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WHAT DO WE KNOW ABOUT INTERPERSONAL SKILLS? A META-ANALYTIC
EXAMINATION OF ANTECEDENTS, OUTCOMES, AND THE EFFICACY OF TRAINING

by

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A dissertation submitted in partial fulfillment of the requirements
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ABSTRACT

Despite extensive statements about the importance of possessing good interpersonal skills, little quantitative evidence has been brought forth to investigate these claims. At the same time, training in soft, or interpersonal, skills continues for organizational managers, customer service representatives, and members of formal work teams. Based on these considerations, the current research was guided by five broad questions. First, are gender and the Big Five personality variables important predictors in the use and effectiveness of interpersonal skills? Second, what is the relationship between various interpersonal skills and important personal and workplace outcomes? Third, given that training in interpersonal skills is prevalent in organizations today, does this training work? Further, and perhaps more importantly, under what conditions do these training interventions result in optimal outcomes? Lastly, does job complexity moderate the relationship between interpersonal skills and outcomes? To answer these questions, a series of meta-analytic investigations was conducted. The results of these analyses provided evidence for the existence of meaningful antecedents of interpersonal skills. In addition, relationships between interpersonal skills and outcomes were identified, with hypotheses in this area confirmed. The results of this research demonstrate the beneficial impact of interpersonal skills training for improving interpersonal skills. Finally, in line with predictions, job complexity was identified as a moderator of the relationship between interpersonal skills and outcomes. The current document concludes with recommendations both for researchers interested in furthering the science of interpersonal skills research, and for practitioners charged with improving the interpersonal skills of their workforce.

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CHAPTER 1: INTRODUCTION

“It may be argued that the most pressing social problems are concerned with the relationships between people, and that these are an essential part of human nature.”
(Argyle, 1969, p. 13)

This quote summarizes nicely the crucial role that social, or interpersonal skills play in our daily routines and social interactions both within and beyond traditional work settings.

Interpersonal Skills (IPS) are particularly critical in the information-focused and service-oriented organizational milieu of today. The successful enactment of these skills enables individuals employed as organizational managers and leaders, customer service representatives, and members of work teams to perform effectively across a wide variety of conditions and circumstances (Hackman, 1987; Hayes, 2002).

The professed need for strong IPS in corporate America extends to virtually every field of endeavor. For example, researchers in the areas of health care (Duffy, Gordon, Whelan, Cole-Kelly, & Frankel, 2004; McConnell, 2004), the military (e.g., DiGiambattista, 2003; TRADOC Pamphlet 525-66), accounting (Messmer, 2001), sales and entrepreneurship (Baron & Markman, 2000; Garavan, 1997), and traditional management (ASTD, 2000; Kilduff & Day, 1994; Wayne, Liden, Graf, & Ferris, 1997) have all noted the importance of possessing good IPS. Moreover, a recent survey commissioned by Microsoft of 500 board-level executives also supports the value of IPS. Of those surveyed, 61% said that interpersonal and teamworking skills were more important than information technology skills (Espiner, 2007). Microsoft Chairman Bill Gates added, “Communication skills and the ability to work well with different types of people are very important” (Espiner, 2007, p. 1). No doubt, the increased importance of these skills has provided the impetus for vast amounts of spending on IPS training programs in order to improve these critical skills.

As further testament to the ubiquitous and widespread attention given to these skills, a recent *Google* search (January 26, 2009) using “interpersonal skills” as the search term yielded approximately 4.6 million hits. By way of comparison, a similar search using the phrase “physical skills” yielded only 459,000 hits, while a search of a more commonly used phrase, “leadership skills,” yielded approximately 8.5 million hits.

The U.S. Army certainly appreciates the importance of having good IPS. A 2005 Force Operating Capabilities document (Department of the Army, 2005) stated it this way: “First and foremost, Future Force leaders must *excel in the human dimension of leadership*... They also must possess both the ability to build cohesive teams rapidly and the essential interpersonal skills needed to communicate and work effectively with diverse groups of people” (p. 128). The U.S. Marine Corps also recognizes the necessity for good IPS, with Marines receiving training to improve these competencies before going to serve peace-keeping duties in Iraq (Phillips, 2004). Others have also argued for the importance of IPS in military settings (e.g., DiGiambattista, 2003; Russell, Crafts, & Brooks, 1995). Simply put, a leader’s ability to get the job done and influence others is directly related to the leader’s level of social awareness (Mueller-Hanson et al., 2007).

The increasingly multinational nature of corporations today provides further impetus for understanding IPS. Multinational corporations (MNCs) are constantly focused on the development and implementation of global human resource management strategies (e.g., Caligiuri, Phillips, Lazarova, Tarique, & Bürgi, 2001; Forster, 2000). One strategy popular with MNCs is to send expatriate managers and executives on overseas assignments to manage the operations of a foreign subsidiary (Caligiuri et al., 2001; Littrell, Salas, Hess, Paley, & Riedel, 2006). Without question, these expatriate managers are doomed to fail if they do not have the

interpersonal and cross-cultural skills necessary to interact in these foreign settings. In fact, it has been estimated that up to 40% of expatriate employees return early from their assignments—a reality that is very costly for MNCs (Black & Mendenhall, 1990).

Taken together, the currently expanding focus and expected increased value that will be placed on IPS provide a clear justification for learning more about these critical skills. IPS are skills used by everyone, everyday. They are used to solve problems and build relationships with others. For the purposes of this work—and in line with the definition put forward by Klein, DeRouin, and Salas (2006), who had carefully considered previous discussions of this construct—IPS are defined as, “goal-directed behaviors, including communication and relationship-building competencies, employed in interpersonal interaction episodes characterized by complex perceptual and cognitive processes, dynamic verbal and nonverbal interaction exchanges, diverse roles, motivations, and expectancies” (p. 81).

In the next section, I outline a more specific rationale for the importance of this research. This is followed by an in-depth exploration IPS in the workplace and previous theoretical conceptualizations of IPS. This foundation sets that stage for the taxonomy of IPS—an empirical assessment of which is the focus of the current research.

Rationale for the Current Research

The relationship between IPS and outcomes of interest to organizations is gaining increased attention among scholars (e.g., Hogan & Shelton, 1998). Empirically, IPS have documented relationships with important workplace outcomes, including task performance, job dedication, interpersonal facilitation, and overall performance (Ferris, Witt, & Hochwarter, 2001). However, the relationships that have been observed between IPS and outcomes are

generally not consistent from study to study. What is needed is a way to summarize these seemingly disparate primary study findings into a cohesive set of statements describing the value of IPS. Moreover, before training and selection programs based on IPS are commonly implemented, it is important to identify their expected impact. Klein, DeRouin, and Salas (2006) suggested, “a meta-analysis (or series of meta-analyses) examining the overall influence of IPS on important individual, group/team, and business outcomes would represent a substantial contribution to the literature” (p. 114). This research study seeks to make that contribution.

There are four specific reasons for the importance of this research. First, *the meta-analysis process can be leveraged to enhance and extend current understanding of the importance of IPS in organizations*. While the value of IPS is frequently declared, agreement and quantitative evidence of these claims have been sparse. In addition, the results available from primary studies are often plagued by a narrow focus on a limited set of skills—often characterized as simply “interpersonal skills.” Similarly, examinations of outcomes are often limited to a particular subset of possible outcomes, ignoring other potential outcomes of interest. Attempts at making systematic conclusions about this class or group of skills, and especially concerning relationships with desired outcomes, have been found wanting. A meta-analysis of this area will cumulate results from a large number of published and unpublished primary studies, allowing for a comprehensive accounting of the importance of these skills.

Second, *existing studies of IPS training provide little insight into the overall effectiveness of this training*. For example, the effectiveness of various IPS training interventions is rarely assessed in comparison to other methods. With the increasing amounts of money being spent on IPS training, it is imperative to assess the efficacy of these interventions. At the same time, this research will investigate separate classes of outcomes and distinguish between cognitive,

affective, and skill-based outcome correlates at the individual level of analysis. The results of this examination may be leveraged to facilitate the provision of research-based conclusions and the development of guidelines for IPS training provided to key organizational personnel. Additionally, the findings may be examined to identify gaps in the current base of empirical research on IPS and IPS training. In short, this research can begin to identify when, where, and how IPS training interventions are most effective.

Third, *the identification of antecedents to IPS will add greatly to our understanding of the entire domain of IPS.* Participant gender and the Big Five personality variables are the primary antecedents assessed in the current research. This study is designed, in part, to assess the relationships between these antecedents and the IPS under examination.

Lastly, *the use of meta-analytic techniques can alleviate some of the problems and limitations inherent in primary studies.* That is, practical methodological limitations in primary studies relying on relatively small samples often result in large sampling error that can adversely influence the consistency and quality of conclusions from independent research studies. At the same time, disparate effect sizes and conclusions from independent studies serve to cloud the accumulation of knowledge and the understanding of interpersonal constructs. A meta-analysis of this research area can facilitate an improved understanding and explanation of these constructs.

Before describing the specific research hypotheses and proposed methods in greater detail, a review of several of the key areas within this domain is in order. First, I examine the workplace environment and discuss the importance of IPS. Next, previous conceptualizations of IPS are discussed, followed by the presentation of a comprehensive definition, framework, and taxonomy of IPS. This taxonomy focuses on two subsets of IPS—communication and

relationship-building competencies. Finally, before the formal presentation of study hypotheses, a review of IPS training is presented.

The Workplace Environment and Interpersonal Skills

Put in simple terms, now more than ever, people spend a major portion of their working day relating to and interacting with others. For example, managers and leaders tasked with helping their employees and coworkers accomplish organizational goals must possess the necessary people skills to motivate and facilitate optimal employee performance (Borman & Motowidlo, 1993; Boyatzis, 1982). Hayes (1994, 2002) suggested that a distinguishing factor between the successful and unsuccessful manager is his or her level of interpersonal competence. A recent survey of training and development professionals supported this point, with over one-third of the respondents reporting that communication or interpersonal relationship skills were the most important qualities in a good boss (ASTD, 2000). Moreover, in one of the largest known studies of CEO selection, Khurana (2002) confirmed that one cannot be selected to run a Fortune 500 company based on a reputation as a “competent manager” alone; you must be seen as a “charismatic leader” (p. 71). You must be seen as someone who can influence others and communicate effectively. Some have even suggested that charisma is simply social skill that is well developed (e.g., Riggio, 1986, 1998). To be sure, people-focused leadership and management skills—including the ability to communicate effectively with all levels of an organization—are essential for organizational managers and leaders alike.

The need for effective IPS does not stop with organizational managers and leaders. Customer service representatives must also possess the personality traits and people skills that enable them to consistently provide superior customer service (e.g., Schneider & Bowen, 1995).

The services sector now makes up approximately 80% of U.S. economic activity (Reuters Limited, 2006). Although always important, the rapid expansion of the service industry has enhanced the need for IPS among both service center managers and front-line, customer-facing employees. It is a fact that as the service sector of our economy has continued to expand, service industry employees have become the fastest growing segment of the workforce. Employees who perform service-oriented work must be able to execute behaviors related to the interpersonal nature of job performance. These employees may work in restaurants, bars, hotels, hair salons, banks, or airlines. However, these varied work environments all have one thing in common—they all require a satisfactory level of IPS for successful customer interactions.

Devine, Clayton, Philips, Dunford, and Melner (1999) found that 48% of the organizations surveyed in their random sample used some type of team approach. Not unlike organizational managers and customer service representatives, members of work teams must also possess an acceptable level of IPS. In fact, interpersonal competencies are said to be imperative to teamwork and working in groups (e.g., Hackman, 1987; Kozlowski & Ilgen, 2006; McIntyre & Salas, 1995). For example, in one seminal article that focused on the design of work teams, Hackman (1987) suggested that a well-designed (work) group has four characteristics. The first two characteristics simply require that, when forming teams, the right number of people is brought together and that they must possess the requisite task skills. The third characteristic is most relevant to the current research, and states that effective teams are composed of individuals with interpersonal skills as well as task skills. The IPS, Hackman argues, are what allows the team to use their collective task skills. Moreover, it is suggested that the importance of IPS is especially apparent in diverse teams—teams that may be characterized by diversity in demographics, values, knowledge, or skills (Hackman, 1987).

While researchers in many fields and domains have argued for the importance of IPS, they often disagree on the scope and definition of IPS. At the same time, attempts to clarify the construct have come from a wide variety of sources. The next section will briefly describe prior notions of IPS, in preparation for providing an overarching framework of IPS.

Previous Conceptualizations of Interpersonal Skills

Many individuals have postulated about the origin and scope of interpersonal skills. What *does* it mean to possess good IPS? Klein and colleagues (2006) described the IPS label as “an umbrella term that refers to a wide variety of concepts and associated terms, such as social skills, social competence, people skills, face-to-face skills, human skills, and soft skills” (p. 81). The online encyclopedia, *Wikipedia*, defines IPS as, “mental and communicative algorithms applied during social communications and interactions in order to reach certain effects or results.” (Wikipedia, 2009) This resource provides no description however, of what these algorithms entail. Another source, the Occupational Information Network (O*NET, 2006) uses the term “social skills” and defines them as developed capacities used to work with people to achieve goals. O*NET lists six categories of social skills, namely coordination, instructing, negotiation, persuasion, service orientation, and social perceptiveness.

Frameworks of “multiple intelligences” have also shed light on the IPS construct. Two of the most well known include Gardner’s Multiple Intelligences Theory (Gardner, 1983, 1999) and Sternberg’s Triarchic Theory of Intelligence (Sternberg, 1985), which both include a social or “personal” intelligence dimension and owe their origins to Thorndike’s (192) seminal work on social intelligence. Borrowing from these theories, Marlowe (1986) later described social intelligence as “the ability to understand the feelings, thoughts, and behaviors of persons,

including oneself, in interpersonal situations and to act appropriately upon that understanding” (p. 52). The link between “forms” of intelligence and the display of social skills has also been anecdotally noted by Yussen and Kane (1980), who argued that, for young children, the demonstration of IPS (e.g., acting nice, being helpful, being polite) is often viewed as a proxy for being intelligent. Thus, at least for this age group, the possession and display of social skills is suggestive of cognitive ability.

Existing literature in the domain of job performance is also informative to a discussion of IPS, and there are many models of job performance in the applied psychology literature (e.g., Borman & Motowidlo, 1993; Campbell, McCloy, Oppler, & Sager, 1993). These and other models have identified relevant aspects of job performance that are interpersonal in nature. In general, these models are quite comprehensive, capturing those elements of performance that are important for all jobs. However, the models usually fail to capture IPS performance at a finite level—a level that would allow for the design of a valid selection, assessment, or training system (e.g., Carpenter, Wisecarver, Deagle, & Mendini, 2005). This is one area where the current research can provide a unique contribution.

Other researchers have also investigated the interpersonal domain, preferring to use social skill (Ferris, Witt, & Hochwarter, 2001; Hochwarter, Witt, Treadway, & Ferris, 2006; Riggio, 1986), social competence (Schneider, Ackerman, & Kanfer, 1996), interpersonal acumen (Aditya & House, 2002), or social self-efficacy (Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982) as the favored construct labels. For example, Hogan and Lock (1995) examined over 600 critical incidents from individuals working across a range of industries and identified seven categories of social skills. These were sensitivity to others’ needs, flexibility,

perceptiveness, instilling trust in others, consistency across interactions, accountability, and effective communication.

More recently, Carpenter and Wisecarver (2004) investigated the domain of interpersonal performance for U.S. Army Special Forces Soldiers. Similar to Hogan and Lock, they also utilized a critical incidents methodology. A content analysis of over 1000 critical incidents, representing 81 different jobs, revealed that over 30% of the incidents contained examples of IPS. From the relevant incidents, Carpenter and Wisecarver developed an interpersonal performance model with four general dimensions and 16 sub-dimensions. Support for this model was suggested by a separate confirmatory factor analysis. A major finding from this study was that various IPS can be differentiated from each other. Indeed, interpersonal performance is multidimensional in nature (Analoui, Labbaf, & Noorbakhsh, 2000; Carpenter & Wisecarver, 2004).

In yet another example, Kantrowitz, Kanfer, and Lippstreu (2006) recently subjected critical incidents of “soft” skills to a qualitative cluster analysis, using data obtained from 18 subject matter experts across five organizations. The results of this analysis indicated the existence of ten categories of soft skills performance: (1) communication skills, (2) leadership skills, (3) decision making/problem solving skills, (4) self-management skills, (5) management skills, (6) organization skills, (7) interpersonal skills, (8) political skills, (9) analysis/creativity skills, and (10) selling skills. While the methodology of Kantrowitz and colleagues’ research study appears sound, the resulting categories are somewhat problematic. For example, “leadership,” “management,” and “organization” skills have considerable theoretical overlap and are perhaps too general to be useful. Of greater concern, “interpersonal” and “soft” skills are alternative labels for the same set of competencies.

One of the most frequently cited models of social skills was developed by Argyle and colleagues out of research conducted at Oxford in the 1960s (e.g., Argyle, 1975, 1994; Argyle & Kendon, 1967). This model posits that in any social encounter, individuals attempt to realize goals through the continuous correction of their social performance. The “corrections” in these encounters are triggered by others’ reactions (Hayes, 2002). One key point concerning this model is that it views social performance as a set of motor responses—motor responses that may be improved through experience or training. This point, that social or interpersonal skills should be viewed as motor responses (i.e., situation-specific behaviors; Bellack, 1983) is a key pillar of the current research and deserves some brief elaboration.

Historically, social skill has been evaluated from two perspectives. The trait-based approach positions social skill as an enduring personality characteristic (e.g., Friedman & Miller-Herringer, 1991; Segrin, 1998) with relations to other individual-difference variables, including empathy (Nezlek, Feist, Wilson, & Plesko, 2001) and extraversion (Lieberman & Rosenthal, 2001). The second perspective, the molecular model (e.g., Argyle & Kendon, 1967; Bellack, 1983; Hayes, 2002) views social skills as situation-specific behaviors that are partially learned, partially instinctive, and subject to environmental and situational factors. I adopted this latter perspective in this study, as research has shown that IPS are best understood when both person and situational determinants are considered simultaneously (Burgoon & Dunbar, 2000; Hochwarter, Witt, Treadway, & Ferris, 2006).

In short, existing literature has described interpersonal competencies to varying degrees of detail. Given all these prior conceptualizations of IPS, where do we stand today? Unfortunately, the discussion, clarification, and understanding of constructs in this area have been somewhat deficient. Take for example, the recent statement of Therese Ravell, the human

resources manager of *Manpower*, who stated that IPS should be divided into three areas—communication skills, social skills, and emotional intelligence (Southam, 2006). While communication skills clearly represent an important subset of interpersonal competencies, most researchers would (again) agree that “social skills” and “interpersonal skills” are interchangeable terms. Moreover, the possibility that emotional intelligence may be viewed from a trait-based perspective would preclude it too from being labeled as a distinct interpersonal skill. It is particularly distressing that there is a lack of agreement concerning what exactly constitutes an IPS. Most notably lacking is an accurate, comprehensive taxonomy of the skills. Consequently, in the next chapter, an inclusive definition, framework, and taxonomy of IPS are each presented. These heuristics serve to clarify existing literature in the area of IPS and provide the platform from which the study hypotheses are launched.

CHAPTER 2: BACKGROUND, DEFINITION, AND TAXONOMY OF INTERPERSONAL SKILLS

In this chapter (along with Chapter 3), the conceptual background leading up to the current study hypotheses is provided. Having examined the rationale for the need for this research, and having reviewed the historical roots of previous investigations of IPS, the spotlight now turns to delineating exactly how IPS will be examined in the current research. This focus will ultimately include antecedents and outcomes of IPS, the effectiveness of IPS training, and job complexity as a potential moderator variable. First, however, the domain of IPS must be more carefully considered.

Incorporating the thinking of Argyle (1981) and others, Klein and colleagues concluded, “expertise in skilled social performance requires competent performance in several different areas—accurate perception, effective nonverbal communication, appropriate self-presentation, and mastery of skilled sequences of behavior” (Klein et al., 2006, p. 115). These authors provided a framework or practical heuristic to depict how antecedent variables (e.g., life experience, individual differences), together with situational characteristics (e.g., setting, task demands, individual roles) contribute to perceptual and cognitive activity that takes place during the course of an interpersonal interaction (see Figure 1, Appendix A). “From these interaction episodes and their associated perceptual and cognitive activity, individuals portray, to a greater or lesser degree of success, specific IPS” (Klein et al., 2006, p. 82). This heuristic is employed in the current research to guide understanding of how interpersonal skills form, but it does not fully encapsulate the hypotheses that will be tested in this research. Implied in this model, really, are any individual difference variables that might be leveraged in the prediction of the execution of IPS. In addition, the model does not directly address how training and development interventions might impact the cognitive and behavioral processes that lead to the effective use of IPS.

Therefore, a new model will be presented later to fully outline the study hypotheses and serve as a driver of this research.

While the labels applied to various IPS may differ, they all revolve around issues of communication, interaction, and managing relationships with others. Thus, two major groupings of IPS will be considered as the focus of this research: communication skills and relationship-building skills. Based upon Klein and colleagues' (2006) qualitative review of over 50 frameworks, definitions, and lists of IPS, this taxonomy represents each of the most commonly described interpersonal constructs. Unlike some previous discussion of IPS, the constructs described here are mutually exclusive and conceptually distinct. In short, these two major categories (and their sub-skills) form an accurate and timely census of the most frequently discussed IPS in the literature.

Communication Skills

Interpersonal communication is essential to an individual's well-being. Adler, Rosenfeld, and Proctor (2001) noted that without this communication, almost all people would tend to feel lost and lonely. For normal, healthy individuals, it is nearly impossible not to communicate through verbal, paraverbal, and nonverbal channels (Watzlawick, Beavin, & Jackson, 1967). Interpersonal communication skills are critical for transmitting feelings, thoughts, and information to others, and they are generally the basis for how individuals are initially perceived by others. The effective use of oral communication provides a mechanism by which individuals' values, intentions, and personality are manifested.

