MENTORS' IMPACT ON THE DEVELOPMENT OF ADAPTABILITY SKILLS VIA EXPERIENTIAL LEARNING

by

Cary F. Kemp

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of
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Committee:

_____ Director

_____

_____

_____ Department Chairperson

_____ Program Director

_____ Dean,
College of Humanities
and Social Sciences

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By

Cary F. Kemp
Master of Arts
George Mason University, 2003

Director: Dr. Stephen J. Zaccaro, Professor
Department of Psychology

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DEDICATION

First and foremost, I dedicate this work to the glory of God, who gives me the strength, ability, and determination to succeed through every stage of my life--especially this one. Furthermore, I dedicate this work to my fabulous family and friends, who have supported me unconditionally through my graduate school experience. I am especially thankful for my husband, Ben Larson, for his love, understanding, and support; my Mom, Estelle Kemp Parker, for her constant encouragement and faith in my abilities; my Dad, George Kemp, for inspiring me down this path and being a role model of compassion and hard work; my stepparents, Nancy and Brian Larson, for their prayers and love. I'm also grateful to a number of close friends who have encouraged me and believed in me--not to mention sacrificed their time and sanity to accommodate my insane schedule and constant busyness: Savannah Amerson, Molly Bauch, Katie Baughman, Lane Conville, Susan Cronier, Kari Dugger, Tara Ford, Erin Greenwell, Andrea Henry, Emma Lovely, Shena Nutter, Elizabeth Porter, Erin Rose, Kate & Micah Salsman, Melissa & Jimmy Summers, and Gabrielle Wood. You have been my strongholds; I love you all and hope I can return your kindness and generosity in the years to come.

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ABSTRACT

MENTORS' IMPACT ON THE DEVELOPMENT OF ADAPTABILITY SKILLS VIA EXPERIENTIAL LEARNING

Cary F. Kemp, Ph.D.

George Mason University, 2007

Dissertation Director: Dr. Stephen J. Zaccaro

This research investigated the process of protégé development, focusing on the development of adaptability skills via experiential learning. Mentors facilitated skill development by challenging protégés during the conceptualization stage of learning. This finding highlights the importance of framebreaking and re-framing activities, and the role that mentors can play in promoting the development of new mental models. Mentors also facilitated development by frequently instructing protégés to intuitively grasp new concepts and to experiment with new skills. All mentoring functions except friendship were positively related to mentors' instruction to use experiential learning activities, suggesting that mentoring functions serve as platforms for learning activities. Career development facilitation and friendship were the only two functions directly related to skill development. Skill development was related to performance improvement and protégé satisfaction. Implications for mentor training and future research are discussed.

1. Introduction

"He who walks with the wise grows wise." – Proverbs 13:20

Certainly individuals that we "walk with" have great influence on our growth and development. In organizational settings, mentors are wise and trusted counselors who guide less-experienced colleagues through stages of personal and career development (Kram, 1983, 1985). Research supports mentors' impact on protégé development. Specifically, research has demonstrated that protégés gain declarative and technical knowledge (e.g., Chao, Walz, & Gardner, 1992; Gallo & Siedow, 2003; Ostroff & Kozlowski, 1993), technical and interpersonal skills (e.g., Fagan & Fagan, 1983), and self-confidence and learning motivation (e.g., Bard & Moore, 2000). However, research has not investigated mentors' impact on protégé development of adaptability skills, which are increasingly important among leaders in today's fast-paced work environments (Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000; Pulakos, Arad, Donovan, & Plamondon, 2000). Furthermore, despite the fact that attribute-by-treatment interaction (ATI) research has successfully illuminated learning processes in classroom, training, and on-the-job learning settings (e.g., Jonassen & Grabowski, 1993), mentoring research has not investigated how ATIs affect protégé development. ATI research holds great potential for shedding light on the process of protégé development, as learning models suggest that interactions between protégé attributes and mentor activities predict development, rather

than attributes or activities alone (e.g., Wulff, 2005; Lentz & Lange, 2005)

The current research addresses these two empirical gaps by investigating how interactions between protégé attributes and mentor instructions promote the development of adaptability skills and technical skills. Previous research suggests there are three pathways to protégé development: cognitive learning, vicarious (social) learning, and experiential learning. Cognitive learning--learning based on passive information acquisition and processing--occurs when protégés listen to mentors' explanations, advice, and experiences (Hale, 2000; Hezlett, 2005). Social learning--learning based on observation of others' experiences--occurs when protégés observe mentors at work (Gibson, 2004; Zagumny, 1993; Hale, 2000; Hezlett, 2005). Experiential learning--learning based on individuals' personal experiences (Dewey, 1938; Kolb, 1984; Lewin, 1951; Piaget, 1970)--occurs when protégés work, discuss, and reflect with their mentor (Hezlett, 2005; Hale, 2000) and embrace opportunities for trial and error that mentors provide (Hezlett, 2005). Here, the focus is on the degree to which protégés develop skills via the experiential learning process, rather than cognitive or social learning processes, because experiential learning strongly contributes to the development of adaptability skills (Banks, 2006; Zaccaro & Banks, 2001), and because work settings (in contrast to classroom and training settings) provide mentors many unique opportunities to promote experiential learning (e.g., "challenging work roles"; Lewis & Jacobs, 1992, p. 136).

Experiential Learning Theory

Dewey (1938) introduced the concept of experiential learning by claiming that experience is the only platform for genuine learning. According to Dewey, educators

must teach through experiences that will affect how the individual approaches future learning opportunities. Lewin's (1951) theory of action learning proposes that experiential learning occurs through a four-stage cycle that involves engaging in two dimensions of naturally opposing activities: experience versus abstraction, and action versus reflection. Piaget (1970) suggested that individuals develop abilities to engage in these activities according to sequential stages of personal development. He also made a clearer distinction between the two dimensions of learning activities: experience and abstraction are ways of assimilating new experiences into existing concepts, while action and reflection are ways of accommodating existing concepts into new experiences.

Kolb's (1984) experiential learning theory (ELT) elaborates and lends validity to these concepts. Similar to Lewin and Piaget, Kolb suggests that learning can occur through four activities (i.e., learning modes). First, individuals can intuitively acquire information and concepts from their experiences, an activity referred to here as "using intuition," (i.e., concrete experience). Second, individuals can reflect on those experiences, here labeled "reflecting" (i.e., reflective observation). Third, individuals can revise existing mental models and create new ones that make sense of their observations, here labeled "conceptualization" (i.e., abstract conceptualization). Finally, individuals can test out their theories by actively "experimenting" with them (i.e., active experimentation). Using intuition and conceptualizing represent opposing ways of grasping new experiences, while reflecting and experimenting represent opposing ways of transforming one's existing behavioral repertoire.

One of ELT's fundamental propositions is that personality and environmental

factors influence the degree to which individuals develop preferences for certain learning activities over others (Kolb, 1984; Kolb & Kolb, 2005). As children, personality attributes prompt us to prefer one grasping activity and/or one transforming activity over others. As we grow up, we embrace activities we prefer, and avoid others. Through this process, we specialize in--become most proficient at using--preferred learning activities (Kolb, 1984; Piaget, 1970). However, most individuals are eventually challenged to broaden their learning repertoire by environments that introduce "creative tension" between their preferred learning activities and non-preferred activities (Kolb & Kolb, 2005, p. 2). To best learn from these experiences, we must integrate non-preferred learning activities with preferred activities. Over time, repeated integration of learning activities reduces learning preferences: "development in learning sophistication is seen as a move from specialization to integration" (Mainemelis, Boyatzis, & Kolb, 2002, p. 6). At the highest level of integration, individuals "systematically change learning styles to respond to different learning situations" (Kolb & Kolb, 2005, p. 29). However, variations in personalities and experiences result in a large amount of variation in the degree to which individuals specialize in versus integrate learning activities (Kolb, 1984; Kolb & Kolb, 2005). The importance of differences between specialization and integration lies in their influence on skill development.

Implications for Skill Development

Secondary propositions of ELT state that specialization in learning activities promotes the development of commensurate first-order skills, while integration represents a sophisticated way of learning, which contributes to the development of

higher-order skills, such as adaptability skills (Boyatzis & Kolb, 1995, 1997; Kolb & Kolb, 2005; Mainemelis et al., 2002). For example, the ability to use a computer program requires a specific skill set. Some individuals will learn a new program best by observing others (using intuition), some by relating the new program to one they already know (reflecting), some by developing a new mental model for how to use the program (conceptualizing), and others engaging in a process of trial and error (experimenting); the new program can be learned through any one of these activities. In contrast, the ability to solve problems adaptively requires all four learning activities. Individuals must be intuitively aware of changes in their environment, reflect on the implications of those changes, develop creative solutions that address the change, then test out the effectiveness of their solutions; thus, adaptive problem solving requires effective integration of all four learning activities. In sum, Kolb and Kolb (2005) state that the move from specialization to integration represents "increasing complexity and relativism in adapting to the world" (p. 4).

Indirect support for the effect of specialization on development of specific skill sets lies in research demonstrating that individuals with similar learning preferences tend to cluster in educational specialization (e.g., engineering students tend to prefer conceptualization; Kolb & Kolb, 2005; Loo, 2004), and that individuals who dedicate themselves to a profession are led to specialize in relevant learning activities (Kolb & Kolb, 2005). This evidence led Mainemelis et al. (2002) to test for relationships between specialization in learning preferences and specific, commensurate skill sets. Their research demonstrated that specialization in using intuition contributed to the

development of interpersonal skills, conceptualizing to analytical skills, and experimenting to behavioral skills. Mainemelis et al.'s research also offered preliminary support for the proposition that integration promotes adaptability. Specifically, they found that individuals with moderate (i.e., balanced) learning preferences were more flexible in their use of learning activities; furthermore, unlike specialization in learning activities, integration did not contribute to development of specific skill sets. As a result of these findings, Mainemelis et al. call on future research to investigate the relationship between integration and development of adaptability skills.

Mentors' Influence on Skill Development

Tertiary propositions of ELT (Kolb, 1984; Kolb & Kolb, 2005) state that *accommodating* individuals' learning preference promotes specialization, while *challenging* individuals to face the tension between opposing learning activities promotes integration. Salomon (1972) introduced *preferential matching* as a method of promoting learning by capitalizing on individuals' capabilities--in other words, by accommodating their strengths. According to Kolb (1984), accommodation results in "programs that produce fine technicians, but few innovators" (p. 203). Research has demonstrated that instructors who accommodate students' learning preferences promote knowledge acquisition and development of specific skill sets (e.g., Dixon, 1982; Raschick, Maypole, & Day, 1998; Svinicki & Dixon, 1987). These studies support for the proposed effect of accommodation on specialization, and subsequently, development of technical skills. In contrast, Messick (1976) introduced *challenge matching* as a method of promoting flexibility in learning by deliberately encouraging learners to engage in new activities. In

the same vain, Lewis and Jacobs (1992) state that development hinges on challenging individuals to take on novel work roles. ELT research demonstrating that learning environments promote integration of learning activities by challenging learners to use non-preferred activities (Boyatzis & Mainemelis, 2000; Lengnick-Hall & Sanders, 1997) supports the effect of challenge on integration. Research demonstrating that classroom instructors have the greatest influence on the development of complex skills (e.g., self-regulation, critical thinking, and problem-solving) when they challenge learners (e.g., Brock & Cameron, 1999; Buch & Bartley, 2002; Travers, 1998) supports the effect of challenge on higher-order skill development. Further support is garnered through research demonstrating that stretch assignments and developmental work experiences, in which leaders encourage subordinates to take on assignments that challenge their skills, contribute to the development of leadership skills, including adaptability skills (e.g., London & Mone, 1999; McCauley, Eastman, & Ohlott, 1995; Tesluk & Jacobs, 1998).

Based on ELT and leadership development literatures, it is proposed that mentors facilitate development of adaptability skills by challenging protégés to integrate new learning activities into their behavioral repertoire. For the purpose of this research, challenge is operationalized as an interaction between mentor instructions and protégé learning preferences: challenge reflects the degree to which a mentor instructs his or her protégé to use a non-preferred learning activity, and is thus maximized when a mentor frequently instructs his or her protégé to use a non-preferred activity. Furthermore, mentors facilitate development of technical skills by accommodating protégés' tendency to *specialize* in preferred learning activities. Accommodation is also operationalized as an

interaction between mentor instructions and protégé learning preferences: accommodation reflects the degree to which a mentor instructs his or her protégé to use a preferred learning activity, and is thus maximized when a mentor frequently instructs his or her protégé to use a preferred activity. Based on this framework, it is hypothesized that challenge of learning preferences is positively related to adaptability skill development, while accommodation is positively related to technical skill development. These relationships are represented by the interactions between protégé learning preferences and mentor instructions seen in Figures 1 and 2.

> *Hypothesis 1.* The degree that mentors challenge protégés by instructing them to use non-preferred learning activities is positively related to protégé development of adaptive problem-solving skills; meanwhile, the degree that mentors accommodate protégés by instructing them to use preferred learning activities is negatively related to protégé development of adaptive problem-solving skills.

> *Hypothesis 2.* The degree that mentors accommodate protégés by instructing them to use preferred learning activities is positively related to protégé development of technical skills; meanwhile, the degree that mentors challenge protégés by instructing them to use non-preferred learning activities is negatively related to protégé development of technical skills.

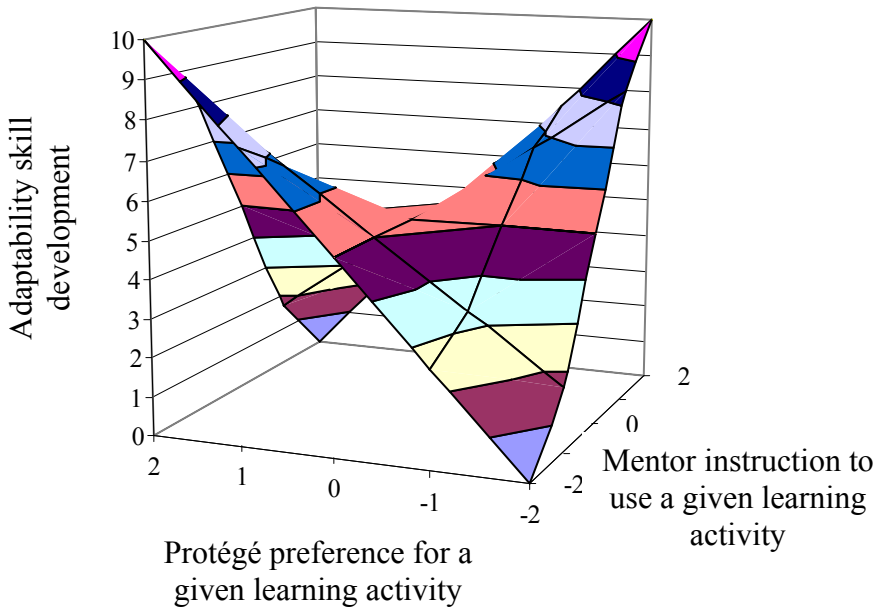

Figure 1. Hypothesized effects of mentors' challenge vs. accommodation on protégé learning preferences on adaptability skill development

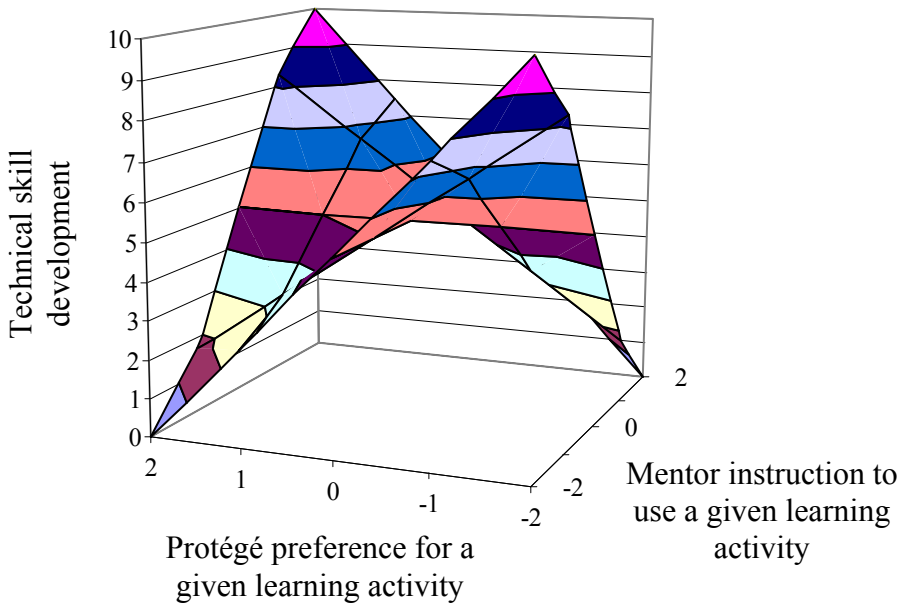

Figure 2. Hypothesized effects of mentors' challenge vs. accommodation of protégé learning preferences on technical skill development

Although the main purpose of this study was to investigate the effects of challenging vs. accommodating experiential learning preferences on skill development in the context of mentoring relationships, inputs to and outcomes of the experiential learning process were also investigated. Figure 3 represents a proposed input-process-outcome model of protégé development. Hypotheses 1 and 2 describe the process of protégé development (challenge vs. accommodation). Hypotheses 3 through 5, explained in the following sections, propose that traditionally-studied mentoring functions (Kram, 1985; Fowler & O'Gorman, 2005) and mentors' own learning preferences are inputs to the experiential learning process, while protégé skill development is related to protégé performance improvement and satisfaction with their mentoring relationship.

