

**Person and Professional Program Determinants of Health Provider Student Attitudes  
toward Inter-professional Teamwork**

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Person and Professional Program Determinants of Health Provider Student Attitudes toward  
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## Summary

Health provider student characteristics and professional program were evaluated as predictors of attitudes toward inter-professional (IP) teams. Sixteen months after completing a self-report battery of demographic and non-ability trait measures, participants completed a second survey ( $N = 213$ ), assessing components of attitudes toward IP teams. Non-ability traits showed comparable within-program predictive validities for affective reactions toward IP behavior. Additionally, results indicated the incremental predictive validity of trait Dominance and Motivational Inter-professional Team Intelligence, over professional program, for IP attitudes and affective reactions toward IP behavior, respectively. The independent, relative, and joint roles of non-ability individual differences and professional program as determinants of IP training outcomes are discussed.

## **Chapter 1**

### **Introduction**

The use of collaborative, inter-professional (IP) teams in the healthcare industry has increased dramatically over the past few decades (e.g., see McCallin, 2001). The Institute of Medicine defines an inter-professional team as, “a team composed of members from different professions and occupations with varied specialized knowledge, skills, and methods” (p.54). Distinguished from more traditional healthcare teams by their shared decision-making processes, IP teams occupy nearly every aspect of healthcare delivery, ranging from the operating theatre (Aggarwal, Undre, Moorthy, Vincent, & Darzi, 2004) to the emergency room (Hooker, Cipher, Cawley, Hermann, & Melson, 2008). Although IP healthcare teams offer many advantages for the quality of patient care compared to conventional, non-patient-centered approaches, the effectiveness of healthcare teams critically depends on teamwork skills and the extent to which team members with different professional backgrounds work well together (Hilton, 1995). Teams in the healthcare domain are typically composed of an array of professionals (e.g., physician, nurse, medical technologist), who not only have had different training experiences maintaining different areas of expertise, but trained in isolation from their future team members. “In most higher education institutions, health professionals are trained separately with minimal interaction with other health professional trainees. This undoubtedly affects the socialization processes...” (Oandasan & Reeves, 2005, *p. 40*).

A large body of research on modern teams suggests that effective teamwork among persons with different backgrounds requires the development of a common goal, a clear action plan, and effective communication patterns (e.g., see Kanfer & Kerry, 2011; Salas, Weaver, DiazGranados, Lyons, & King, 2009); often only achieved through explicit training directed



toward building a common set of IP teamwork skills. Accordingly, a large portion of research to date on IP teamwork has focused on the effectiveness of specific IP team training strategies, such as Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS; Guimond, Sole, & Salas, 2009), work design (Niazkhani, Pirnejad, de Bont, & Aarts, 2008; Reeves & Freeth, 2003), and use of checklists (Winters et al., 2009) for IP team skill learning and performance. However, less attention has been given to understanding the role of person characteristics on the development of IP team attitudes.

### *Role of attitudes toward IP teamwork*

Research on the factors that affect the development of effective IP teamwork skills has increased dramatically during the past decade (Reeves, Lewin, Espin, & Zwarenstein, 2010) following a seminal report by the Institute of Medicine (IOM, 2000) that estimated the root cause of all medical errors in patient care and safety could be traced to problems in teamwork. The IOM (2000) report stressed the critical importance of effective IP teamwork for assuring patient safety and positive patient outcomes. In 2003, the IOM went one step further and advised that “All healthcare professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics.” (IOM, 2003, p.3). As a consequence of the IOM recommendations, health educators across the U.S. began building IP team training programs into their curriculum (see, for example, Barr, Koppel, Reeves, Hammich, & Freeth, 2005; Hammich, Freeth, Koppel, Reeves, & Barr, 2007).

The implementation of IP education (IPE) programs in professional healthcare training represents a paradigmatic shift from the “silo” approach to training that has dominated healthcare

training for decades (WHO, 1988). Not surprisingly, attitudes toward IP teamwork training have varied. As Barr and Ross (2006) state, “Conventional wisdom that IPE is better left until after qualification has been swept aside as the case for collaborative practice has become ever more compelling” (Barr & Ross, 2006, *p.* 96). To facilitate progressive IP training, health provider educators have focused more attention on including curricular components aimed at improving student attitudes toward IPE and teamwork skill training (Areskog, 1998; Pollard & Miers, 2008).