Communication skills are important in virtually every field of endeavor—from teaching elementary school students to effectively arguing cases as a prosecuting attorney. They are every

bit as important to athletic coaches as they are to the hard-working employees at one's favorite restaurant. In health care, the importance of communication skills for doctors and physicians is paramount. "Professional conversation between patients and doctors shapes diagnosis, initiates therapy, and establishes a caring relationship. The degree to which these activities are successful depends, in large part, on the communication and interpersonal skills of the physician" (Duffy et al., 2004, p. 495). Importantly, surveys consistently support the idea that patients seek better communication from their doctors (Lansky, 1998). Moreover, the much-too-frequent communication failures of health care teams lead to mistakes that threaten patient safety (Committee on Quality Health Care in America, Institute of Medicine, 1999).

Although the importance of communication skills is readily apparent in all work organizations, it has been argued that new hires and current employees are plagued by poorly-developed communication skills (Cassady & Watson, 1994). When a statement such as this is made, the speaker is usually referring to oral or written communication skills. However, well-developed and existing constructs within the domain of interpersonal communication skills may be expanded to include active listening, nonverbal communication, and assertive communication.

For example, Lorr and More (1980) outlined four primary dimensions of assertive communication: directiveness, social assertiveness, defense of interest, and independence. At a broader level, Smith-Jentsch, Salas, and Baker (1996) described assertive communication skills as "the ability and willingness to state one's opinions, concerns, and desires in a manner that is direct and to the point without being offensive, demeaning, or hostile" (p. 4). Excellent literature is also available which examines the nature and manifestation of other communication skills, including active listening (e.g., Fisher et al., 1991; Nurick, 1993; Rogers & Farson, 1976), oral communication (e.g., Goffman, 1955; O'Conner, 2003), written communication (e.g., Sharplin,

Sharplin, & Birdsong, 1986; Vaughn, 1985) and nonverbal communication (e.g., DePaulo, 1992; Goldstein, 1983).

For the purposes of this research, five specific categories of interpersonal communication skills will be considered: *active listening, oral communication, written communication, assertive communication, and nonverbal communication*. Again, these categories were distilled from recent research and analysis on existing frameworks and taxonomies; it represents a synthesis of previous descriptions of IPS. These skills will be examined both independently (where possible) and in combination. Unfortunately, there is a tendency in the IPS research area to assess “communication skills” at the broadest level only, typically through self- or observer reports of these skills. Therefore, it is expected that evaluations of relationships between specific outcomes and “communication skills,” assessed at a broad level, will be more readily available than evaluations of more narrowly defined relationships.

Relationship-Building Skills

The other major category of IPS assessed in this research is relationship-building skills. Specifically, the seven categories of relationship-building skills that will be assessed herein are: (1) *cooperation and coordination*, (2) *intercultural sensitivity*, (3) *service orientation*, (4) *empathy*, (5) *self-presentation*, (6) *social influence*, and (7) *conflict resolution and negotiation*. Each of these skills and descriptions also represent a related set of alternatively named terms and constructs.

The first of these categories, *cooperation and coordination*, has often been discussed within the concept of teamwork. In fact, the assumption that interpersonal skills and relations would lead to improved team performance has been around for awhile (e.g., Argyris, 1962).

More recently, Stevens and Campion (1994) described three important interpersonal KSAs found in teams. These include conflict resolution, collaborative problem solving, and communication. Similarly, Marks, Mathieu, and Zaccaro (2001) described three facets of team interpersonal processes, including conflict management, motivation and confidence building, and affect management. These processes are posited to be critical to team performance, particularly when teams engage in longer-term tasks (e.g., Bradley, White, & Mennecke, 2003). As conflict management and resolution skills will be examined separately from their role in facilitating teamwork, the focus here will be on other teamwork interpersonal behaviors and processes, including interpersonal relations, cooperation, coordination, trust, and cohesion.

The second category of interpersonal relationship skills is *intercultural sensitivity*. This construct—which may also be described as cultural competence—also includes acceptance and sensitivity to others’ ideas, as well as cross-cultural relations. It describes the ability to appreciate individual differences among people and act appropriately based on that understanding and appreciation. In today’s business environment, where organizational relationships increasingly span international boundaries (DuBrin, 1997; Landy & Conte, 2004), this skill set is increasingly more vital.

Next, *service orientation* describes an inclination and ability to provide superior customer service—to be courteous and helpful in building rapport with customers, clients, and associates. For individuals with first-rate customer service skills, their behavior is often outwardly manifested as effective communication, negotiation, and social adaptability. Expanding this discussion, the ability to provide consistent and superlative customer service is critical in jobs that demand a high degree of “emotional labor.” The concept of emotional labor refers to “the effort, planning, and control needed to express organizationally desired emotion during

interpersonal transactions” (Morris & Feldman, 1996, p. 987). The level of emotional labor required is often highest in jobs requiring copious amounts of interaction with customers and clients. To be sure, individuals with high levels of customer-focused and customer-sensitive IPS are able to excel in environments requiring substantial levels of emotional labor.

The fourth category of relationship-building skills, *empathy* describes the ability to recognize and understand the emotions of others. In one sense, the ability to act empathetically—and to be viewed that way by others—is a critical competency for the successful enactment of *any* of the interpersonal relationship-building competencies. Moreover, the concept of empathy is a critical component, and perhaps the basis for, the increasingly popular concept of emotional intelligence (EI; Goleman, 1995; Matthews, Zeidner, & Roberts, 2002; Salovey & Mayer, 1990). In this sense, the concept of empathy is somewhat confounded with the construct of EI. To be clear, while empathy is a critical component of EI, other EI competencies expand *beyond* empathy to include emotional self-awareness, assertiveness, and happiness. Similar to IPS, EI has been conceptualized in two primary ways: trait- or ability-based. While manifestations of empathy in the form of EI include the recognition and understanding of others’ emotions, for the purposes of this research, *behaviorally-based manifestations* of empathy in the form of EI behaviors will also be considered within the domain of empathy. Despite this distinction, it will be necessary to exercise some caution when interpreting the analyses involving empathy in this study. More importantly, it will be particularly imperative during the coding process to clearly understand how primary study authors are operationalizing the constructs of empathy versus EI. Again, behaviorally-based manifestations of empathy will be the focus for this category of interpersonal relationship skills.

The fifth category, *self-presentation*, describes the behaviors and processes by which individuals attempt to influence the reactions and perceptions people have of them. Relevant behaviors in this category include self-expression, face-saving, impression management, and self-promotion. In general, impression management theorists focus on situations in which consciously formed impressions are essential for achieving certain goals or social competence needs (Baumeister, 1982, 1989; Goffman, 1959; Judge & Bretz, 1994; Leary & Kowalski, 1990). Importantly, self-presentation and impression management tactics are often successful. For example, research has shown that job applicants who use ingratiation or other-focused activities are more likely to receive positive evaluations and get a job offer than those who do not use such strategies (Higgins & Judge, 2004; McFarland, Ryan, & Kriska, 2003).

A distinct (but related) category of interpersonal relationship-building skills, *social influence*, describes the process of guiding others towards the adoption of specific behaviors, beliefs, or attitudes. Social influence is often referenced by a variety of labels. In this research, alternative constructs that will be examined within the domain of social influence include political skill, networking, and persuasion. Social influence is distinct from self-presentation because the goal is not necessarily to leave others with a more positive impression, but rather to convince them to act or believe in a certain manner. The construct of political skill or political savvy also overlaps to a modest degree with other social competencies, including social perceptiveness and savvy (Ferris, Perrewé, & Douglas, 2002). However, social skill and political skill are still conceptually distinct (Luthans, Hodgetts, & Rosenkrantz, 1988; Peled, 2000), and thus political skill will be viewed here as one of many social or interpersonal skills.

Regarding these social influence competencies, it is well documented that organizations are inherently political arenas and are ripe with the potential for social influence attempts (e.g.,

Mintzberg, 1985). Political skill, as a form of social influence, has been defined as the exercise of influence through persuasion, manipulation, and negotiation (Mintzberg, 1983). Elaborating on this description, Ferris and colleagues defined political skill as “the ability to effectively understand others at work, and to use such knowledge to influence others to act in ways that enhance one’s personal and/or organizational objectives (Ferris, Treadway, Kolodinsky, Hochwarter, Kacmar, Douglas, & Frink, 2005, p. 127). People who score highly on political skill not only know exactly what to do in different social situations at work, but also how to do it in a sincere, engaging manner (Ferris et al., 2002). It has been argued, “Politically skilled individuals have large, strong networks which not only supply social support, but also provide a great deal of information” (Ferris, Perrewé, Brouer, Lux, Treadway, & Douglas, 2007, p. 23). Information provided by these expanded networks allows politically skilled individuals to receive timely and accurate information that affects both their performance and the workings of larger organizational systems. In short, social influence in the form of political skill enhances individuals’ resources, allows them to acquire new resources, facilitates performance, and results in a more favorable perception by others (Hobfoll, 2002). As just one example of how political skill can influence performance, Ahearn and colleagues (2004) found team leader political skill to be an important predictor of team performance.

Finally, this research also examines various *conflict resolution and negotiation* skills as key interpersonal competencies in the relationship-building domain. Related skills which fall into this category include conflict management, compromising, and problem solving. In general, interpersonal conflicts at work can range from minor disagreements to intense arguments. Regardless of their severity, these conflicts often represent significant stressors for individuals. In the job stress literature, interpersonal conflict has been empirically linked to many unfortunate

outcomes, including turnover intentions, job dissatisfaction, depression, and somatic symptoms (Spector & Jex, 1998). Thus, for personal health reasons alone, the ability to solve interpersonal conflicts amicably is an important competency. Extending beyond individual well-being, research has demonstrated that failure to manage interpersonal conflicts between members of work teams can lead to substantial performance decrements (e.g., Jehn, 1995; Jehn & Chatman, 2000).

Taken together, these communication (i.e., active listening, oral communication, written communication, assertive communication, and nonverbal communication) and relationship-building (i.e., cooperation and coordination, intercultural sensitivity, service orientation, empathy, self-presentation, social influence, and conflict resolution and negotiation) IPS represent a cohesive and accurate census of the most frequently investigated IPS in the literature. As such, they will represent the focus of this research. At times, however, researchers who study IPS will decide against using any one of these more narrowly defined constructs in favor broader conceptualizations.

“General” Interpersonal Skills

As an unfortunate indictment of the lack of clarity for the IPS construct, too often researchers oversimplify complex, dynamic behaviors observed in their research studies as basic displays of social or interpersonal skills. That is, all behaviors that may be considered within this domain are lumped together and either rated by the participants themselves, or by external observers as simple displays of social, or interpersonal skills. One example of this is the assessment of “supervisory skills.” Depending on the particular author or researcher, supervisory skills may refer to giving feedback, coaching, mentoring, or any other of a number of assorted

leadership- and management-related IPS. The chief concern is that when researchers assess IPS or social skills at the broadest level possible, with no finite description of the specific behaviors being evaluated, fine-tuned interpretation becomes problematic. However, in an effort to salvage the findings and potential knowledge contributions which may be discerned from these studies, this research will also attempt to assess IPS outcomes and correlates at a most general level—a level which unfortunately, will tend to obscure more finite relationships. That is, in addition to examining the previously mentioned communication and relationship-building competencies, results and relationships between more generally described “interpersonal” or “social” skills and outcomes will also be examined. At the same time, every effort will be made to carefully examine the operationalization of broadly described IPS assessed in primary studies. If it is determined that the construct(s) actually being assessed can be suitably placed within the domain of one of the communication or relationship-building IPS described above, then the effect size(s) from that study will be included with others which have resulted from the measurement of similar constructs.

Knowledge of Interpersonal Skills

Finally, beyond interpersonal communication skills, relationship-building interpersonal skills, and “general” interpersonal skills, this research also investigates knowledge of interpersonal skills. Such IPS knowledge estimates are typically operationalized through self-report assessments of individuals’ knowledge of the communication, relationship-building, or “general” IPS previously described.

Taking stock of the discussion thus far, two points are clear. First, IPS are important to a number of individual, team, and organizational outcomes. Second, it is hard to find agreement

upon what constitutes the domain of IPS. In fact, one may rightly argue that there are almost as many taxonomies of IPS as there are IPS researchers. What this study aims to examine are the most frequently represented of these skills. That is, the IPS examined in the current research represent the most commonly described skills in the literature. The empirical assessment of these skills has the power to set the foundation for a generation of future research in this area.

Before describing the hypotheses and methodology of the current study in greater detail, there is one more area which must be reviewed. Thus, the following section provides a more in-depth discussion of IPS training. This discussion focuses on the prevalence of this training and presents a few illustrative examples of IPS training interventions. Following this section, the proposed study hypotheses and research methodology will be put forward.

CHAPTER 3: INTERPERSONAL SKILLS TRAINING

A consensus position derived from a review of the literature in this area suggests that IPS are not to be viewed as simple trait-based orientations, but instead as behaviorally-based competencies, expressed independently of personality and capable of improvement through training (e.g., Hogan & Shelton, 1998; Mueller-Hanson et al., 2007). Moreover, as expenditures on IPS training have swelled (Gist & Stevens, 1998; Landy & Conte, 2004), these training interventions are becoming increasingly more common. In fact, it is estimated that across all industries, half the training budget is spent on improving the IPS of organizational employees (U.S. Banker, 2000). Additionally, in a survey of organizations known to use teams, Devine and colleagues (1999) found that 74% of the organizations trained team members in IPS or dealing with diversity (vs. 29% in a random sample of organizations). Unfortunately, published evaluations of these training interventions are not nearly as frequent.

It has been argued that, "...teaching interpersonal skills creates the same kind of challenges as teaching employees how to work with products coming off the assembly line" (Goldstein & Ford, 2002, p. 15). At the same time, the complex and dynamic nature of interpersonal tasks suggests these can be difficult areas in which to provide training (Stevens & Gist, 1997). In general, "the accumulated evidence on IPS training suggests that such training should focus on specific, optimal social skills, and not on increased general sensitivity or insight" (Klein et al., 2006, p. 109). Moreover, IPS training should be designed to enhance each of the cognitive, behavioral, and affective components of these skills (Bailey & Butcher, 1983; Harrison, 1992).

At a broad level of examination, interventions targeting the development of communication and relationship-building IPS may be either formal or informal. Informal

methods for improving IPS include motivating and goal setting, coaching and mentoring, and feedback. Formal methods include behavioral modeling training (BMT) and other strategies which may incorporate information-, demonstration-, and practice-based methods. However, the distinction between formal and informal methods is, at times, hazy. Take for example, Tews and Tracey's (2008) examination of the effect of both self-coaching and multi-source feedback (MSF) on interpersonal skill performance. In this study the coaching and feedback mechanisms, which can also be wonderful informal developmental tools, were systematic and formal. The self-coaching program included a workbook filled with behavioral checklists and open-ended questions. Additionally, this program encouraged self-generated feedback and provided a goal-setting action plan. Confirming the authors' hypothesis, the self-coaching program helped facilitate interpersonal skill performance ($\beta = .25, p < .05$). Importantly, these findings were identified even while controlling for general mental ability, conscientiousness, and pre-training self-efficacy. Similarly, the multi-source feedback (MSF) intervention, which included both self- and subordinate assessments, also had a positive impact on IPS performance ($\beta = .44, p < .01$). As another example of the effective use of feedback in this area, Hunt and Baruch (2003) examined the impact of subordinate feedback on the development of IPS for 252 executives. In this study, feedback was given as part of a five-day training workshop. The results of this research indicated that the IPS training had a modest impact on the executives' IPS.

Beyond self-coaching and MSF, multimedia and simulation-based training systems have become increasingly popular options for IPS development. As one example, the Federal Bureau of Investigation (FBI) developed a unique simulator to facilitate their agents' interview skills (Olsen, Sellers, & Phillips, 2004). In this program, agents were encouraged to use verbal and nonverbal cues to detect deception in human behavior. As another example, Smith-Jentsch,

Griffin, and Onyejiaka (2006) described an assessment and training tool for assertive communication skills. Specifically, they developed a multimedia platform populated by twenty-six events, each scripted to elicit assertive communication during an immersive 40-minute workplace simulation. Preliminary results provided support for the efficacy of the computer-based simulation as an alternative for live role-plays or video-based situational judgment tests in the assessment and training of IPS.

Hanson, Nangle, and Meyer (1998) performed a meta-analysis of social skills training in which the participants were primarily elementary, middle, and high school students. The results from this study indicated a mean effect size of .697, after correction for sampling error. This effect size suggests the average participant in a social skills training program was more socially skilled than 74% of those not in a training group. These results, although not speaking directly to the efficacy of IPS training for adults, are nonetheless illustrative of the potential impact of IPS training.

Team members have also been the focus of formal IPS training programs. Unfortunately, a number of previous reviews have concluded that efforts to enhance team interpersonal relationships have met with little success (e.g., Salas, Rozell, Mullen, & Driskell, 1999; Tannenbaum, Beard, & Salas, 1992). However, Bradley, White, and Mennecke (2003) argued that there is abundant support for the contention that interpersonal processes relate positively to team performance, *when teams engage in longer-term tasks*. That is, team interpersonal processes have a better chance of demonstrating their beneficial effects when examined over longer time periods, after individuals have worked together for some time. In contrast, IPS matter to a lesser degree with contrived tasks of short duration. In support of this finding, Druskat and Kayes (2000) found interpersonal processes predicted improved performance for

teams working on four-month long-term projects. Research such as this is vital to understanding the boundary conditions for when, where, and how IPS training interventions are effective. That is, this study and related research (e.g., Marks et al., 2001) have each touted the benefits of incorporating a time-based perspective in the measurement and training of team interpersonal processes.

Role playing, and specifically behavioral modeling training (BMT), are perhaps the most common strategies for developing IPS. “In role-playing, trainees practise the part they are going to play in a classroom situation, and are given some kind of feedback on their performance” (Argyle, 1969, p. 402). Role playing interventions were first initiated in organizational settings for the training and development of industrial supervisors (Argyle, 1969). Importantly, these programs have proven successful in a wide variety of settings (e.g., Baldwin, 1992; Goldstein & Sorcher, 1974; May & Kahnweiler, 2000). As described by Pescuric and Byham (1996), behavior modeling has been proven effective in all industries and at all educational levels. Based on principles of social learning theory (i.e., attention, retention, reproduction, and motivational processes; Bandura, 1977), this very common strategy incorporates information, demonstration, and practice-based methods. The typical sequence involved in BMT programs includes “a description of skills-behaviors to be learned, prior to, or along with, modeling, and then practice with feedback (Taylor et al., 2005, p. 693).

While early studies of BMT cited large positive training effects (e.g., many were reported in a 1976 issue of *Personnel Psychology*), more recent research has not consistently confirmed these findings. For example, despite evidence of learning, some recent studies have failed to find significant changes in job behavior (May & Kahnweiler, 2000; Russell, Wexley, & Hunter, 1984; Werner, O’Leary-Kelly, Baldwin, & Wexley, 1994). These inconsistent results provided

the impetus for Taylor, Russ-Eft, and Chan (2005) to conduct a sweeping meta-analysis on BMT.

Specifically, Taylor and colleagues' research focused on the impact of BMT on six outcome criteria: declarative knowledge, procedural knowledge, attitudes, job behavior, workgroup productivity, and workgroup climate. Moreover, the skills taught in the BMT programs they reviewed consisted of supervisory skills ($n = 78$ studies), interpersonal communication skills ($n = 30$ studies), and technical skills ($n = 11$ studies). The results from this research were most encouraging for declarative ($d = 1.05$) and procedural knowledge outcomes ($d = 1.09$), followed by attitudes ($d = 0.29$) and job behavior ($d = 0.25$). The impact of BMT interventions on workgroup productivity and workgroup climate was not as pronounced ($d = 0.12$ and 0.10 , respectively).

Pertaining to the current research, these authors also broke down IPS into supervisory and teamwork skills and again assessed the impact of BMT interventions on four of the six outcomes assessed previously. They found that BMT interventions were most effective for improving declarative knowledge of supervisory skills ($d = 2.04$) and declarative knowledge of teamwork skills ($d = 1.29$). Concerning procedural knowledge/skills, BMT interventions were (again) more successful with supervisory skills ($d = 1.27$) than teamwork skills ($d = 0.91$). Finally, the effects of BMT interventions on supervisory and teamwork attitudes ($d = 0.28$ and 0.51 , respectively) and job behaviors ($d = 0.26$ and 0.35 , respectively) were substantially less well pronounced.

Upon reflection, Taylor and colleagues' (2005) comprehensive research effort has particular relevance to the current research. In fact, if this dissertation were centered on BMT alone, rather than specific antecedents and outcomes of IPS, it would have been rendered redundant by the Taylor and colleagues study. However, their study examined IPS at general

levels only, and focused on only one training strategy—BMT. Moreover, they argued, “Large residual variances often remained even after studies were broken down by methodological variables, suggesting that moderator variables other than those assessed in the present study are likely to be responsible for the remaining variability of BMT effects across studies” (p. 706). Indeed, additional variance may be captured by examining IPS at a finer level of detail, rather than amalgamating them all together as “supervisory” or “teamwork” skills. The current research examines, therefore, a more fine-tuned and accurate set of skills.

Thus, the major extension provided by the current research is four-fold. In short, it: (1) assesses a more finely-tuned set of interpersonal competencies; (2) addresses and examines the efficacy and boundary conditions for a variety of IPS interventions; (3) examines antecedents of IPS; and (4) examines job complexity as a possible moderator of the relationship between IPS and outcomes. The next section outlines the 15 hypotheses advanced in this research.

CHAPTER 4: THEORETICAL BACKGROUND AND STUDY HYPOTHESES

As described by Morrison and Heggstad (2008), the literature in this area suffers from both the jingle (Thorndike, 1903) and the jangle (Kelly, 1927) fallacies. Specifically, there are times when “research findings may be integrated, when, in fact they should not be (the jingle fallacy) and other occasions in which findings will not be integrated when they should be (the jangle fallacy)” (Morrison & Heggstad, 2008, p. 4). Particularly problematic is that without construct clarification, the quantitative integration of findings via meta-analytic methods becomes extremely problematic.

The taxonomy examined here represents an attempt to understand the most common IPS—those that appear in most discussions of the topic area. Using this taxonomy, the results of primary studies can be organized and meta-analytically scrutinized to discern the relationships between various antecedents and IPS, between these IPS and important outcomes, the efficacy of IPS training interventions, and various moderators of the relationship between IPS and outcomes. Given the abundance of attention placed on IPS in organizations today, it has never been more important to gain an increased understanding of the domain in which they reside. Thus, the hypotheses presented in this research will be discussed within the context of four overarching themes: (1) antecedents of IPS, (2) relationships between IPS and outcomes, and (3) assessing the efficacy and boundary conditions for successful IPS training interventions, and (4) assessing whether the relationship between IPS and outcomes is moderated by job complexity. Figure 2 (see Appendix A) is provided as an organizing framework to guide the discussion of study hypotheses.