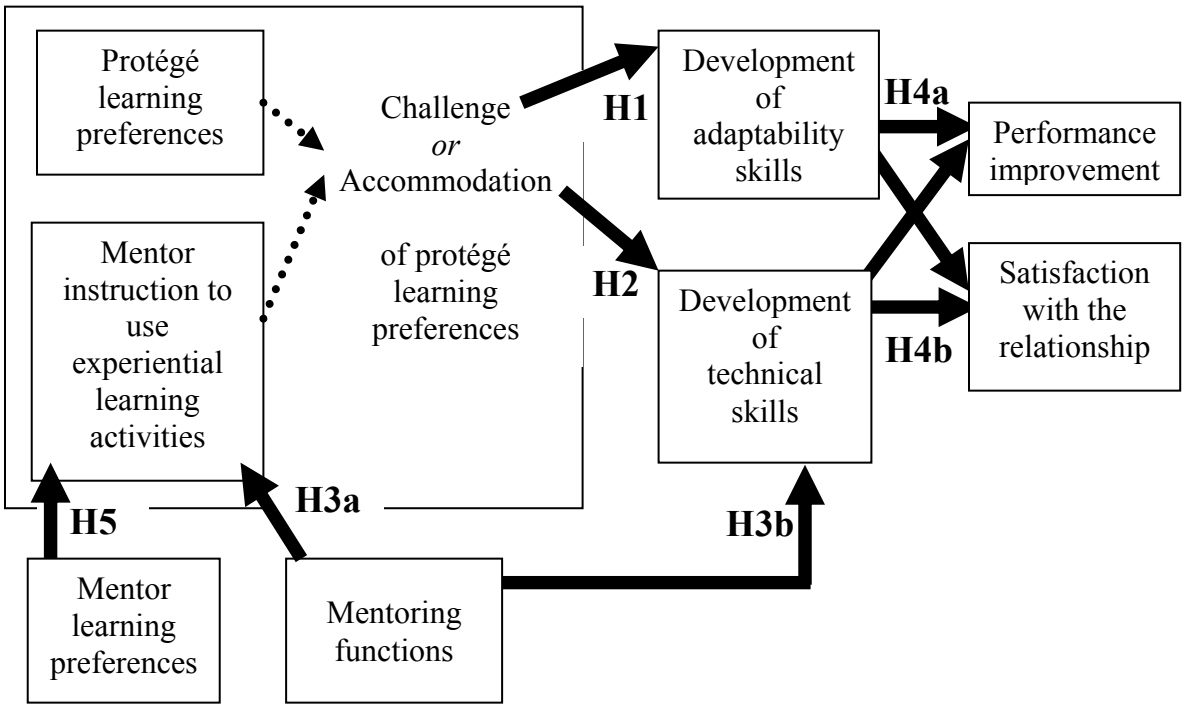

Figure 3: Proposed model of protégé development

Mentoring Functions

Research on organizational mentoring suggests that mentors interact with protégés by engaging in a number of "mentoring functions" (Kram, 1985; Scandura, 1992). Most recently, Fowler and O'Gorman (2005) found that contemporary mentoring relationships are characterized by eight functions: coaching, learning facilitation, role modeling, systems/strategies advice, career development facilitation, personal/emotional guidance, friendship, and advocacy (see Appendix A for descriptions of each). These functions describe the various career and social roles that mentors adopt when working with protégés. Mentoring functions have served as the focal point of mentoring research; they have served as both indicators of relationship effectiveness, and have proved to predict other relationship outcomes (e.g., Allen, Eby, Poteet, Lentz, & Lima, 2004; Lankau and Scandura, 2002; Scandura, 1992). These functions are useful because they describe the broad spectrum of mentors' activities; however, to understand how mentors influence skill development, it is necessary to investigate how these functions relate to learning activities. For example, by playing the role of coach, a mentor is well-positioned to instruct his or her protégé to reflect. In other words, mentoring functions may be platforms from which mentors instruct protégés to use learning activities (e.g., experiential, cognitive, and social learning). To investigate this proposition, it is hypothesized mentoring functions are positively related to mentors' instructions to use intuition, reflect, conceptualize, and experiment. Furthermore, because career functions describe learning activities more so than social functions, it is proposed that career functions will be related to mentors' instructions to engage in experiential learning

activities more strongly than social functions.

> *Hypothesis 3a*. Career functions are related to mentor instructions to use experiential learning activities more strongly than social functions.

The fact that mentoring functions encompass a broad spectrum activities, many of which are likely to influence protégé development outside of the experiential learning process (e.g., systems/strategies advice involves helping protégés learn organizational processes; career development facilitation involves helping protégés secure job promotions), suggests that mentoring functions are also directly related to protégé skill development. Based on Allen et al.'s (2004) recent meta-analysis, which demonstrated that social functions have stronger relationships with attitudinal outcomes (e.g., protégé satisfaction), while career functions have stronger relationships with objective outcomes (e.g., promotion, salary growth), it is proposed that career functions are related to protégé skill development more strongly than social functions.

> *Hypothesis 3b*. Career functions are related to protégé skill development more strongly than social functions.

Outcomes of Protégé Development

Performance Improvement

Though a primary goal of mentoring is protégé development, organizations invest in employee development for the ultimate purpose of enhancing protégé performance. Literature on organizational training suggests that learned skills translate to performance improvement when there is a positive climate for skill transfer (Roullier & Goldstein, 1993), which emerges when training goals are in line with organizational values (Kozlowski & Salas, 1997). Mentoring relationships are likely to promote performance

improvement because they often exist in and/or create a positive climate for skill development. For example, mentoring is most common in organizations that value employee development, and organizations that support mentoring are likely to honor protégés' efforts to reach their goals. Furthermore, most organizational mentoring programs make strong efforts to create developmental assignments for protégés, and mentors help protégés set goals that align with other organizational values. Thus, the skills protégés develop via mentoring are expected to transfer to on-the-job performance improvement. However, the measurement of performance improvement is time-dependent because it takes time for individuals to be given or to create opportunities to utilize new skills. A protégé cannot demonstrate development of a specific skill until he or she is faced with a situation requiring the use of that skill. Therefore, I propose that protégé development is positively related to performance, and this relationship will be stronger among longer-term relationships than shorter-term relationships.

> *Hypothesis 4a.* Protégé development is positively related to performance improvement, but this relationship is moderated by duration; the relationship is stronger among longer-term relationships than shorter-term relationships.

Protégé Satisfaction

Training literature suggests that some individuals derive satisfaction from personal development. Research has demonstrated that individuals with high learning goal orientation, self-efficacy, openness, and conscientiousness are most likely to embrace developmental experiences (Cron, Slocum, VandeWalle, & Fu, 2005). Although measurement of these attributes was beyond the scope of this research, there is evidence to suggest that protégés in both formal and informal relationships possess these

characteristics. Individuals with high learning goal orientation, self-efficacy, openness, and conscientiousness are most likely to request developmental support and feedback. Protégés often initiate informal relationships, thus demonstrating all four attributes; when mentors initiate relationships, protégés at least demonstrate conscientiousness and openness by their willingness to reciprocate. Furthermore, protégés almost always apply for acceptance into formal relationships, which reflects all four attributes. Thus, it is reasonable to suspect that protégés represent a population of individuals who are likely to derive satisfaction from personal development.

Hypothesis 4b. Protégé development is positively related to protégé satisfaction.

Effect of Mentor Learning Preferences on Mentor Instruction

A third goal of this research was to determine whether mentors' learning preferences influence the instructions they give to their protégés. Several researchers have referenced an assumption that individuals tend to instruct others via learning activities that conform to their own preferences (e.g., Eickmann, Kolb, & Kolb, 2004; Sugarman, 1985). Eickmann et al. (2004) state that professors "tend to teach the way they learn" (p. 247). As a result, self-awareness of learning preferences "can help them recognize the need to teach in different ways" (p. 247). For example, a teacher who prefers active experimentation is more likely to assign hands-on projects than a teacher who prefers conceptualization, while the teacher who prefers conceptualization is more likely to draw models for his or her students. A review of the learning style literature reveals no basis for this assumption; no research has demonstrated such relationships. Nevertheless, researchers have used this assumption to state that instructors must be

careful to avoid this pitfall, and furthermore, that instructors need to be trained to engage in the full spectrum of learning activities in order to challenge and/or accommodate their protégés' preferences (Jonassen & Grabowski, 1993). In order to test this assumption, it is hypothesized that mentors' learning preferences are related to the degree to which they instruct protégés to engage in corresponding learning activities. Support for this hypothesis will suggest that mentor learning preferences are a factor worthy of consideration.

> *Hypothesis 5.* Mentors' learning preferences are related to the degree to which they instruct protégés to engage in corresponding experiential learning activities.

Together, these five hypotheses investigate inputs to, processes of, and outcomes of protégé development via experiential learning, as presented in the proposed model (see Figure 1). This model is offered as a general model of protégé development--it is expected to explain the process of protégé development across mentoring relationships. Of course, there are many contextual differences in mentoring relationships; there are different types of mentoring relationships (e.g., formal vs. informal), and also differences in mentor-protégé dynamics (e.g., frequent communication vs. infrequent). In order to determine whether the proposed model does indeed explain development across contextual differences, data was collected from a diverse population of mentor-protégé pairs, and the effects of relationship structure and dynamics on protégé development were explored.

Research Questions Related to Contextual Factors

Based on research demonstrating that relationship formality (formal vs. informal; Chao et al., 1992; Ragins & Cotton, 1999; Underhill, 2006), mentor status (colleague,

supervisor, superior; Eby, 1997), gender (both women, both men, mixed; Baugh, Lankau, & Scandura, 1996), duration (Fagenson-Eland, Marks, & Amendola, 1997), mentor-protégé dialogue (Bozionelos, 2004), and similarity of cognitive styles (Armstrong, Allinson, & Hayes, 2002) influence mentoring functions and outcomes, I investigated whether there are differences in mentoring functions, mentor instructions, and protégé skill development, performance improvement, and satisfaction between: (a) occupational groups; (b) formal vs. informal relationships; (c) mentor-as-colleague vs. supervisor vs. superior relationships; (d) male/male, female/female, and mixed gender relationships; e) shorter-term vs. longer-term relationships; (f) relationships in which pairs communicate frequently vs. infrequently; (g) relationships in which pairs have similar vs. different learning preferences; and (h) relationships in which protégés understand vs. misinterpret mentors' instructions. These questions are addressed prior to hypothesis tests, in order to identify contextual factors that may affect hypothesized relationships.

2. Methods

Design

This research is a field study of existing mentoring relationships in organizational, medical, and academic settings. Data were collected using a paired-response approach; each mentor and his or her protégé were asked to respond to parallel survey items. Pairs were matched so that data were combined into a single dataset containing both mentor and protégé responses. While several researchers have collected data from mentor-protégé pairs (e.g., Armstrong et al., 2002), this is the first research to investigate attribute-by-treatment interactions (ATIs). Collecting data from mentor-protégé pairs reduces problems associated with common source reporting bias (e.g., inflated observed correlations; Doty & Glick, 1998), and makes it possible to investigate the effect of relationship dynamics (e.g., protégé understanding of mentor instructions, congruence between mentor and protégé learning styles) on the learning process. This study is also unique in that it focuses on mentor ratings of protégé development, as opposed to protégé self-reports. Although all ratings are influenced by rater biases, mentor ratings of development are preferable to protégé self-reports because they reflect the way that protégés are evaluated in job settings (e.g., performance evaluations).

Participants

Surveys were distributed in several waves, beginning in March 2006 and

concluding in January 2007. Surveys were distributed to employees in a federal leadership development program, business consultants, nurses, university faculty, K-12 teachers, and professional listservs (e.g., the International Leadership Association).

A total of 353 individuals completed the survey; 117 mentor-protégé pairs, plus 32 mentors whose protégé did not participate, 28 protégés whose mentor did not participate, 17 mentors who did not provide their protégé's contact information, and 42 protégés who did not provide their mentor's contact information. Three of the 117 pairs were discarded because comments indicated their relationship was superficial, resulting in a total of 114 pairs of data. A traditional response rate is impossible to estimate because there is no way to determine the number of survey recipients who were qualified to participate (i.e., currently or previously had a mentor or protégé). According to Tabachnick and Fidell's (2001) rule of thumb for requisite sample size ($N \geq 50 + 8 * m$, where m represents the number of terms in the regression equation), 90 mentor-protégé pairs were needed to test hypotheses 1 and 2, 106 pairs to test hypotheses 3a and 3b, and 66 cases to test hypotheses 4a and 4b. Thus, 114 pairs provided adequate power to test all hypotheses.

Procedure

Data were collected via a web-based survey. Individuals in the target populations were e-mailed an invitation to the survey. Participants completed an informed consent form and confirmed that they were involved in a mentoring relationship, defined as "a relationship with a more-experienced colleague who helps a less-experienced colleague to navigate in his or her world of work." Participants were then asked to think of a single

mentor or protégé (depending on their status as a protégé or mentor), and focus on that relationship as they responded to questions. Toward the end of the survey, participants were asked to provide an e-mail address for their mentor/protégé, and survey invitations were sent to these addresses. To maximize response rate, individuals were sent a total of four reminders.

Measures

Learning Preferences

The Kolb Learning Style Inventory Version 3.1 (KLSI 3.1; Kolb, 1999) was used to assess protégés' and mentors' preferences for the four experiential learning activities (using intuition, reflecting, conceptualizing, and experimenting). The KLSI 3.1 is a 12-item self-report instrument that asks individuals to rank in order (1 = least like you, 4 = most like you) statements regarding their learning preferences. An example item is, "I learn best from: (a) rational theories (conceptualizing), (b) personal relationships (using intuition), (c) a chance to try out and practice (experimenting), and (d) observation (reflecting). Reliabilities were high (α =.79 to .85). Kolb's (1999) scoring rubric calculates learning preference scores by taking the sum of ratings across the 12 items corresponding to each activity, resulting in scores ranging from 12 to 48 (a 36-point scale). However, in order to compare protégés' learning preferences to mentors' instruction to engage in experiential learning activities (measured on a five-point rating scale), learning preference scores were converted to a five-point scale. This was achieved by dividing each participant's LSI score by a factor of 4/36. The result was a scale ranging from zero to 4, for which 0 = least like me, 1 = a little like me, 2 = moderately

like me, 3 = much like me, and 4 = most like me.

Mentor Instruction to Engage in Learning Activities

To assess the degree to which each mentor instructed his or her protégé to engage in the four experiential learning activities (using intuition, reflecting, conceptualizing, and experimenting), I developed survey items based ELT's descriptions of each activity (Kolb, 1984; Kolb & Kolb, 2005; Mainemelis et al., 2002; Jonnasen & Grabowski, 1993). For example, Kolb (1984) describes a conceptualizing individual as one who uses logic and builds general theories. Based on this description, an item for instruction to conceptualize (framed toward mentors) reads, "I encourage my protégé to use mental imagery when learning new concepts." Mentors were asked to rate each item on a 5-point scale ranging from zero (never) to 4 (all of the time).

The original scale contained four items per learning activity. A reliability analysis suggested that two of the four items substantially reduced the reliability of the using intuition and conceptualizing scales, while one of the four items substantially reduced the reliability of the reflecting and experimenting scales. When these items are dropped, scale reliabilities are adequate (α = .73 to .81). A confirmatory factor analysis conducted using LISREL 8.72 (Jöreskog & Sörbom, 2005) suggested that the reduced 10-item measure represents the four factors better than the full 16-item measure. Fit indices for the 10-item measure (e.g., NFI = .94, RMR = .046, RMSEA = .073) are generally higher than fit indices for the 16-item measure (e.g., NFI = .87, RMR = .087, RMSEA = .099). Given the improvements in reliability and fit, I decided to use the 10-item measure (containing two- and three-item scales) for analyses.

Mentoring Functions

Fowler and O'Gorman's (2005) measure of mentoring functions was used to assess the roles that each mentor adopted when working with his or her protégé (coaching, learning facilitation, role modeling, systems/strategies advice, career development facilitation, personal/emotional guidance, and friendship). Mentors indicated the degree to which they viewed themselves filling these roles using a scale of 1 (not at all) to 5 (very much). A sample item is, "To what extent do you see yourself as an effective role model?" Reliabilities were generally high (α = 81 to .93). Of the eight functions, five (coaching, role modeling, learning facilitation, career development facilitation, and systems/strategies advice) describe career-oriented roles, in that they are ways that mentors provide career-related support, while two (friendship and personal/emotional guidance) describe socially-oriented roles, in that they are ways in which mentors provide social support (advocacy is not considered in this research because the focus here is on mentor-protégé interactions, and advocacy reflects what a mentor does *for* his or her protégé, rather than *with* his or her protégé). However, a confirmatory factor analysis conducted using LISREL 8.72 (Jöreskog & Sörbom, 2005) supported an 8-factor scale (NFI = .89, RMR = .078, RMSEA = .089), over a two-factor scale (career and social functions; NFI = .84, RMR = .10, RMSEA = .13), or a single factor scale (NFI = .83, RMR = .10, RMSEA = .14). These analyses suggest that functions should not be grouped into career-related and social categories, as each role is distinct. However, functions descriptively related to career development can certainly be compared to functions descriptively related to social support.