To date, research evidence on the determinants and consequences of IPE has been scattered. Many studies have been conducted on the effectiveness of specific inter-professional teamwork training programs among working professionals in a variety of healthcare settings, for example, in surgery (Kennedy, 2001; Kitto, Gruen, & Smith, 2009) and neonatal units (Rogowski et al., 2001; see, Martin-Rodriguez, Beaulieu, D’Amour, & Ferrada-Videla, 2005; Zwarenstein, Reeves, & Perrier, 2005 for a review), and on professional differences in attitudes toward inter-professional collaboration, particularly among physicians and nurses (e.g., Hojat et al., 2003; see, Hammick, Freeth, Koppel, Reeves, & Barr, 2007, for a review). Research on IP attitudes and team training has also tended to focus on either person or professional influences, but rarely on both factors. For example, a budding research literature provides evidence for the role of individual differences in non-ability traits on learning outcomes and performance within a discipline, for example, medicine (see, Doherty & Nugent, 2011), and a few studies further show mean differences on trait measures across disciplines (e.g., Pihl & Spiers, 1977). Other studies have examined the impact of professional affiliation on IP team training effectiveness (e.g., McFadyen, Webster, Maclaren, & O’Neill 2010; Aarnio, Nieminen, Pyorala, & Lindblom-Ylanne, 2010). Taken together, findings from these studies suggest that both person and

professional affiliation are likely to play a role in IP team training outcomes. However, to date, there has been no research investigating both the independent and joint role that these factors play in IP attitudes as a result of IP training. This research addressed this gap in the literature by simultaneously examining person (trait) and context (professional program) influences on healthcare student attitudes toward IP teams.

### *Attitudes as an outcome of IP team training*

Interest in student attitudes toward IP teams is relatively recent, and reflects widely-held beliefs in the healthcare community that team member attitudes toward IP teams are critically related to IP team effectiveness. Hammick (2000), for example, developed a set of performance criteria for assessing the effectiveness of IP team education that explicitly recognizes the modification of trainee attitudes and perceptions as an early step in the development of IP team competencies.

The concern regarding attitudes toward IP teamwork as a foundational element of IP teamwork skill training is further reflected in controversy regarding when healthcare trainees should be provided IP team training (Carlisle, Cooper, & Watkins, 2004); Parsell & Bligh, 1998). For example, Carpenter (1995) evaluated the impact of a one-day program intended to improve medical and nursing students' attitudes toward one another. A pre-post test design was employed in order to assess students' attitudes toward their own profession (in-group), as well as attitudes toward the other profession (out-group). Results indicated that, while perceptions of one's own profession changed very little over the IP course ( $d < .2$ ), out-group attitudes significantly increased for both medical ( $d = .34$ ) and nursing students ( $d = .67$ ). Carpenter (1995) concluded that early IP team training may attenuate some of the early biases held by

students prior to matriculating into their professional programs. Carpenter (1995) further suggested that failure to redress these attitude biases early in professional education may exacerbate ineffective communication between members of different professions in later IP team environments.

In contrast to the early intervention perspective, Funnell (1995) proposed that compelling healthcare students from different professions to interact before a clear identity is established may engender feelings of anxiety and role insecurity. This argument is reflective of the notion of *distinctiveness threat*, proposed by Hewstone and Brown (1986), who hypothesized that nascent members of a group (e.g., students early in their professional training) would prefer clear group boundaries that maximize (rather than minimize) distinctions among themselves and members of other groups. From a distinctiveness threat perspective, IPE early in training may elicit negative affect and consequently exert a negative impact on anticipated future interactions.

Notwithstanding this position, the most recent, best-evidence systematic review of the IP literature conducted by Hammick, Freeth, Koppel, Reeves, and Barr (2007) concluded that 86% of studies found positive student reactions toward IP initiatives. Hammick et al. (2007) summarize, “reactions may not directly relate to an impact on professional behaviour or service, but may create a good foundation for developing a positive attitude to IPE and working with others” (p.17). While there is some evidence for discipline-based differences in IP attitudes (McFaden et al., 2010), extant research has yet to consider the role of person variables.

*Relevant personality traits for predicting IP team attitudes*

While there is a considerable history of individual non-ability predictors of medical school success (Gough & Hall, 1975; Johnson & Hutchins, 1966; Knehr & Kuhl, 1959), most early studies operationalized success as graduation versus attrition. For example, the American Association of Medical Colleges (AAMC) commissioned a report to address attrition rates of medical students, which had increased from an average of 7.7% in the early 1950s to over 10% in the early 1960s (Johnson & Hutchins, 1966). Factors that were identified as contributing to rising attrition rates included state and program differences, as well as individual demographic variables evaluated in IP research today ( e.g., age, gender, parental occupation etc.) In addition to demographic determinants of medical school dropouts, Johnson and Hutchins (1966) found, in a national sample of 2,812 students, that dropouts scored significantly lower on the Achievement subscale of Edwards Personal Preference Schedule (1954), relative to graduates. Conversely, medical school graduates scored significantly higher than dropouts on the Deference and Order subscales.