Antecedents of Interpersonal Skills

The existing literature has identified a number of possible antecedents of IPS. Among those most frequently investigated include gender (e.g., Althoff & Ashkanasy, 2004; Sarason, Sarason, Hacker, & Basham, 1985) and various personality constructs (e.g., the “Big Five” personality variables; Barrick, Parks, & Mount, 2005; Neuman & Wright, 1999; Witt & Ferris, 2003). These individual difference variables are expected to relate to IPS across a variety of settings. However, consistent with the prevailing view of IPS as *situation-specific* behaviors, it may be difficult to identify strong (or even significant) predictors of these skills. That is, because IPS are believed to be influenced by a multitude of factors (e.g., instinct, previous experience and learning, situational factors, and individual differences; Argyle & Kendon, 1967; Bellack, 1983; Hayes, 2002), identifying strong and consistent demographic or personality predictors may be a difficult task. Nonetheless, in an effort to build upon previous research in this area and better illuminate the domain space of interpersonal competencies, two potential predictors of IPS will be examined: gender and personality variables.¹

Gender

A pervasive gender stereotype posits that, while men often perform better in math and science contexts, women are better when it comes to creativity, communication, and developing interpersonal relationships. In general, sex differences on psychological attributes have been investigated under two major theories—evolutionary psychology and social role theory (Archer & Lloyd, 2002). In social role theory, attributes associated with masculine social roles (e.g., physical aggression) are expected to be more common in men than in women. At the same time, those attributes that are associated with domestic and child-care roles (e.g., nurturing, caring) are

expected to be more common in women (Archer, 2006; Eagly, 1987). These expectations were largely confirmed by Hyde (2005), who recently presented a comprehensive review of 46 meta-analyses on sex differences.

Concerning the early development of communication ability, there is evidence to suggest that females are better at both verbal and nonverbal communication than males. As one example, Leaper and Smith (2004) found female children to be rated higher than males in both affiliative speech ($d = -0.11$) and talkativeness ($d = -0.26$). In addition, LaFrance, Hecht, and Paluck (2003), in a sample including both adolescents and adults, found a rather large difference favoring females ($d = -0.40$) on the variable of smiling. McClure (2000) also found differences favoring females, this time ranging from $d = -0.18$ to $d = -0.92$ in infants' facial expression processing—a type of nonverbal communication ability. Unfortunately, these studies did not examine adult populations.

However, a number of applied psychology and management research studies have also investigated gender differences in IPS. For example, sex differences have been observed on Fine's (1955) people-things dimension of interests. Specifically, women have generally scored higher on the dimension of "people orientation," while men have rated higher on a scale measuring orientation towards things (Lippa, 1998). In addition, gender differences in the British Army officer assessment center (AC) have been investigated (Anderson, Lievens, van Dam, & Born, 2006). In this study, Anderson and colleagues found gender differences in performance on interpersonally oriented leadership dimensions. More specifically, female candidates scored higher than males on both oral communication ($d = 0.17$) and interaction ($d = 0.31$) dimensions. There is also anecdotal and empirical evidence to suggest that men require more human skills training (Altonji & Spletzer, 1991).

In other research, Huffcutt, Conway, Roth, and Stone (2001) reported a -0.13 mean effect size difference (i.e., favoring women) for interview ratings of applied social skills. Likewise, Sarason, Sarason, Hacker, and Basham (1985) reported findings from their study suggesting that females were rated higher than males on the construct of global social competence ($F = 7.05, p < .01$). Finally, Adler and Izraeli (1995) suggested that women's strengths, when it comes to relationship-building skills, should position them to do quite well in international and cross-cultural assignments. However, in contrast to these findings which have favored females, Hochwarter, Witt, Treadway, and Ferris (2006) found a slight, nonsignificant tendency for males to score higher than females on a broad measure of social skills with two samples of customer service employees ($n = 136, 47\%$ male; and $n = 115, 69\%$ male).

Taken together, the balance of research investigating the relationships between gender and IPS suggests that women may be more effective in *both* communication- and relationship-oriented dimensions of IPS. In addition, when IPS are rated at a general, broad level, it is usually the case that females are rated higher. These findings confirm the expectations of both evolutionary theory and social role theory. Generally speaking, these theories suggest that women have greater ability when it comes to "softer" attributes such as nurturing and caring for others. In contrast, social roles typically associated with men (e.g., aggression, physicality) are frequently used as explanations for why men have been found to have lower measured levels of IPS.

These theoretical, and often anecdotal, assertions will be examined meta-analytically in the current study. That is, in this research it is expected that gender differences in measured levels of IPS will be apparent, with females rating higher than males on evaluations of the two subsets of communication and relationship-building interpersonal skills, as well as the entire set

of “general” interpersonal skills. The results from this research are expected to empirically confirm past research in this area, and to do so using only normal, adult samples and a larger base of evidence. By employing meta-analytic techniques, evidence gathered from a diverse pool of primary studies can be leveraged to make an overall assessment of the relationship between gender and interpersonal skills. Finally, there will be no formal expectation that female-male differences in interpersonal communication skills will be greater than gender differences observed in relationship-building interpersonal competencies (or vice versa). While such a finding may provide for an interesting post hoc discussion, there is not enough evidence to make any formal predictions at this time.

Hypothesis 1(a-c): Females will be rated higher than males on evaluations of (a) interpersonal communication skills (b) relationship-building interpersonal skills, and (c) broad-based measures of “general” interpersonal skills.

PERSONALITY TRAITS

Agreeableness

Agreeableness has been referred to as “likeability” and is associated with traits such as trust, cooperation, flexibility, and tolerance (Vinchur, Schippmann, Switzer, & Roth, (1998). Individuals who possess these traits are expected to be able to get along well with others. As such, individuals with high levels of agreeableness should also possess relatively high levels of IPS. For example, it has been argued that the facets of trust, cooperation, and altruism should be related to relationship-building IPS (Driskell, Goodwin, Salas, & O’Shea, 2006). Across all individuals one would expect a significant positive relationship between these two constructs. As

a general rule, high levels of agreeableness can be expected to positively impact the quality of one's interpersonal relations.

Many researchers have empirically investigated this link and there is some evidence to suggest that agreeableness may very well be the best primary predictor of performance in interpersonal settings (e.g., Mount, Barrick, & Stewart, 1998; Neuman & Wright, 1999). More specific arguments have been made concerning hypothesized positive relationships between communication in teams and the agreeableness facets of trust and cooperation (Driskell et al., in 2006). In support of these assertions, one study of a group of human resources personnel (Neuman & Wright, 1999) found agreeableness to be related to communication and conflict resolution IPS, at both the individual ($r = .35, p < 0.01$) and group level ($r = .39, p < 0.01$).

There is also evidence to suggest that the trait of agreeableness has a moderate positive correlation with general measures of IPS (Ferris et al., 2001). For example, Morgeson, Reider, and Campion (2005) found a small correlation between agreeableness and a broad measure of social skills ($r = .14, ns$). Upon examining more narrow measures, they also described a small, positive correlation between cooperation and agreeableness ($r = .11, ns$). In other research, Kantrowitz, Kanfer, and Lippstreu (2006) found agreeableness to be modestly related to a broad measure of self-rated social skills ($r = .15, ns$; 95% CI ranged from $-.01$ to $.32$), and more strongly related to supervisor-rated social skills ($r = .31, p < 0.01$). Finally, in contrast to these positive findings, Barrick and Mount (1991) found no relationship between agreeableness ($r = .00$) and a composite of various metrics of criteria for salespersons (e.g., job performance, training proficiency, salary). However, it is important to note that these performance outcomes may have been influenced by many factors, including but not limited to the salespersons' IPS.

On balance, the available research evidence suggests that agreeable individuals are more likely to display strong communication and relationship-building IPS, including the ability to communicate openly and resolve conflicts amicably. The essential nature of the agreeableness trait suggests that it *should* be expected to relate positively and moderately to IPS. The question then becomes, is it possible to predict that agreeableness will be differentially related to communication versus relationship-building IPS? Hogan and Holland (2003) demonstrated that agreeableness is an important predictor when performance is evaluated based upon getting along with others (versus getting ahead). In the context of the current research, one might expect agreeableness to be positively related to cooperation and coordination, intercultural sensitivity, and service orientation. In addition, although it is expected that agreeableness will display positive relationships with each of the relationship-building IPS in almost all cases, the same may not be said for associations between agreeableness and interpersonal communication skills. For example, while agreeableness should be positively related to global ratings of communication skills, it might indeed be unrelated to assertive communication. Individuals who adopt an assertive stance towards an issue (whether in defense of personal rights or for other reasons) would not necessarily be expected to also appear to be agreeable. Upon examining the entire set of communication skills, positive relationships between oral communication and agreeableness may exist alongside negative associations between assertiveness and the agreeableness trait. Considering this issue in its entirety, and evaluating existing research and theory together, it is expected that agreeableness will be positively related to global measures of IPS and more strongly related to relationship-building IPS than interpersonal communication skills.

Hypothesis 2(a-b): *Agreeableness will be (a) positively related to broad-based measures of “general” interpersonal skills, and (b) more strongly related to relationship-building interpersonal skills than interpersonal communication skills.*

Conscientiousness

John and Srivastava (1999) described conscientiousness as “socially prescribed impulse control that facilitates task- and goal-directed behavior, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing and prioritizing tasks” (p. 121). Individuals, who possess moderate levels of impulse control, and those who generally follow prescribed rules and norms, would logically be expected to get along better with others. Based on a review of the literature in this area, Driskell and colleagues (2006) posited a positive relationship between the dutifulness facet of conscientiousness and interpersonal relations in teams. They also hypothesized a positive relationship between the dependability facet of conscientiousness and communication in teams. Considering both the nature of the construct and the relationships hypothesized by Driskell and colleagues, a positive association between conscientiousness and broad-based measures of IPS is to be expected.

The research findings linking conscientiousness to IPS have been mixed. Arguing against a relationship between conscientiousness and IPS, Neuman and Wright (1999) found no association between these two variables at the individual level ($r = .01$, *ns*) and a small negative relationship at the group level ($r = -.20$, *ns*). In this study, IPS were assessed as combination of communication and conflict resolution skills. Similarly, Morgeson, Reider, and Campion (2005)

found virtually no relationship between conscientiousness and a broad measure of social skills ($r = .02, ns$).

On the other hand, empirical evidence arguing in favor of a relationship between conscientiousness and IPS has come from a number of sources. For example, Witt and Ferris (2003) found self-rated social skill to be marginally related to conscientiousness in four separate samples ($r = .16, ns$; $r = .27, p < .05$; $r = .07, ns$; and $r = .14, ns$). Moreover, conscientiousness displayed mixed relations with observer ratings of social skills ($r = .08, ns$; $r = .30, p < .01$) and self-ratings of social skill awareness ($r = -.04, ns$; $r = -.30, p < .01$). In other research, Barrick and Mount (1991) found a relationship between a composite measure of sales performance outcomes and conscientiousness ($r = .23$). A meta-analysis performed by Dudley, Orvis, Lebiecki, and Cortina (2006) found a relationship between a global measure of conscientiousness and interpersonal facilitation ($\beta = 0.15, p < .001$). In this study, interpersonal facilitation was defined using Motowidlo and Van Scotter's (1994) classification of performance criteria, which posits interpersonal facilitation as a reflection of a combination of teamwork, cooperation, and helping behaviors. Finally, Kantrowitz, Kanfer, and Lippstreu (2006) found conscientiousness to be related to both a measure of self-rated social skills ($r = .21, p < .05$) and supervisor-rated social skills ($r = .36, p < .01$). In this study, social skills were rated broadly and included communication, selling skills, and political skills.

The empirical findings have confirmed the theoretical rationale for the existence of a relationship between conscientiousness and IPS, but the findings have not been universally positive. However, based on both the preponderance of evidence and the fact that persons high on conscientiousness are viewed as being responsible, dependable, thorough, and organized, it is expected that they will also perform well in situations that require relationship-building skills.

What is not as clear, however, is that conscientious individuals would necessarily perform better in social communication contexts, contexts that necessitate active listening, effective verbal and nonverbal communication, and assertive communication. Thus, it is posited that existing relationships will be stronger between conscientiousness and relationship-building skills than for communication skills. Upon careful deliberation, hypotheses 3a and 3b are proposed.

Hypothesis 3(a-b): Conscientiousness will be (a) positively related to broad-based measures of “general” interpersonal skills, and (b) more strongly related to relationship-building interpersonal skills than interpersonal communication skills.

Emotional Stability

Emotional stability refers to the tendency to be relaxed, secure, and calm (Digman, 1990). In general, emotional stability reflects aspects related to a person’s adjustment or lack of adjustment, and individuals who are high on emotional stability appear well-adjusted, calm, secure, and self-confident (Driskell et al., 2006). Moreover, emotionally stable individuals are expected to communicate effectively and have positive interpersonal relations in teams (Driskell et al., 2006). On the negative side of this dimension (alternatively termed neuroticism or negative affectivity) are anxiety, anger, depression, and insecurity (Vinchur, Schippmann, Switzer, & Roth, 1998). Each of these negative aspects would be expected to contribute to lower rated levels of interpersonal relationship-building skills, including self-presentation. As an example, individuals who score lower on emotional stability may be less likely to persist in an attempt to influence others and overcome resistance without becoming overly emotional (Schneider, 2001). This emotionality would be expected to have a negative effect on the ability to effectively

influence others. Alternatively, it is reasonable to suggest that emotionally stable individuals are better able to communicate effectively and manage the impressions that others form of them.

In empirical research in this area, Neuman and Wright (1999) found no relation between emotional stability and interpersonal skills at the individual level ($r = .03$, *ns*) and a small negative relationship at the group level ($r = -.14$, *ns*). In another investigation, Morgeson, Reider, and Campion (2005) found virtually no relationship between emotional stability and a broad measure of social skills ($r = .02$, *ns*). Similarly, Barrick and Mount (1991) found little relationship between emotional stability and a composite measure of performance for salespersons ($r = .07$, *ns*). In contrast to these findings, Chan (2001) found significant negative relationships between negative affectivity and impression management (r 's ranging from $-.22$ to $-.34$, $p < .05$). Finally, in studies involving military teams conducted over 50 years ago, Haythorn (1953) and Greer (1955) found a positive relation between emotional stability and team effectiveness.

Certainly, the ability to work well with others requires a competent reservoir of interpersonal relationship-building skills. It is also likely that the positive aspects associated with emotional stability would contribute to better interpersonal relations in general. However, there is little reason at this time to expect that emotional stability would be more or less important for communication versus relationship building skills. With these considerations in mind, hypotheses 4a, 4b, and 4c are proposed.

Hypothesis 4(a-c): *Emotional stability will be positively related to (a) interpersonal communication skills, (b) relationship-building interpersonal skills, and (c) broad-based measures of "general" interpersonal skills.*

Extraversion

Extraversion has been described as a combination of assertiveness / dominance and sociability / affiliation (Lucas, Diener, Suh, Shao, & Grob, 2000). In an extensive review of 137 distinct personality traits, DeNeve and Cooper (1998) listed assertiveness, sociability, social boldness, and social competence among the interpersonal-oriented traits with strong theoretical relations to the Big Five factor of extraversion. In contrast to agreeableness, which may influence the quality of one's interpersonal relationships, extraversion primarily impacts the quantity and intensity of interpersonal relationships (DeNeve & Cooper, 1998). In the area of cross-cultural relations, Ones and Viswesvaran (1997) suggested that extraversion predicts good intercultural relations and specific aspects of expatriate job performance. Barrick and Mount (1991) were able to show that extraversion predicts performance in sales and management jobs.

Beyond relationships at the individual level, Driskell and colleagues (2006) discussed the likely effects of team member personality on team performance. Concerning the dimension of extraversion, they hypothesized negative relationships between the dominance facet of extraversion and both communication and interpersonal relations in teams. On the positive side, they described what they considered to be an expected positive relationship between the flexibility facet of extraversion and interpersonal relations in teams. In addition, they hypothesized positive relationships between communication in teams and both the ambition and flexibility facets of extraversion.

Many researchers have empirically investigated the relationships between extraversion and interpersonal competencies. For example, Barrick and Mount (1991) found a small association between extraversion and a composite of job performance criteria for salespersons ($r = .15$). In other research, Kantrowitz, Kanfer, and Lippstreu (2006) found extraversion to be

related to both a broad measure of self-rated social skills ($r = .19, p < .05$) and a supervisor-rated social skills ($r = .35, p < .01$). Similarly, Morgeson, Reider, and Campion (2005) found a small correlation between extraversion and a broad measure of social skills ($r = .11, ns$). Finally, in contrast to the previous findings, Neuman and Wright (1999) found no relationship between extraversion and IPS at the individual ($r = .02, ns$), or group level ($r = .01, ns$).

Upon consideration of the bulk of empirical evidence and theoretical discussions in this area, it is expected that positive associations exist between extraversion and both communication and relationship-building skills. That is, because extraversion refers to the tendency to be sociable, talkative, and assertive (Digman, 1990), it is expected that it will be related positively to communication skills, relationships-building IPS, and general IPS. In the current research, hypotheses 5a, 5b, and 5c will examine these assertions.

Hypothesis 5(a-c): Extraversion will be positively related to (a) interpersonal communication skills, (b) relationship-building interpersonal skills, and (c) broad-based measures of “general” interpersonal skills.

Openness to Experience

Openness to experience has been described as tendency to be imaginative, artistically sensitive, and intellectual (Digman, 1990). Individuals who are high on the openness dimension are likely to be more aware of social cues, and thus, more likely to attempt to adapt their own behavior to achieve better outcomes (e.g., Pulakos, Schmitt, Dorsey, Arad, Hedge, & Borman, 2002). The dimension of openness consists of a number of components, including intelligence, culture, creativity, interests, and cognitive complexity (DeNeve & Cooper, 1998). Moreover, openness is closely related to two of the seven dimensions of the Hogan Personality Inventory

(HPI)—intellectance (i.e., imagination, creativity) and school success (i.e., valuing learning for its own sake). While research has found openness to be an important predictor for training performance (e.g., Barrick, Mount, & Judge, 2001; George & Zhou, 2001), studies examining the relationship between openness and IPS have not been nearly as positive.

For example, Neuman and Wright (1999) found a small negative relationship between openness and IPS at the individual level ($r = -.07$, *ns*). At the group level, they reported a small positive relationship between openness and IPS ($r = .19$, *ns*). In other research, Barrick and Mount (1991) found a small negative predictor-criterion relationship between openness and job performance indicators for salespersons ($r = -.02$). Taking just these previous findings into account, it may not be expected that significant relationships between openness to experience and IPS will be uncovered in the current research. Theoretically however, one might expect those who rate higher on the construct of openness to have more ability when it comes to intercultural sensitivity and other relationship-building interpersonal skills.

Speaking directly to this idea, research in the area of international assignments and expatriates has provided a number of interesting findings. In fact, openness to experience is frequently and positively linked to successful performance in international assignments (Jordan & Cartwright, 1998). In one study, 338 international assignees ranked “extra-cultural openness” as one of five critical factors that contribute to success (Arthur & Bennett, 1995). Similarly, Ones and Viswesvaran (1997) suggested that openness would be related to communication competence, but also interpersonal relations and acceptance, adjustment, and completion of expatriate examples. Finally, openness has also been investigated in the context of the propensity to utilize certain relationship-oriented career management strategies. These activities involve a strong social element and include building a network of contacts and relationships, using self-

nomination or presentation, and developing closer mentoring relationships (Guthrie, Coate, & Schwoerer, 1998). In a study of 128 professional accountants, Guthrie and colleagues examined the relationship of various dimensions of the HPI to relationship-oriented strategies of career management. They found the HPI dimensions of intellectance and school success to be modestly related to both the propensity to seek mentoring ($r = .11$, and $.13$, respectively), and self-presentation behaviors ($r = .08$, and $.16$, respectively). Because these HPI dimensions are essential equivalents to the Big Five dimension of openness to experience, it is likely that relationship-oriented career management tactics are also somewhat related to openness. On balance, there is reason to expect that openness to experience will relate positively to relationship-building IPS (including intercultural sensitivity and cross-cultural relations), but not necessarily to interpersonal communication competencies. Therefore, hypothesis 6 will be used to examine the relationship between openness and relationship-building IPS.

Hypothesis 6: Openness to experience will be positively related to relationship-building interpersonal skills.

Relationships between Interpersonal Skills and Outcomes

The first group of hypotheses in this research examined various antecedents to interpersonal skills. The current section, then, addresses the relationships between IPS and various outcomes. However, what will be needed is a way to organize these seemingly disparate findings into a coherent set of conclusions pertaining to the associations between various interpersonal communication and relationship-building skills and outcomes. First, it must be noted that effect sizes describing the relationships between IPS and outcomes will first be divided by three levels of analysis on which the criterion variables may be measured—

individual, group/team, unit/organizational. However, only individual level data will be fully investigated and reported.

Our understanding of interpersonal processes and relationships is still—nearly 90 years after Thorndike’s articulation of the construct of *social intelligence*—in its infancy. Periods of research and thought leadership have been buttressed by periods of relative inactivity (Ferris et al., 2002). Moreover, research on groups and teams (as well as unit and organization-wide factors) is even more nascent. More importantly, the nature of interpersonal interactions necessitates first, an understanding of one-one-one relationships. That is, before we can postulate about the outcomes of IPS at the group, team, unit, or organizational levels, we need a better understanding of how IPS relate to important outcomes at the individual level. These realities are further supported by an examination of the current database of collected articles, where it is evident that the vast majority of studies in this area assess the impact of IPS on outcomes at the individual level of analysis. In terms of conducting a synthesis of research, we are simply not at the point where a comprehensive review of interpersonal relations at higher levels of analysis is possible. Therefore, the hypotheses presented here will focus on and include outcomes at the individual level only. Relationships between IPS and team or organizational-level outcomes will also be coded, but examined on an exploratory (and post hoc) basis only.