Development of Technical Skills

To assess development of technical skills, each mentor rated the degree to which his or her protégé developed technical competence over the course of the mentoring relationship. Mentors were first provided a definition of technical competence, "the ability to work with, understand, and evaluate technical information related to the job, advise others on technical issues, and apply knowledge of one's job domain to the solution of problems at work," along with examples of low, moderate, and high skill display. Weak technical skill development was evidenced by lacking the knowledge to perform the job adequately and producing below-standard products/services; strong technical skill development was evidenced by demonstrating the knowledge required for excellent job performance and being recognized as an expert. Based on the definition and behavioral examples provided, mentors were asked to respond to the question, "Over the course of your mentoring relationship, how much technical competence has your protégé gained?" on a scale of 1 (none) to 10 (all there is to be gained).

Development of Adaptability Skills

To assess development of adaptability skills, each mentor rated the degree to which his or her protégé developed adaptive problem-solving skills over the course of the mentoring relationship. Mentors were provided with a definition of adaptive problem-solving skills, "the ability to identify problems, determine the accuracy and relevance of information, use sound judgment to generate and evaluate alternatives, and make recommendations for problem solutions," along with examples of low, moderate, and high skill display. Weak skill was evidenced by reacting illogically to routine problems

and being unable to adapt solve novel problems; strong skill was evidenced by anticipating and responding effectively to complex, novel problems, solving problems creatively, and adapting problem-solving strategies to novel situations. Based on the definition and behavioral examples provided, mentors were asked to respond to the question, "Over the course of your mentoring relationship, to what degree has your protégé developed adaptability skills?" on a scale of 1 (none) to 10 (all there is to be gained).

Protégé Performance Improvement

To assess performance improvement, each mentor rated the degree to which his or her protégé improved his or her job performance over the course of the mentoring relationship. Mentors were provided with a definition of performance improvement, the degree to which protégés demonstrated three standards in their work: timeliness, quantity, and quality. Timeliness was described as, "plans projects adequately to ensure completion within established time frames, and promptly responds to inquiries in a timely manner"; quantity as, "performs an appropriate amount of work considering position and level"; and quality as, "accurately and adequately meets project goals." Based on these descriptions, mentors rated their protégé's performance improvement on a scale of 1 (none) to 10 (all that is possible).

Protégé Satisfaction

I created five survey items to measure protégés' satisfaction with various aspects of their mentoring relationship. These aspects included: 1) satisfaction with the degree to which the mentor and protégé interact, 2) satisfaction with the quality of mentor/protégé

interaction, 3) satisfaction with the degree to which the protégé is learning from the mentor, 4) satisfaction with how well the mentor and protégé get along, and 5) overall satisfaction with the mentoring relationship. Protégés rated each item on a scale of 1 (strongly disagree) to 5 (strongly agree). Because correlations between each specific item and the overall item were high (*r*s = .69 to .81), I used the single overall satisfaction item in analyses.

Contextual Factors

Relationship Dynamics

I developed several measures to assess the influence of relationship dynamics on mentoring functions and instructions, and as moderators of hypothesized effects.

Dialogue. I developed four items to assess the degree to which mentor-protégé pairs interacted with one another via different modes of communication: face-to-face planned, face-to-face unplanned, e-mail, and telephone. Responses were summed to create a single measure of mentor-protégé dialogue ranging from zero (no dialogue among any modes) to 16 (much dialogue across all modes).

Protégé Understanding of Mentor Instruction. I created a measure of protégé understanding of the instructions that mentors provide by calculating the absolute value of the difference between mentors' reports of instructions they provide and protégés' reports of mentors' instructions. The measure ranges from zero to 2.54 (M = .89, SD = .46), where scores closer to zero represent stronger understanding. This measure reflects the quality and clarity of mentor communication, as high-quality communication is characterized by clearly explaining oneself as well as checking for understanding

(Hargie, Saunders, & Dickson, 1994). Although difference scores have low reliability (Edwards, 1994), their use is justified when they are based on internally reliable multiple-item measures from separate sources (Smith & Tisak, 1993). Use of this measure is justified because it is based on differences in mentor and protégé ratings on the multiple-item learning activities scales.

Cognitive Congruence. Following the same method employed by Armstrong et al. (2001), I created a measure of cognitive style congruence by calculating the average of absolute value differences between mentor and protégé LSI scores. This measure reflects the degree to which mentor-protégé pairs approach learning opportunities similarly. Scores range from zero to 4 (M = 2.25 and SD = 1.16), where scores closer to zero indicate very similar approaches. Again, while difference scores are plagued with low reliability (Edwards, 1994), this measure is justified given that it is based on differences between mentor and protégé ratings on the 48-item, internally reliable KLSI3.1 (Kolb & Kolb, 2005).

Relationship Structure

Factors related to the structure of mentoring relationships were investigated as moderators of hypothesized effects. First, participants classified their relationship as formal (defined as a relationship "formed when an organizational entity assigns you with a mentor, or directs you to find a mentor"), or informal ("formed when you or your mentor initiates the relationship, without being assigned to one another or directed to do so by your organization"). Second, participants indicated the mentor's position relative to that of the protégé: colleague, direct supervisor, or superior. Third, participants indicated

their gender, and by comparing mentor and protégé datasets, I created a categorical variable representing gender composition (male/male, male/female, female/female). Finally, participants indicated the date their relationship was initiated and (if applicable) ended. By calculating the number of months between the initiation of the relationship and either the survey completion date or the relationship end date, I created a measure of the duration of the mentoring relationship at the time of the study.

Comment Items

I included two comment items to ensure that all participants were engaged in true mentoring relationships. Specifically, the survey asked participants to comment on 1) the top three benefits of their mentoring relationship, and 2) anything unique about the nature of their relationship that the survey did not address. Several participants indicated that their relationship was in name only; these participants were excluded from the study.

3. Results

Descriptive statistics, intercorrelations, and reliabilities (where applicable) of variables are reported in Appendix B. An important observation is that the two types of protégé skill development under investigation (adaptive problem-solving and technical) were moderately related to one another (r = .59), suggesting that either there was a large degree of overlap between these constructs (e.g., adaptability is a "technical" requirement among the jobs sampled), or that the measures failed to distinguish between them (e.g., halo effect). Furthermore, correlations among the four types of mentor instruction were moderate (rs =.52 to .67), as were correlations among the seven mentoring functions (rs = .34 to .69). Both patterns demonstrate that there are different, yet overlapping, approaches to working with protégés.

Demographics of the research sample (occupation, formality, gender composition, and duration) are presented in Appendix C. The largest group represented was leadership development program participants (40%), followed by K-12 teachers (20%). Over half the relationships were informal (58%). Mixed gender relationship were most common (39%); within this mixed gender group, there were only slightly more male mentors with female mentees (22%) than vice versa (17%). Female/female relationships (37%) outnumbered male/male relationships (24%). With respect to mentor status, 39% of mentors were non-supervisor superiors, while 34% were colleagues and 26% were direct

supervisors. The average relationship duration was approximately 15 months; average durations by subgroup are displayed in Figure C3. There were several notable differences in relationship structure and dynamics across occupational groups. For example, all of the hospital nurses were in informal relationships, while most of the K-12 teachers were in formal relationship. These differences are displayed in Figures C4 through C6. Because the process of protégé development may differ across types of mentoring relationships, I first identified differences in research variables across both occupational groups and across contextual factors. These preliminary analyses, presented in Appendix D, suggest that development of adaptability skills does not differ across groups, though technical skill development differs across occupation, relationship formality, and relationship duration, and performance improvement differs across occupation. Furthermore, mentoring functions and mentor instructions are related to occupation, gender, mentor status, duration, mentor-protégé dialogue, and cognitive congruence. These factors are addressed during hypothesis testing, where appropriate. An alpha level of .05 was used for all statistical tests, and all variables were centered to avoid non-essential multicollinearity before they were entered as predictors in hierarchical regressions.

Hypothesis 1. Effect of Challenge on Adaptability Skill Development

Hypothesis 1 stated that the degree that mentors challenge protégés by instructing them to use non-preferred learning activities is positively related to protégé development of adaptability skills, while the degree that mentors accommodate protégés by instructing them to use preferred activities is negatively related to protégé development of adaptability skills. High adaptability skill development was evidenced by mentors'

reports that protégés improved in their ability to anticipate and respond effectively to complex, novel problems, solve problems creatively, and adapt problem-solving strategies to novel situations. Polynomial regression techniques (Edwards, 2002; Kreiner, 2006) were used to test this hypothesis. For each of the four experiential learning activities (using intuition, reflecting, conceptualizing, and experimenting), development of adaptive problem-solving skills was regressed onto protégé preference and mentor instruction (step 1), then their interaction, and to test for curvilinear effects, squared terms for protégé preference and mentor instructions (step 2). Results show that hypothesis 1 was supported for conceptualization, but not the other three learning activities.

Regression statistics related to conceptualization are presented in Table 1. As presented under Model 1 in Table 1, the interaction between mentor instruction and protégé preference for conceptualization was significant, and the effect of mentor instruction, but not protégé preference, was curvilinear. Model 2 in Table 1 shows the simplified model excluding the squared term for protégé preference. The three-dimensional response surface related to hypothesis 1 is displayed in Figure 4.

Table 1

Effects of Protégé Preference for Conceptualization and Mentor Instruction to Conceptualize on Adaptability Skill Development

		Adaptability skill development		
	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Protégé preference for conceptualization	0.01	0.04	0.22
	Mentor instruction to conceptualize		0.10	0.76
2	Protégé preference for conceptualization	0.09†	0.05	0.31
	Mentor instruction to conceptualize		0.11	0.86
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.36	-2.27*
	Mentor instruction to conceptualize squared		0.22	2.14*
	Protégé preference for conceptualization squared		-0.13	-0.80
Model 2: Simplified model				
1	Protégé preference for conceptualization	0.01	0.04	0.22
	Mentor instruction to conceptualize		0.10	0.76
2	Protégé preference for conceptualization	0.08†	0.04	0.28
	Mentor instruction to conceptualize		0.10	0.82
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.33	-2.15*
	Mentor instruction to conceptualize squared		0.22	2.12*

Note. $N = 110$. $^{**}p < .01$. $^{*}p < .05$. †$p < .10$.

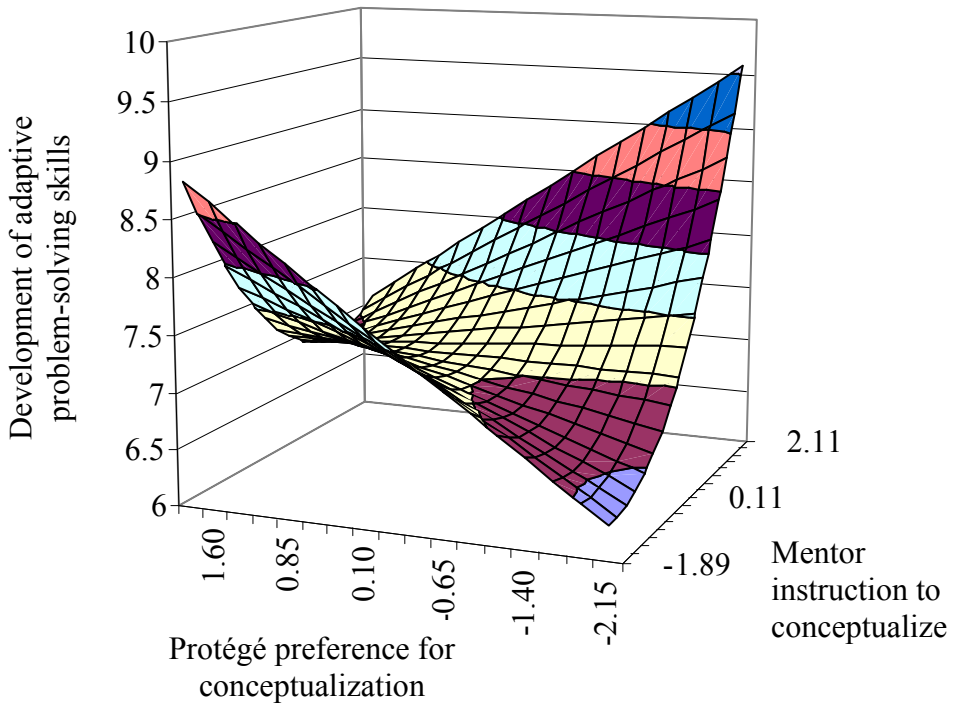

Figure 4. Interaction between protégé preference for conceptualization and mentor instruction to conceptualize on protégé development of adaptive problem-solving skills

As indicated by the line running upward from front to back on the right side of Figure 4, among protégés with a weak preference for conceptualization, development of adaptive problem-solving skills increased with frequency of instruction (i.e., as mentors increasingly challenge protégés' preference for conceptualization). As indicated by the line running downward from front to back on the left side of Figure 4, among protégés with strong preferences for conceptualization, development of adaptability skills decreased with frequency of instruction (i.e., as mentors increasingly accommodate protégés' preference for conceptualization). These patterns support Mainemelis et al's (2002) proposition that integrating non-preferred activities into one's behavioral repertoire contributes to adaptability skill development. Furthermore, the finding that this

pattern emerges only for conceptualization activities demonstrates the importance of challenging individuals to think in new ways. Indeed, many leadership experts have highlighted the importance of conceptualization, especially toward the development of higher-order skills (Jacobs & Jaques, 1990). At this stage, learners must break free from old ways of thinking and embrace new ways of thinking. The current research suggests that mentors can promote development of adaptability skills by challenging protégés to conceptualize.

In addition, as indicated by the back-left half of Figure 3, the effect of mentor instruction was curvilinear among protégés with moderate and strong preferences: adaptability skill development was higher when mentors provided frequent instruction compared to moderate instruction. This pattern may represent the effect of cognitive power as a moderator of development. Mainemelis et al. (2002) state that not all individuals with moderate preferences are able to integrate learning activities effectively; those with less cognitive capacity may need help engaging in even preferred activities. Jaques, Clement, Rigby, and Jacob's (1986) formula for work capability states that development is a function of cognitive capacity (i.e., cognitive power), defined as "the raw mental power enabling a person to sustain increasingly complex mental processes" (Hooijberg, Hunt, & Dodge, 1997, p. 379) and other individual characteristics (e.g., skills, values, temperament) in addition to opportunities for development (e.g., challenging work assignments). Post-hoc analyses support this explanation. Using the measure of protégé prior work accomplishment as an indicator of protégé ability, post-hoc ANOVAs demonstrated that on average, the group of protégés with moderate and

strong preferences for conceptualization who were provided frequent instruction to conceptualize were less accomplished (M = 6.14, SD = 1.92 for moderate preferences; M = 6.06, SD = 1.73 for strong preferences) than those provided less instruction [M = 7.10, SD = 1.37 for moderate preferences; M = 7.44, SD = 1.13 for strong preferences; $F(1, 49) = 5.29$, $p = .03$ and $F(1, 18) = 4.62$, $p = .05$ for moderate and strong, respectively]. This finding suggests that protégé's cognitive capacity may need to be taken into consideration when determining the level of instruction necessary to promote protégé development.

Results with respect to using intuition and experimenting suggest that these activities can promote development of adaptability skills when mentors frequently instruct protégés to use them. However, no effects related to reflection were significant. Statistics related to the effects of instructions to use intuition and experiment on adaptability skill development are presented in Tables 2 and 3; for each table, Model 1 shows results related to the full hypothesized model, while Model 2 shows results related to a reduced model which excludes protégé preferences for intuition and experimentation. Figures 5 and 6 clarify the nature of these relationships. As seen on the back side of Figures 5 and 6, adaptability skill development was facilitated by frequent instructions to use intuition and experiment, regardless of protégé preferences. This finding suggests that high engagement in these activities, rather than challenge and/or accommodation of learning preferences, facilitates development.

Table 2

Effects of Protégé Preference for Intuition and Mentor Instruction to Use Intuition on Adaptability Skill Development

		Adaptability skill development		
	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Preference for intuition	0.02	-0.03	-0.17
	Instruction to use intuition		0.29	1.58
2	Preference for intuition	0.05	-0.08	-0.38
	Instruction to use intuition		0.50	2.30
	Mentor instruction to use intuition x Protégé preference for intuition		0.34	1.42
	Instruction to use intuition squared		0.27	1.86
	Protégé preference for intuition squared		0.03	0.21
Model 2: Simplified model				
1	Preference for intuition	0.02	-0.02	-0.17
	Instruction to use intuition		0.29	1.58
2	Preference for intuition	0.02†	-0.05	-0.34
	Instruction to use intuition		0.49	2.24**
	Instruction to use intuition squared		0.24	1.66†

Note. $N = 110$. $^{**}p < .01$. $^{*}p < .05$. $^{\dagger}p < .10$.