In a similar example, Gough and Hall (1975) aggregated data across nine classes of medical students from 1959 – 1971 at the University of California, San Francisco School of Medicine. Again, mean differences were evaluated between graduates and dropouts on multiple measures. In addition to higher Medical College Admissions Test scores and undergraduate grade point averages for graduates, relative to dropouts, Gough and Hall (1975) also found that graduates scored significantly higher on the Responsibility ( $d = .4$ ), Socialization ( $d = .69$ ), and Communality ( $d = .78$ ) subscales of the California Personality Inventory.

Despite early evidence for the significant relationships between psychological variables and medical school completion, few studies have been conducted on the predictability of more

specific, multifaceted performance criteria, such as inter-professional teamwork attitudes and performance. Some exceptions that are relevant to the current study are reviewed below.

Building on advances in the personality psychology domain, in particular, the development of the five-factor model (FFM) of personality, studies have been conducted to evaluate the role of personality traits on professional performance within a healthcare discipline. Ferguson, Sanders, O’Hehir, and James (2000) examined the predictive validity of first-year medical students’ personal statements (PS), past academic performance (PAP), and personality traits, as assessed using the FFM model, on first-year medical school performance using Ackerman’s (1996) PPIK (Intelligence-as-Process, Personality, Interests, and Intelligence-as-Knowledge) theory as a framework. Ferguson et al. (2000) predicted that individual differences in personality would exhibit incremental validity for performance over demographics and students’ PAP. Ferguson et al. (2000) found positive significant relationships between conscientiousness and all performance criteria ( $r = .17 - .44$ ). Interestingly, students’ PAP was positively associated with conscientiousness, but was not associated with performance of clinical (non-classroom) skills. Results of a hierarchical regression analysis further indicated that conscientiousness provided significant incremental predictive validity for only first-year academic performance, beyond variance accounted for by demographics, PS, and PAP ( $f^2 = .21$ ). Ferguson et al., (2000) concluded that, “... the association with C [conscientiousness] may be of great importance to medicine as it may relate to a set of traits that addresses the variety of skills needed in medicine.” (p. 339). The authors suggested that future researchers consider the potential effects of both trait facets and trait complexes on various performance criteria.

In their review of the research literature on the role of personality traits and medical training on performance between 2000 and 2010, Doherty and Nugent (2011) identified seven

longitudinal, multi-year studies that examined the relationship between personality characteristics and various medical training criteria. The authors also noted the robustness of conscientiousness as a predictor of both long-term academic success and vulnerability to stress when accompanied by either low levels of extraversion or high levels of neuroticism. Further, Doherty and Nugent (2011) underscored the growing importance of “social traits,” such as sociability, in clinical settings. A more detailed review of the three most relevant studies summarized by Doherty and Nugent (2011) is provided below.

Lievens, Coetsier, De Fruyt, and Maeseneer (2002) examined data from a nation-wide longitudinal study across the five medical schools of Belgium. They found that individual differences in conscientiousness, as measured by the NEO-PI-R, provided positive incremental predictive validity for end-of year performance over extant selection factors (including a comprehensive admissions examination, comprised of cognitive ability and simulation-based tests) across medical students’ first 3 years of training ( $r = .24, .17, \text{ and } .19$ , respectively). Specifically, conscientiousness accounted for an additional 6% of the variance in Year-1 performance, 3% in Year-2 performance, and 5% in Year-3 performance over the other selection devices.

In a follow-up study, Lievens, Ones, and Dilchert (2009) extended their analyses of their medical student sample through all 7 years of medical training to examine if personality increased in predictive validity over medical school training. Lievens et al. (2009) found that individual differences in conscientiousness, extraversion, and openness accounted for 5% of the variance in first-year performance, compared to an increase to 32% of variance in performance at Year 7. Lievens et al (2009) concluded that grade point average (GPA) may be a better predictor

of early medical school training, but that individual differences in personality traits become increasingly important as one moves from the classroom to an applied setting.

