentors. The cognitive behavior constructs were significant predictors of performance. The statistical significance illustrates the importance of modifying mentor behaviors to analyze and express their decision-making processes and explore new problem-solving methods. Mastering these competencies will increase their effectiveness as mentors.

The most significant implications resulted with the specific mediation processes. This study's quantitative results conclude that a mentor's cognitive skills will influence protégé outcomes, highlighting the importance of reflection, articulation, and exploration. The reflection test results correspond to Matsuo's (2012) recent findings, which concluded that encouraging reflective practice is central to the leadership of learning. It is important for two people involved in a mentoring relationship to clarify goals, objectives, and processes, and to have a common understanding of the desired outcomes (Watt, 2004). Reflecting upon the problem-solving process is a tool that partially mediates protégé performance.

Exploration was the other cognitive tool that partially mediated the relationship between mentorship and performance. This relationship may correspond to the mentoring function of Challenging Assignments (Wanberg et al., 2003). Challenging Assignments provide challenging work that prepares protégés for greater responsibility to encourage skill development and innovativeness. This research determined that if a mentor continues to investigate new ideas, exploration will affect the unit's performance. Increasing performance may be due to mentors providing new ideas, or acting as role models, thereby developing protégés' drive for new problem-solving methods.

The result, that mentors' ability to articulate their knowledge fully mediated the model, is not surprising. When mentors participate in the learning process, they demonstrate and articulate the temporal process of thinking (Dennen, 2004). Not only is it important to make target processes visible, but it is also important to verbally address the concepts, procedures, and strategies of the decision-making. Specifically, this behavior is associated with the enhancement of the task-related aspects of work that facilitate objective success (Allen et al., 2004).

To gain a better understanding of the relationship between cognitive behaviors and performance, a multivariate regression was conducted with unit performance as the dependent variable and reflection, articulation, and exploration as a series of independent variables. The results of these regression models, presented in Table 3, suggest that articulation had the highest predictive power in explaining the cognitive factors associated with performance. While reflection and exploration show some predictive power and significance associated with performance, articulation transfers information

into knowledge by sharing some context, some meaning, with the protégé (Swap et al., 2001).

Managerial Implication

The Air Force Mentoring instruction sets the foundation to take advantage of this framework of understanding. The Air Force must capitalize on its people and processes to cultivate these cognitive skills. The Air Force Instruction must not only tell mentors what they should focus on, but *how* each person can create positive interaction with their protégés. Mentors can continually reflect upon their problem solving, articulate this and discuss with protégés, and then set the example to explore new ideas and progressively become more innovative. It is important to understand that articulating expert knowledge and problem-solving strategies is not the only method to impact performance. Linking reflection, articulation, and exploration facilitates the realistic evaluation of both performance and potential of protégés (Department of the Air Force, 2000).

Previous research has shown that mentoring takes time and continuity (Swap et al., 2001). The Air Force relocates individuals often, whether the relocation is a permanent change of station or a local permanent change of assignment. Unfortunately, the organizational culture combats the transfer of expertise from a mentor to protégé due to (1) time pressures in the organization and (2) the increasing tendency for individuals to work in many different organizations. However, these trends may in fact create higher demand for quality mentoring, not only because individuals have less time to "come up to speed" on their own, but because individuals need to be active and continuous learners as they move to new organizations (Swap et al., 2001). Reflection, articulation, and

exploration will provide a consistent approach to mentoring on technical development and performance.

Limitations and Future Research

First, research findings are restricted to a single organization. While the sample of convenience was large and encompassed a wide range in military rank, the data is limited to Air Force personnel. Future research would benefit from investigating the proposed relationships within civilian industry or other government organizations.

Second, the variables tested from the archival data set possess same-source bias. Even though the study focused on the supervisor perspective, collecting data from leaders and subordinates would have better validated the mentorship and performance construct. To minimize the same-source bias, a psychological separation was created between variable items in the survey, which diminished the respondent's ability and motivation to use his or her prior responses to answer subsequent questions (Podsakoff, 2003). While it was appropriate to include self report data for the mentor's cognitive behaviors, future research could include separate tests for this variable. For example, the Wonderlic test measures an individual's aptitude for learning, understanding, and solving problems.