Table 3

Effects of Protégé Preference for Experimentation and Mentor Instruction to Experiment on Adaptability Skill Development

		Adaptability skill development		
	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Preference for experimentation	0.03	0.18	1.01
	Instruction to experiment		0.31	1.77
2	Preference for experimentation	0.04	0.30	1.57
	Instruction to experiment		0.46	2.36
	Mentor instruction to experiment x Protégé preference for experimentation		0.02	0.09
	Instruction to experiment squared		0.25	1.57
	Protégé preference for experimentation squared		0.15	1.11
Model 2: Simplified model				
1	Preference for experimentation	0.03	0.18	1.01
	Instruction to experiment		0.31	1.77†
2	Preference for experimentation	0.02†	0.24	1.31
	Instruction to experiment		0.45	2.33*
	Instruction to experiment squared		0.25	1.65†

Note. $N = 110$. $^{**}p < .01$. $^{*}p < .05$. $^{\dagger}p < .10$.

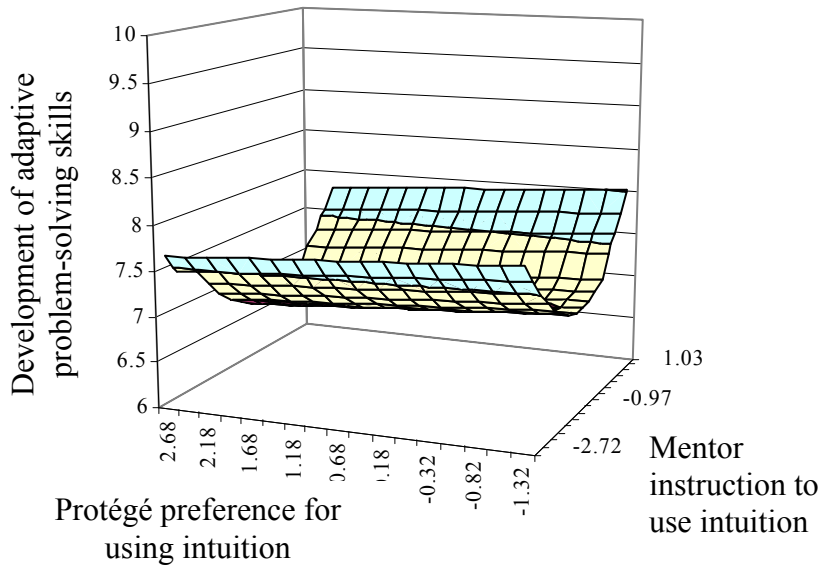

Figure 5. Relationship between mentor instruction to use intuition, protégé preference for intuition, and protégé development of adaptive problem-solving skills

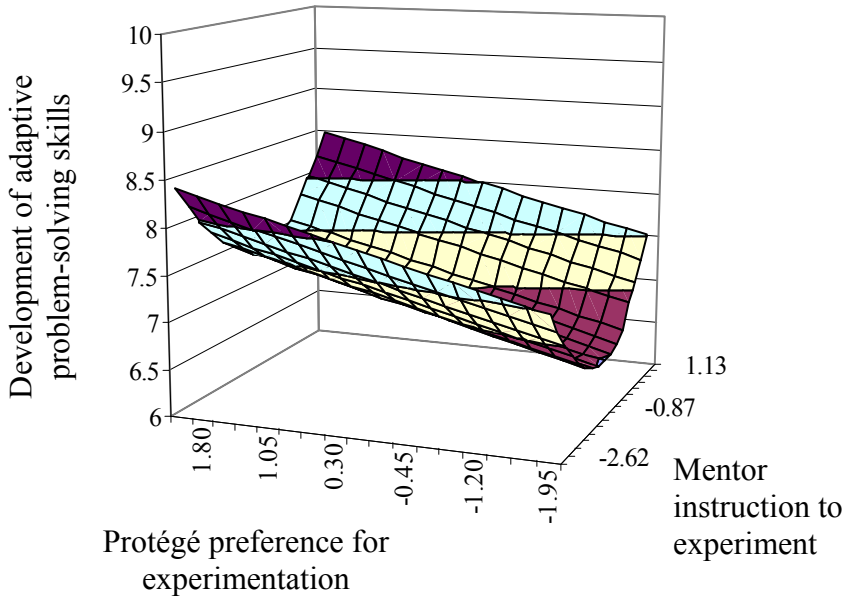

Figure 6. Relationship between mentor instruction to experiment, protégé preference for experimentation, and protégé development of adaptive problem-solving skills

The findings that adaptability skill development was lowest when mentors provided moderate instruction, and that development was as high when mentors provided little instruction as when they provided frequent instruction, prompted me to investigate the nature of relations across levels of instruction. Measures related to relationship dynamics were regressed onto mentor instructions to see whether any meaningful patterns emerged. Results indicate that mentor-protégé dialogue (the degree to which mentor-protégé pairs communicated face-to-face, via phone, and through e-mail) and protégé understanding (the degree of similarity between protégés' perceptions of the instructions their mentors gave them and mentors' reports of the instructions they gave) were lowest when mentors provided moderate instruction to use intuition [$F(1, 107) = 4.68$, $p = .03$; $F(1, 109) = 8.08$, $p = .00$, respectively] and experiment [$F(1, 107) = 5.52$, $p = .02$; $F(1, 109) = 5.93$, $p = .02$, respectively]. These patterns, displayed in Figures 7 and 8, shed light on how why development was high when little instruction was provided, and why development was low when moderate instruction was provided.

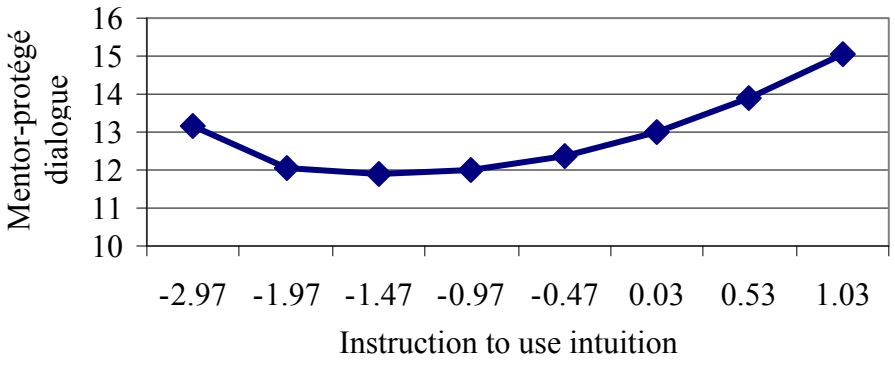

Figure 7. Relationship between mentor instruction to use intuition and mentor-protégé dialogue

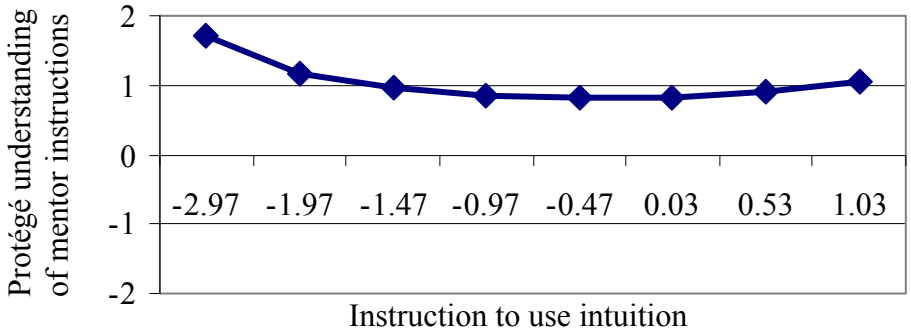

Figure 8. Relationship between mentor instruction to use intuition and protégé understanding

Figures 7 and 8 first suggest that mentors who provided moderate instruction to engage in experiential learning activities, as opposed to frequent or little instruction, communicated with their protégé less effectively. Mentors who provide moderate instruction may have encouraged the use of intuition and experiment in words only (i.e., they failed to provide their protégés with opportunities to use intuition and experiment), and/or failed to communicate their instructions clearly, thus hindering development. Furthermore, Figures 7 and 8 demonstrate that the frequency and quality of mentor-protégé communication was as high when mentors rarely instructed protégés to use intuition and experiment as when they frequently instructed them to engage in these activities. Thus, mentors who rarely instructed their protégés to engage in experiential learning activities communicated with their protégés as frequently and as clearly as those who provided frequent instruction; in short, this is evidence of active, high-quality relationships. These patterns demonstrate that mentors can promote development via non-

experiential learning activities (e.g., cognitive or social learning activities) in addition to experiential activities. Unfortunately, non-experiential pathways to development were outside the scope of this research. Nevertheless, these data suggest that when mentors instruct protégés to use intuition and experiment, they must do so frequently and clearly. Alternatively, mentors can promote development via other activities.

Hypothesis 2. Effect of Accommodation on Technical Skill Development

Hypothesis 2 stated the degree that mentors accommodate protégé learning preferences by instructing them to use preferred learning activities is positively related to protégé development of technical skills, while the degree that mentors challenge protégés by instructing them to use non-preferred activities is negatively related to protégé development of technical skills. High technical skill development was evidenced by mentors' reports that protégés improved their expertise and their ability to demonstrate the knowledge required for excellent job performance. The same polynomial regression techniques used to test hypothesis 1 were used to test hypothesis 2, using technical skill development as the dependent variable.

Results (see Appendix E) do not support hypothesis 2, but rather suggest that in the given sample, the development of technical skills largely mirrored the development of adaptability skills. Mentor instructions to conceptualize interacted with protégé preferences for conceptualization such that challenge to conceptualize facilitated technical skill development [$F(2, 106) = 4.96$, $p = .01$], while mentor instructions to use intuition and experiment were related to development in a curvilinear fashion [$F(1, 107) = 4.92$, $p = .03$ and $F(1, 107) = 3.28$, $p = .07$, respectively], and reflection was unrelated

to development. Although preliminary analyses suggest that informal relationships may differ from formal relationships, and in particular the sample of hospital nurses (all engaged in informal relationships) may differ than other occupational groups with respect to technical skill development, there was not enough power to test for differences between groups. However, when nurses are excluded from the sample, the pattern of results is not affected.

The similarity of results across the two measures of development is not surprising given the high correlation between them (r = .59). The overlap in the measures of development may reflect, in part, halo effects among mentor ratings: mentors may let their overall impression of protégé development across domains influence their ratings of specific types of development (e.g., technical vs. adaptability skills). In addition, given that technical competence was defined as the ability to produce professional work without specifying the nature of that work, this overlap may indicate that adaptive problem-solving is a job requirement among the occupational groups in this sample. According to the occupational network database (O*NET) and descriptions of the specific sub-samples, adaptive problem-solving skills are in fact job requirements among these occupational groups. Appendix F specifies which dimensions of adaptability (e.g., handling emergency or crisis situations, handling work stress; Pulakos et al., 2000) are generally required within each sub-sample. Further support for this proposition lies in the fact that correlations between adaptability and technical skill development differ substantially between sub-samples, ranging from r = .41 among business consultants to r = .84 among university faculty. Unfortunately, there was not enough power to test

hypothesis 2 within sub-samples.

Hypothesis 3a. Effect of Mentoring Functions on Experiential Learning Instructions

Hypothesis 3a stated that career-oriented mentoring functions (coaching, learning facilitation, role modeling, systems/strategies advice, and career development facilitation) have a greater effect on mentor instructions (e.g., to conceptualize) than socially-oriented mentoring functions (friendship and personal/emotional guidance). Correlations suggest that all career functions have stronger relationships with instructions than do friendship, but not personal and emotional guidance. Correlations between friendship and the four learning activities were low and non-significant (rs = .09 to .17), while the correlations of coaching, learning facilitation, role modeling, systems/strategies advice, career development facilitation, and personal/emotional guidance with personal/emotional guidance were all significant (rs = .20 to .58, $p < .05$). However, Hotelling-Williams t-tests, conducted to determine whether the correlations between career functions and each type of instruction were significantly higher than correlations between friendship and each type of instruction, indicate that there are actually few significant differences. Compared to the correlations with friendship, learning facilitation was more strongly related to instructions to conceptualize, experiment, and reflect (ts = 1.98 to 2.87; critical $t = 1.98$, $p < .05$); coaching was more strongly related to instructions to conceptualize and reflect (ts = 2.40 and 2.50; $p < .05$); and role modeling was more strongly related to instruction to reflect ($t = 2.52$; $p < .05$).

Overall, these analyses do not support hypothesis 3. However, observation of correlations (see Appendix B) does suggest that mentoring functions are related to

mentors' instructions to use experiential learning activities. Instructions to conceptualization and experiment are most strongly related to coaching (*r*s = 53 and .58) and learning facilitation (*r*s = .43 and .51), while instructions to use intuition and to reflect are most closely related to personal/emotional guidance (*r*s = 39 and .50, respectively). Furthermore, correlations show friendship is not significantly related to mentors' instructions. Although there was too little power to repeat these analyses within sub-groups, post-hoc analyses did show that these relationship remained relatively stable when nurses and teachers (the two occupational groups that engaged in more learning facilitation and role modeling than other groups) were removed from the sample.

Hypothesis 3b. Effect of Mentoring Functions on Protégé Skill Development

Hypothesis 3b, which stated that career functions are more strongly related to protégé skill development than social functions, was not supported. Correlations suggest that only one career function--career development facilitation, and one social function--friendship, are related to skill development (*r*s = .23 and .26, respectively). To determine whether each of these functions contributed unique variance to technical and/or adaptability skill development, I conducted two hierarchical regression, first entering friendship (step 1) followed by career development (step 2); second entering career development facilitation (step 1) followed by friendship (step2). Results, presented in Models 1 and 2 of Table 4, show that both functions contribute unique variance to technical and adaptability skill development.

Table 4

Effects of Career and Social Mentoring Functions on Skill Development

		Adaptability skill development			Technical skill development		
	Model, step and variable	Model ΔR^2	B	*t*	Model ΔR^2	B	*t*
Model 1: Effect of career functions beyond social functions							
1	Friendship	0.07**	0.43	2.81**	0.05*	0.02	0.12*
2	Friendship	0.03†	0.35	2.28*	0.05†	-0.29	-1.23†
	Career development facilitation		0.32	1.80†		0.29	1.96*
Model 2: Effect of social functions beyond career functions							
1	Career development facilitation	0.05*	0.43	2.42*	0.05**	0.39	2.48**
2	Career development facilitation	0.04*	0.32	1.80†	0.02†	0.32	1.95*
	Friendship		0.35	2.28*		0.24	1.71†

Note. $N = 110$ for adaptability skill development, N = 111 for technical skill development. ** $p < .01$. * $p < .05$. †$p < .10$.

Hypothesis 4a. Effect of Protégé Development on Performance Improvement

Hypothesis 4a stated that protégé development is positively related to performance improvement, though (because it takes time for protégés to demonstrate performance of new skills) this relationship emerges in relationships of greater duration more so than relationships of shorter duration. This hypothesis was tested in two hierarchical regressions. First, the effect of technical skill development was tested by

regressing performance improvement on duration and development of technical competence (step 1), followed by their interaction (step 2). Results, presented as Model 1 of Table 5, show that technical skill development did not interact with duration to affect performance improvement. Second, the effect of adaptability skill development was tested by regressing performance improvement on duration and development of adaptability skills (step 1), followed their interaction (step 2). Results, presented as Model 2 of Table 5, show that adaptability skill development predicted performance improvement regardless of the duration of the mentoring relationship at the time of the study.

Table 5

Effects of Skill Development on Performance Improvement

		Performance improvement		
	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Effect of technical skill development				
1	Duration of relationship	0.03	0.00	0.97
	Technical skill development		0.12	0.59
2	Duration of relationship	0.00	0.00	0.97
	Technical skill development		0.12	0.57
	Duration x technical skill development		0.00	0.10
Model 2: Effect of adaptability skill development				
1	Duration of relationship	0.34	0.00	1.35
	Adaptability skill development		0.62	5.39**
2	Duration of relationship	0.02	0.00	1.46
	Adaptability skill development		0.64	5.55**
	Duration x adaptability skill development		0.00	1.29

Note. N= 71 for technical skill development, N = 72 for adaptability skill development. ** $p < .01$.

A post-hoc analysis was conducted to investigate the direct and incremental effects of technical versus adaptability skill development on performance improvement. Results demonstrate that technical skill development predicts 33% variance in performance improvement [$F(1, 109) = 52.10$, $p = .00$], and 7% variance in performance improvement above and beyond adaptability skill development [$F(1, 107) = 12.79$, $p = .00$]. Meanwhile, adaptability skill development predicts 38% variance in performance improvement [$F(1, 109) = 65.10$, $p = .00$], and 12% variance in performance improvement above and beyond technical skill development [$F(1, 107) = 22.51$, $p = .00$]. Together, these results provide partial support for Hypothesis 4a; both types of skill development predict performance improvement, but duration does not moderate these relationships.

Because teachers had significantly less technical skill development than nurses and LDP participants, analyses were re-run within these groups. The pattern is the same among LDP participants and nurses (combined); both types of skill development were significantly related to performance, with technical skill development adding less incremental variance [$\Delta R^2 = .04$; $F(1, 53) = 4.57$, $p = .04$] than adaptability skill development [$\Delta R^2 = .14$; $F(1, 53) = 14.42$, $p = .00$]. The pattern of results is the similar among teachers--both adaptability skill development [$F(1, 20) = 7.81$, $p = .01$] and technical skill development [$F(1, 21) = 5.69$, $p = .03$] predicted performance improvement, and adaptability skill development added some variance over technical skill development [$\Delta R^2 = .14$; $F(1, 19) = 3.86$, $p = .06$].