A study by Ferguson, James, O’Hehir, Sanders, and McManus (2003) evaluated the impact of medical students’ PAP, reference letters and personal statements, and five factors of personality, as measured by Goldberg’s bipolar adjectives, on performance across 5 years of medical training. After accounting for PAP and both reference letter and personal statement information, measures of personality added significant variance to the prediction of students’ performance across all three assessment periods: pre-clinical (Years 1-2;  $f^2 = .67$ ), biomedical (Year 3;  $f^2 = .62$ ), and clinical (Years 4 -5;  $f^2 = .18$ ).

Taken together, these longitudinal studies show the importance of personality in the prediction of medical school performance. However, these studies do not permit evaluation of how individual differences in non-ability traits may affect ancillary aspects of professional learning and performance, such as attitudes toward IP teams and the development of effective teamwork skills.

In my review of the interprofessional literature, I found four studies that examined the impact of personality characteristics on collaborative professional activities undertaken during healthcare training. Pihl and Spiers (1977) examined the relationship between individual differences in personality, using Jackson’s (1965) personality research form (PRF), and performance in a Therapeutic Multidisciplinary Team (TMT), comprised of psychologists, physical therapists, social workers, and occupational therapists working in a rehabilitation setting. Phil and Spiers (1977) found mean-profession difference on Dominance and Succorance (*Cohen’s*  $f = .37$  and  $.39$ , respectively). Pihl and Spiers (1977) summarized that the effectiveness



of an interprofessional team may be more influenced by consonant personalities than skill differentiation.

In a more recent qualitative study, Leever, Hulst, Berendsen, Boendemaker, and Roodenburg et al. (2010) examined individual differences in personality and conflict management style in physician-nurse collaborations. Leever et al. (2010) conducted in-depth, semi-structured interviews with physicians and nurses in a single ward of a medical university hospital. After a multi-step coding procedure of interviews (Strauss & Corbin, 1998), results indicated both person- and context-based categories of determinants affecting one's choice of conflict management style. Among the person-based determinants of conflict management style was extraversion, self-confidence, and experience. However, the qualitative nature of these data precluded the calculation of effect sizes.

In another qualitative study, Pollard (2008) examined nursing students' experience of interprofessional learning in their clinical placements during training. A combination of behavioral observation (formal and non-formal interprofessional interaction) and semi-structured interviews was employed to assess factors affecting students' interprofessional experiences. Pollard reported that nursing students' interprofessional experience varied widely as a function of three factors: differing professional cultures, mentors' support for interprofessional engagement, and nurse personality. Specifically, Pollard (2009) discussed how each professional culture varied as to students' exposure to interprofessional working, both in quantity (e.g., frequency, variety) and quality (e.g., formal / informal meetings). Pollard (2009) also noted that mentor expectations and support for interprofessional working varied widely across professions, from minimally interactive to fully collaborative. Lastly, Pollard (2009) noted that students' own attitudes and personality seemed to orient them toward more or less interprofessional

engagement. This last finding underscores the potential importance of individual differences in decisions to participate in IP collaborations in practice, particularly in settings where other meso- (ward, hospital) or macro (provider, government system) -level variables are unfavorable (D'Amour and Oandasan, 2005). Again, the qualitative nature of these data precludes effect size calculations of these individual differences.

A quantitative study conducted by Hojat et al. (2005) examined the relationship between individual differences in physician empathy with personality, as measured by a shortened version of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ). Interprofessional teamwork and empathy are similar in that they both constitute elements of medical professionalism, deemed quantifiable by Veloski & Hojat, 2006. In a sample of 422 first-year medical students, Hojat et al. (2005) found that empathy was significantly correlated with ZKPQ sociability ( $r = .15$ ) and aggression-hostility ( $r = -.13$ ). These results are consistent with earlier findings by Hojat et al. (2002) that showed students who received high faculty ratings on clinical competence, relative to students receiving low and mid-level competency ratings, also scored significantly higher on empathy ( $d = .39$ ). A related study by Ward et al. (2008) employed an adapted version of the empathy measure in a sample of 333 undergraduate nursing students and found a positive relationship between empathy and attitudes toward physician-nurse collaboration ( $r = .38$ ), as measured by the Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (Hojat et al., 1999).

Although there have been few studies investigating the role of personality traits on inter-professional competencies, the pattern of findings obtained to date suggests that individual differences in non-ability traits related to interpersonal orientation and style may provide predictive validities for the development of IP attitudes among students engaged in IP healthcare

training. The following section outlines two paradigms in contemporary psychological research that lead to hypothesized relationships with student IP attitudes.