By itself, this separation of IPS correlates into individual, group, or organizational variables (with the focus on individual level outcomes) is somewhat problematic. For example, one might rightfully argue that it is inappropriate to combine all of the individual attitudinal and performance outcomes into one group. Combining these dissimilar outcomes would do little to clarify the empirical relationships in this area. Therefore, primary study data will be further divided, where possible, into some additional categories. Specifically, outcome correlates of IPS

will be further separated based on whether they are primarily cognitive, affective, or skill-based in nature (e.g., Kraiger, Ford, and Salas, 1993). This particular conceptualization of outcomes was initially put forward as a way to better assess learning outcomes during the training evaluation process. As such, it was meant to expand upon Kirkpatrick's (1987) well-known training evaluation model (i.e., reactions, learning, behavior, results). However, its usefulness extends beyond the evaluation of training, as it is also a practical and intuitive mechanism for categorizing the many constructs addressed in the current literature.

Cognitive outcomes include declarative knowledge and describe, "a class of variables related to the quantity and type of knowledge and the relationships among knowledge elements" (Kraiger et al., 1993, p. 313). Examples of cognitive outcomes at the individual level might include declarative knowledge of cross-cultural values, or generic teamwork competencies (e.g., Marks, Sabella, Burke, & Zaccaro, 2002). Affective or attitudinal variables might include individual efficacy beliefs, or measures of satisfaction. Finally, examples of skill-based outcomes at the individual-level primarily include indices of performance, but at the team level might also include process measures such as planning or coordination.

Empirical research on IPS has documented many relationships between IPS and outcomes. For example, Morgeson, Reider, and Campion (2005) found relationships between a broad measure of social skills (including both communication and relationship-building skills) and teamwork knowledge ($r = .23, p < .05$). Associations were also found between social skills and both cooperation and coordination-oriented contextual performance ($r = .28, p < .05$), and task performance ($r = .17, ns$). In other research, Hochwarter and colleagues found social skills to be positively related to a measure of supervisor ratings of job performance for groups of sales representatives ($n = 136; r = .24, p < .01$) and customer service employees ($n = 115; r = .25, p <$

.01). Of course, many other outcome variables have been shown to have positive relationships with various IPS. Among these include executive success (Aditya & House, 2002), managerial performance (Borman & Brush, 1993), objective and supervisor measures of performance (Alge, Gresham, Heneman, Fox, & McMasters, 2002), entrepreneurial style (Avkiran, 2000), intercultural adjustment (Black, 1990), feedback seeking (Dahling & Whitaker, 2005), and group performance (Dirks, 1999). However, not all relationships have been positive, and no prior research has examined the full range of IPS and outcomes that are under investigation in the current research.

In general, it is expected that interpersonal communication and relationship-building skills will be positively related with most, if not all, of the correlates examined. Moreover, these associations will likely vary from small to moderate, depending on the particular relationship examined. As an example, behaviorally-based empathy skills would be expected to relate to perceptions of workgroup climate, but not necessarily to performance outcomes. Similarly, it is doubtful there will be any associations found in the literature which assess the relationship between written communication skills and team-level affective outcomes. However, there should be a moderate positive relationship between individuals' active listening skills and affective outcomes at the individual and team levels. As another example, cooperation should be expected to be related to climate-type outcomes, at both the group and organizational levels. However, due to the vast number of possible skill-outcome combinations in this literature, no specific differential predictions will be made for this set of hypotheses. At the same time, more specific predictions detailing expected differential outcomes based on training method are provided in the following section, a section which examines the efficacy and boundary conditions for IPS training.

Hypothesis 7(a-c): *Interpersonal communication skills will be positively correlated with (a) cognitive, (b) affective, and (c) skill-based outcomes.*

Hypothesis 8(a-c): *Relationship-building interpersonal skills will be positively correlated (a) cognitive, (b) affective, and (c) skill-based outcomes.*

Hypothesis 9(a-c): *“General” interpersonal skills will be positively correlated with (a) cognitive, (b) affective, and (c) skill-based outcomes.*

The Efficacy of Interpersonal Skills Training

As expenditures on IPS training have swelled (Gist & Stevens, 1998; Landy & Conte, 2004), these interventions are becoming increasingly more common. Of the estimated \$109 billion dollars spent on training last year, 9.5% of that was directed at supervisory skills training, 4% at customer service training, and 4% directly targeted for training of interpersonal skills (Rivera & Paradise, 2006). IPS training should be designed to enhance each of the cognitive, behavioral, and affective components of these skills (Bailey & Butcher, 1983; Harrison, 1992). At the same time, differences in training methods are expected to lead to differences in the relative efficacy of training for improving various outcomes associated with IPS.

The Effectiveness of IPS Training for Improving IPS

A general assumption in this research is that interpersonal skills training is effective for improving interpersonal skills. This assumption, although basic in nature is important to document. Meta-analytic procedures have developed to the point where they can provide evidence-based conclusions and guidance for training and development practitioners. That is, beyond the findings of isolated and individual studies—each of which examine specific training

methods, skills, and populations—a general understanding of the efficacy of IPS training is needed. Given the extensive sums of money spent on developing interpersonal skills, it is important to provide a comprehensive accounting of this relationship. Hypothesis 10 will examine this basic assumption.

Hypothesis 10: *Interpersonal skills training will be effective for improving interpersonal skills.*

Training Method

Beyond the basic question regarding the efficacy of IPS training, this research will also examine whether the method of training moderates the relationship between IPS training and individual benefits in terms of gains to cognitive, affective, and skill-based outcomes. Thus, the efficacy of four distinct training methods will also be investigated as part of this research: (1) lecture, (2) lecture and discussion, (3) process interventions, and (4) behavioral modeling training.

Lecture

Lecture-based methods are traditional mechanisms for disseminating information. These methods typically consist of an oral presentation by a qualified source, but in the context of the current research may be extended to include any method of conveying factual information. As such, this method also includes computer-based methods of presenting information (e.g., written documents or slideshow presentations).

In an early examination of the perceived efficacy of nine different training methods for improving various training objectives, Carroll, Paine, and Ivancevich (1972) surveyed 117

organizational training directors for their opinions on the effectiveness of various training methods. Specifically, the training directors were asked to rate the alternative training methods on a five-point scale ranging from “not effective” to “highly effective.” The results showed lecture-based training to be rated as the least effective among the nine alternatives for knowledge acquisition and next to last for changing attitudes and improving IPS. However, despite their relatively poor reputation among these training practitioners, one finding from a recent meta-analysis by Arthur, Bennett, Edens, & Bell (2003) suggested that lectures are one of the most effective training methods for improving cognitive outcomes. Similarly, lecture-based methods have demonstrated effectiveness for generic teamwork skills training (Cannon-Bowers et al., 1995; Ellis, Bell, Ployhart, Hollenbeck, & Ilgen, 2005). However, because they are less involving and interactive than other methods, they are not expected to substantially impact outcomes other than declarative knowledge. By its very nature, lecture-based instruction involves a one-way sharing of knowledge. Without interaction and practice, it would not be expected that lecture-based instruction of IPS would improve affective or skill-based outcomes to any discernable degree. Taking these considerations together, hypothesis 11 is presented.

Hypothesis 11: Lecture-based methods will be more effective for improving cognitive outcomes of interpersonal skills than affective or skill-based outcomes.

Lecture and Discussion

Lecture and discussion methods combine group discussions with traditional lectures and typically focus on generic interpersonal contexts and skills. In contrast to process interventions, which focus on the group’s specific interaction processes, these discussions elaborate and extend upon the information provided during a traditional lecture. As one example, a group of sales

managers might participate in a training program for improving their customer interaction skills. In this context, the program might include a lecture on pertinent topics (e.g., nonverbal communication, active listening) and include a group discussion on alternate methods, tips, or suggestions for improving these skills. Moreover, in this method of training delivery, active participation is encouraged and the opportunity for feedback and clarification on key concepts is provided (Burke & Day, 1986). Carroll and colleagues (1972) found training methods incorporating both lecture and discussion to be rated third most effective among nine training methods for facilitating knowledge acquisition, changing attitudes, and improving IPS. Because this method of training expands upon the basic lecture format (by allowing for elaboration, questioning, and further discussion), lecture and discussion methods are expected to be most useful for improving cognitive outcomes and more effective than lecture alone for this purpose. Elaboration itself promotes active learning and thereby a deeper embedding of cognitive structures. Similarly, because these methods focus on generic contexts and concepts—which are not necessarily as effective as context-specific training for skill improvement (cf. Cannon-Bowers et al., 1995)—they are not expected to produce the same level of benefits in terms of affective or skill-based outcomes. Hypotheses 12a and 12b will investigate these assertions.

Hypothesis 12(a-b): Lecture and discussion methods will be (a) more effective for improving cognitive outcomes of interpersonal skills than affective or skill-based outcomes, and be (b) superior to lecture-based methods for this purpose.

Process Interventions

Process intervention activities are aimed at assisting individuals and groups to examine, diagnose, and act upon their behavior and interpersonal relationships (Schein, 1969; Schein,

1999). One particular process intervention is sensitivity, or *t* group, training. The typical model for sensitivity training includes a group meeting which takes place without a formal agenda. Individuals who participate in sensitivity training are expected to discuss topics related to the group's interaction processes. Formal team building efforts have also been described as process intervention activities (Beer, 1976; Beer, 1980; Buller, 1986; Dyer, 1987), and typically focus on interpersonal relations, goal setting, role clarification, or interpersonal problem solving. A recent meta-analysis on team building found it to be more effective for improving affective and process-oriented outcomes, than cognitive or performance-based outcomes (Klein et al., under review). Moreover, in the survey conducted by Carroll and colleagues (1972), sensitivity training was rated highest among nine different training methods for improving IPS. Importantly, sensitivity training was rated first among the various methods for the training objective of changing attitudes. Conversely, these process intervention activities were rated next to last in this study for the acquisition of knowledge (Carroll et al., 1972). Considering both the interactive nature of these interventions, and the previous research in this area, process intervention activities are expected to have a greater influence on affective outcomes than any other training method. Hypothesis 13 is put forward to examine this assumption.

Hypothesis 13: *Process intervention methods will rank first among the various training methods for improving affective outcomes of interpersonal skills.*

Behavioral Modeling Training (BMT)

Behavioral role modeling training is based upon Bandura's social learning theory and includes observation, role-playing (modeling, practice), and feedback for modifying the behavior of trainees. In general, these programs have demonstrated success in a broad variety of settings

(e.g., Baldwin, 1992; Goldstein & Sorcher, 1974; May & Kahnweiler, 2000). The typical sequence involved in BMT programs includes “a description of skills-behaviors to be learned, prior to, or along with, modeling, and then practice with feedback (Taylor et al., 2005, p. 693).

By examining behavioral role modeling interventions and broad-based supervisory and teamwork-related IPS, Taylor and colleagues’ (2005) comprehensive research clearly has much in common with the current proposal. However, rather than amalgamating IPS as “supervisory” or “teamwork” skills, they may be better viewed as sets of communication and relationship-building competencies, in addition to an inclusive set of “general” IPS. One rationale for the superiority of the current distinction stems directly from the way in which supervisory and teamwork skills were operationalized by Taylor and colleagues. Specifically, both contained a substantial emphasis on communication skills. In the current research, communication skills will be more appropriately examined separately from other, relationship-building IPS. Importantly, the influence of training methods other than BMT will also be examined in the current study.

There are reasons to believe that the more rigorous BMT methods will result in improvements across the different outcomes—cognitive, skill-based, and affective. For example, the organizational trainers who responded to the survey by Carroll and colleagues (1972) rated role playing second only to sensitivity training for improving IPS and changing attitudes. In addition, these methods should be more effective for improving cognitive and skill-based outcomes than other methods. Training methods that involve only symbolic modeling (e.g., lectures and observation) rank lower in cognitive involvement than methods that involve participative modeling processes (e.g., role plays). Thus, the more rigorous the training method (in terms of modeling and practice), the more likely it is that trainees will be able to reproduce the learned material in the form of skill-based outcomes (Bandura, 1977). Moreover, researchers

have suggested that interactive training methods such as BMT that include role-playing, guided practice, and feedback should be equally or more effective than other methods for developing generic teamwork competencies (e.g., Beard, Salas, & Prince, 1995; Salas, Burke, & Cannon-Bowers, 2002). Finally, Taylor and colleagues' (2005) review on BMT suggested that these interventions were most effective at inculcating declarative knowledge, followed by procedural knowledge, attitudes, and job behaviors. The crucial point is that the comprehensive and highly involving nature of these interventions leads to the expectation that they are useful for improving each of the individual-level outcomes examined in this research. Thus, as the most common and engaging of the various training methods, BMT is posited to have a greater impact than other methods on cognitive and skill-based outcomes, but not necessarily affective outcomes. Specifically, BMT should positively impact affective outcomes, but not to the same degree as process interventions, which have routinely demonstrated their effectiveness for these outcomes.

Hypothesis 14(a-b): Behavioral modeling training methods will be (a) effective for improving each of the training outcomes assessed in this research, and (b) will rank first among the various training methods for improving cognitive and skill-based outcomes.

Job Complexity and Interpersonal Skills

Job Complexity

One particularly interesting moderator variable that may influence the relationships between IPS and outcomes is job complexity. In this area, Fine's (1955) discussion and rationale of rating jobs according to their demands for dealing with people, data, and things has been

especially influential. For example, Hunter and Hunter (1984) used the dimensions and complexity families from Fine (1955) in analyzing a large database (U.S. Employment Service, 1970) which catalogued the relationship between general mental ability (*g*; as measured by the General Aptitude Test Battery, GATB) and job performance. Upon examining this data, they decided to group job families by level of complexity rather than similarity of tasks, and five job families resulted. Moreover, they found that the dimension of job complexity was largely captured by Fine's (1955) data dimension, "though Fine's things dimension did define [two] small but specialized industrial job families: set-up work and jobs involving feeding/offbearing" (Hunter & Hunter, 1984, p. 81).

A primary finding from the Hunter and Hunter study is that the validity of cognitive ability as a predictor decreases as job complexity decreases. Stated a different way, as jobs become more complex, cognitive ability becomes increasingly important. Moreover, cognitive ability has been shown to a superb predictor of job-related learning, of the acquisition of job knowledge on the job (e.g., Schmidt & Hunter, 1992; Schmidt, Hunter, & Outerbridge, 1986), and of performance in job training programs (Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1992). These findings are in contrast to those reported for psychomotor ability. Specifically, the validity of psychomotor ability as a predictor increases only as job complexity decreases (Hunter & Hunter, 1984).

Whereas the validity of psychomotor ability tends to be high for job families where the validity of cognitive ability is lowest, the validity of IPS is expected to more closely mirror the results found for cognitive ability. This expectation stems in part from the spirit of the century-old quest to document different "forms" of intelligence (e.g., social intelligence, emotional intelligence). And, as is the case with cognitive ability, the enactment of interpersonal skills is

expected to show greater validity in occupations with higher rated levels of job complexity. That is, in spite of the fact that interpersonal skills are currently positioned as behaviorally-, rather than cognitively-based, they still involve a cognitive component in the sense that it is important to know when and how to best deploy these skills.

As an example, consider managerial jobs and professional jobs that require the coordination of data and people. It is likely the case that in these settings those with superior IPS (e.g., communication, conflict resolution) are simply better performers than those with lower rated levels of IPS. In contrast, jobs at levels four and five, where individuals may work in isolation of others, would not likely require the same level of communication or relationship-building skills. Taking these considerations into account, the current research will examine the potential moderating impact of job complexity. However, rather than replicating previous findings for cognitive or psychomotor ability, this research will examine whether the relationships between IPS and outcomes are moderated by job complexity. Two further points regarding this analysis are necessary. First, effect sizes from primary studies will only be included in this analysis when they come from “real world” participant populations. Specifically, findings derived from lab studies conducted with student populations will not be included in this analysis due to the difficulty of coding for job complexity in these settings. Second, in an effort to enhance the reliability of the coding for this analysis, the five levels of job complexity will be collapsed into three levels: high (levels 1 and 2), medium (level 3), and low (levels 4 and 5). Taken together, it is expected that IPS will be of greater importance in complex jobs that involve increased managerial and coordination requirements (e.g., levels 1 and 2) than in less complex jobs. Similarly, the relationships between IPS and medium complexity jobs are expected to be

greater than for low complexity jobs. Hypotheses 15a, 15b, and 15c will be used to examine these assertions.

Hypothesis 15(a-c): (a) Interpersonal communication skills, (b) relationship-building interpersonal skills, and (c) broad-based measures of “general” interpersonal skills will display stronger relationships with the combined set of outcome variables as job complexity increases.

Summary of Hypotheses

To review, hypotheses addressing the domain of IPS and IPS training are presented under the organization of four themes. First, various antecedents variables to IPS will be investigated, including gender and personality traits. Concerning gender, previous research has found gender differences favoring females for various interpersonal communication and relationship-building competencies. This research will attempt to replicate these findings using meta-analysis as a tool to quantitatively summarize the literature in this area. In the area of personality, a handful of studies have investigated relationships between assorted personality dimensions and IPS. Among these individual difference variables, there is strong support for the expectation that the construct of agreeableness will have moderate positive relations with communication and relationship-building interpersonal competencies. However, each of the Big Five personality dimensions will be examined in this research, with differential relationships predicted for some of them.

Second, there will be an examination of the relationships between IPS and various outcome variables. Similar to the hypotheses concerning various antecedents of IPS, the investigations presented in this section will help to illuminate and quantify empirical relationships in the domain of IPS. Building upon previous research in this area, this research

will examine IPS correlates based upon whether they address primarily cognitive, affective, or skill-based outcomes. Next, hypotheses are presented that investigate the relative efficacy and boundary conditions of IPS training. Finally, job complexity will be examined as a potential moderating variable in the relationship between IPS and outcomes. Figure 2 (see Appendix A) is provided as a high-level framework and organizing reference for the theory upon which the hypotheses in the current research will be tested.

Having formally presented the 15 proposed hypotheses, the next chapter discusses the proposed methods and analyses in greater detail. This discussion includes a description of the study identification, selection, and coding procedures, as well as an elaboration of the proposed analyses. Following the presentation of study methods and analyses, potential study limitations are discussed, along with a few concluding remarks.

CHAPTER 5: METHOD

Leveraging Meta-Analysis

While the specific, named use of “meta-analysis” is a relatively recent phenomenon, there is a long history of using quantitative techniques to summarize the results of scientific studies. For example, in the early 18th century an English mathematician named Roger Cotes computed weighted averages of measurements produced by different astronomers (Shadish, Cook, & Campbell, 2002). Sir Karl Pearson (1904) also applied cumulative methods to six studies of the effectiveness of inoculations against typhoid fever. More recently, the term meta-analysis was coined by Glass, who described it as a quantitative technique employed for cumulating effect size estimates over multiple primary studies (Glass, 1976; Glass, McGaw, & Smith, 1981).

Since its inception, the technique of meta-analysis has been used in countless domains, including areas such as evidence-based medicine (Lau, Schmid, & Chalmers, 1995), relapse prevention (Irvin, Bowers, Dunn, & Wang, 1999), unemployment and well-being (McKee-Ryan, Song, Wanberg, & Kinicki, 2005), psychological intervention programs and worker productivity (Guzzo, Jette, & Katzell, 1985), gender and leadership effectiveness (Eagly, Johannesen-Schmidt, & van Engen, 2003), leader-member exchange theory (Gerstner & Day, 1997), and team building (Salas, Rozell, et al., 1999). Meta-analyses are particularly useful for assessing whether conflicting primary study results in the literature are due to artifactual, or actual, variation (Hunter & Schmidt, 2004; Hunter, Schmidt, & Jackson, 1982). Moreover, as a technique, meta-analysis is useful in support of generalized causal inference (Shadish, Cook, & Campbell, 2002). The current study applies meta-analytical techniques to published and unpublished empirical research in order to obtain quantitative estimates of the relationships

between various antecedents and outcomes of IPS. In addition, the efficacy and boundary conditions for effective IPS training interventions will be evaluated.

Literature Search and Selection of Studies

The search for articles and manuscripts with potential for inclusion in the meta-analytic database proceeded in four ways. First, electronic searches of computerized databases were performed using the following key words: interpersonal skills, social skills, people skills, interpersonal skills training, social skills training, communication skills, active listening, nonverbal communication, assertive communication, relationship-building skills, cooperation and coordination, cross-cultural relations, intercultural sensitivity, customer service orientation, empathy, self-presentation, influence, persuasion, and conflict resolution and negotiation. More specifically, the electronic databases and abstracting services of Academic Search Premier, Business Source Premier, Defense Technical Information Center, EBSCOhost, Military & Government Collection, PsychINFO, PsycARTICLES, Science Direct, and SPORT Discuss were all searched for pertinent articles published through August 2008. Second, an ancestry approach was leveraged to extract additional, potentially relevant, articles. In this approach, the reference sections and bibliographies of primary studies which had already been retrieved were scanned for articles of interest that may have avoided detection during the larger literature search. For this effort, a number of prior qualitative and quantitative reviews (e.g., Taylor et al., 2005) were instrumental for uncovering studies which were not identified through the electronic searches. Moreover, this ancestry approach was particularly crucial in light of the wide variety of construct labels used to refer to IPS. Third, efforts were also made to obtain unpublished conference paper presentations and proceedings. Specifically, relevant annual conference

presentations and proceedings from two national conferences (i.e., Society for Industrial and Organizational Psychology, Academy of Management) were obtained for the years 2002-2008. Finally, the author took extensive efforts to contact organizations and researchers who publish in the IPS area for additional unpublished articles. These efforts included informal discussions at conferences and formal queries to researchers and organizations (e.g., Center for Creative Leadership).

This initial search process resulted in the identification of over 1,000 articles with potential for inclusion in the meta-analytic database. Next, abstracts from the targeted articles (in many cases, the full text article was already in hand) were reviewed and a decision was made as to whether the study would be subjected to the full coding procedure that will be used for this research. During this stage of the study selection process, articles containing the following characteristics were eliminated from further analyses: (a) use of clinical populations, (b) use of children as participants. While research on these types of individuals may be of practical benefit to researchers working with these specific populations, it would not be appropriate to include the results of these studies with those from more “mainstream” populations. Moreover, articles already in possession were eliminated at the outset if they failed to report a usable test statistic (e.g., r , t , F , d , χ^2 , z), or the raw data necessary to calculate these statistics (e.g., means, standard deviations, sample size). Studies were also eliminated prior to coding if they assessed constructs not considered skill- or behaviorally-based (e.g., personality constructs). Finally, studies which present the results of IPS training interventions must have either: (1) a comparison between trained groups and no-training control groups, or (2) a pre-post comparison of the results of a training intervention within a single group.