Further post-hoc analyses were conducted to identify other predictors of

performance improvement. These analyses revealed that two mentoring functions (role modeling, career development facilitation) were related to performance improvement beyond their effects on mentor instructions and adaptability skill development (see Appendix G).

Hypothesis 4b. Effect of Protégé Development on Satisfaction

Hypothesis 4b stated that protégé skill development is positively related to protégé satisfaction. To test this hypothesis, protégé satisfaction was simultaneously regressed on mentor ratings of technical skill development and adaptive problem-solving skill development. Results do not support this hypothesis; there was no relationship between protégé satisfaction and mentor ratings of skill development [$F(2, 107) = .58$, $p = .56$]. However, a post-hoc regression of protégé satisfaction on *protégé self-ratings* of development, presented in Table 6, reveals that protégé self-assessments of adaptability skill development (but not technical skill development) were significantly related to protégé's overall satisfaction with their mentoring relationship.

Table 6

Effects of Protégé Skill Development on Protégé Satisfaction

	Protégé Satisfaction		
Variable	Model ΔR^2	B	*t*
Technical skill development	0.16**	0.07	1.20
Adaptability skill development		0.23	4.44**

Note. $N = 114$. * $p < .05$. ** $p < .01$.

While using protégé self-assessments of both development and satisfaction introduces common source variance, it nevertheless suggests that protégé satisfaction is partly a result of skill development--namely, development of adaptability skills. Post-hoc analyses reveal that in addition to adaptability skill development, protégé satisfaction was positively related to mentor ratings of performance improvement, friendship, protégés' understanding of their mentors' instructions, and mentor-protégé dialogue (see Appendix H). Together, these results suggest that many factors--development, clarity and frequency of communication, and relationship climate--contribute to protégés' satisfaction with their mentoring relationship.

Hypothesis 5. Effect of Mentor Learning Preferences on Mentor Instruction

Hypothesis 5 proposed that mentors' learning preferences are related to the degree that they instruct their protégés to engage in corresponding experiential learning activities. For example, a mentor who prefers to use intuition is most likely to instruct his or her protégé to use intuition. Correlations between mentor learning preferences and mentor instructions, reported in Table 7, do not support hypothesis 5. Mentor learning preferences were not meaningfully related to the types of instruction they provided. In contrast, observation of the frequency with which mentors instructed protégés suggests that most mentors encouraged their protégé to embrace a combination of two or three learning activities.

Table 7

Correlations between Mentor Learning Preferences and Mentor Instructions

	Instruction to use intuition	Instruction to conceptualize	Instruction to experiment	Instruction to reflect
Mentor preference for using intuition	**0.23**	0.10	0.16	**0.20**
Mentor preference for conceptualization	**-0.20**	-0.04	-0.17	**-0.28**
Mentor preference for experimentation	0.14	-0.03	0.18	0.14
Mentor preference for reflection	-0.12	-0.02	-0.14	-0.03

Notes. $N = 104$. Correlations in bold are significant at $p < .05$.

4. Discussion

The purpose of this research was to investigate how experiential learning contributes to skill development in the context of mentoring relationships. Figure 9 presents a summary of research findings, which begins to elucidate the process of protégé development via experiential learning. The results of this research have implications for the design of formal mentoring programs and mentor training, as well as future research.

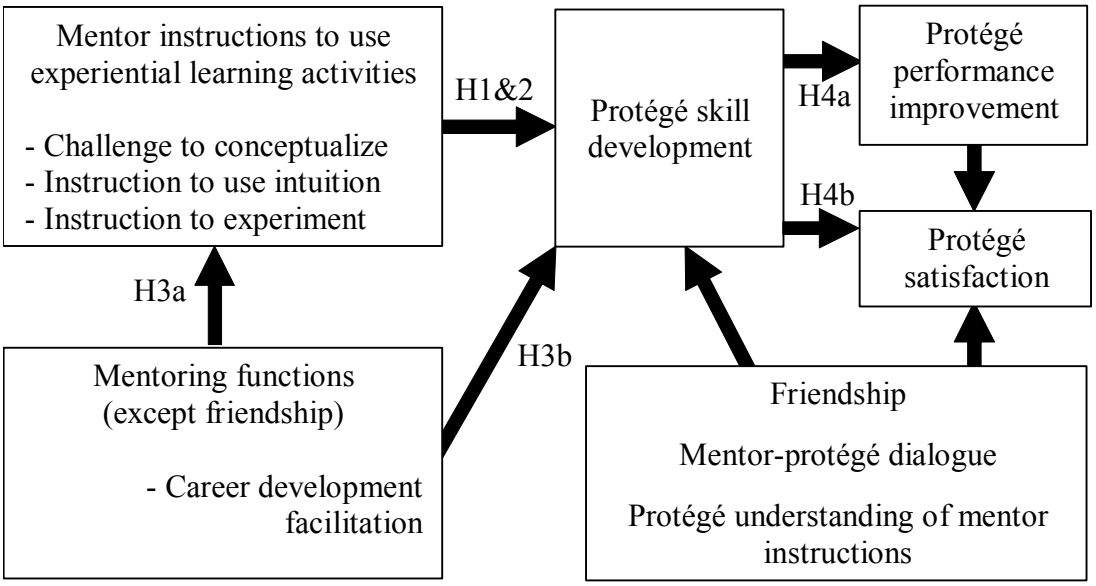

Figure 9. Summary of research findings.

First, this research contributes to leadership development literatures by demonstrating that mentors facilitate protégé development when they challenge protégés who do not prefer to conceptualize--to think in new ways--to do so. Conceptualization is the third stage of the experiential learning process. During stage one (using intuition) learners intuitively acquire information and concepts from their experiences; during stage two (reflection), learners reflect on what that information means to them. During the conceptualization stage, learners must break free from an old way of thinking and embrace a new way of thinking. London (1989) states that this stage involves "framebreaking" and "reframing," and claims that these two activities are essential for learning. Jacobs and Jaques (1990) offer additional support for the importance of conceptualization, claiming that development of conceptual skills is key to development of higher-level leadership skills, including adaptability. The present research supports these propositions by demonstrating that skill development was significantly higher when mentors challenged protégés who did not embrace conceptualization to engage in conceptual learning activities.

Opportunities to engage in framebreaking and reframing activities are born out of complex, novel work experiences, because such developmental work experiences challenge existing mental models (Zaccaro, 2001). Lewis and Jacobs (1992) point out that because most organizational settings provide only limited opportunities to challenge existing frames of reference, it is at the conceptualization stage of learning that individuals need to be challenged with the support of a mentor "who can help the individual better understand the new, more complicated work in which the new manager

must now operate" (p. 136). Thus, the current research also supports the idea that mentors are in a unique position to promote development because mentors can encourage protégés to reconceptualize their learning environment.

By extension, this finding may suggest that mentors can facilitate development of adaptability skills in protégés by helping them to overcome barriers to the frame switching process. Jaques et al. (1986) formula for work capability suggests that lack of requisite opportunity, cognitive capacity, and other individual characteristics are barriers to frame switching. Opportunities that challenge individuals to think in new ways create platforms for the development of conceptual skills. Cognitive capacity "sets the maximum level of work of any kind that [an individual] would be capable of" (Jaques et al., 1986, p. 23), regardless of his or her access to developmental experiences. In the current research, the effect of cognitive capacity may be reflected in the fact that individuals with strong preferences for conceptualization but low prior work performance benefited from mentor instruction, while those with high prior work performance did not. In addition, other skills, values, and temperaments, such as learning preferences, influence what kind of event will require an individual to switch frames. In the current research, protégés with low preferences for conceptualization were required to switch frames when their mentor instructed them to conceptualize. Future research should continue to address how mentors create opportunities for protégés engage in framebraking and reframing activities, and overcome barriers to these processes. In sum, these findings suggest that organizations should educate mentors on the importance of the conceptualization stage of learning, and the importance of challenging protégés to break

from old ways of thinking and form new mental models.

In addition to demonstrating the impact of conceptualization activities on development, this research suggests that mentors can promote development by instructing protégés to learn via intuitively grasping information from their environement, and actively experimenting with new skills. In the present sample, protégé development was highest when mentors frequently instructed protégés to engage in these activities. This finding suggests that mentors should be informed of the importance of providing these instructions consistently, and perhaps also the importance of supplementing verbal instructions with opportunities for protégés to engage in these activities. On the flip side of the coin, this research suggests that experiential learning is not the sole pathway to development, as protégés also developed both technical and adaptability skills when their mentor rarely instructed them to engage in experiential learning activities. The fact that mentors who rarely instructed their protégés to engage in experiential learning nevertheless communicated with protégés frequently and clearly is evidence of the operation of non-experiential learning activities on protégé development. Although non-experiential learning activities were outside the scope of this research, they likely include cognitive and vicarious learning activities. For example, mentors can promote development by teaching them about theories of adaptability. Future research should investigate the role of these pathways, and their interactions, in protégé development.

A final observation related to mentor instruction is that instruction to reflect had no effect on development. One possible explanation for this finding is that mentors may have a difficult time effectively instructing protégés to reflect. However, data reveal that,

on average, protégé understanding of mentor instructions to reflect was better than protégé understanding of other instructions, which suggests that mentors at least provided clear (but perhaps not accurate or compelling) instructions. Given the fact that reflection is viewed as an essential component of development, it is likely that the effect of reflection on development was moderated by other factors, such as individual differences. For example, protégé self-awareness may moderate the degree to which mentor instructions to reflect are effective. Future research should test this proposition, and, if valid, readdress the effect of reflection on development among protégés with requisite characteristics.

In addition to shedding light on the role of experiential learning in protégé development, this research provides insight on the inputs to and outcomes of development. Exploratory analyses revealed that relationship structure and dynamics are related to mentoring functions and mentors' instructions to use experiential learning activities. Several factors (formality, duration, and mentor status) were also related to technical skill development. Future research should investigate how these factors influence development (e.g., what types of learning activities do these groups engage in more so than others?).

A key finding is that mentoring functions, which have been the focal point of mentoring research since Kram's (1985) landmark study, may indeed serve as platforms from which mentors cue protégés to engage in experiential learning. All five career mentoring functions, as well as personal/emotional guidance, were significantly related to mentors' instructions to use experiential learning. Only friendship was not related to

experiential learning activities. Although it was beyond the scope of this research to investigate the exact nature of these relationships, future research should determine how each mentoring function is related to various learning activities.

Furthermore, only two of seven mentoring functions (career development facilitation and friendship) were directly related to protégé skill development. The finding that career development facilitation is directly related to skill development suggests that networking, securing promotions, and other job advancement opportunities are important inputs to protégé development. The finding that friendship is directly related to skill development supports research demonstrating that friendship is an important predictor of mentoring effectiveness (Knackstedt, 2001; Zagumny, 1993). Given the fact that friendship was the only mentoring function *not* related to mentors' instructions to engage in experiential learning activities, this finding suggests that friendship has an effect on protégé development unique from that of the experiential learning process. Organizations can promote friendship by encouraging individuals to share their personality, attitudes, and values openly and honestly and by encouraging pairs to invest in the early stages of relationship development. Orientation sessions should include activities (e.g., ice breakers, discussions in pairs, goal-setting) that promote relationship development (Zachary, 2005). Cultivation should be the primary goal of meetings until trust and mutual respect develop, and should continue to be a priority throughout the duration of the relationship. As a final note, friendship differs from the other mentoring functions in that it must be reciprocated by the protégé. Thus, friendship may reflect the social climate of the relationship more so than a role mentors can freely choose to adopt.

With respect to outcomes, this research demonstrates that protégé development has positive effects on both performance improvement and satisfaction. Results demonstrate that both adaptability and technical skill development were related to performance improvement. This finding supports previous mentoring research demonstrating that mentoring has significant effects on protégé performance, and begins to speak to the return-on-investment of mentoring. Future research should take this research a step further to determine the degree to which individual performance improvement translates to organizational performance. The finding that protégés' self-reports of adaptability development, but not technical skill development, were positively related to their satisfaction with the relationship supports the importance of adaptability skill development to protégés. Protégés may be especially satisfied with adaptability skill development because they view mentoring as a rare and valuable opportunity to learn adaptability skills, whereas they have many opportunities to learn technical skills (e.g., courses, on-the-job training).

The fact that mentors' ratings of development were not related to protégés' satisfaction highlights the discrepancy between mentor and protégé ratings of skill development. Future research should pursue the source of these differences. For example, it is possible that similarity of ratings increases among pairs in which mentors provide protégés with ample developmental feedback.

Finally, the finding that mentors' learning preferences were not meaningfully related to the types of instructions they gave their protégés suggests that mentors do not necessarily teach to their preferred styles. Rather, this finding suggests that individuals do

not naturally instruct others to engage in the learning activities that they prefer. An alternative explanation is that mentors either naturally or consciously strive to instruct protégés to use various learning activities even though their default mechanism is to instruct others to learn in the same way they do. Finally, it is possible that on-the-job learning environments naturally promote a variety of learning activities, in comparison to classroom environments where instructors must make active efforts to engage in the full spectrum of learning activities. Certainly the fact that mentoring relationships are, by definition, close and interpersonal provides mentors with greater opportunities (compared to classroom instructors) to use a variety of instructional activities. Whatever the explanation, this finding reduces concern that mentors' learning preferences affect their ability to challenge and/or accommodate protégés' learning preferences.

Limitations and Future Research Directions

This research had several limitations and opens multiple doors for future research. With respect to sampling, this research was limited by having too little power to investigate whether relationships were stable across subgroups. Preliminary analyses show structural differences had few effects on the process of experiential learning (e.g., mentors instructions to engage in experiential learning) or on relationship outcomes (e.g., skill development, satisfaction). Nevertheless, small sample sizes within occupational groups make it impossible to test the stability of relationships (e.g., the effect of challenge to conceptualize on adaptability skill development) across groups. In addition, several were tested using same-source data.

Another limitation of this research was that it focused only on the experiential

pathway to protégé development. Future research should investigate how experiential learning occurs in tandem with, or alongside, other pathways to development (e.g., cognitive and social learning). When mentors do not instruct protégés to engage in experiential learning, how do they promote development? In addressing this question, researchers may want to consider investigating what drives mentors to provide instruction. Why do some mentors instruct protégés frequently while others only moderately? For example, time constraints and/or motivation may limit mentors' instructions.

Furthermore, this research only addressed the role of a single type of individual difference--learning preferences--on development. Future research should continue to embrace the ATI framework to investigate interactions between mentors' guidance and other development-related individual differences. For example, Jaques et al. (1986) point to the importance of cognitive capacity, while other researchers highlight the importance of metacognition (Boström & Lassen, 2006; DEMOS, 2005; Sadler-Smith & Smith, 2004), and with respect to development of adaptability skills, tolerance for ambiguity and openness (e.g., Judge, Thoresen, Pucik, & Welbourne, 1999). Future research should investigate whether such individual differences influence the relationship between mentors instructions--especially instruction to reflect--and development. Finally, future research should tease apart differences in the development of technical versus adaptability skills by refining the measurement method to reduce halo bias, or by focusing on job domains that do not involve adaptive performance.

In sum, this research contributes to literature on organizational mentoring and

experiential learning theory. Several results have practical applications for the design of mentoring programs, and for training individuals for informal and formal mentorship. Additional findings provide rich avenues for future research, with the goal of fully understanding factors that impact how and what protégés learn from their mentors.