*Characteristics that may determine attitude toward IP teamwork*

Over the past 15 years, personality and organizational scholars have noted that the broad personality traits assessed using the FFM model may provide partial, but incomprehensive assessment of behavior-related person characteristics (Ones & Viswesvaran, 1996). Two disparate research streams have generated evidence for the use of personality markers, beyond the purview of the Big Five factors: (1) studies comparing the predictive validities of broad personality trait measures with specific facet measures (Ones, Viswesvaran, & Dilchert, 2005) and (2) studies investigating the predictive validities of trait complexes (e.g., Ackerman, 1996; Ackerman and Heggestad, 1997; Rolfhus & Ackerman, 1999). These two avenues of research are briefly reviewed below.

The value of facet-level predictive validities, compared to broader personality factors, has been theoretically explicated (Barrick, Mount, & Judge, 2001), and empirically demonstrated in a variety of research fields (Booth-Butterfield & Booth-Butterfield, 2002; Dudley, Orvis, Lebiecki, & Cortina, 2006). For instance, Dudley et al.'s (2006) meta-analytic investigation into the conscientiousness-job performance relation revealed that narrower traits subsumed by conscientious showed comparable, if not stronger, predictive validity for specific dimensions of performance across jobs (e.g., contextual, counterproductive behavior). In the communication research domain, Booth-Butterfield and Booth-Butterfield (2002) examined how affective orientation (AO) mapped onto the FFM of personality. As a stable processing pattern, AO is related to the awareness, appraisal, and regulation of one's own emotions, particularly in interpersonal communication settings. Using a sample of 234 undergraduates, Booth-Butterfield

and Booth-Butterfield (2002) demonstrated the factorial independence of AO from the factor-level of personality, as measured by the short form of the NEO-FFI (Costa & McCrae, 1992). The authors reasoned the relational overlap of facets underlying, both neuroticism and extraversion, and AO concluding that "...AO exists at a lower order of abstraction" (p.309).

Consistent with the findings suggesting the importance of individual differences in traits that pertain to interpersonal interactions and styles for IP team training outcomes, Schneider, Hough, and Dunnette (1996) noted that measures of extraversion may be too broad for capturing individual differences in interpersonal styles that might affect IP learning. Furthermore, a growing consensus among researchers advocates the specification of narrow, theoretically relevant predictors for concomitant criteria (Burch and Anderson, 2008).

A second line of research examining the potential utility of personality assessment beyond the the Big Five framework comes from the evaluation of 'trait complexes'(see, Ackerman and Beier, 2003). As described by Ackerman and Beier (1997), trait complexes refer to non-trivial relational overlap of ability, personality, and interest variables that "affect the direction and intensity of the investment of cognitive effort...in the breadth and depth of knowledge / expertise acquired during adulthood" (p.4). Preliminary evidence for the trait complex framework was provided by Ackerman and Heggestad (1997) in a meta-analysis of ability, personality, and interest relations.

More specifically, the trait complex approach suggests that individual differences in cognitive abilities and non-cognitive traits may be usefully organized in a common framework that capitalizes on corresponding person attributes. For purposes of the present research, from the trait complex, I infer that attitudes toward inter-professional education may be best represented in terms of a complex of non-cognitive factors, rather than a single broad trait or its

constituent components. Specifically, I employ the construct of cultural intelligence in terms of a trait complex comprised of multiple, related narrow trait tendencies.

In the following section, I propose both a facet trait characteristic (e.g., dominance) and a trait complex (e.g., cultural intelligence) that may provide predictive validities for attitudes toward IP teamwork as a specific IP team training outcome.

### Dominance.

Cattell (1949; Cattell & Schuerger, 1999) defined dominance as “a broad, temperamental disposition to being assertive and forceful in approaching one’s environment...” (p. 60). Similarly, Gough, McClosky, and Meehl (1951) defined a person high in dominance as someone who “maintains a high level of self-confidence...” and “...does not seem to be plagued by self-doubts...” (p. 362). In the FFM personality paradigm, dominance is typically conceptualized as a facet of extraversion (McCrae & Costa, 1989). In the broader personality literature, research on individual differences in dominance indicate a positive relationship between trait dominance and proactivity (Bateman & Crant, 1993;  $r = .45$ ), leader emergence (Lord, De Vader, & Alliger, 1986;  $r = .13$ ), and valuing of sociability over competency in others (Operario & Fiske, 2001; *Cohen’s  $f = .46$* )