Once initial articles were collected, the ancestry approach continued. Late obtained scholarly works were reviewed in greater detail for the possibility that additional “fugitive” literature in the IPS area may be identified. As a result of this screening process, 350 published and unpublished papers were targeted for subsequent coding. Each of these articles, book chapters, technical reports, dissertations, conference papers and proceedings were subsequently obtained in full text. In the next section, a thorough discussion of the specific coding strategy for these articles is provided.

Primary Study Coding

Often, meta-analytic integrations will make use of a similar coding scheme to quantify study characteristics and results (Lipsey & Wilson, 2001; Stock, 1994). The coding strategy used in this research included capturing 22 pieces of information from each primary study. In general, the information targeted from these studies corresponds to the proposed hypotheses, as described earlier. For example, studies were coded according to the level of job complexity experienced by the participants. For this moderator analysis, articles were first coded based on whether participants were students or organizational employees; further coding which focused on job complexity was completed for those studies that utilized organizational employees as their focus. In addition (where applicable), gender and Big Five personality variables were coded as possible antecedents of IPS to be investigated. In order to capture the data necessary for performing corrections for unreliability, the reliability estimates for various IPS, antecedents of IPS, and outcomes of IPS were also recorded from primary studies. Importantly, primary study effect size estimates were identified by their level of analysis and only individual-level data was analyzed in the current research. Additional information that did not directly contribute to hypothesis testing

was also collected. Categories such as study setting (e.g., lab, field, or hybrid), publication type (e.g., journal, conference, technical report, dissertation) and study design type (e.g., single group posttest only, single group pretest-posttest comparison, pretest-posttest with control group, and posttest only with control group) were also utilized. Further description for all 22 coding categories is provided in Appendix C.

Rater Reliability

In meta-analytic initiatives, the assessment of rater reliability is generally of great importance to reviewers, critics, and the general audience. Observations and ratings of primary study characteristics should be objective and reliable. Indeed, accurate coding is vital to the conclusions generated from any amalgamation of primary study effect sizes. Therefore, it was important to perform an independent check on the accuracy of these recorded observations.

Interrater reliability refers to degree of agreement or consistency that exists between two or more judges. The reliability of raters or judges is assessed to determine whether obtained ratings are free from bias or error. Whenever human judgment becomes part of the measurement process, there remains the possibility that study-irrelevant variance is introduced into the process. That is, rater idiosyncratic judgments concerning study design, characteristics, and measurement issues can yield results that might be expected to vary across raters. In most meta-analyses, two or more raters will rate most (or all) of the available studies, with the agreement among ratings used to estimate reliability, using traditional estimates of the interrater reliability of judgments provided by multiple judges (e.g., intraclass correlation coefficients; Nunnally, 1978; Nunnally & Bernstein, 1994; Shrout & Fleiss, 1979). Despite the independent nature of this research, another individual was recruited to code a subset of the articles in the database. This individual is

a fellow graduate student with previous experience in similar meta-analytic coding schemes and was trained on the specific categories that were assessed in the current research. This second set of ratings was performed on twenty articles chosen by the author from the final, complete database of coded articles. These articles were purposively sampled to comprise a representative sample of each of the hypothesis areas under investigation in this research. This subset represents 14% of the articles included in the final database.

Both the primary author and his colleague have had considerable experience and possess an adequate level of expertise with similar coding schemes. In fact, the current coding methods are based in large part upon previous schemes which have proven to be robust and highly reliable (cf. Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006; Klein, Salas, Burke, Goodwin, Halpin, DiazGranados, & Badum, 2006). Thus, it was expected that the primary studies would be coded accurately, completely, and without bias.

Upon examination, the coders were in agreement 100% of the time concerning the proper effect size estimate to pull from primary studies in the reliability sample. Across all coding categories, the calculated ICCs ranged from $ICC(3, 1) = .886$ to $ICC(3, 1) = 1.000$. More specifically, other categories assessed for interrater agreement included primary study hypothesis area ($ICC(3, 1) = 1.000$), job complexity ($ICC(3, 1) = .905$), sample size ($ICC(3, 1) = 1.000$), antecedent reliability ($ICC(3, 1) = 1.000$), specific interpersonal skill under examination ($ICC(3, 1) = .890$), predictor reliability ($ICC(3, 1) = .923$), criterion reliability ($ICC(3, 1) = .886$), and article inclusion/exclusion ($ICC(3, 1) = 1.000$). Based on these estimates, it appears that the primary study coding process was done with a high level of reliability.

Effect Size Calculations

In general, the term effect size refers to the magnitude of effect observed in a study. It may indicate either the size of a relationship between variables or the degree of difference between group means (Field, 2001). Before calculating a meta-analytic estimate of the relationship between variables, effect sizes culled from primary studies must be prepared for entry into the database. First, the researcher must decide on the effect size metric to use (e.g., r). Next, effect sizes from primary studies will often have to be converted or transformed into the common metric. Following that, the method for calculating standard error should be clarified. In addition, the researcher must decide whether to perform “corrections” upon the primary study effect sizes. These corrections are meant to combat unreliability in predictor and/or criterion measures. Corrections may also be performed to rectify the effect of direct or indirect restriction of range in the variables under examination. Failure to perform these corrections can lead to an underestimate of the population effect size and an overestimation of variation of effect sizes across studies. Finally, the particular weighting procedure for primary study effect sizes must be decided upon. For example, primary study effect sizes will often be weighted by study sample size. Each of these issues will be discussed more thoroughly in the following sections.

Effect Size Metric

In general, there are two metrics of study outcomes: Significance level and effect size. In the present study, the index of effect size (i.e., r), rather than significance level (i.e., p -levels), was chosen for specification of the relationships between study variables. Effect size estimates are more desirable for this purpose because of their ability to take into account the magnitude of the relationship between variables. Further, significance levels are highly influenced by sample

size and are not as informative concerning the relationship between two constructs. In addition, raw r values, rather than Fisher's r -to- z transformation, will be utilized. While many investigators report both average r and average z , practically speaking, the difference between the two is typically small (Wolf, 1986). In fact, use of the Fisher z transformed may result in an upward bias, or overestimate of the population r (Fisher, 1932; Field, 2001; Hunter et al., 1982; Schmidt, Gast-Rosenberg, & Hunter, 1980). It may also yield estimates of variance that are less accurate than estimates based on the correlation coefficient (Field, 2005; Hunter & Schmidt, 2004). Consequently, in keeping with a desire to provide a conservative estimate of the combined effect, only the combined r will be reported.

As noted earlier, relevant empirical studies were excluded if they failed to report a usable statistic relating IPS to specified outcomes. In order to aggregate findings across studies, it was necessary to first convert all test statistics to a common metric, r . "Statistical tests such as t -tests, F -tests, and chi-square statistics are not effect sizes because for any given effect, their value increases as the sample size increases" (Rothstein, McDaniel, & Borenstein, 2002, p. 541). That is, while test statistics and confidence levels may indicate the likelihood that study results are due to chance, they cannot specify the magnitude or strength of the effect of one variable on another. Thus, when necessary, effect sizes reported in primary studies as either t , F , d , χ^2 or Z statistics were transformed using the following formulas:

$$t \text{ to } r = \sqrt{(t^2)/(t^2 + df)}$$

$$F \text{ to } r = \sqrt{(F)/(F + df_{error})}$$

$$d \text{ to } r = d / \sqrt{(4 + d^2)}$$

$$\chi^2 \text{ to } r = \sqrt{\frac{\chi^2(1)}{N}}$$

$$Z \text{ to } r = \frac{Z}{\sqrt{N-1}}$$

Once placed on this common metric of effect size (r), the results of separate tests of hypotheses can be combined, compared, and examined for fit with predicted hypotheses. However, several studies contained more than one effect size estimate. It is a well known fact that when a study contains multiple effect sizes, they are stochastically dependent (Shadish et al., 2002). These dependencies violate the statistical assumption of independent effect sizes. These violations serve to inflate the observed variance of effect sizes across studies, but do not necessarily affect the mean r value in a meta-analysis (Hunter & Schmidt, 2004). Nonetheless, one solution researchers adopt is simply to combine effect sizes from different measures obtained from the same sample within a single study prior to combining results from multiple studies. This type of subgroup analysis is useful, but does come with a price. Specifically, this approach underestimates the total sample size and causes a greater likelihood of sampling error or capitalization on chance (Hunter & Schmidt, 2004).

An alternative method is available which combines effect sizes within single studies using confirmatory factor analysis techniques. Unfortunately, this method involves the use of reported correlations among all of the variables in question, and for this reason was not feasible in the current research. Thus, the approach employed in the current research was to average across effect sizes from primary studies. That is, related measures found within primary studies were combined in order to avoid artificially increasing the overall sample size. In some cases, it becomes logically and theoretically inappropriate to combine effect size estimates obtained from two different measures. For example, it is unnecessary to combine effect sizes of the same

outcomes obtained from two different samples in the same study. Therefore, when it deemed more appropriate to keep effect size estimates separated, that is the approach that was utilized.

Meta-Analysis Approach

In general, there are two ways to conceptualize the process of combining effect sizes from individual studies—fixed-effects and random-effects models. Essentially, in fixed-effects models (also called the “homogeneous” case) the effect size in the population is assumed to be the same for all studies included in the meta-analysis (Hedges, 1992; Field, 2001). In contrast, random-effects models assume that population effect sizes vary from study to study such that the population effect size is likely to be different than any other study in the meta-analysis (1992; Field, 2001). This is also referred to as the “heterogeneous” case. Further, in random-effects models, “studies in the meta-analysis are assumed to be only a sample of all possible studies that could be done on a given topic” (Field, 2001, p. 162). Statistically, the choice of one model over the other will influence the calculation of standard errors associated with the combined effect size.

For the present study, the random-effects model will be used to combine effect sizes from primary studies. This model is “probably more realistic than the fixed-effect model on the majority of occasions” (Field, 2001, p. 162). In addition, three methods of meta-analysis are often used in contemporary studies (Field, 2001): The methods devised by Hedges and Olkin (1985); by Rosenthal and Rubin (see Rosenthal, 1991); and by Hunter and Schmidt (2004). The current study will employ the Hunter and Schmidt method, which is a random-effects method, using formulas from Hunter and Schmidt (2004) for estimating the standard error of obtained effect sizes.

Corrections for Unreliability and Range Restriction

Meta-analytic integrations commonly include corrections to adjust obtained reliability coefficients for unreliability in the predictor, criterion, or both (e.g., Hunter & Schmidt, 2004; Johnson, Mullen, & Salas, 1995). The correction of study artifacts requires auxiliary information (Hunter & Schmidt, 2004). In many cases, original studies will not report all of the necessary information to perform these corrections. When a decision is made not to correct for unreliability in primary studies, it is acknowledged that observed mean effect sizes will be downwardly biased. Thus, the decision not to use corrections for unreliability will result in a more conservative estimate of the relationships between antecedents and IPS and between IPS and outcomes.

On balance, it is argued that making corrections for unreliability in the predictor and criterion measures will result in a more accurate estimate of the population effect size. Provided that enough information is available in primary studies, these corrections for unreliability were made in the current research using the Hunter and Schmidt (2004) approach. Specifically, effect sizes were corrected individually for unreliability using alpha coefficients. In some cases, the mean reliability from similar criterion measures may be imputed.

It is also common in meta-analytic studies to correct for direct or indirect range restriction. Similar to performing corrections for unreliability, correcting for range restriction will generally result in a combined estimate that is more accurate than had no corrections been performed at all. A recent study by Hunter, Schmidt, and Le (2006) demonstrated the importance of making accurate corrections when restriction of range is a possibility. Specifically, they found that the correlation between g and job performance had been previously underestimated by as

much as 25%. Interestingly, this underestimate resulted from the improper use of correction formulas for direct range restriction, when in fact the restriction in range was indirect. Certainly, there are important practical implications that would result from the widespread use and dissemination of the underestimated value. Unfortunately, in the current research primary studies did not contribute enough information concerning range restriction ratios to allow for statistical corrections. Therefore, corrections for range restriction were not performed. To the extent that primary studies were characterized by a restriction in range, obtained meta-analytic estimates could be considered conservative estimates.

Weighting

Primary study effect sizes included in meta-analytic integrations are often weighted, sometimes by divergent weighting schemes. However, research has shown that various weighting methods have been demonstrated to produce comparable results (Borenstein & Rothstein, 1999). As one example, Rosenthal (1995) described strategies for coding primary studies on the basis of study quality. Unfortunately, this coding strategy is subjective, and requires a number of judgment calls by the researcher. The problem is that an unnecessary subjective element is introduced into the meta-analysis (Hunter & Schmidt, 2004).

Conversely, studies may be weighted by sample size. The logic underlying this suggestion is that effect sizes obtained from studies with large sample sizes are more stable (i.e., accurate) than effect sizes from studies with small sample sizes. However, it is important to remember that large sample studies are not inherently more valid. Giving these larger N studies more weight in a meta-analysis can sometimes result in the studies contributing a disproportionate amount of influence on the overall effect size. At the same time, it must be

acknowledged that estimates obtained from large sample studies are indeed more stable. Based on this assumption, it is often recommended that studies with larger sample sizes should receive more weight in meta-analytic integrations (e.g., Shadish et al., 2002). Taken together, there is a need to balance validity and reliability concerns.

For the major analyses in this research, weighted population effect size estimates were calculated. Recent simulation studies examining this method have shown that you can indeed get a very accurate combined effect size through procedures used to weight primary studies by their associated sample sizes (e.g., Field, 2005). Thus, in this research the “combined effect” represents a weighted mean of the effects of all included outcomes. Consequently, studies providing more information will be given greater weight in the combined test.

Removal of Outliers

Outliers present in meta-analytic databases should be assessed for their potential to distort the overall findings (e.g., Huffcutt & Arthur, 1995). In general, outlier data can result from errors in data collection or computation, extreme sampling error, or unique facets of the sample (Colquitt, LePine, & Noe, 2000). There are a number of ways to determine the presence of outliers in meta-analytic research. For example, one available option is to calculate the sample-adjusted meta-analytic deviance statistic (SAMD; Huffcutt & Arthur, 1995). For this research however, outliers will be defined as effect sizes obtained from primary studies that are beyond plus or minus two standard deviations of the mean effect size. Any primary study effect sizes beyond two standard deviation units from the mean effect size, in either direction, will be excluded from subsequent calculations.

It is perhaps also important to concede that a researcher can never be sure of having found all relevant studies for inclusion in a meta-analysis. Studies that are hard to find are often referred to as the “fugitive literature” (Rosenthal, 1994). Thus, one issue often discussed in meta-analyses is the “file drawer problem.” This represents the concern that only studies with significant results find their way into publication, while studies with nonsignificant results are relegated to file drawers (Rosenthal, 1979). More specifically, proponents of this concern posit that studies found in a meta-analysis may all be instances of Type I error. To deal with this concern, one may compute the number of statistically nonsignificant studies that would have to be in file drawers to render the combined set of studies “just significant” at the $p = .05$ level. Once calculated, this should exceed Rosenthal and Rosnow’s (1991) benchmark of $5k + 10$. The logic behind this approach suggests that if the N_{FD} number is larger than the benchmark provided, there is evidence to suggest that the results appear robust to future disconfirmations. However, the usefulness of this approach (which is based on a fixed-effects model that is essentially irrelevant to the current research) has been criticized by many (e.g., Begg, 1994; Hunter & Schmidt, 2004; Scargle, 2000). Therefore, rather than conducting a file drawer analysis this research employs a simple graphic method for detecting availability bias—the funnel plot.

Funnel plots can be used to assess publication and other bias in meta-analytic research and are essentially simple scatterplots with effect sizes (on the horizontal axis) plotted against study sample sizes (on the vertical axis). In general, publication bias would result in asymmetrical funnel plots (generally resulting in truncation of the lower left-hand portion of the plot). On the other hand, the absence of bias is indicated when small sample studies are scattered widely across the bottom of the graph, with larger N studies more narrowly confined along the effect size continuum (forming an inverted funnel shape; Hunter & Schmidt, 2004). In this

research, funnel plots were constructed using study effect sizes and sample sizes within the meta-analytic database from three key analyses: (1) the relationship between interpersonal communication skills and skill-based outcomes, (2) the relationship between relationship-building IPS and skill-based outcomes, and (3) the relationship between “general” IPS and skill-based outcomes. These analyses were specifically chosen for this analysis because they contain the largest number of independent effect sizes ($k = 34, 40, \text{ and } 31$, respectively) and are representative of the entire database of effect sizes. Figures 3, 4, and 5 (see Appendix A) display the results of these analyses. Although the judgment is subjective in nature, for each analysis it appears relatively clear that small sample studies are indeed fairly well spread across the effect-size continuum, which lends support to the assertion that publication or availability bias is less of a concern in this research.

Computer Software Programs

Article coding for this research was done in Microsoft Excel[®]. Data analysis was aided by software created for the Hunter-Schmidt meta-analysis methods (Hunter-Schmidt Meta-Analysis Programs 1.1; Schmidt & Le, 2005). Upon completion of article coding, effect sizes were sorted within their associated subgroups (e.g., IPS type, outcome type, antecedents, training, etc.) before a combined effect size estimate was generated for each subgroup and/or level of each moderator. The Schmidt-Le software utilizes a random effects model, rather than a fixed effects model, to analyze the data. As alluded to earlier, the random effects model allows the true effect sizes to vary, instead of assuming the true effect sizes have fixed, or constant values. The data output from the Schmidt-Le software program includes the mean true score correlation, the standard deviation and variance of true score correlations, credibility intervals,

and the percentage of variance attributable to observed correlations after the removal of artifacts (other data is provided by the program but not utilized in the current research).

In addition to the output provided by the Schmidt-Le software, confidence intervals around each mean observed correlation were calculated in Excel using formulas provided by Hunter and Schmidt (2004). It is important to report both credibility and confidence interval estimates because they provide users of research data with answers to different questions. Credibility intervals estimate the variability of population correlations, taking into consideration information about the distribution of effect sizes after other research artifacts have been taken out. When used in conjunction with the estimate for the percentage of variance due to statistical artifacts, credibility intervals are useful for the purpose of detecting whether moderators may be operating (Whitener, 1990). Specifically, as the percentage of variance due to artifacts increases, the more confident we can be that additional moderators are not present. Confidence intervals provide an estimate of the variability around the estimated mean correlation. They are centered on a single mean score and reflect the effects of sampling error.

CHAPTER 6: RESULTS

Upon completion of the primary study coding process, it was determined that 141 studies would contribute data for the current meta-analytic database. This number includes 117 published journal articles, 13 conference presentations, four dissertations, three technical reports, two unpublished manuscripts, and two book chapters. Of the 141 studies in the database, 86 (61%) utilized real-world organizational employees for investigations of IPS.

Considering the mix of professional employees and university students in the studies included in the current research, it is worth noting that the possibility exists for sample type to be operating as an undetected moderating variable. At the same time, at least one recent study investigated variation in meta-analysis results based upon the domain in which the study was conducted. Specifically, Salas, DiazGranados, Klein, Burke, Stagl, Goodwin, and Halpin (in press) examined sample type as a potential moderator of the effectiveness of team training. In general, the results did not support the conclusion that sample type was operating as a moderator. The effect of team training for university students ($\bar{r} = .30$; $k = 37$) was generally similar to results obtained for aviation ($\bar{r} = .29$, $k = 6$), medical ($\bar{r} = .21$; $k = 6$), military ($\bar{r} = .49$; $k = 39$) and traditional business settings ($\bar{r} = .72$; $k = 5$). Even though differences were found (especially in comparison to military and traditional business settings), the fact that many of the results in question were based on a small number of effect sizes necessitates that caution is exercised before concluding that sample type moderated the effectiveness of team training. In the context of the current research, sample type could be operating as a moderator of the meta-analysis results, but there is little evidence to suggest that it is definitely a factor. Whenever the reported percentage of variance accounted for by statistical artifacts is high, this issue becomes even less of a concern. In cases where the percentage of variance accounted for by artifacts is low, the

possibility of additional moderators operating on the study results is greater and the results should be interpreted with caution.

In many instances, studies provided multiple effect sizes that were eligible for conceptually separate analyses. In other cases, studies examined multiple samples. As a result, there were 62 studies available for the assessment of IPS antecedents; 92 studies available for the examination of the relationship between IPS and outcomes; and 34 studies which addressed IPS training. Taken together, the results for this research can be separated into four main areas. These sections address: (1) antecedents of IPS, (2) the relationship between IPS and outcomes, (3) the efficacy of IPS training, and (4) the potential moderating influence of job complexity on the relationship between IPS and outcomes. Tables 2 through 6 contain the meta-analytic results for each of these hypothesis areas. In these tables, key results from each hypothesis area are displayed. Information found in these tables includes the number of participants in each analysis (N), the number of independent effect sizes (i.e., correlations) in each analysis (k), the mean weighted observed correlation (\bar{r}), the estimated true score correlation (ρ), the estimated standard deviation of this true score correlation (SD_{ρ}), 80% confidence intervals around each estimated true score correlation, the 80% credibility interval for each distribution (10% CV and 90% CV), and the percentage of observed variance accounted for by statistical artifacts (% Var. Acct.). Rationale for the inclusion of both confidence and credibility intervals was provided in the Method section. It's also important to point out the differing information provided by the mean observed correlation and estimated true score correlation. Whereas the mean weighted observed correlation (\bar{r}) provides an estimate of the average weighted effect size from data included in the meta-analytic database, the estimated true score correlation (ρ) between the

predictor construct and the relevant criterion represents an estimate that is fully corrected for measurement error in both the predictor and criterion.

The percentage of variance accounted for by artifacts requires some additional explanation. Specifically, this research is based on the assumption that much of the variation across studies is based on statistical and methodological artifacts (rather than true underlying population relationships). Artifacts operate to distort study findings in different ways—sampling error has a random effect on study findings, while measurement error adds systematic bias to study results. The reported percentage of observed variance accounted for by artifacts is based on the ratio of variance due to artifacts to the total variance. As witnessed in Tables 2-6, this ratio occasionally results in a number over 100 percent. Second-order sampling error is the primary culprit of this result. Hunter and Schmidt (2004) describe how second-order sampling error—which results from the sampling of studies in a meta-analysis—can lead to computed estimates of greater than 100 percent. “The larger the number of studies (other things being equal), the smaller the deviations of observed from expected variance. If the number of studies is small, however, these deviations can be quite large *on a percentage basis* (although *absolute* deviations are usually small, even in such cases)” (Hunter & Schmidt, 2004, p. 400).