Appendix A

Description of Fowler and O'Gorman's (2005) Eight Mentoring Functions

Mentoring function	Description
Coaching	Provides support or guidance for undertaking tasks or projects Provides professional or technical advice Provides assistance in developing job-related skills and knowledge Provides performance feedback on work tasks or projects
Learning facilitation	Provides alternative perspectives on the protégé's ideas Helps the protégé think things through for himself/herself Shares experience, information, and knowledge Reflects with the protégé on work situations or incidents
Role modeling	Demonstrates approaches and values the protégé admires and would like to develop Displays skills and behaviors that the protégé would like to learn Is the type of person the protégé wants to emulate
Systems/strategies advice	Discusses and/or provides advice on how to handle internal politics Provides knowledge about the organizational system Shares "inside knowledge" and passes information down from above Provides strategic advice for handling situations and/or people

Career development facilitation	Introduces the protégé to networks of people Points out and encourages protégé to take advantage of opportunities or promotions Advises and guides the protégé with regard to his/her career Provides specific practical assistance to advance the protégé's career
Personal/emotional guidance	Acts as confidant for the protégé to share personal values, etc. Actively listens to, and acts as a sounding board for the protégé Shows understanding of the protégé's feelings and emotions Provides affirmation of the protégé's behavior and/or self Discusses and helps with decisions regarding balancing professional and personal life
Friendship	Someone with whom the protégé gets together socially outside the work setting Someone with whom the protégé has a friendship
Advocacy *(not included in this research)*	Offers or appoints the protégé to a job Recommends and advocates the protégé to "people that count" "Goes to bat" for the protégé Uses reputation to reflect positively on the protégé

Appendix B

Descriptive Statistics, Reliabilities, and Intercorrelations among Study Variables

			M	*SD*	1	2	3	4	5	6	7	8	9	10
Skill development	1	Adaptability skill development	7.29	1.39										
	2	Technical skill development	7.4	1.25	**0.59**									
Mentor instructions to use experiential learning activities	3	Instruction to experiment	2.87	.75	0.16	0.04	*.76*							
	4	Instruction to reflect	2.90	.75	0.13	-0.08	**0.64**	*.73*						
	5	Instruction to use intuition	2.97	.72	0.15	-0.04	**0.67**	**0.64**	*.74*					
	6	Instruction to conceptualize	1.89	1.03	0.07	0.04	**0.53**	**0.60**	**0.52**	*.81*				
Protégé learning preferences	7	Preference for conceptualization	2.24	.82	0.02	-0.09	0.00	-0.05	-0.12	-0.01	*.85*			
	8	Preference for using intuition	1.54	.75	0.00	-0.16	0.01	0.11	0.12	0.04	**-0.50**	*.79*		
	9	Preference for experimentation	2.51	.73	0.08	**0.22**	-0.09	-0.04	0.03	0.03	**-0.34**	**-0.20**	*.79*	
	10	Preference for reflection	1.69	.73	-0.10	0.06	0.07	-0.02	-0.02	-0.06	**-0.26**	**-0.27**	**-0.42**	*.79*

			M	SD	1	2	3	4	5	6	7	8	9	10	11	12
Mentoring functions	11	Coaching	3.81	.74	0.03	0.05	**0.42**	**0.43**	**0.33**	**0.53**	-0.10	-0.10	0.15	0.06	*.87*	
	12	Learning facilitation	4.01	.63	0.11	0.14	**0.45**	**0.51**	**0.35**	**0.58**	-0.13	-0.06	0.08	0.12	**0.69**	*.86*
	13	Role modeling	3.79	.67	0.11	0.16	**0.31**	**0.45**	**0.20**	**0.30**	-0.08	0.02	-0.09	0.15	**0.53**	**0.56**
	14	Systems/strategies advice	3.82	.82	0.09	0.14	**0.34**	**0.33**	**0.20**	**0.36**	-0.15	-0.04	0.06	0.15	**0.47**	**0.67**
	15	Career development facilitation	3.75	.74	**0.23**	**0.23**	**0.33**	**0.34**	**0.26**	**0.33**	-0.07	-0.06	-0.03	0.15	**0.34**	**0.46**
	16	Personal/ emotional guidance	3.80	.71	0.17	0.10	**0.39**	**0.50**	**0.39**	**0.29**	-0.08	-0.01	-0.07	0.16	**0.38**	**0.62**
	17	Friendship	3.08	.87	**0.26**	**0.21**	0.17	0.09	0.14	0.15	-0.02	0.04	-0.02	0.01	0.17	**0.26**
Relationships outcomes	18	Performance improvement (mentor rating)	7.27	1.68	**0.61**	**0.57**	0.14	0.17	**0.21**	0.08	-0.12	0.03	0.03	0.09	0.02	0.12
	19	Performance improvement (protégé rating)	6.23	1.79	**0.32**	0.15	0.13	0.12	**0.21**	0.02	-0.05	0.03	0.01	0.02	0.15	0.09
	20	Protégé satisfaction	4.35	.87	0.10	0.04	0.03	-0.11	-0.08	-0.09	0.05	-0.11	0.08	-0.02	0.01	0.07
Contextual factors	21	Protégé understanding (of mentor instruction)	.89	.46	0.05	0.07	0.00	-0.08	-0.02	0.00	0.02	0.04	-0.07	0.00	-0.10	-0.10
	22	Dialogue	13.2	2.52	-0.02	0.05	**0.35**	**0.32**	**0.31**	**0.40**	-0.02	-0.01	0.06	-0.03	**0.48**	**0.37**
	23	Duration of relationship	453	242	0.20	**0.41**	-0.09	**-0.24**	0.02	-0.08	0.02	0.04	0.13	-0.22	-0.22	-0.15
	25	Cognitive congruence	2.25	1.16	-0.02	0.07	0.15	**0.20**	**0.22**	0.03	0.06	**-0.23**	**0.27**	-0.11	0.18	0.17

			13	14	15	16	17	18	19	20	21	22	23
Mentoring functions (continued)	13	Role modeling	*.88*										
	14	Systems/strategies advice	**0.47**	*.88*									
	15	Career development facilitation	**0.51**	**0.61**	*.82*								
	16	Personal/emotional guidance	**0.48**	**0.55**	**0.53**	*.87*							
	17	Friendship	0.18	**0.21**	**0.28**	**0.43**	*.68*						
Relationship outcomes	18	Performance improvement (mentor rating)	**0.23**	0.10	**0.29**	0.14	0.11	-					
	19	Performance improvement (protégé rating)	**0.19**	**0.19**	**0.23**	0.17	**0.23**	0.18	-				
	20	Protégé satisfaction	0.01	0.14	0.04	0.13	**0.32**	**-0.20**	**0.28**	-			
Contextual factors	21	Protégé understanding (of mentor instruction)	-0.02	-0.02	0.16	-0.07	-0.13	0.12	0.15	**-0.24**	-		
	22	Dialogue	0.15	**0.40**	**0.33**	**0.36**	**0.18**	0.00	0.03	-0.07	0.07	-	
	23	Duration of relationship	-0.18	0.06	0.12	-0.22	-0.10	**0.25**	0.19	-0.06	**0.24**	-0.04	-
	24	Cognitive congruence	0.16	0.17	**0.32**	**0.21**	0.02	0.01	0.04	0.08	0.02	-0.01	0.07

Appendix C

Sample Characteristics

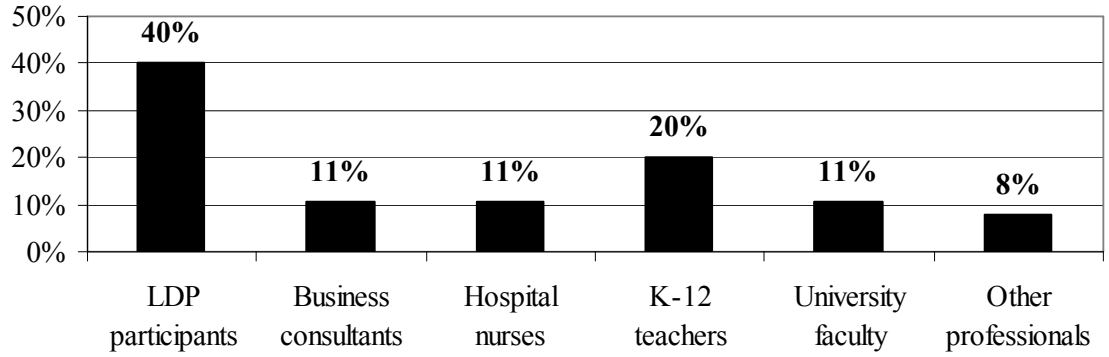

Figure C1. Occupations of research participants

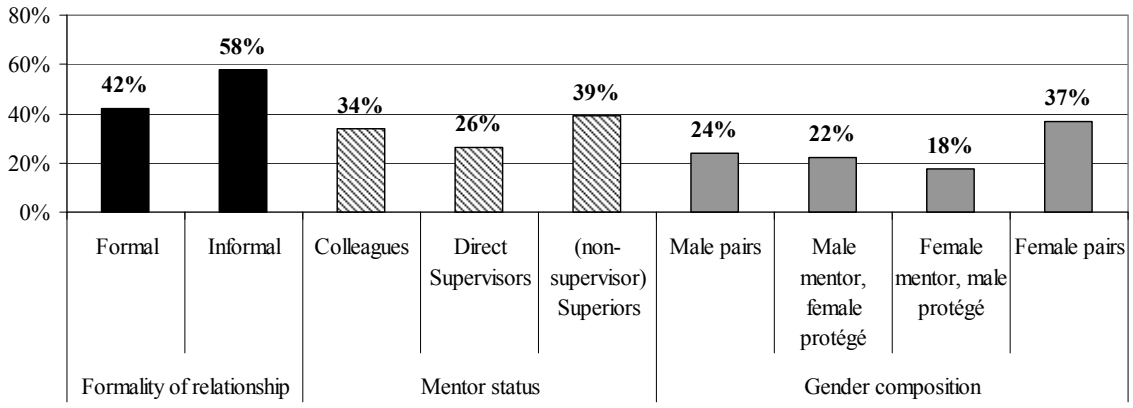

Figure C2. Distribution of participants by relationship formality, mentor status, and gender composition

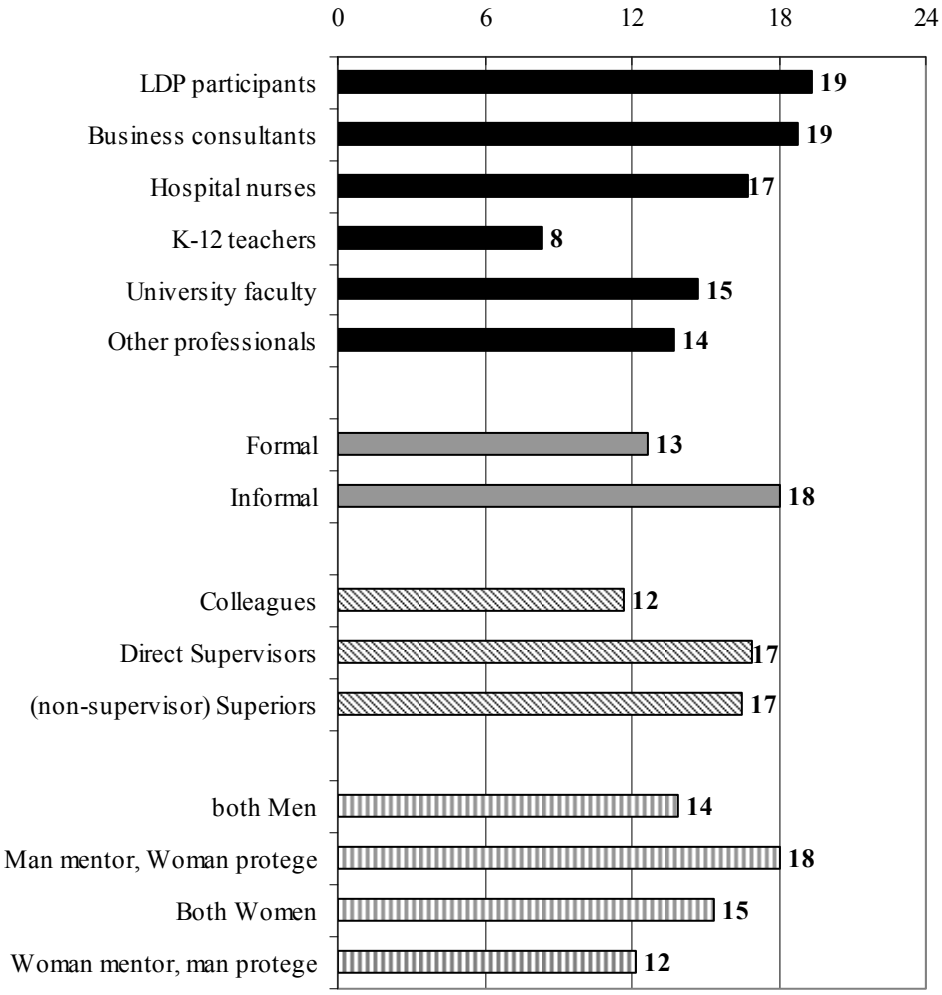

Figure C3. Differences in average relationship duration across occupational groups and relationship structure

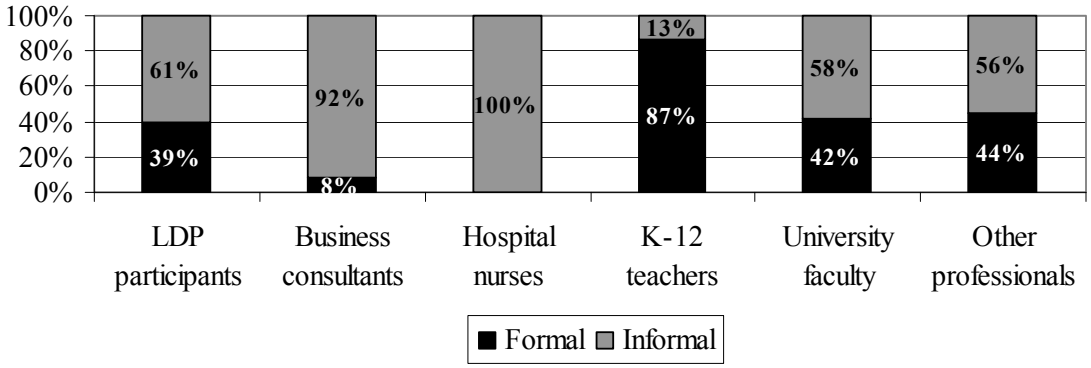

Figure C4. Distribution of formal vs. informal relationships across occupational groups

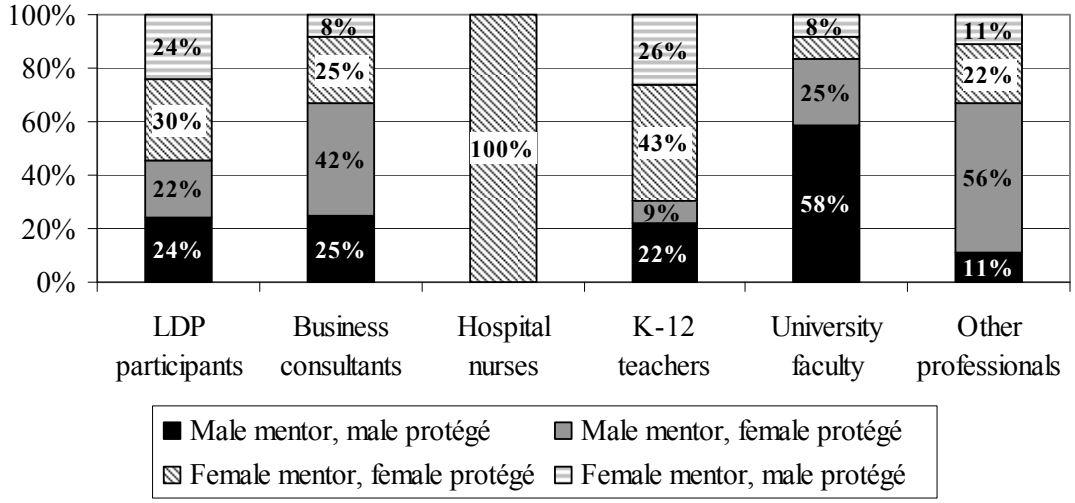

Figure C5. Distribution of gender composition across occupational groups

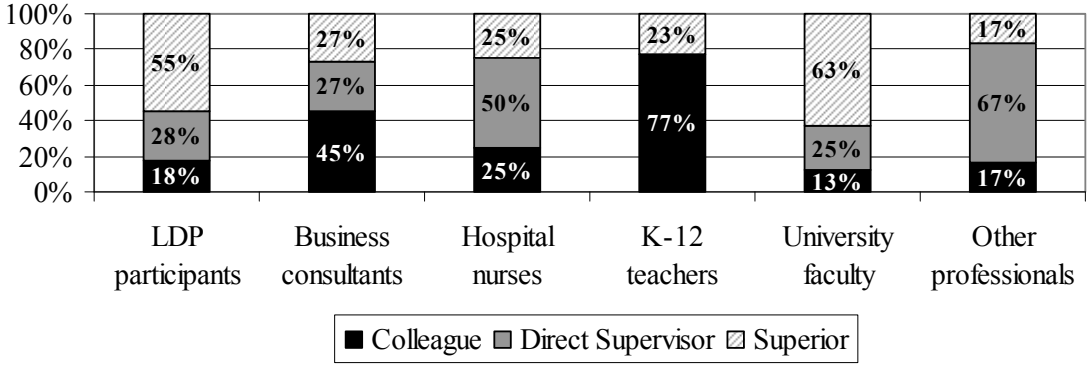

Figure C6. Distribution of mentor status across occupational groups

Appendix D

Differences in Key Variables Related to Occupational Group and Contextual Factors

ANOVAs reveal that the K-12 teachers, and to a lesser extent, hospital nurses, differ from other occupational groups. Table D1 presents means and standard deviations for variables where significant differences exist by group (number in bold and significantly different than non-bolded numbers). Tukey's *b* ($\alpha = .05$) revealed that teachers developed technical skills less so than LDP participants and nurses [$F(5, 105) = 4.29$, $p = .00$]. Teachers also reported shorter relationship duration than business consultants and LDP participants [$F(5, 105) = 7.31$, $p = .00$]. Furthermore, teachers and nurses engaged in the more learning facilitation [$F(5, 106) = 3.37$, $p = .01$], role modeling [$F(5, 106) = 5.45$, $p = .00$], and systems and strategies advice [$F(5, 106) = 3.56$, $p = .01$] than other groups. There were no differences in mentor instruction between groups. These findings suggest that development of technical skills (hypotheses 2 and 4) and relationships between mentoring functions and mentor instructions (hypothesis 3) may differ across occupational groups.