In contrast to personality conceptions of dominance, dominance in the healthcare domain has traditionally been regarded as a structural feature that characterizes inherent professional hierarchies (e.g., ‘medical dominance’) (Freidson, 1970; Gaier & Hartery, 2001) and acts as a barrier to collaboration (Katzman & Roberts, 1988). Indeed, a keyword search in three medical journals (*Medical Teacher*, *Journal of Interprofessional Care*, and *Social Science and Medicine*) returned 1163 hits for professional dominance, whereas a sum of both “trait dominance” and “personality dominance” searches yielded only 460 hits. The disproportionate treatment of

dominance as a structural variable may have obscured the impact of individual differences in dominance on effective inter-professional relations or other IPE outcomes. One related exception is a nursing study that investigated the relationship between perceived communication styles and outcomes of physician-nurse interactions. Coeling and Cukr (2000) recruited 65 nursing students who worked in various in-patient sites. At the end of a communication class, in which various communication styles were taught, participants were instructed to recall and rate the communication style used in their latest physician interaction. Descriptors for the three communication styles of interest (dominant, contentious, and attentive) were provided to guide participants' responses in recalling the relative use of each communication style. The three outcome variables of interest were perceived collaboration, perceived quality of patient care, and interaction satisfaction. Coeling and Cukr (2000) found that nurses who recalled physicians' use of non-dominant communication style, compared to dominant, indicated significantly higher perceived levels of collaboration ( $d = .63$ ), quality of patient care ( $d = .6$ ), and satisfaction ( $d = .89$ ) resulting from the interaction.

In the psychological literature on teamwork, several studies show that individuals high on dominance are less likely to be perceived by other team members as collaborative or receptive (Detert & Trevino, 2010; Georgesen & Harris, 1998; Tiedens & Feragale, 2003). Bales' (1970) work on personality and interpersonal behavior synthesized relationships between numerous personality traits and observable interactions. He posited that dominant individuals are likely to be more vocal in team settings, that is, to speak first, to speak most often, and to speak with limited regard to others' input. These conjectures of pervasive vocalizations by dominant individuals have received experimental support via behavioral observation of small-group discussions (Aries, Gold, & Weigel, 1983,  $r = .66$ ; Weinstein & Hanson, 1975,  $d = .92$ ).

Piezon and Ferree (2008) evaluated the impact of team members' perceptions, in an online learning environment, on individual contributions to a group project. In a mixed sample of 227 undergraduate and graduate students, correlational analyses revealed a negative relationship between perceptions of dominance in the team and personal contribution ( $r = -.22$ ). Piezon and Ferree (2008) concluded that perceptions of dominance in a team context may engender feelings of intimidation, insecurity, or, more generally, inhibition to contribute.

Research has focused on the effects of team member dominance on team interactions and performance. Extrapolating from these findings, it is tenable to expect that healthcare professionals who score high on dominance may demonstrate lower levels of teamwork skills and be less effective in teams that require collaboration and shared or consultative decision-making. As a central tenet of IP training, collaborative learning requires individuals to both consider others' roles, and be willing to modify their own roles (Dillenbourg, Baker, Blaye, & O'Malley, 1995). Research showing dominant individuals' devaluation of others' contributions (Georgeson & Harris, 1998) suggests that dominant individuals may be less willing to endorse IP attitudes. Relevant effect size estimates, reported earlier, were entered into a series of post-hoc power analyses in order to generate a range of estimates based on the current study's sample size. The median effect size of this range was selected as estimate for my first hypothesis, below.

Thus, I hypothesize that:

*H1: Individual differences in trait dominance will negatively predict student endorsement of attitudes toward IP teamwork (anticipated  $r = -.43$ ).*

*Cultural Intelligence.*

In addition to individual differences in dominance, cultural intelligence refers to an intelligence construct for predicting behavior in specific settings. Building on Sternberg and Detterman's (1986) four-dimensional framework of intelligence, Ang and Van Dyne (2008) defined the multi-dimensional construct of cultural intelligence (CQ) as individual differences in "an individual's capability to function and manage effectively in culturally diverse settings" (Ang & Van Dyne, 2008, *p.* 3).