The interpretation of effect size magnitude is guided by Cohen’s (1988) definition of small ($r = .10$), moderate ($r = .30$), and large ($r = .50$) effect sizes. These definitions are provided as a “rule of thumb” only, and should assist (but not guide) interpretation of study findings. Moreover, it bears acknowledging that meta-analytic results are presented wherever possible; there was no a priori criterion to determine the minimum number of effect sizes to include in any given analysis. In general, meta-analyses conducted with fewer effect sizes increase the probability of second-order sampling error (Arthur, Bennett, & Huffcutt, 2001; Hunter &

Schmidt, 2004). To aid interpretation, the results of meta-analyses based on fewer than five effect sizes should be considered with caution. This guideline concurs with advice that has been put forward by other scholars, and is pertinent to any meta-analytic integration (e.g., Arthur, Bennett, Edens, & Bell, 2003).

Antecedents of IPS

Gender and the Big Five personality characteristics were examined as potential antecedents of IPS. Results for gender are presented in Table 2 (see Appendix B), and the hypotheses put forward in this area argued that females would receive higher ratings on various communication, relationship-building, and “general” IPS.

Taken together, there was essentially no gender effect for interpersonal communication skills ($\bar{r} = .02$, $\rho = .02$, $CI_{\rho} 10\% = -.05$, $CI_{\rho} 90\% = .08$). However, there was a modest tendency for women to score higher on measures of relationship-building IPS ($\bar{r} = .12$, $\rho = .13$, $CI_{\rho} 10\% = .06$, $CI_{\rho} 90\% = .20$) and “general” IPS ($\bar{r} = .07$, $\rho = .08$, $CI_{\rho} 10\% = .07$, $CI_{\rho} 90\% = .08$).

Subgroup results indicated that women scored higher on ratings of oral communication ($\rho = .09$; $k = 3$) and nonverbal communication ($\rho = .13$; $k = 8$), while men generally displayed higher levels of assertive communication ($\rho = -.22$). Subgroup results for relationship-building IPS favored females for empathy ($\bar{r} = .61$, $\rho = .67$, $CI_{\rho} 10\% = .45$, $CI_{\rho} 90\% = .89$); whereas the results for cooperation and coordination ($\bar{r} = .03$, $\rho = .03$, $CI_{\rho} 10\% = .03$, $CI_{\rho} 90\% = .03$), self-presentation ($\bar{r} = -.03$, $\rho = -.04$, $CI_{\rho} 10\% = -.09$, $CI_{\rho} 90\% = .01$), and social influence ($\bar{r} = .03$, $\rho = .04$, $CI_{\rho} 10\% = .00$, $CI_{\rho} 90\% = .07$) showed essentially no gender differences. Although occasionally small in scale, wherever 80% confidence intervals for gender differences do not contain zero, they may be considered significant. At the same time, estimated relationships

between gender and oral communication, cooperation and coordination, and empathy were based on a small number of studies. Thus, these particular findings should be interpreted with caution.

Across the three broad groupings of IPS, females generally outperformed their male counterparts. These differences, however, are often small in magnitude and frequently characterized by wide credibility intervals that indicate the possibility that additional moderators may be operating. In addition, the confidence intervals for interpersonal communication skills contained zero. As a result, Hypotheses 1(a) cannot be fully supported. On the other hand, the confidence intervals for relationship-building IPS and “general” IPS did not include zero—a result which suggests the true correlation is significantly different from zero (with females scoring higher in these areas). Taken together, there is partial support for Hypothesis 1(b) and stronger support for the investigation of Hypothesis 1(c).

The personality characteristics investigated in this research include agreeableness, conscientiousness, emotional stability, extraversion, and openness to experience. The results for investigations of these variables as antecedents of IPS are provided in Table 3 (see Appendix B), and discussed in more detail in the following paragraphs.

Viewed as a whole, Table 3 (see Appendix B) provides broad-based support for Hypotheses 2(a-b) to Hypothesis 6. Focusing first on agreeableness, the results of the current meta-analytic integrations suggest small-to-moderate relationships with various interpersonal skills. Specifically, the relationships between agreeableness and interpersonal communication skills ($\bar{r} = .06$, $\rho = .07$, $CI_{\rho} 10\% = .07$, $CI_{\rho} 90\% = .07$), relationship-building IPS ($\bar{r} = .13$, $\rho = .16$, $CI_{\rho} 10\% = .12$, $CI_{\rho} 90\% = .21$), “general” IPS ($\bar{r} = .26$, $\rho = .30$, $CI_{\rho} 10\% = .29$, $CI_{\rho} 90\% = .32$), and IPS knowledge ($k = 2$, $\bar{r} = .11$, $\rho = .15$, $CI_{\rho} 10\% = .15$, $CI_{\rho} 90\% = .15$) are all positive. Importantly, none of the 80% credibility intervals for the distributions included zero; although

the finding for agreeableness and IPS knowledge was based on only two studies and should be treated with caution.

Similarly, the relationships between conscientiousness and communication skills ($\bar{r} = .06, \rho = .07, CI_{\rho} 10\% = .07, CI_{\rho} 90\% = .07$), relationship-building skills ($\bar{r} = .12, \rho = .15, CI_{\rho} 10\% = .10, CI_{\rho} 90\% = .21$), “general” IPS ($\bar{r} = .12, \rho = .15, CI_{\rho} 10\% = .10, CI_{\rho} 90\% = .19$), and IPS knowledge ($\bar{r} = .12, \rho = .15, CI_{\rho} 10\% = .11, CI_{\rho} 90\% = .19$) are all positive. The analysis of the relationship between conscientiousness and relationship-building IPS was based on a total sample size of 1,745, with nine independent effect sizes contributing to the investigation. This was also the only relationship in this area for which the outcome was based on a credibility interval that included zero.

This research also found small but meaningful relationships between the personality variable of emotional stability and various IPS. Upon an examination of Table 3, emotional stability had stronger relationships with communication skills ($\bar{r} = .10, \rho = .14, CI_{\rho} 10\% = .14, CI_{\rho} 90\% = .14, 10\% CV = .14, 90\% CV = .14$) and relationship-building IPS ($\bar{r} = .11, \rho = .13, CI_{\rho} 10\% = .13, CI_{\rho} 90\% = .13, 10\% CV = .12, 90\% CV = .14$) than ratings of “general” IPS or IPS knowledge (ρ 's = .11 and .10, respectively).

Of all the personality variables investigated, extraversion had the strongest relationships to the interpersonal skills addressed in this research. For example, an analysis of the relationship between extraversion and “general” IPS reported an estimated true score correlation of .36. This analysis was based on a sample of 1,226 participants and contained eight independent effect sizes. Similarly, extraversion showed small-to-moderate relationships with interpersonal communication skills ($\bar{r} = .23, \rho = .28, CI_{\rho} 10\% = .28, CI_{\rho} 90\% = .28$) and relationship-building

IPS ($\bar{r} = .14, \rho = .18, CI_{\rho} 10\% = .13, CI_{\rho} 90\% = .22$), as well as IPS knowledge ($\bar{r} = .21, \rho = .26, CI_{\rho} 10\% = .21, CI_{\rho} 90\% = .31$).

Finally, small-to-moderate relationships were found between openness to experience and the various IPS under investigation in this research. Although based on only two independent effect sizes (a reality that necessitates caution in interpretation), there appeared to be a moderate relationship between openness to experience and IPS knowledge ($k = 2, \bar{r} = .24, \rho = .29, CI_{\rho} 10\% = .21, CI_{\rho} 90\% = .37, 10\% CV = .18, 90\% CV = .41$). Associations between openness and interpersonal communication skills ($\bar{r} = .09, \rho = .11, CI_{\rho} 10\% = .04, CI_{\rho} 90\% = .18$), relationship-building IPS ($\bar{r} = .09, \rho = .11, CI_{\rho} 10\% = .05, CI_{\rho} 90\% = .19$), and “general” IPS ($\bar{r} = .01, \rho = .01, CI_{\rho} 10\% = -.05, CI_{\rho} 90\% = .06$) were less robust, and were (unfortunately) characterized by credibility intervals that included zero.

In sum, Hypotheses 1(a-c) through Hypothesis 6 were commonly supported. As predicted, females were generally rated higher in assessments of communication, relationship-building, and “general” interpersonal skills. Associations between IPS and personality variables were all in the positive direction (although some estimates had credibility intervals which contained zero). Moreover, results for the relationships between Big Five personality variables and IPS were generally significant, as evidenced by confidence intervals that did not contain zero. These findings suggest that personal characteristics can serve as antecedents, or predictors of workplace interpersonal skills.

IPS and Outcomes

In addition to assessing potential antecedents of IPS, I also wanted to investigate the relationship between various IPS and important (non-IPS) cognitive, affective, and skill-based outcomes. Table 4 (see Appendix B) presents the results of these analyses.

First, moderate relationships were found between ratings of interpersonal communication skills and cognitive ($\bar{r} = .34$, $\rho = .44$, CI_{ρ} 10% = .37, CI_{ρ} 90% = .52), affective ($\bar{r} = .24$, $\rho = .30$, CI_{ρ} 10% = .23, CI_{ρ} 90% = .36), and skill-based ($\bar{r} = .27$, $\rho = .33$, CI_{ρ} 10% = .28, CI_{ρ} 90% = .38) outcomes. Taken together, the results generally support Hypotheses 7(a-c). However, for affective outcomes, the 80% credibility interval ranged widely from -.02 to .61, including the possibility that additional moderators may be operating. Credibility intervals for cognitive and skill-based outcomes also ranged widely, but did not include zero in either case.

Contrary to Hypotheses 8(a), relationship building skills were essentially unrelated to non-IPS cognitive outcomes ($\bar{r} = .01$, $\rho = .02$, CI_{ρ} 10% = -.04, CI_{ρ} 90% = .08, 10% CV = -.12, 90% CV = .16). In line with predictions, however, relationship-building IPS were positively correlated to affective (Hypothesis 8b) and skill-based outcomes (Hypothesis 8c). The results indicated an estimated true score correlation of .26 (10% CV = .08, 90% CV = .44; $\bar{r} = .21$, CI_{ρ} 10% = .22, CI_{ρ} 90% = .30) between relationship-building IPS and affective outcomes; and an estimated true score correlation of .33 (10% CV = .05, 90% CV = .61; $\bar{r} = .27$, CI_{ρ} 10% = .29, CI_{ρ} 90% = .37) between relationship-building IPS and skill-based outcomes.

Strong support was found for Hypotheses 9(a-c), investigating the relationships between “general” IPS and cognitive, affective, and skill-based outcomes. Specifically, moderate-to-large correlations were found between “general” IPS and cognitive ($\bar{r} = .23$, $\rho = .28$, CI_{ρ} 10% = .20, CI_{ρ} 90% = .37, 10% CV = .05, 90% CV = .51), affective ($\bar{r} = .18$, $\rho = .21$, CI_{ρ} 10% = .16, CI_{ρ}

90% = .27, 10% CV = .05, 90% CV = .38), and skill-based ($\bar{r} = .37$, $\rho = .44$, CI_{ρ} 10% = .39, CI_{ρ} 90% = .49, 10% CV = .17, 90% CV = .71) outcomes. Importantly, none of the 80% confidence or credibility intervals for the observed relationships included zero.

In general, the results of this investigation supported the positive association between IPS and outcomes. However, in some cases, the confidence intervals contained zero. In these instances, one cannot conclude with 100% certainty that the variables under investigation are related to each other in any meaningful way. Moreover, in many cases, the estimated true score correlations from the meta-analyses had 80% credibility intervals that were fairly wide. Here again, there are occasional uncertainties around the magnitude and direction of particular IPS-outcome relationships. In these instances, the probability of additional moderator variables acting on the relationships between IPS and outcomes cannot be precluded.

The Efficacy of IPS Training

The next group of hypotheses addressed the efficacy and boundary conditions for successful IPS training interventions. Hypothesis 10 predicted simply that IPS training would be effective for improving IPS. This omnibus test assessed all forms of IPS training and all types of specific interpersonal skills. Results for this evaluation are provided in Table 5 (see Appendix B).

As can be seen from Table 5, an analysis the effectiveness of IPS training confirmed Hypothesis 10. Training groups were associated with far greater improvements in IPS through IPS training ($\bar{r} = .47$, $\rho = .52$, CI_{ρ} 10% = .47, CI_{ρ} 90% = .57, 10% CV = .25, 90% CV = .79). This finding is based on an analysis of 27 independent effect sizes, with a total sample size of 1,482 participants.

Hypothesis 11 through Hypothesis 14(a-b) were put forth to investigate the potential for training method to moderate the relationships between IPS training and cognitive, affective, and skill-based outcomes. Lecture-based training methods were posited to be primarily effective for improving cognitive outcomes (i.e., rather than affective or skill-based outcomes); lecture and discussion methods were also predicted to be most effective for improving cognitive outcomes, and also more effective than lecture-only methods for this purpose; process interventions were predicted to be most effective for improving affective outcomes; and behavioral modeling training methods were suggested to rank first among the various methods for improving cognitive and skill-based methods. Whereas sufficient numbers of primary study effect sizes would have allowed for the full investigation of these hypotheses, the relative lack of non-BMT training methods for improving IPS precluded the full examination of these questions. As a result, there were only enough primary study effect sizes available to assess the effectiveness of BMT for improving distinct outcomes. Table 5 displays the results of these analyses. Here, it can be seen that BMT methods were indeed effective for enhancing cognitive ($\bar{r} = .44$, $\rho = .52$, CI_p 10% = .34, CI_p 90% = .70, 10% CV = .16, 90% CV = .88), affective ($\bar{r} = .25$, $\rho = .32$, CI_p 10% = .22, CI_p 90% = .43, 10% CV = .14, 90% CV = .51), and skill-based ($\bar{r} = .42$, $\rho = .47$, CI_p 10% = .38, CI_p 90% = .57, 10% CV = .14, 90% CV = .81) outcomes. However, because of the lack of comparative information for the other training methods, Hypothesis 11 through Hypothesis 14(a-b) could not be fully tested. In findings that concur with previous research on this topic, BMT does appear to be quite effective for improving various outcomes through enhanced IPS.

Job Complexity and IPS

The final set of hypotheses assessed whether job complexity moderates the relationship between IPS and outcomes. Table 6 (see Appendix B) contains the results from this investigation.

Specifically, Hypothesis 15(a-c) predicts that the relationships between various interpersonal skills and the combined set of outcomes (i.e., non-IPS cognitive, affective, skill-based) would increase at higher levels of job complexity. These predictions were generally confirmed. As can be seen from Table 6, in situations characterized by high job complexity, the relationship between the combined set of IPS and outcomes was strong ($\bar{r} = .34$, $\rho = .41$, CI_{ρ} 10% = .37, CI_{ρ} 90% = .46). As you go down levels of complexity, the relationships for medium ($\bar{r} = .25$, $\rho = .33$, CI_{ρ} 10% = .27, CI_{ρ} 90% = .39) and low job complexity ($\bar{r} = .19$, $\rho = .22$, CI_{ρ} 10% = .16, CI_{ρ} 90% = .29) also go down. This pattern generally holds true across assessments of interpersonal communication, relationship-building IPS, and “general” IPS. However, for relationship-building skills, it was in medium complexity jobs where the strong relationship between IPS and outcomes was found ($\bar{r} = .31$, $\rho = .36$, CI_{ρ} 10% = .31, CI_{ρ} 90% = .42, 10% CV = .23, 90% CV = .50). Moreover, for the assessment of the potential moderating effect of job complexity on the relationship between interpersonal communication skills and outcomes, findings for medium and low complexity job incumbents were based on only two studies each, and should be treated with caution. Taken together, there is enough evidence to support Hypotheses 15a and 15c, even though 15b cannot be fully supported (see Table 6, Appendix B).

CHAPTER 7: DISCUSSION

The purpose of this research was to carefully examine at the domain of IPS, including antecedents, outcomes, training efficacy, and the potential moderating influence of job complexity. All told, the investigation of these communication (i.e., *active listening, oral communication, written communication, assertive communication, and nonverbal communication*) and relationship-building (i.e., *cooperation and coordination, intercultural sensitivity, service orientation, empathy, self-presentation, social influence, and conflict resolution and negotiation*), and “general” IPS provides a robust assessment of the state of research on IPS. Specifically, it illuminates potential antecedents, outcomes, and boundary conditions for the effectiveness training of IPS. Additional analyses investigated whether the relationship between IPS and outcomes is moderated by the level of complexity of the context in which IPS and outcomes were measured.

To date, little quantitative evidence has been brought forth to investigate the frequent claims purporting the importance of possessing good IPS. This research provides a first set of this type of evidence by examining a comprehensible group of communication and relationship-building interpersonal competencies. Moreover, the prescriptive guidance derived from this research may serve as a resource for organizational decision makers charged with improving the interpersonal skills of their workforce.

In line with previous research on gender differences (e.g., Hyde, 2005; Hyde & Linn, 1988; Stuhlmacher & Walters, 1999), this study found a small tendency for women to score higher on ratings of interpersonal skills. Looking more closely, women appeared to score higher on empathy ($\rho = .67$), but lower on assertive communication ($\rho = -.22$); higher on nonverbal communication ($\rho = .13$), but lower on self-presentation skills ($\rho = -.04$); all in line with prior

gender stereotypes and predictions. Women also received higher scores for oral communication ($\rho = .09$) and ratings of “general” IPS ($\rho = .08$). These differences—although small in magnitude—represent consistent and practically meaningful areas where men and women differ.

Of the personality variables, extraversion showed the strongest relationships with interpersonal communication skills, relationship-building skills, and “general” IPS. It can be argued that extraverted individuals develop stronger social ties with others through sheer quantity of interactions. At the same time, each of the other personality variables assessed in this research proved worthy of consideration, as each of them were related to various interpersonal skills in important ways.

Certainly, the results also demonstrated the clear, positive impact of IPS training programs. In particular the literature is flush with studies assessing the value of behavior modeling for improving interpersonal skills. The results of this investigation provided additional, summative evidence for the value of these interventions. Finally, as predicted, the relationship between IPS and outcomes becomes more pronounced at higher levels of job complexity. This finding is in line with findings supportive of the increasing level of importance of cognitive ability at higher levels of job complexity.

Theoretical Implications

The findings presented here provided support to the inclusion of IPS in any theoretical model of individual performance in modern work organizations. The results also indicate differential relationships between IPS and outcomes, depending on both the specific IPS and outcomes under investigation, and upon the level of job complexity of the participants being

assessed. Based on the complete set of findings in this research, a number of recommendations for practitioners can be put forward.

Recommendations for Researchers

To further advance the study of the efficacy of IPS training, additional research needs to be conducted which addresses the efficacy of IPS training in greater detail. Boundary conditions of IPS training effectiveness continue to represent a key area of need. Are certain training methods more effective for developing particular IPS? Can low resource interventions offer the same return on investment as more involved behavioral modeling programs? One way in which BMT differs from other training methods is its greater emphasis on the transfer of skills to the job (Decker & Nathan, 1985; Goldstein & Sorcher, 1974). It appears then, that human resource leaders who implement BMT for employees will see a return on that investment. The effect sizes for behavior modeling reported here appear of sufficient magnitude to justify the value of BMT. The question remains, however, whether other interventions may be equally valuable for the purpose of enhancing IPS.

Second, additional moderator variables could be investigated to further illuminate the domain of IPS. For example, future research might examine the effectiveness of IPS training within specific industries or job families. Although job complexity was addressed in the current study, variations within complexity levels could be accounting for additional variance beyond that observed in the current investigation. In addition, constructs such as self-efficacy and emotional intelligence might serve as useful leverage points in the investigation of antecedents of IPS.

In truth, each of the hypothesis areas under study in this research could serve as its own primary focus in future meta-analytic integrations. Given the requisite availability, the collection of additional primary study data could allow for a more fine-tuned analysis of one or more areas under investigation in the current research. Therefore, I also encourage future researchers to further explore the myriad relationships between IPS and outcomes; to assess whether there are any unforeseen moderators acting on the relationships between gender and various IPS; to address whether the observed moderating impact of job complexity on the relationship between IPS and outcomes differs from the way in which the relationship between cognitive ability and performance is moderated by job complexity; and to address the relationship between IPS and outcomes at the team, department, or organizational levels of analysis.

Another area of future research concerns the area of training transfer. Training transfer refers to the degree to which trainees effectively apply knowledge, skills, and attitudes learned in training to the job (Newstrom, 1984; Wexley & Latham, 1981). As originally proposed by Thorndike and Woodworth (1901), the idea of identical elements suggests that training transfer is maximized to the degree that there are identical stimulus and response elements in the training and transfer settings (Baldwin & Ford, 1988). For example, in the literature on groups and teams there is a distinction made between task- and team-generic versus task- and team-specific teamwork training programs (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995). In this context, task- and team-generic teamwork skills training programs focus on developing skills that can be applied to a variety of settings. Thus, the competencies are said to be transportable across teams and tasks (Salas, Burke, & Cannon-Bowers, 2002). In contrast, task- and team-specific teamwork skills training programs might focus on team members' characteristics, or aspects of the particular task at hand. Examples of this type of intervention include cross training

(e.g., Marks et al., 2002), or team coordination training (e.g., Prince & Salas, 1992). The results of previous task- and team-specific skills training efforts have generally shown positive benefits in terms of team effectiveness (see Cannon-Bowers & Salas, 1998).

There is much less literature which focuses directly on the effects of task- and team-generic teamwork skills training. Some notable examples include Smith-Jentsch and colleagues (1996), who examined team performance-related assertiveness; and Chen, Donahue, & Klimoski (2004), who studied five categories of these skills (i.e., conflict resolution skills, collaborative problem solving skills, communication skills, goal setting and performance management skills, and planning and task coordination skills). In addition, Ellis and colleagues (2005) examined the task- and team-generic skills of collaborative problem solving, communication, and planning and task coordination. The results of these three studies have generally demonstrated enhanced transfer behavior and performance.