Third, the cognitive behavior scales were developed within the confines of the archival data set. It has yet to be determined if there are established constructs measuring cognitive apprentice items against the mentor's behavior. This study was an attempt to initiate further research on a proposed cognitive mentorship model, which would increase interaction among different mentoring disciplines. Further research is needed to examine the validity and reliability of these constructs and measures or to develop new scales.

Additionally, future research would benefit by using a proper mentorship scale, one that is not operationalized through LMX items.

It would also be worthwhile for future research to investigate additional organizational outcomes. There have been several organizational outcomes identified with mentoring, a few of which could be influenced by cognitive behaviors. Future research should include the following: citizenship behavior, employee integration, organizational communication, management development, managerial succession, and socialization to power (Zey, 1984; Wanberg et. al, 2003).

Finally, it is important to test the context in which cognitive behavior does, or does not, apply through moderation. The moderator effect is nothing more than an interaction whereby the effect of one variable depends on the level of another (Frazier, Tix, and Barron, 2004). Moderator variables address "when" or "for whom" the predictor variable is more strongly related to an outcome, rather than the "how" or "why" as mediators conclude (Frazier et al., 2004). For example, if articulation is a significant moderator, the mentoring increases performance more for an articulating mentor than for a non-articulating mentor.

Conclusion

This research discussed the prevalence of cognitive behaviors in the mentor-protégé relationship and was examined within the boundaries of the Air Force organization. This research observed significant relationships between the mentors' cognitive behavior and the influence on group performance. The cognitive mentorship model should be encouraged, with the intention that mentors continually promote their

reflective, expressive, and exploratory behaviors. Further research on a mentor's cognitive behavior should be conducted so individuals can develop the skills necessary to positively affect mentoring outcomes.

Appendix

Survey Item Constructs

Mentorship (Bauer and Green, 1996)
1. He/she understands my problems and needs.
2. My supervisor would be personally inclined to use his or her power to help me solve problems in my work?
3. I can count on my supervisor to "bail me out", even at his/her own expense, when I really need it.
4. I would view my working relationship with my supervisor as extremely effective.
5. I have enough confidence in my supervisor that I would defend and justify his/her decisions if he/she were not present to do so.
6. I usually know where I stand with my supervisor.
7. I usually know how satisfied my supervisor is with me.
8. My supervisor recognizes my potential well.

Reflection
1. I am very familiar with how my supervisor makes decisions.
2. I am very familiar with how my supervisor likes to receive information.
3. Through my past experience with my supervisor, I understand what he/she expects.
4. I feel like I know my supervisor well.

Articulation
1. I discuss in specific terms who is responsible for achieving performance targets.
2. I talk enthusiastically about what needs to be accomplished.
3. I make clear what one can expect to receive when performance goals are achieved.
4. I am able to use rich and varied language when communicating with my supervisor.
5. I am easily able to tailor my messages to my supervisor.
6. It's easy for me to explain things to my supervisor.

Exploration
1. I get others to look at problems from many different angles.
2. I suggest new ways of looking at how to complete assignments.
3. If I see something I don't like, I fix it.
4. I love being a champion of my ideas, even against others' opposition.
5. No matter what the odds, if I believe in something, I will make it happen.
6. I can spot a good opportunity, long before others can.

Performance (Elshaw, 2010)
1. Performs effectively with limited resources.
2. Communicates information clearly.
3. Adapts to changing conditions effectively.
4. Develops creative solutions to problems.
5. Takes appropriate levels of risk.

6. Empowered to act.
7. Behaves responsibly and ethically.
8. Gets positive results.
9. Efficiently gets tasks done.
10. Gets tasks done efficiently.
11. Able to overcome adversity.
12. Works hard, with great effort.
13. Is innovative.

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14. ABSTRACT

The role of cognitive apprenticeship has been emphasized in facilitating individual performance in the classroom, but there is limited quantitative research directly linking cognitive behaviors to mentoring relationships and workplace performance. This study investigates the characteristics of mentoring behavior that influence group performance using archival data from 52 different organizations. A mediation model is developed and the results indicate that the group-level of mentors' cognitive behavior plays a central role in the mentor-protégé relationship. The findings suggest that the mentors' collective articulation of problem solving processes fully mediate the unit's performance, while reflection and exploration partially mediate the relationship. The theoretical and practical implications of the findings are discussed.

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