Theorizing and research by Ang and her colleagues (Earley & Ang, 2003; Ng & Earley, 2006) proposed that individual differences in CQ played a significant role in expatriate adjustment among workers provided temporary assignments in foreign countries. Earley and Ang (2003) argued that effective expatriate adjustment and job performance require that individuals develop competencies in negotiating differences between the expatriates' native culture and the culture in which they are required to work. According to Ang and her colleagues, the extent to which expatriates develop cross-cultural competencies as a consequence of training is determined, in large part, by individual differences in CQ (e.g., adaptive performance). Consistent with Ackerman and Beier's (1997) notion of a trait complex and the multi-dimensional conceptualization of emotional intelligence (EQ) by Salovey and Mayer (1989), Earley and Ang (2003) conceptualized CQ as a multi-dimensional construct that captured individual differences in cognition, motivation, and affect related to cross-cultural functioning. Specifically, Earley and Ang (2003) posited four CQ dimensions; cognitive (CogCQ), motivational (MotCQ), behavioral (BehCQ), and metacognitive (MCCQ) facets.

Individual differences in the motivational CQ dimension refers to "the capability to direct attention and energy toward learning about and functioning in situations characterized by cultural differences." (Earley & Ang, 2003, *p.* 6). Persons high in MotCQ are described as intrinsically



motivated and confident to interact in cross-cultural situations (Ang & Van Dyne, 2008). MotCQ has been found to be positively related to extraversion ( $r = .29$ ), openness to experience ( $r = .28$ ), past cultural experience (Ang, Van Dyne, & Koh, 2006;  $r = .12$ ), as well as general ( $r = .32$ ), work ( $r = .35$ ), and interactional adjustment ( $r = .32$ ) of expatriates (Templer, Tay, & Chandrasekar, 2006)

Individual differences in the cognitive CQ dimension “reflects knowledge of norms practices, and conventions in different cultures...” (*p. 5*). Persons high in CogCQ are described as having more knowledge of cultural systems (e.g., economic, educational, legal) and, thus, are more adept at interacting with individuals of other cultures. Similar to the motivational facet, CogCQ has been found to be positively related to past cultural experience ( $r = .10$ ), extraversion ( $r = .29$ ), and openness to experience (Ang, Van Dyne, & Koh, 2006;  $r = .28$ ), as well as cross-cultural judgment and decision making (Ang et al., 2007;  $r = .39$ )

Individual differences in the behavioral CQ dimension “reflects the capability to exhibit appropriate verbal and nonverbal actions when interacting with people from different cultures.” (*p. 6*). Persons high in BehCQ are described as behaviorally adaptive and adept at adjusting their verbal and nonverbal communications to suit a particular cross-cultural interaction. BehCQ has been found to relate positively to past cultural experience ( $r = .12$ ), extraversion ( $r = .27$ ), and openness to experience (Ang, Van Dyne, & Koh, 2006;  $r = .24$ ), as well as to cross-cultural well being ( $r = .27$ ) and peer-rated task performance (Ang et al., 2007;  $r = .37$ ).

The potential predictive value of the CQ dimensions for student healthcare professional attitudes toward IP teamwork and IP training outcomes derives from the similarities between the interprofessional team context and the expatriate’s job context. Triandis (2006) noted, “A culturally intelligent person suspends judgment until information becomes available...” (*p.21*).

Both student healthcare professionals and expatriates are required to operate in professional cultures that differ from their own. Indeed, Cameron (2011) noted that many of the professional boundaries in healthcare settings are characterized as differences in professional cultures. Student nurses, medical students, and other health provider students are expected to adhere to norms and develop competencies within their profession in a socialization process that supports the development of a professional identity (Weaver, Peters, Koch, and Wilson, 2011). In the IP team setting, however, students must learn about other professional norms and routines in order to facilitate team processes. In many IP training programs, students from different professions learn to use a common, trans-professional language (King et al., 2008).

The similarity in setting demands imposed by performing in a foreign culture and an interprofessional healthcare team makes tenable that CQ dimensions may serve as important determinants of IP training outcomes. In this study, I build upon theory and research in CQ to develop an alternative ability measure that can be used to predict IP attitudes and outcomes in the interprofessional healthcare team setting. In accord with the distinction between applications, I refer to the modified CQ measure proposed in this study as a measure of Interprofessional Team Intelligence (ITI). Templer et al. (2006) reported effect size estimates for motivational CQ and various expatriate ‘adjustment’ variables, including attitudes and perceptions of cultural fit. These effect size estimates were entered into post-hoc power analyses in order to generate a range of estimates, based on the current study’s sample size. The median effect size is used as estimate for my second hypothesis. Consistent with findings in the CQ literature, I proposed that:

*H2: Individual differences in the motivational ITI dimension will positively predict attitudes toward IP teamwork (anticipated  $r = .45$ ).*