There is little doubt that teaching specific content will best facilitate immediate training outcomes, including declarative knowledge, procedural knowledge and attitudes. However, on the basis of the preceding research, it is also possible to conclude that training methods that incorporate generic content might still prove useful for facilitating training transfer behavior. The question remains, however, whether IPS training should incorporate general principles, rather than focusing on specific behaviors. According to Baldwin and Ford (1988), the aim of interpersonal and supervisory skills training is to inculcate generalizable rules or concepts and “not simply to enable the trainee to reproduce only those behaviors specifically modeled” (p. 90). That is, in complex skill modeling programs, trainees ought to be taught principles that will allow them to learn, generalize, and apply behaviors different from those modeled (Baldwin &

Ford, 1988). Research needs to examine the relative efficacy (in terms of transfer behavior) of teaching generic principles of interpersonal behavior versus teaching context-specific IPS.

Practical Implications

The results of this research support the basic idea that individuals differ in terms of their level of IPS. Importantly, some of this variability can be better understood based upon gender and personality characteristics. These individual difference variables contribute to a person's baseline level of IPS, and should be considered as a contributing factor to the effectiveness with which IPS are executed. Put another way, although it is clear that IPS can be developed, it is likely that certain roles or positions will be a better fit for particular individuals based upon their unique combination of personality and other individual differences. This baseline knowledge can provide those tasked with selection a firm foundation upon which to begin their important task.

Moreover, interpersonal competencies matter in organizations. They are related to important workplace outcomes, and they can be developed through training and development. In contemporary work organizations, IPS training is typically targeted towards senior executives and managers—employees whose image and behaviors have the most impact on the company (Poe, 2001). These employees serve a critical function within their organizations by facilitating positive interactions and performance in the workgroup. At the same time, recipients of IPS training often include customer service professionals, who serve a critical role in maintaining customer satisfaction and commitment towards their organizations. In fact, the inability of frontline employees to display strong IPS may indeed have a more negative impact on the company than similar deficiencies at the corporate level.

As for the link between IPS and outcomes (and whether this relationship is moderated by the level of job complexity of the incumbent job holder), the results were positive. Accumulated knowledge in understanding mediators and moderators has suggested that moderators typically used in organizational research are less potent than previously believed (e.g., Aguinis, Beaty, Boik, & Pierce, 2005). In other words, validity tends to generalize more than one might suspect. However, important moderators nonetheless *do* exist and it's important to quantify these differential relationships when possible.

Recommendations for Practitioners

Based on the findings presented here, a few recommendations are offered for human resource leaders and other practitioners. First, the assessment of IPS as part of a carefully planned system for assessing potential is essential. Beyond recommendations, work samples, and biographical information, the assessment of personal competencies can aid organizational decision makers for tasks that include management development, the identification of “high potentials,” and the selection of new associates. For example, for the selection of key customer-facing associates, human resource decision makers may want to consider looking first at those individuals who score high on the Big Five dimensions of extraversion and agreeableness. The results presented in this research suggest that individuals who score high on these variables also show enhanced levels of both communication and relationship-building IPS. Moreover, for management development initiatives, the results presented herein suggest that each of the Big Five variables might be considered as important to the development of relationship-building IPS. That is, beyond extraversion and agreeableness, openness to experience, emotional stability, and conscientiousness are also important to consider. It seems likely that more specific relationship-

building skills may be impacted to a greater or lesser degree by particular personality variables. Although this research did not have available the sheer number of primary research studies necessary to test each possible combination of relationship-building IPS and Big Five personality variable, organizational decision-makers and stakeholders would likely benefit from an in-depth examination of their current, high-performing job incumbents, with a particular focus on the measurement and linkage of their IPS and personality metrics.

Second, behavioral modeling training remains a highly effective mechanism for improving a wide range of interpersonal skills. Human resource leaders can be confident that investments in these interventions are likely to pay off in terms of enhanced performance. Not only that, but a particularly interesting aspect of the current research findings in this area is that BMT proved especially effective at enhancing each set of cognitive, affective, and skill-based outcomes of IPS. It is important to realize the synergies that may be captured when—through IPS—individuals' relationships with others, their personal (or self) evaluations, *and* job performance can each be enhanced. Thus, to the extent that organizations can enhance the IPS of key frontline personnel, the benefits (in terms of key organizational metrics) are clear. Of course, case studies of other organizations, meta-analytic findings, and theoretical rationale can only go so far in convincing organizational decision-makers of the value of IPS. What's needed within each setting are specific linkage research studies that—for a particular organization—link the level of IPS of key associates to important workplace outcomes such as customer services, sales, team performance and other metrics of interest.

Limitations

Before concluding this research, a brief discussion of the limitations inherent in this research is provided. That is, despite the anticipated positive contributions of the current research, six limitations should be noted. These revolve around issues concerning the quality of studies included in the meta-analysis, the diverse nature of the primary studies, the presumed causality implied by the findings, findings that were sometimes based on a small number of effect sizes, the possibility of the existence of availability bias, and limitations which characterized the state of research into IPS training.

First, it is acknowledged that individual research studies were not directly coded for, nor differentially weighted according to any subjective index of study “quality.” Although it is clear that articles differ on the quality and soundness of their research methods, no attempt was made to quantify these differences. Thus, in an effort to be inclusive and include a large number of primary studies, definitive conclusions regarding the validity of each included study were not made.

Second, Bobko and Stone-Romero (1998) discussed how the validity of inferences which are derived through meta-analytic methods are a function of several factors, including: (a) the number of primary studies, (b) the representativeness of the sample of primary studies included in the meta-analysis, and (c) the validity of each of the primary studies. In this research, the studies reviewed are expected to be quite diverse in their samples, settings, and methods. Therefore, the conceptual and methodological heterogeneity of the set of studies included in this meta-analysis, has, in many ways, added confidence that findings are not an artifact of individual study particulars (Cook & Campbell, 1976, 1979; Rosenthal & Rosnow, 1991; Runkel & McGrath, 1972; Stone, 1978). That is, the meta-analytic integration of diverse independent

studies has allowed for a more generalizable indication of the relationships between antecedents and IPS, between IPS and outcomes, an assessment of the benefits and boundary conditions of IPS training interventions, and an investigation into the possible moderating influence of job complexity.

Third, to the extent that primary studies lacked proper confound control mechanisms, one cannot unequivocally conclude that IPS training interventions *cause* improvements in specified outcomes. Therefore, despite the occasional use of language that is seemingly causal in nature, no claims concerning the causality the relationships under investigation should be implied.

Fourth, many of the relationships observed in the current research were based on a small number of primary studies. For example, many of the findings included two, three, or four effect sizes. Whenever results were presented based upon a smaller number of effect sizes, those findings should be interpreted with caution. Future research may target these areas for the purpose of building up the meta-analytic database to the point where more meaningful meta-analyses may be conducted.

Fifth, it is important to point out that the evaluation of funnel plots to assess availability bias is primarily subjective in nature. Although there does not appear to be widespread availability bias operating in the data (see Figures 3-5), others may view the same results and come to a different conclusion. If there is publication or availability bias, small-sample studies reporting small effect sizes would be largely missing from the plot. Essentially, these studies typically fail to attain statistical significance in their findings and are thought to be published less frequently. In addition, to the extent that availability bias is operating, it has the potential to, “seriously distort conclusions from research reviews” (Hunter & Schmidt, 2004, p. 504). Such

distortion would be announced by larger-than-warranted meta-analytic effect sizes estimates in the current research.

Finally, this study was limited in its ability to assess the boundary conditions of IPS training for enhancing non-IPS outcomes. Other than behavioral modeling training, there were not enough effect sizes in the meta-analytic database to test a number of the proposed hypotheses in this area. Future research should take every measure possible to locate additional “fugitive” studies to add to the database.

CHAPTER 8: CONCLUDING REMARKS

“...Relations with others can be the source of the deepest satisfaction and of the blackest misery. ...Many people are lonely and unhappy, some are mentally ill because they are unable to sustain social relationships with others. Many everyday encounters are unpleasant, embarrassing or fruitless, because of inept social behaviour. ...Many of those difficulties and frustrations could be eliminated by a wider understanding, and better training in the skills of social interaction” (Argyle, 1967, p. 111).

This quote, from one of the pioneers in the study of social skills, quite clearly describes how IPS training can benefit the individual. However, there remains a need to discern how and under what conditions IPS training interventions are most effective. Is it the case that lecture-based methods can impart knowledge of IPS efficiently, and in a less resource-intensive manner than the more involving methods of behavioral modeling training? For enhancing the relationships between members of groups, should training take place in a group or team setting? Or, can individuals be trained separately on the key IPS that will enhance group interaction and have this training prove equally effective when the groups re-convene to perform their primary task. If so, IPS development may be more easily accessible to those organizational units with limited resources. In the end, the answers to these questions will be of great value to both individuals and organizations.

In terms of interpreting meta-analysis results, Kraiger (1985) once cautioned, “we seek to tell the apple from the orange, but you [the meta-analysts] try to tell us that all fruit is tasty” (p. 800). However, if one wants to generalize about fruit, it may sometimes be a good thing to mix apples and oranges. That is, “Studies that are exactly the same in all respects are actually limited in generalizability” (Rosenthal & DiMatteo, 2001, p. 68). The implication is that the results found in this research allow for attempts to generalize the findings to a wide variety of interpersonal competencies, including IPS not assessed in the current research. Had the current

research assessed a more limited set of IPS, the findings would not be as relevant to situations which are not characterized by the same limited set of competencies.

Finally, Mead (1934) said long ago that the secret to human exchange is to give the other person behavior that is more valuable to him/her than costly to you, and to get from the other person behavior that is more valuable to you than costly to him/her. This simple but insightful quote illustrates the quintessential simplicity of human interactions. Indeed, human interactions in the interpersonal domain can be examined, investigated, and improved through training. The results of this research provide evidence to more carefully delineate the domain of IPS. Armed with this knowledge, researchers and practitioners can continue moving forward as they seek to enhance their understanding of the science and practice of IPS development. Everyone will benefit from enhanced customer relations, manager-employee relationships, and the synergistic cooperation and coordination among organizational groups and teams that is only possible when the individuals involved possess an adequate level of communication and relationship-building IPS.

APPENDIX A: FIGURES

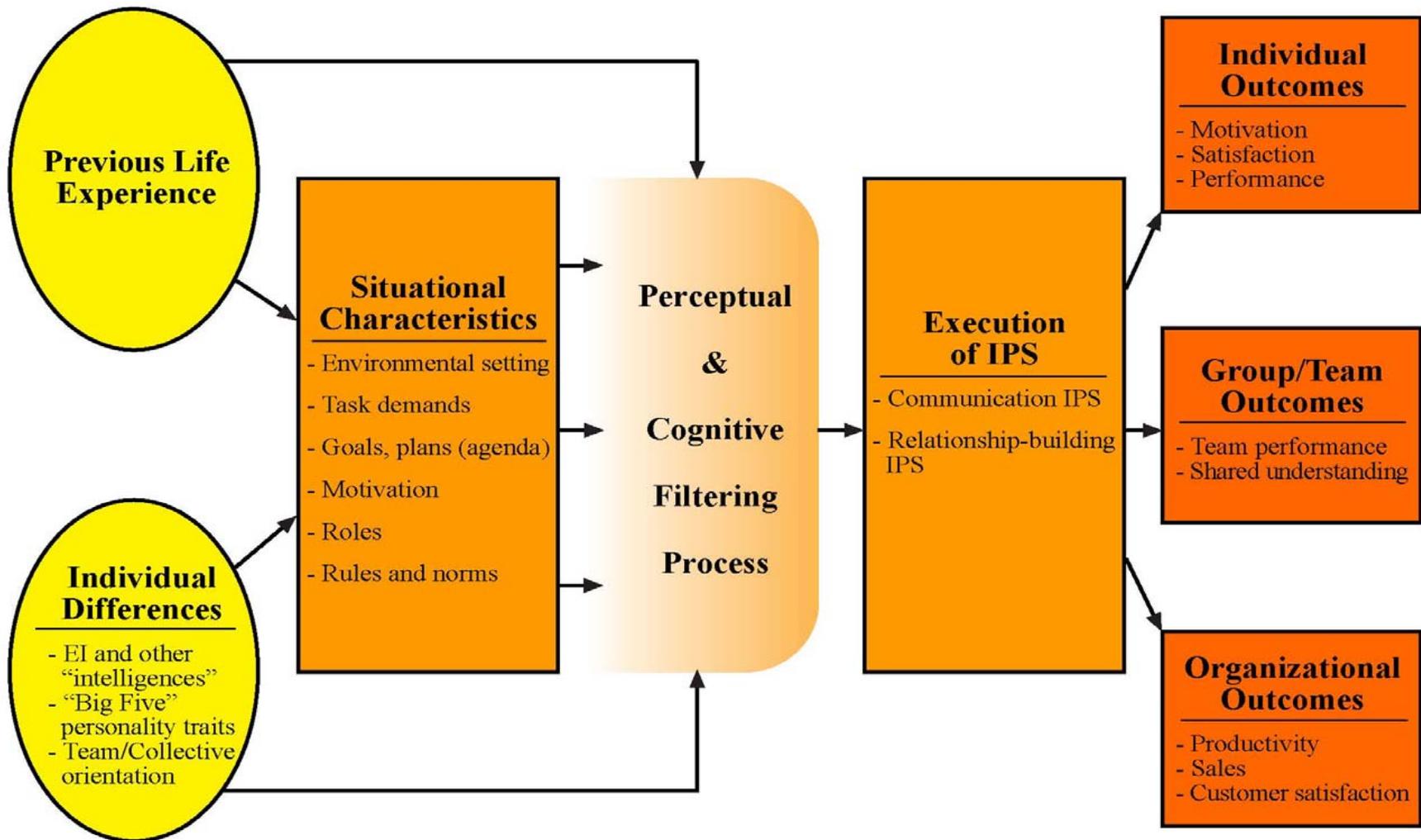


Figure 1: Framework of Interpersonal Skills Performance^a

^a From Klein, DeRouin, and Salas (2004)

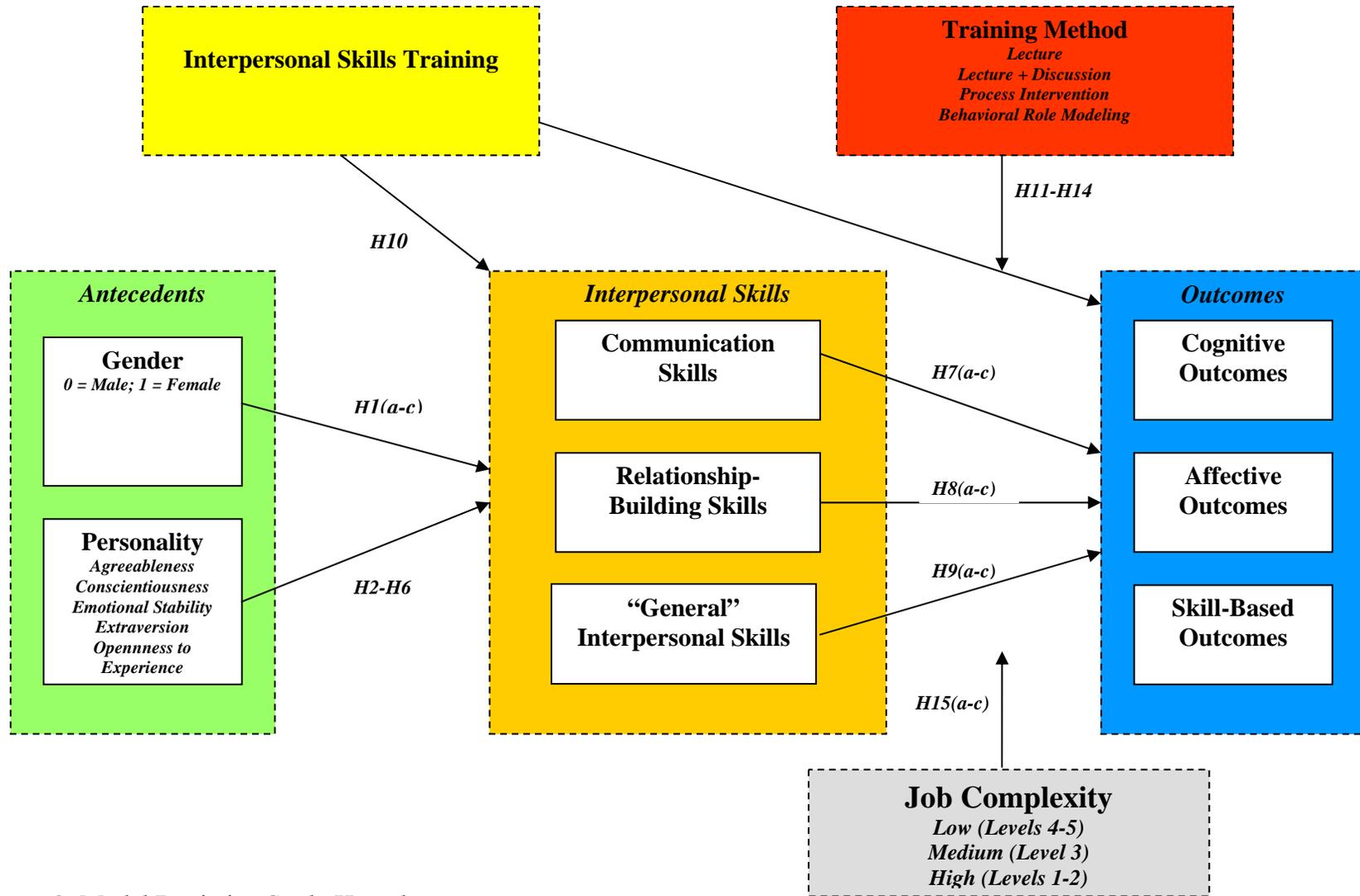


Figure 2: Model Depicting Study Hypotheses

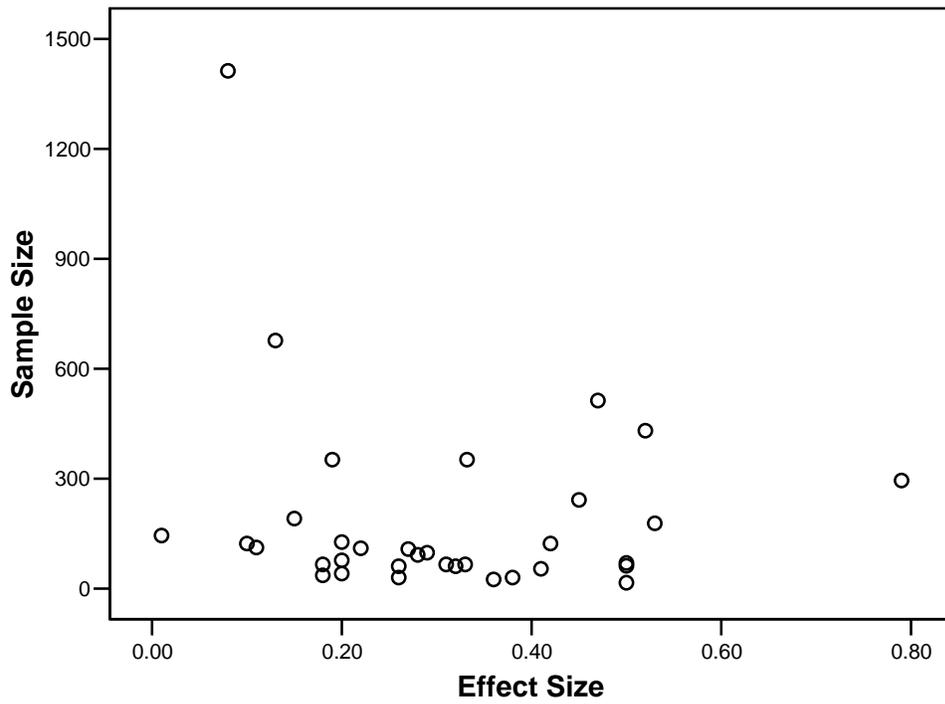


Figure 3: Funnel Plot for Detecting the Possibility of Availability Bias: Interpersonal Communication Skills and Skill-Based Outcomes

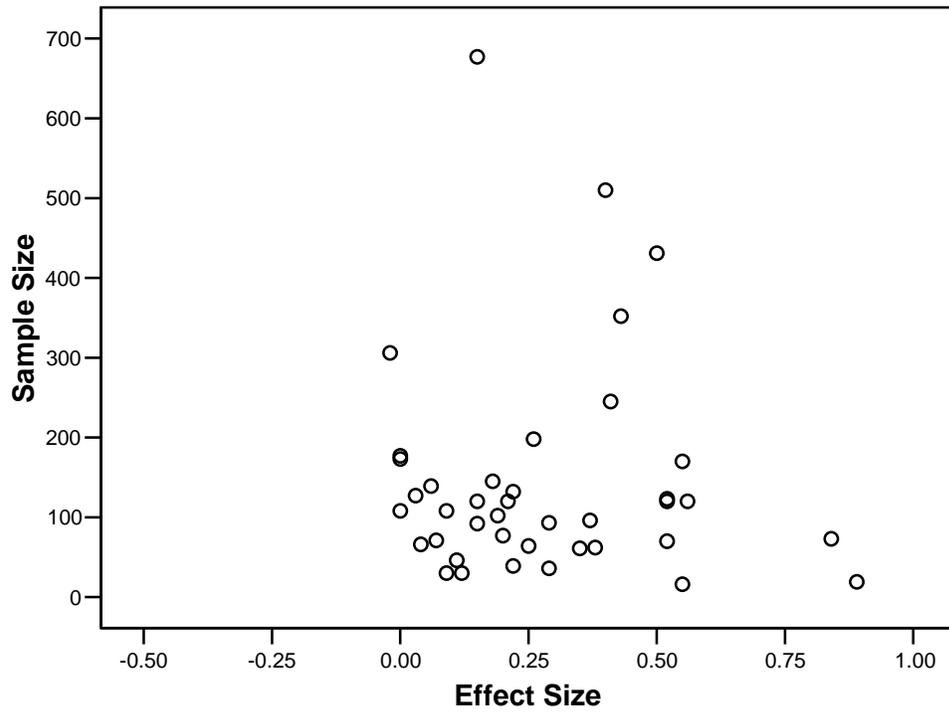


Figure 4: Funnel Plot for Detecting the Possibility of Availability Bias: Relationship-Building Interpersonal Skills and Skill-Based Outcomes

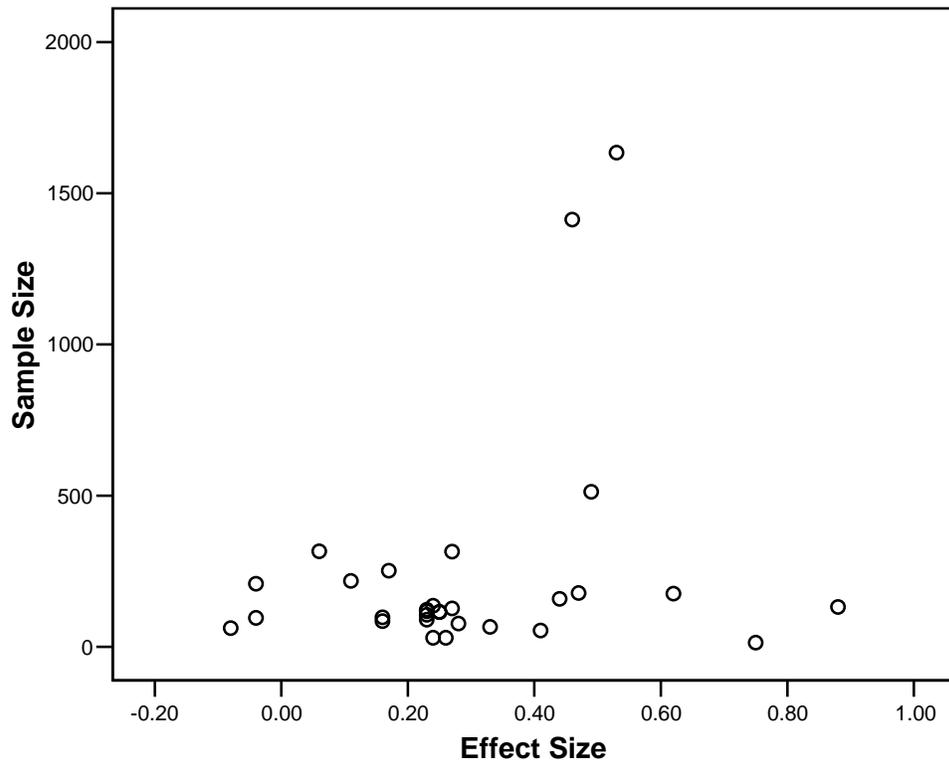


Figure 5: Funnel Plot for Detecting the Possibility of Availability Bias: “General” Interpersonal Skills and Skill-Based Outcomes

APPENDIX B: TABLES

Table 1
Five Levels of Job Complexity

Job Complexity Level	Job Complexity Level / Family ^a Description	Dimension	Mean Validity of <i>g</i> for Training Success ^b	Mean Validity of <i>g</i> for Performance ^b
1 – High	Complex set up jobs (setting up)	Things	.65	.56
2 – High	Managerial / professional jobs (synthesizing / coordinating)	Data	.50	.58
3 – Medium	Technician and skilled jobs (analyzing / compiling / computing)	Data	.57	.51
4 – Low	Semiskilled jobs (comparing / copying)	Data	.54	.40
5 – Low	Unskilled jobs (feeding / offbearing)	Things	-	.23

^a Dimensions and job family descriptions from Fine (1955) and Hunter, Schmidt, and Le (2006).