Table D1

Means and Standard Deviations for Key Differences across Occupational Groups

	LDP participants	Business consultants	Hospital nurses	K-12 teachers	University faculty	Other professionals
Technical skill development						
N	44	12	12	23	11	9
M	**7.75**	**7.58**	7.75	**6.43**	7.64	7.11
SD	1.18	0.79	1.14	1.27	1.12	1.27
Learning facilitation						
N	44	12	12	23	12	9
M	3.90	3.96	**4.47**	**4.22**	3.99	3.56
SD	0.70	0.32	0.52	0.43	0.66	0.68
Role modeling						
N	44	12	12	23	12	9
M	3.72	3.48	**4.29**	**4.12**	3.69	3.19
SD	0.72	0.65	0.45	0.42	0.45	0.75
Systems and strategies advice						
N	44	12	12	23	12	9
M	3.88	3.63	**4.29**	**4.08**	3.31	3.25
SD	0.88	0.62	0.58	0.56	1.09	0.64
Duration (in months)						
N	30	6	6	22	5	6
M	19.3	18.8	16.8	**8.3**	14.7	13.7
SD	5.9	6.1	10.0	6.4	11.0	4.8

ANOVAs also revealed several differences in study variables across relationship structure. The only significant difference between formal and informal relationships is that protégés in informal relationships (M = 7.74, SD = 1.12) developed technical skills more so than protégés in formal relationships [M = 6.91, SD = 1.28; $F(1, 109) = 12.97$, p = .00].

With respect to gender composition, the only significant difference is that male mentors provided less personal/emotional guidance when working with female protégés (M = 3.50, SD = .81), compared to when working with male protégés (M = 3.68, SD = .70), and compared to female mentors working with either male protégé (M = 3.80, SD = .71) or female protégés [M = 4.10, SD = .63; $F(1, 108) = 3.97$, p = .01].

With respect to mentor status, direct supervisors provided more coaching (M = 4.28, SD = .14) than colleagues (M = 3.37, SD = .12) or superiors [M = 3.72, SD = .11; $F(2, 95) = 6.14$, p = .00], and more instruction to conceptualize (M = 2.42, SD = .2) than colleagues (M = 1.77, SD = .17) or superiors [M = 1.71, SD = .16; $F(2, 96) = 4.53$, p = .01). Protégés also developed technical skills more so when working with superiors (M = 7.57, SD = .20) and supervisors (M = 7.65, SD = .24), than when working with colleagues [M = 6.85, SD = .21; $F(2, 94) = 4.06$, p = .02].

Correlations indicate that relationship duration was positively related to technical skill development (r = .41, $p < .05$), and negatively related to instruction to reflect (r = -.24, $p < .05$). Mentor-protégé dialogue was positively related to all types of instruction (rs = .31 to .40, ps < .05) and all mentoring functions except role modeling and friendship (rs = .33 to .48, ps < .05). Cognitive congruence was positively related to

career development facilitation ($r = .32$, $p < .05$), personal/emotional guidance ($r = .21$, $p < 05$), mentor instruction to reflect ($r = .20$, $p < .05$) and mentor instruction to use intuition ($r = .22$, $p < .05$).

In sum, these patterns suggest that while relationship formality may influence technical skill development, other contextual factors influence development indirectly, through their relationships with mentoring activities (e.g., functions and instructions).

Appendix E

Regression of Technical Skill Development on Experiential Learning Preferences and Activities

Results of polynomial regressions suggest that the pattern of technical skill development is opposite to the pattern hypothesized, but similar to the pattern of adaptability skill development. As presented in Table E1, the interaction between mentor instruction and protégé preference for conceptualization was significant, and the effect of mentor instruction was also curvilinear. As indicated by the line running upward from front to back on the right side of Figure E1, among protégés with a weak preference for conceptualization, development of technical skills increased with frequency of instruction (i.e., as mentors increasingly challenge protégés' preference for conceptualization). As indicated by the line running downward from front to back on the left side of Figure E1, among protégés with strong preferences for conceptualization, development of adaptability skills decreased with frequency of instruction (i.e., as mentors increasingly accommodate protégés' preference for conceptualization).

As presented in Table E2, instruction to use intuition had a significant curvilinear effect on protégé development; protégé preference for intuition had a marginally significant effect on development. As presented in Table E3, instruction to experiment had a marginally significant curvilinear effect on development, while protégé preference for experimentation had a significant positive effect on development.

Table E1

Effects of Preference for Conceptualization and Instruction to Conceptualize on Technical Skill Development

	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Preference for conceptualization	0.01	-0.14	-0.97
	Instruction to conceptualize		0.04	0.36
2	Preference for conceptualization	0.10**	-0.10	-0.73
	Instruction to conceptualize		0.03	0.25
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.30	-2.20*
	Instruction to conceptualize squared		0.21	2.33*
	Protégé preference for conceptualization squared		-0.17	-1.19
Model 2: Simplified model				
1	Preference for conceptualization	0.01	-0.14	-0.97
	Instruction to conceptualize		0.04	0.36
2	Preference for conceptualization	0.08**	-0.11	-0.75
	Instruction to conceptualize		0.02	0.17
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-.25	-1.94†
	Instruction to conceptualize squared		0.20	2.27*

Note. $N = 111$. $^{**}p < .01$. $^{*}p < .05$. $^{\dagger}p < .10$.

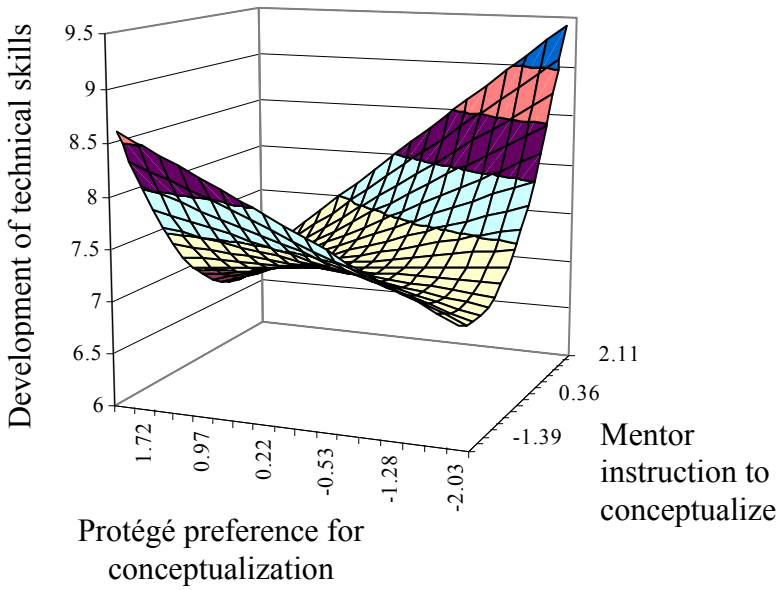

Figure E1. Relationship between protégé preference for conceptualization, mentor instruction to conceptualize, and technical skill development

Table E2

Effects of Preference for Intuition and Instruction to Use Intuition on Technical Skill Development

	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Preference for intuition	0.03	-0.25	-1.61
	Instruction to use intuition		-0.05	-0.28
2	Preference for intuition	0.06†	-0.18	-0.98
	Instruction to use intuition		0.16	0.83
	Mentor instruction to use intuition x Protégé preference for intuition		0.25	1.17
	Instruction to use intuition squared		0.29	2.32*
	Preference for intuition squared		-0.15	-1.25
Model 2: Simplified model				
1	Preference for intuition	0.03	-0.21	-1.61
	Instruction to use intuition		-0.05	-0.28
2	Preference for intuition	0.04*	-0.24	-1.86†
	Instruction to use intuition		0.18	0.93
	Instruction to use intuition squared		0.28	2.22*

Note. $N = 111$. $^{**}p < .01$. $^{*}p < .05$. $^{\dagger}p < .10$.

Table E3

Effects of Preference for Experimentation and Instruction to Experiment on Technical Skill Development

	Model, step, and variable	Model ΔR^2	B	*t*
Model 1: Hypothesized model				
1	Preference for experimentation	0.06†	0.38	2.34*
	Instruction to experiment		0.10	0.62
2	Preference for experimentation	0.19	0.38	2.29*
	Instruction to experiment		0.22	1.30
	Mentor instruction to use intuition x Protégé preference for intuition		0.06	0.29
	Instruction to experiment squared		0.23	1.67†
	Preference for experimentation squared		-0.13	-1.26
Model 2: Simplified model				
1	Preference for experimentation	0.05†	0.38	2.34*
	Instruction to experiment		0.10	0.62
2	Preference for experimentation	0.03†	0.43	2.67**
	Instruction to experiment		0.23	1.34
	Instruction to experiment squared		0.24	1.81†

Note. $N = 111$. $^{**}p < .01$. $^{*}p < .05$. †$p < .10$.

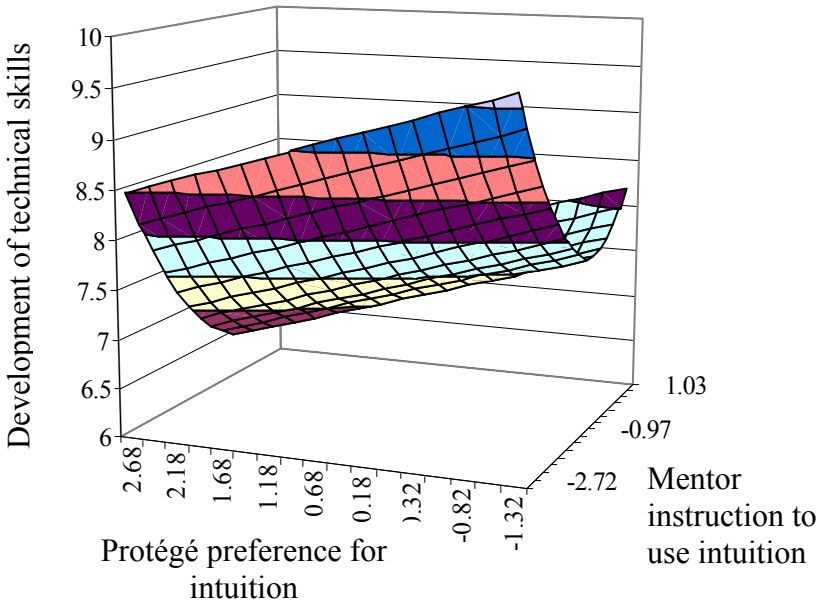

Figure E2. Relationship between mentor instruction to use intuition and technical skill development

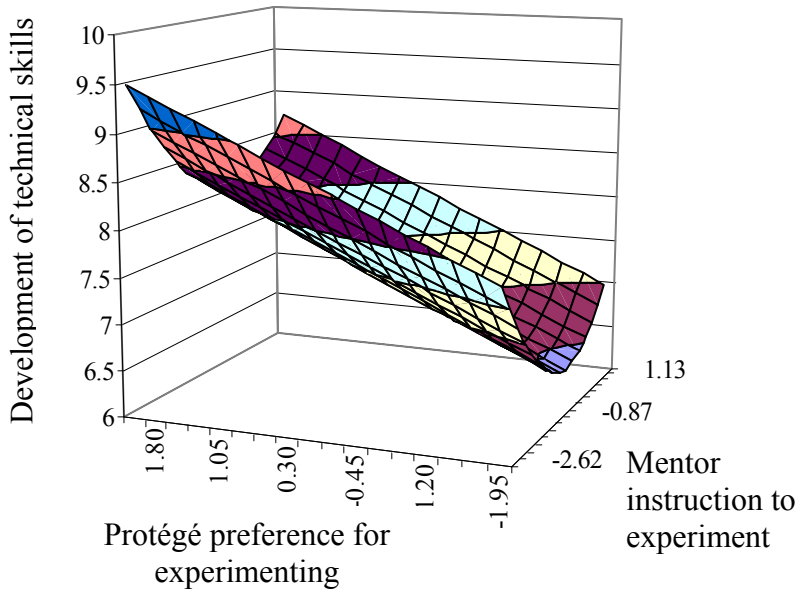

Figure E3. Relationship between mentor instruction to experiment and technical skill development

Appendix F

Adaptability Requirements of Occupations Represented In Sample Population

Sample	% of population	Type of adaptive performance (Pulakos et al., 2000)	Evidence
Leadership development program (LDP) participants	40%	Handling work stress Solving problems creatively Learning work tasks, technologies, and procedures	Individuals in this sample had challenging new job assignments; were required to work on improving leadership competencies, including resilience, conflict management, and complex problem-solving.
Hospital nurses	11%	Handling emergency or crisis situations Handling work stress Solving problems creatively Learning work tasks, technologies, and procedures Demonstrating interpersonal adaptability Demonstrating cultural adaptability Demonstrating physically-oriented adaptability	Relevant skills of nurses include critical thinking and social perceptiveness; abilities include problem sensitivity and inductive reasoning; and work activities include updating and using relevant knowledge; making decisions and solving problems; working directly with the public; and establishing and maintaining interpersonal relationships (O*NET). Nurses in the sample population face life-and-death situations; work in a stressful hospital environment; are required to continually learn new techniques and technologies; work on teams with diverse others; work with a culturally diverse clientele; and work long shifts on variable work schedules.

Sample	% of population	Type of adaptive performance (Pulakos et al., 2000)	Evidence
K-12 Teachers	20%	Handling work stress Solving problems creatively Learning work tasks, technologies, and procedures Demonstrating interpersonal adaptability	Relevant skills of teachers include critical thinking, active learning, and social perceptiveness; abilities include problem sensitivity, originality, and inductive reasoning; work activities include updating and using relevant knowledge, making decisions and solving problems; establishing and maintaining interpersonal relationships, and thinking creatively (O*NET).
University faculty	11%	Solving problems creatively Demonstrating interpersonal adaptability Demonstrating cultural adaptability	Relevant skills of postsecondary business faculty include critical thinking, active learning, and selecting learning strategies based on situational demands. Faculty often work closely (e.g., training, teaching, coaching, developing) with students of diverse backgrounds and abilities (O*NET).
Business consultants	11%	Solving problems creatively Demonstrating interpersonal adaptability	Relevant skills of business consultants include critical thinking, complex problem-solving, and active learning; abilities include problem sensitivity, inductive reasoning, and originality; work activities include making decisions and solving problems, and establishing and maintaining interpersonal relationships (O*NET).

Appendix G

Effects of Role Modeling and Career Development Facilitation on Performance Improvement

To investigate whether the effects of role modeling and career development facilitation on performance improvement were mediated by the experiential learning process, performance improvement was regressed on best-fit learning preference/mentor instruction models (see analyses related to hypothesis 1) in steps 1 and 2, adaptability skill development in step 3, and finally either role modeling or career development facilitation in step 4. Results related to the effect of role modeling are presented in Tables G1 through G3.

Table G1 shows that role modeling maintained a marginally significant effect on performance improvement after the effects of instruction to *use intuition* and skill development are accounted for.

Table G1

Effect of Role Modeling on Performance Improvement: Mediation by Instruction to Use Intuition

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Instruction to use intuition	0.04	0.47	2.15*
2	Instruction to use intuition	0.03	0.70	2.72**
	Instruction to use intuition squared		0.28	1.67†
3	Instruction to use intuition	0.07	0.36	1.70†
	Instruction to use intuition squared		0.12	0.85
	Adaptability skill development		0.71	7.56**
4	Instruction to use intuition	0.01	0.28	1.28
	Instruction to use intuition squared		0.08	0.60
	Adaptability skill development		0.70	7.51**
	Role modeling		0.36	1.86†

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

Table G2 shows that role modeling maintained a significant effect on performance improvement after the effects of instruction to *conceptualize* and skill development are accounted for.

Table G2

Effect of Role Modeling on Performance Improvement: Mediation by Challenge to Conceptualize

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Preference for conceptualization	0.02	-0.25	-1.25
	Instruction to conceptualize		0.12	0.76
2	Preference for conceptualization	0.06*	-0.25	-1.26
	Instruction to conceptualize		0.12	0.79
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.22	-1.19
	Instruction to conceptualize squared		0.28	2.20*
3	Preference for conceptualization	0.33**	-0.28	-1.76†
	Instruction to conceptualize		0.05	0.37
	Mentor instruction to conceptualize x Protégé preference for conceptualization		0.02	0.10
	Instruction to conceptualize squared		0.12	1.14
	Adaptability skill development		0.72	7.53**
4	Preference for conceptualization	0.02*	-0.25	-1.62
	Instruction to conceptualize		-0.03	-0.22
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.03	-0.22
	Instruction to conceptualize squared		0.11	1.08
	Adaptability skill development		0.70	7.36**
	Role modeling		0.41	2.02*

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

Table G3 shows that role modeling maintained a significant effect on performance improvement after the effects of instruction to *experiment* and skill development are accounted for.

Table G3

Effect of Role Modeling on Performance Improvement: Mediation by Instruction to Experiment

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Instruction to experiment	0.02	0.30	1.41
2	Instruction to experiment	0.00	0.34	1.43
	Instruction to experiment squared		0.07	0.38
3	Instruction to experiment	0.36**	0.03	0.17
	Instruction to experiment squared		-0.09	-0.60
	Adaptability skill development		0.74	7.84**
4	Instruction to experiment	0.03*	-0.12	-0.61
	Instruction to experiment squared		-0.15	-1.02
	Adaptability skill development		0.74	7.90**
	Role modeling		0.46	2.28*

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

Tables G4 through G6 show the effects of career development facilitation above and beyond the effects of preferences and/or instructions and skill development. As seen in Table G4, career development facilitation did not significantly affect performance

improvement beyond the effect of instruction to *use intuition* and skill development.