^b Based on data from the U.S. Employment Service (Hunter 1980).

Table 2
 Analysis of the Relationship between Gender and Interpersonal Skills^a

Broad Interpersonal Skill	Specific Interpersonal Skill	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^b	CI $_{\rho}$ 10%	CI $_{\rho}$ 90%	10% CV	90% CV	% Var. Acct. ^c
Interpersonal Communication Skills	Overall	5,288	14	.02	.02	.19	-.05	.08	-.23	.26	8.25
	Active Listening	509	1	.18	-	-	-	-	-	-	-
	Oral Communication	2,720	3	.08	.09	.05	.05	.13	.02	.15	30.88
	Written Communication	354	1	-.13	-	-	-	-	-	-	-
	Assertive Communication	1,546	4	-.20	-.22	.14	-.31	-.13	-.40	-.05	13.98
	Nonverbal Communication	1,739	8	.12	.13	.16	.06	.20	-.07	.34	18.24
Relationship-Building Interpersonal Skills	Overall	6,603	22	.12	.13	.26	.06	.20	-.20	.47	5.48
	Cooperation & Coordination	482	2	.03	.03	.00	.03	.03	.03	.03	117.30
	Intercultural Sensitivity	-	-	-	-	-	-	-	-	-	-

Broad Interpersonal Skill	Specific Interpersonal Skill	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ} ^b	CI _{ρ} 10%	CI _{ρ} 90%	10% CV	90% CV	% Var. Acct. ^c
	Service Orientation	-	-	-	-	-	-	-	-	-	-
	Empathy	1,031	2	.61	.67	.24	.45	.89	.36	.98	1.57
	Self-Presentation	1,592	7	-.03	-.04	.10	-.09	.01	-.17	.09	33.00
	Social Influence	4,103	13	.03	.04	.10	.00	.07	-.09	.16	26.32
	Conflict Resolution & Negotiation	422	1	.04	-	-	-	-	-	-	-
“General” Interpersonal Skills	Overall	2,286	14	.07	.08	.02	.07	.08	.06	.10	95.85

Note. *k* = number of correlation coefficients on which each distribution was based; \bar{r} = mean observed correlation; ρ = estimated true correlation between the predictor construct and the relevant criterion (fully corrected for measurement error in both the predictor and criterion); SD_{ρ} = estimated standard deviation of the true correlation; CI _{ρ} 10% = lower bound of the confidence interval for estimated true correlation; CI _{ρ} 90% = upper bound of the confidence interval for estimated true correlation; 10%CV = lower bound of the credibility interval for each distribution; 90% CV = upper bound of the credibility interval for each distribution; % Var. Acct. = percentage of observed variance accounted for by statistical artifacts.

^a Positive effect sizes favor females.

^b An SD_{ρ} of zero indicates that the real variance of the true correlation is zero. In other words, there is only one value of the true correlation underlying all the studies. This result is a consequence of the percentage of variance by accounted for by statistical artifacts estimate being greater than 100%, and also indicates that there should be no additional moderators operating for this analysis.

^c The percentage of variance accounted for by statistical artifacts being greater than the theoretical maximum value of 100% indicates that sampling error and other study artifacts explain all of the observed variation in the effect sizes across studies. The estimated value is greater than 100% because of second-order sampling error.

Table 3
 Analysis of the Relationships between Personality and Interpersonal Skills

Personality Variable	Interpersonal Skill	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI $_{\rho}$ 10%	CI $_{\rho}$ 90%	10% CV	90% CV	% Var. Acct. ^b
Agreeableness	Communication	353	4	.06	.07	.00	.07	.07	.07	.07	537.54
	Relationship-Building	1,154	6	.13	.16	.09	.12	.21	.05	.28	49.65
	“General” Interpersonal Skills	744	5	.26	.30	.02	.29	.32	.27	.33	94.56
	Knowledge of Interpersonal Skills	553	2	.11	.15	.00	.15	.15	.15	.15	103.50
Conscientiousness	Communication	502	5	.06	.07	.00	.07	.07	.07	.07	156.00
	Relationship-Building	1,745	9	.12	.15	.13	.10	.21	-.02	.32	30.46
	“General” Interpersonal Skills	1,384	10	.12	.15	.12	.10	.19	.00	.30	41.76
	Knowledge of Interpersonal Skills	253	2	.12	.15	.04	.11	.19	.10	.21	77.40
Emotional Stability	Communication	804	6	.10	.14	.00	.14	.14	.14	.14	113.68
	Relationship-Building	2,039	10	.11	.13	.01	.13	.13	.12	.14	98.98
Personality	Interpersonal Skill	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI $_{\rho}$ 10%	CI $_{\rho}$ 90%	10% CV	90% CV	% Var.

Variable		Acct. ^b									
	“General” Interpersonal Skills	874	6	.10	.11	.04	.09	.13	.07	.16	86.39
	Knowledge of Interpersonal Skills	855	3	.08	.10	.00	.10	.10	.10	.10	738.52
Extraversion	Communication	653	6	.23	.28	.00	.28	.28	.28	.28	138.65
	Relationship- Building	1,404	7	.14	.18	.10	.13	.22	.05	.30	45.54
	“General” Interpersonal Skills	1,226	8	.30	.36	.24	.25	.46	.06	.66	12.68
	Knowledge of Interpersonal Skills	553	2	.21	.26	.05	.21	.31	.19	.33	61.98
Openness to Experience	Communication	488	4	.09	.11	.10	.04	.18	-.02	.24	51.88
	Relationship- Building	1,010	7	.09	.11	.14	.05	.19	-.06	.30	35.20

Personality Variable	Interpersonal Skill	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI_{ρ} 10%	CI_{ρ} 90%	10% CV	90% CV	% Var. Acct. ^b
	“General” Interpersonal Skills	524	3	.01	.01	.08	-.05	.06	-.09	.11	56.69
	Knowledge of Interpersonal Skills	553	2	.24	.29	.09	.21	.37	.18	.41	38.12

Note. *k* = number of correlation coefficients on which each distribution was based; \bar{r} = mean observed correlation; ρ = estimated true correlation between the predictor construct and the relevant criterion (fully corrected for measurement error in both the predictor and criterion); SD_{ρ} = estimated standard deviation of the true correlation; CI_{ρ} 10% = lower bound of the confidence interval for estimated true correlation; CI_{ρ} 90% = upper bound of the confidence interval for estimated true correlation; 10%CV = lower bound of the credibility interval for each distribution; 90% CV = upper bound of the credibility interval for each distribution; % Var. Acct. = percentage of observed variance accounted for by statistical artifacts.

^a An SD_{ρ} of zero indicates that the real variance of the true correlation is zero. In other words, there is only one value of the true correlation underlying all the studies. This result is a consequence of the percentage of variance by accounted for by statistical artifacts estimate being greater than 100%, and also indicates that there should be no additional moderators operating for this analysis.

^b The percentage of variance accounted for by statistical artifacts being greater than the theoretical maximum value of 100% indicates that sampling error and other study artifacts explain all of the observed variation in the effect sizes across studies. The estimated value is greater than 100% because of second-order sampling error.

Table 4
Analysis of the Relationships between Interpersonal Skills and Outcomes

Interpersonal Skills	Outcome	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI_{ρ} 10%	CI_{ρ} 90%	10% CV	90% CV	% Var. Acct. ^b
Interpersonal Communication Skills	Cognitive	3,164	13	.34	.44	.21	.37	.52	.17	.71	11.99
	Affective	3,575	22	.24	.30	.25	.23	.36	-.02	.61	12.34
	Skill-Based	6,443	34	.27	.33	.22	.28	.38	.05	.61	12.92
Relationship-Building Interpersonal Skills	Cognitive	673	6	.01	.02	.11	-.04	.08	-.12	.16	53.19
	Affective	3,257	21	.21	.26	.14	.22	.30	.08	.44	31.30
	Skill-Based	5,744	40	.27	.33	.22	.29	.37	.05	.61	16.64
“General” Interpersonal Skills	Cognitive	1,380	8	.23	.28	.18	.20	.37	.05	.51	20.96
	Affective	1,192	9	.18	.21	.13	.16	.27	.05	.38	37.35
	Skill-Based	7,173	31	.37	.44	.21	.39	.49	.17	.71	10.49

Note. *k* = number of correlation coefficients on which each distribution was based; \bar{r} = mean observed correlation; ρ = estimated true correlation between the predictor construct and the relevant criterion (fully corrected for measurement error in both the predictor and criterion); SD_{ρ} = estimated standard deviation of the true correlation; CI_{ρ} 10% = lower bound of the confidence interval for estimated true correlation; CI_{ρ} 90% = upper bound of the confidence interval for estimated true correlation; 10%CV = lower bound of the

credibility interval for each distribution; 90% CV = upper bound of the credibility interval for each distribution; % Var. Acct. = percentage of observed variance accounted for by statistical artifacts.

^a An SD_p of zero indicates that the real variance of the true correlation is zero. In other words, there is only one value of the true correlation underlying all the studies. This result is a consequence of the percentage of variance by accounted for by statistical artifacts estimate being greater than 100%, and also indicates that there should be no additional moderators operating for this analysis.

^b The percentage of variance accounted for by statistical artifacts being greater than the theoretical maximum value of 100% indicates that sampling error and other study artifacts explain all of the observed variation in the effect sizes across studies. The estimated value is greater than 100% because of second-order sampling error.

Table 5
 Analysis of the Efficacy of Interpersonal Skills Training

Training Type	Outcome	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI $_{\rho}$ 10%	CI $_{\rho}$ 90%	10% CV	90% CV	% Var. Acct. ^b
All Interpersonal Skills Training	Interpersonal Skills Outcomes	1,482	27	.47	.52	.21	.47	.57	.25	.79	24.49
Lecture	Cognitive	74	1	.01	-	-	-	-	-	-	-
	Affective	-	-	-	-	-	-	-	-	-	-
	Skill-Based	-	-	-	-	-	-	-	-	-	-
Lecture + Discussion	Cognitive	-	-	-	-	-	-	-	-	-	-
	Affective	-	-	-	-	-	-	-	-	-	-
	Skill-Based	-	-	-	-	-	-	-	-	-	-
Process Intervention	Cognitive	-	-	-	-	-	-	-	-	-	-
	Affective	80	1	.41	-	-	-	-	-	-	-

Training Type	Outcome	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ} ^a	CI _{ρ} 10%	CI _{ρ} 90%	10% CV	90% CV	% Var. Acct. ^b
Behavioral Modeling Training	Cognitive	307	4	.44	.52	.28	.34	.70	.16	.88	13.59
	Affective	208	3	.25	.32	.14	.22	.43	.14	.51	53.08
	Skill-Based	829	12	.42	.47	.26	.38	.57	.14	.81	19.94

Note. *k* = number of correlation coefficients on which each distribution was based; \bar{r} = mean observed correlation; ρ = estimated true correlation between the predictor construct and the relevant criterion (fully corrected for measurement error in both the predictor and criterion); SD_{ρ} = estimated standard deviation of the true correlation; CI _{ρ} 10% = lower bound of the confidence interval for estimated true correlation; CI _{ρ} 90% = upper bound of the confidence interval for estimated true correlation; 10%CV = lower bound of the credibility interval for each distribution; 90% CV = upper bound of the credibility interval for each distribution; % Var. Acct. = percentage of observed variance accounted for by statistical artifacts.

^a An SD_{ρ} of zero indicates that the real variance of the true correlation is zero. In other words, there is only one value of the true correlation underlying all the studies. This result is a consequence of the percentage of variance by accounted for by statistical artifacts estimate being greater than 100%, and also indicates that there should be no additional moderators operating for this analysis.

^b The percentage of variance accounted for by statistical artifacts being greater than the theoretical maximum value of 100% indicates that sampling error and other study artifacts explain all of the observed variation in the effect sizes across studies. The estimated value is greater than 100% because of second-order sampling error.

Table 6
 Analysis of Job Complexity as a Moderator of the Relationship between Interpersonal Skills and Outcomes

Interpersonal Skills	Job Complexity	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ}^a	CI $_{\rho}$ 10%	CI $_{\rho}$ 90%	10% CV	90% CV	% Var. Acct. ^b
All Interpersonal Skills	High Complexity	6,077	29	.34	.41	.19	.37	.46	.17	.65	15.94
	Medium Complexity	1,874	10	.25	.33	.15	.27	.39	.13	.52	27.98
	Low Complexity	1,534	11	.19	.22	.17	.16	.29	.01	.44	24.58
Interpersonal Communication Skills	High Complexity	3,361	19	.20	.25	.16	.21	.30	.05	.45	25.10
	Medium Complexity	215	2	.11	.14	.13	.02	.26	-.03	.31	44.44
	Low Complexity	314	2	.14	.17	.00	.17	.17	.17	.17	721.45
Relationship-Building Interpersonal Skills	High Complexity	1,476	17	.18	.23	.19	.17	.29	-.02	.47	32.25
	Medium Complexity	1,255	6	.31	.36	.10	.31	.42	.23	.50	34.48
	Low Complexity	641	4	.16	.20	.09	.14	.26	-.18	.57	9.34

Interpersonal Skills	Job Complexity	<i>N</i>	<i>k</i>	\bar{r}	ρ	SD_{ρ} ^a	CI _{ρ} 10%	CI _{ρ} 90%	10% CV	90% CV	% Var. Acct. ^b
“General” Interpersonal Skills	High Complexity	4,703	13	.44	.51	.13	.47	.56	.35	.68	17.67
	Medium Complexity	520	3	.12	.13	.01	.12	.14	.11	.14	97.16
	Low Complexity	890	7	.19	.22	.02	.21	.23	.20	.25	95.78

Note. *k* = number of correlation coefficients on which each distribution was based; \bar{r} = mean observed correlation; ρ = estimated true correlation between the predictor construct and the relevant criterion (fully corrected for measurement error in both the predictor and criterion); SD_{ρ} = estimated standard deviation of the true correlation; CI _{ρ} 10% = lower bound of the confidence interval for estimated true correlation; CI _{ρ} 90% = upper bound of the confidence interval for estimated true correlation; 10%CV = lower bound of the credibility interval for each distribution; 90% CV = upper bound of the credibility interval for each distribution; % Var. Acct. = percentage of observed variance accounted for by statistical artifacts.

^a An SD_{ρ} of zero indicates that the real variance of the true correlation is zero. In other words, there is only one value of the true correlation underlying all the studies. This result is a consequence of the percentage of variance by accounted for by statistical artifacts estimate being greater than 100%, and also indicates that there should be no additional moderators operating for this analysis.

^b The percentage of variance accounted for by statistical artifacts being greater than the theoretical maximum value of 100% indicates that sampling error and other study artifacts explain all of the observed variation in the effect sizes across studies. The estimated value is greater than 100% because of second-order sampling error.

APPENDIX C: CODING SCHEME

Coding Scheme

Category	Description
Citation	Full APA-style reference
Hypothesis Area	(1) Antecedents, (2) IPS & Outcomes, (3) Training, (4) Job Complexity
Publication Type	e.g., Journal Article, Conference, Technical Report, Dissertation
Study Setting	Lab, Field, or Hybrid
Nature of Organization and Participant Sample	Description of organization and sample
Sample Characteristics	Students vs. Organizational Employees

Category	Description
Job Complexity	High—levels 1 and 2; Medium—level 3; Low—levels 4 and 5
<i>N</i>	Training vs. control group; gender breakdown
Study Design Type	Single group posttest only [SGPO] single group pretest-posttest comparison [SGPP], pretest-posttest with control group [PPWC], posttest only with control group [POWC], other
Antecedents Examined	Gender, personality
Antecedent Reliability	(r_{xx}) and Source of Estimate (reliability estimate, type, and source of estimate [self, observer, automated])
IPS Examined	(1) Communication, (2) Relationship-Building, (3) "General", (4) IPS knowledge [describe exact IPS where possible]

Category	Description
Predictor / IPS Reliability	(r_{xx}) and source of estimate (reliability estimate, type, and source of estimate [self, observer, automated])
IPS -or- Training	Generic, non-IPS cognitive, affective, skill-based [for team level outcomes, indicate if skill-based
Outcomes Examined	outcomes are process or performance]
Criterion Reliability	(r_{yy}) and source of estimate (reliability estimate, type, and source of estimate [self, observer, automated])
Type of Training	Name and explain
Intervention	
Method of Training	Lecture, lecture + discussion, process intervention, BMT
Intervention	

Category	Description
Method of Training Intervention	Additional description
Level of Analysis	Individual, group / team, unit / organization
Effect Size(s)	r_{xy} ; -or- F , t , χ^2 , z , d ; -or- means, SDs , & N
Recommendation for Inclusion?	Yes / No Recommendation
Additional Comments	Add additional instructions, when relevant

ENDNOTES

¹ A number of other demographic and psychological variables have been examined as possible antecedents of IPS. For example, both age (e.g., Althoff & Ashkanasy, 2004; Tung, 1998) and emotional intelligence (e.g., Althoff & Ashkanasy, 2004; Rapisarda, 2002) have been the focus of investigation in studies also examining IPS. However, upon a review of the literature in this area, there are too few empirical studies which investigate these relationships to allow for the development of formal hypotheses in the current research. That is, while a few previous studies have investigated whether measured levels of IPS are positively correlated with age or emotional intelligence, there is generally not as much support in the literature for these links as there are for links with gender or personality traits. In addition, there is little theoretical rationale for making predictions concerning how age might serve as an antecedent variable to the effective display of IPS. In the case for EI as an antecedent variable, two issues are problematic. First, there is disagreement in the literature concerning whether to view EI as trait-based or ability-based. To be considered as an antecedent variable, it would be more convenient to view EI from a trait-based perspective. At the same time, EI behaviors in the form of empathy are considered to be a distinct subset of the interpersonal or social skills that are under investigation in the current research. Thus, as is the case with age, EI will also not be formally examined as an antecedent to IPS in the current research.

² It is acknowledged that the study by Kraiger and colleagues (1993) was put forward as a way to better evaluate learning outcomes from training. Specifically, they discuss how the learning “level” from Kirkpatrick’s famous taxonomy should be further divided into cognitive, skill-based, and affective outcomes. They further break down each of these outcomes into additional categories (i.e., cognitive—verbal knowledge, knowledge organization, cognitive strategies;

skill-based—compilation, automaticity; and affective—attitudinal, motivational). For the purposes of the current research, only the higher level outcomes will be addressed (i.e., cognitive, skill-based, affective). Thus, in this research the broader labels of cognitive, affective, and skill-based will be employed to assist in further dividing individual and team outcomes from training.

³ Taylor and colleagues (2005) found four studies assessing declarative knowledge of both supervisory and teamwork skills, 27 studies examining procedural knowledge of interpersonal communication skills in supervisory or teamwork settings, 46 studies assessing attitudes related to supervisory and teamwork skills, 57 studies investigating the effects of BMT on supervisory or teamwork-related job behaviors, 33 studies examining workgroup productivity following supervisory training, and 36 studies assessing workgroup climate following supervisory training.

⁴ Later, Ghiselli (1973) also discussed various job families (e.g. manager, service worker, vehicle operator), arranged in order of decreasing cognitive complexity of job requirements.

⁵ Hunter, Schmidt, and Le (2006) later replicated this research, using the same five job families. The principle finding from this research was that previous meta-analyses had underestimated the correlation between *g* and job performance by as much as 25%. The new, more accurate numbers were derived through the use of corrections for indirect range restriction.

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