Table G4

Effect of Career Development Facilitation on Performance Improvement: Mediation by Instruction to Use Intuition

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Instruction to use intuition	0.04**	0.47	2.15**
2	Instruction to use intuition	0.02†	0.70	2.72**
	Instruction to use intuition squared		0.28	1.67†
3	Instruction to use intuition	0.33**	0.36	1.70†
	Instruction to use intuition squared		0.12	0.85
	Adaptability skill development		0.71	7.56**
4	Instruction to use intuition	0.01	0.23	1.00
	Instruction to use intuition squared		0.04	0.29
	Adaptability skill development		0.69	7.29**
	Career development facilitation		0.29	1.48

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

As seen in Table G5, career development facilitation had a marginally significant effect on performance improvement beyond the effect of instruction to *conceptualize* and skill development.

Table G5

Effect of Career Development Facilitation on Performance Improvement: Mediation by Challenge to Conceptualize

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Preference for conceptualization	0.02	-0.25	-1.25
	Instruction to conceptualize		0.12	0.76
2	Preference for conceptualization	0.06*	-0.25	-1.26
	Instruction to conceptualize		0.12	0.79
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.22	-1.19
	Instruction to conceptualize squared		0.28	2.20*
3	Preference for conceptualization	0.33**	-0.28	-1.76†
	Instruction to conceptualize		0.05	0.37
	Mentor instruction to conceptualize x Protégé preference for conceptualization		0.02	0.10
	Instruction to conceptualize squared		0.12	1.14
	Adaptability skill development		0.72	7.53**
4	Preference for conceptualization	0.02†	-0.26	-1.65†
	Instruction to conceptualize		-0.03	-0.19
	Mentor instruction to conceptualize x Protégé preference for conceptualization		-0.01	-0.05
	Instruction to conceptualize squared		0.09	0.82
	Adaptability skill development		0.69	7.12**
	Career development facilitation		0.32	1.69†

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

Finally, Table G6 shows that career development facilitation had a significant effect on performance improvement beyond the effect of instruction to *experiment* and skill development.

Table G6

Effect of Career Development Facilitation on Performance Improvement: Mediation by Instruction to Experiment

		Performance improvement		
	Step and variable	Model ΔR^2	B	*t*
1	Instruction to experiment	0.02	0.30	1.41
2	Instruction to experiment	0.00	0.34	1.43
	Instruction to experiment squared		0.07	0.38
3	Instruction to experiment	0.36	0.03	0.17
	Instruction to experiment squared		-0.09	-0.60
	Adaptability skill development		0.74	7.84**
4	Instruction to experiment	0.03	-0.16	-0.79
	Instruction to experiment squared		-0.21	-1.35
	Adaptability skill development		0.71	7.56**
	Career development facilitation		0.45	2.28*

Note. $N = 110$. ** $p < .01$. * $p < .05$. †$p < .10$.

Appendix H

Additional Predictors of Protégé Satisfaction

		Protégé Satisfaction		
	Step and variable	Model ΔR^2	B	*t*
1	Protégé self-rating of adaptability skill development	0.15**	0.23	4.36**
2	Protégé self-rating of adaptability skill development	0.04*	0.23	4.51**
	Performance improvement		-0.11	-2.35*
3	Protégé self-rating of adaptability skill development	0.05**	0.18	3.47**
	Performance improvement		-0.12	-2.67**
	Friendship		0.25	2.76**
4	Protégé self-rating of adaptability skill development	0.03*	0.18	3.44**
	Performance improvement		-0.11	-2.42*
	Friendship		0.23	2.52**
	Protégé understanding (of mentor instruction)		-0.32	-1.98*
5	Protégé self-rating of adaptability skill development	0.03†	0.16	3.12**
	Performance improvement		-0.10	-2.21*
	Friendship		0.22	2.48**
	Protégé understanding (of mentor instruction)		-0.34	-2.07*
	Dialogue		0.26	1.93†

Note. $N = 112$. ** $p < .01$. * $p < .05$. †$p < .10$.

LIST OF REFERENCES

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Allen, T. D., Eby, L. T., Poteet, M. L., Lentz, E., & Lima, L. (2004). Career benefits associated with mentoring for protégés: a meta-analysis. *Journal of Applied Psychology, 89*(1), 127-136.

Armstrong, S. J., Allinson, C.W., & Hayes, J. (2002). Formal mentoring systems: An examination of the effects of mentor/protégé cognitive styles on the mentoring process. *Journal of Management Studies, 39*(8), 1111-1137.

Banks, D. J. (2006). *Stretch experiences and leader development: The relationships among work experience, individual differences, contextual variables, and leader adaptability*. Dissertation Abstracts International: Section B: The Sciences and Engineering 67(6). ProQuest Information & Learning.

Bard, M., & Moore, E. (2000). Mentoring and self-managed learning: Professional development for the market research industry. *International Journal of Market Research, 42*, 255-275.

Baugh, S., Lankau, M. J., & Scandura, T. A. (1996). An investigation of the effects of protégé gender on responses to mentoring. *Journal of Vocational Behavior, 49*(3), 309-323.

Boström, L., & Lassen, L.M. (2006). Unraveling learning, learning styles, learning strategies, and metacognition. *Education & Training, 48*(2/3), 178-189.

Boyatzis, R.E., & Kolb, D.A. (1995). From learning styles to learning skills: The executive skills profile. *Journal of Managerial Psychology, 10*(5), 3-17.

Boyatzis, R.E., & Kolb, D.A. (1997). Assessing individuality in learning: The learning skills profile. *Educational Psychology, 11*(3-4), 279-295.

Boyatzis, R.E., & Mainemelis, C. (2000, August). An empirical study of the pluralism of learning and adaptive styles in an MBA program. Paper presented at the annual meeting of the Academy of Management, Toronto, B.C.

Bozionelos, N. (2004). Mentoring provided: Relation to mentor's career success, personality, and mentoring received. *Journal of Vocational Behavior, 64*(1), 24-46.

Brock, K. L., & Cameron, B. J. (1999). Enlivening political science courses with Kolb's learning preference model. *Political Science and Politics, 32*(2), 251-256.

Buch, K., & Bartley, S. (2002). Learning style and training delivery mode preference. *Journal of Workplace Learning, 14*(1), 5-10.

Chao, G. T., Walz, P. M., & Gardner, P. D. (1992). Formal and informal mentorships: A comparison on mentoring functions and contrast with nonmentored counterparts. *Personnel Psychology, 45*(3), 619-636.

Cron, W. L., Slocum, J. W., Jr., VandeWalle, D., & Fu, Q. (2005). The role of goal orientation on negative emotions and goal setting when initial performance falls short of one's performance goal. *Human Performance, 18*(1), 55-80.

DEMOS (2005). *About Learning. Report of the Learning Working Group.* DEMOS, London.

Dewey, J. (1938). *Art as experience*. New York: G.P. Putnam, Capricorn Books.

Dixon, N. M. (1982). Incorporating learning style into training design. *Training & Development Journal, 36*(7), 62-64.

Doty, D. H., & Glick, W. H. (1998). Common method bias: Does common method variance really bias results? *Organizational Research Methods, 1*, 374-406.

Eby, L. T. (1997). Alternative forms of mentoring in changing organizational environments: A conceptual extension of the mentoring literature. *Journal of Vocational Behavior, 51*(1), 125-144.

Edwards, J.R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes, 64*, 307-324.

Edwards, J. R. (2002). Alternatives to difference scores: Regression analysis and response surface methodology. In F. Drasgow & N. Schmitt (Eds.), *Measuring and analyzing behavior in organizations* (pp. 350 - 400). San Francisco: Jossey-Bass.

Eickmann, P., Kolb, A., & Kolb, D. (2004). Designing learning. In R.J. Boland and F. Collopy's *Managing as Designing* (pp. 241-247). Stanford, CA: Stanford University Press.

Fagan, M. M., & Fagan, P. D. (1983). Mentoring among nurses. *Nursing and Health Care, 4*, 80-82.

Fagenson-Eland, E. A., Marks, M. A., & Amendola, K. L. (1997). Perceptions of mentoring relationships. *Journal of Vocational Behavior, 51*(1), 29-42.

Fowler, J. L., & O'Gorman, J. G. (2005). Mentoring functions: A contemporary view of the functions of protégés and mentors. *British Journal of Management, 16*, 51-57.

Gallo, S., & Siedow, J. (2003). Usher in a new era of nurturing. *Nursing Management, 34*(12), 10.

Gibson, S. K. (2004). Social learning (cognitive) theory and implications for human resource development. *Advances in Developing Human Resources, 6*, 193-210.

Hale, R. (2000). To match or mis-match? The dynamics of mentoring as a route to personal and organizational learning. *Career Development International, 5*, 223-234.

Hargie, O., Saunders, C., & Dickson, D. (1994). *Social Skills in Interpersonal Communication.* London: Routledge.

Hezlett, S. A. (2005). Protégés' learning in mentoring relationships: A review of the literature and an exploratory case study. *Advances in Developing Human Resources, 7*(4), 505-526.

Hooijberg, R., Hunt, J. G., & Dodge, G. E. (1997). Leadership complexity and development of the Leaderplex Model. *Journal of Management, 23*(3), 375-408.

Jacobs, T., & Jaques, E. (1990). Military executive leadership. In K. E. Clark & M. B. Clark (Eds.), *Measures of leadership* (pp. 281-295). West Orange, NJ: Leadership Library of America, Inc.

Jaques, E., Clement, S.D., Rigby, C., & Jacobs, T.O. (1986). *Senior leadership requirements at the executive level* (ARI Research Rep. No. 1420). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Jonassen, D. H., & Grabowski, B. L. (1993). *Handbook of individual differences, learning, and instruction.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Jöreskog, K., & Sörbom, D. (2005). *LISREL 8.72: User's guide*. Chicago: Scientific Software International.

Judge, T.A. Thoresen, C.J., Pucik, V., & Welbourne, T.M. (1999). Managerial coping with organizational change: A dispositional perspective. *Journal of Applied Psychology, 84*(1) 107-122.

Knackstedt, J. E. U. (2001). *Organizational mentoring: What about protégé needs?* Dissertation Abstracts International: Section B: The Sciences and Engineering

62(2), ProQuest Information & Learning.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D.A. (1999). *Learning Style Inventory, Version 3.* Boston: Hay Resources Direct.

Kolb, A. Y., & Kolb, D. A. (2005). *The Kolb learning style inventory - Version 3.1: 2005 technical specifications.* Boston: Hay Resources Direct.

Kozlowski, S. W. J., & Salas, E. (1997). A multilevel organizational systems approach for the implementation and transfer of training. In J. K. Ford & Associates (Eds.), *Improving training effectiveness in work organizations* (pp. 247-287). Mahwah, NJ: Law.

Kram, K. E. (1983). Phases of the mentor relationship. *Academy of Management Journal, 26*(4), 608-625.

Kram, K. E. (1985). *Mentoring at work: Developmental relationships in organizational life*. Glenview, IL: Scott, Foresman and Company.

Kreiner, G. E. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *Journal of Organizational Behavior, 27*(4), 485-507.

Lankau, M. J., & Scandura, T. A. (2002). An investigation of personal learning in mentoring relationships: Content, antecedents, and consequences. *Academy of Management Journal, 45*(4), 779-790.

Lengnick-Hall, C. A., & Sanders, M. M. (1997). Designing effective learning systems for management education: Student roles, requisite variety, and practicing what we teach. *Academy of Management Journal, 40*(6), 1334 - 1368.

Lentz, L. R., & Lange, S. E. (2005). Aligning in the mentoring partnership. In D. E. Wulff (Ed.), *Aligning for learning: Strategies for teaching effectiveness* (pp. 106-119). Boston: Anker Publishing Company, Inc.

Lewin, K. (1951). *Field theory in social science: Selected theoretical papers.* Oxford, England: Harpers.

Lewis, P., & Jacobs, T. (1992). Individual differences in strategic leadership capacity: A constructive/developmental view. In R.L. Phillips & J.G. Hunt (Eds.) *Strategic leadership: A multiorganizational-level perspective* (pp 121-137).

London, M. (1989). *Managing the training enterprise: High-quality, cost-effective employee training in organizations.* San Francisco: Jossey-Bass.

London, M., & Mone, E. M. (1999). Continuous learning. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of performance* (pp. 119-153). San Francisco: Jossey-Bass.

Loo, R. (2004). Kolb's learning styles and learning preferences. Is there a linkage? *Educational Psychology, 24*(1), 99-108.

Mainemelis, C., Boyatzis, R. E., & Kolb, D. A. (2002). Learning styles and adaptive flexibility: Testing experiential learning theory. *Management Learning, 33*(1), 5-33.

Messick, S. (1976). Personal styles and educational options. In S. Messick & Assoc. (Eds.), *Individuality and Learning* (pp. 327-368). San Francisco: Jossey Bass.

McCauley, C. D., Eastman, L. J., & Ohlott, P. J. (1995). Linking management selection and development through stretch assignments. *Human Resource Management, 34*(1), 93-115.

Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T., & Fleishman, E. A. (2000). Leadership skills for a changing world: Solving complex social problems. *Leadership Quarterly, 11*(1), 11-35.

Proverbs 13:20. *The Holy Bible, New International Version:* International Bible Society.

O*NET (Occupational Information Network). Retrieved September 15, 2007 from http://online.onetcenter.org/find.

Ostroff, C., & Kozlowski, S. W. (1993). The role of mentoring in the information gathering processes of newcomers during early organizational socialization. *Journal of Vocational Behavior, 42*(2), 170-183.

Piaget, J. (1970). *Science of education and the psychology of the child*. Trans. D. Coltman. Oxford, England: Orion.

Pulakos, E. D., Arad, S., Donovan, M. A., & Plamondon, K. E. (2000). Adaptability in the workplace: Development of a taxonomy of adaptive performance. *Journal of Applied Psychology, 85*(4), 612-624.

Ragins, B. R., & Cotton, J. L. (1999). Mentor functions and outcomes: A comparison of men and women in formal and informal mentoring relationships. *Journal of Applied Psychology, 84*(4), 529-550.

Raschick, M., Maypole, D. E., & Day, P. (1998). Improving field education through Kolb learning theory. *Journal of Social Work Education, 34*(1), 31-43.

Rouiller, J. Z., & Goldstein, I. L. (1993). The relationship between organizational transfer climate and positive transfer of training. *Human Resource Development Quarterly, 4*(4), 377-390.

Sadler-Smith, E., & Smith P.J.B. (2004). Strategies for accommodating individual styles and preferences in flexible learning programmes. *British Journal of Educational Technology, 35*(4), 395-412.

Salomon, G. (1972). Heuristic models for the generation of aptitude-treatment interaction hypotheses. *Review of Educational Research, 42*(3), 327-343.

Scandura, T. A. (1992). Mentorship and career mobility: An empirical investigation. *Journal of Organizational Behavior, 13*(2), 169-174.

Smith, C. S., & Tisak, J. (1993). Discrepancy measures of role stress revisited: New perspectives on old issues. *Organizational Behavior and Human Decision Processes, 56*(2), 285-307.

Sugarman, L. (1985). Kolb's model of experiential learning: Touchstone for trainers, students, counselors, and clients. *Journal of Counseling & Development, 64*(4), 264-268.

Svinicki, M., & Dixon, N. (1987). The Kolb Model modified for classroom activities. *College Teaching, 35*, 141-146.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston: Allyn and Bacon.

Tesluk, P. E., & Jacobs, R. R. (1998). Toward an integrated model of work experience. *Personnel Psychology, 51*(2), 321-355.

Travers, N. (1998). *Experiential learning and students' self-regulation*. Saratoga Springs, NY: The National Center on Adult Learning.

Underhill, C. M. (2006). The effectiveness of mentoring programs in corporate settings: A meta-analytical review of the literature. *Journal of Vocational Behavior, 68*, 292-307.

Wulff, D. E. (2005). *Aligning for learning: Strategies for teaching effectiveness*. Boston: Anker Publishing Company, Inc.

Zaccaro, S.J. (2001). *The Nature of Executive Leadership*. Washington DC: APA.

Zaccaro, S. J., & Banks, D. J. (2001). Leadership, vision, and organizational

effectiveness. In S. J. Zaccaro & R. J. Klimoski (Eds.), *The nature of organizational leadership: Understanding the performance imperatives confronting today's leaders* (pp. 181-218). San Francisco: Jossey-Bass.

Zachary, L.J. (2005) *Creating a mentoring culture*. San Francisco: Jossey-Bass.

Zagumny, M. J. (1993). Mentoring as a tool for change: A social learning perspective. *Organization Development Journal, 11*(4), 43-48.

CURRICULUM VITAE

Cary F. Kemp received her bachelor's degree from Centre College (Danville, KY) in May of 2001, and began George Mason University's doctoral program in I/O Psychology that September. Cary received a Master's of Arts in Psychology after two years in the doctoral program. During these first two years in graduate school, she conducted several leadership development and assessment projects, working with the U.S. Army and Air Force, as well as the Center for Creative Leadership. During her final years in the doctoral program, Cary held adjunct faculty positions at George Mason University and at the U.S. Naval Academy (Annapolis, MD). Her courses included Social Psychology, the Psychology of Groups and Teams, and the Psychology of Leadership. In addition, Cary has worked as a Personnel Research Psychologist for the U.S. Office of Personnel Management's Center for Talent Services (CTS; Washington, DC) since 2004.