The effect size estimate for my third hypothesis was derived from a series of post-hoc power analyses, adjusting for current sample size, using effect sizes reported by Ang et al. (2007) between cognitive CQ and expatriate cultural judgments and decision-making processes. The median effect size is selected for my third hypothesis. Thus, I hypothesized that:

*H3: Individual differences in the cognitive ITI dimension will positively predict attitudes toward IP teamwork (anticipated  $r = .44$ ).*

The effect size estimate for my fourth hypothesis was derived from a series of post-hoc power analyses, which entered effect sizes reported by Ang et al. (2006) and Ang et al. (2007) between behavioral CQ and, past cultural experience and cross-cultural well-being, respectively. This generated a range of estimates based on the current sample size, from which the median effect size is selected.. Thus, I hypothesize that:

*H4: Individual differences in the behavioral ITI dimension will positively predict attitudes toward IP teamwork (anticipated  $r = .41$ ).*

#### *Incremental validity of person characteristics over professional affiliation*

As mentioned previously, studies investigating IP teamwork attitudes have focused on differences based on professional affiliation and do not assess individual differences in person characteristics beyond demographic variables (e.g., gender, age, experience). Findings of group differences by professional affiliation are consistent with theories of socialization (Saks & Ashforth, 1997) and professional identity (Ashforth & Mael, 1989) that propose increasing homogeneity in attitudes and behavior within professions as a function of socialization. For students early in training, however, socialization processes may be comparatively weaker and attitudes toward IP teamwork may be more strongly governed by person characteristics compared to professional affiliation. In the present study, I examined the relative influence of

professional affiliation and person characteristics among a sample of first-year health provider students. I hypothesized that each person characteristic will exhibit incremental predictive validity for IP team attitudes beyond variance accounted for by professional affiliation.

Specifically, I propose that:

*H5: Individual differences in trait Dominance, Motivational ITI, Cognitive ITI, and Behavioral ITI will each provide incremental validity for IP team attitude, beyond the variance accounted for by student professional affiliation (anticipated semi-partial  $r = .08, .10, .07,$  and  $.07,$  respectively).*

A power analysis at the  $\alpha = .05$  level indicated that, given the number of participants in the proposed sample ( $n = 213$ ), detection of my smallest anticipated effect size (*semi-partial  $r = .07$* ) could be achieved with a power of  $.88$ . The within-subjects design will reduce error variance and so facilitate detection of the smallest anticipated effect size. Because previous research has shown that gender and age-related work experience affect medical students' attitudes (Wahlqvist, Gunnarsson, Dahlgren, & Nordgren, 2010), gender and age will also be examined in all analyses. Additionally, students' ethnicity has been empirically linked with health provider students' attitudes (Hauer et al., 2010). Therefore, ethnicity will also be examined at the first step in all hierarchical analyses.

## **Chapter 2**

### **Method**

#### *Participants*

Students in the 2011-year Emory University Bachelors of Nursing (BSN) program, and the 2013-year Emory University School of Medicine (MD) program were recruited to participate in the study in conjunction with their participation in a two-session IP teamwork skill training event held jointly by the Emory University Schools of Medicine and Nursing. A total of 136 medical students and 109 nursing students completed the first survey. A total of 118 medical students and 95 nursing students completed the second survey, approximately sixteen months later, yielding a total sample size of  $N = 213$  (118 medical, 95 nursing). Twenty-nine percent of the total sample was male (43 percent MD, 11 percent BSN). Mean age of the total sample was twenty-four years (MD = 23; BSN = 25). Sixty-two percent of the total sample was Caucasian, seventeen percent Asian, eleven percent African American, four percent Hispanic, and ten percent other. Sixty-eight percent of students reported having no prior interprofessional teamwork training or experience, twenty-nine percent reported having some prior training or experience, and three percent reported having extensive prior training or experience.

A dummy coded variable incorporating two reverse-scored items was used to identify potential acquiescent responders. Specifically, individuals scoring  $> 25$  on a preliminary 5-item scale using standard scoring for two reverse-scored items were evaluated on a case-case basis for potential exclusion. This way, individuals would have had to indicate at least a 5 on the 6-point Likert-type scale across all items in order to be detected. From this dummy code procedure, fourteen participants were further examined for similar acquiescent responding across all items in the follow-up assessment. From this case-case examination, 8 of these participants (6 MD, 2

BSN) were identified as acquiescent responders and so were excluded from subsequent analyses. After standardizing both predictor and criterion scores, an additional nine participants were identified as statistical outliers ( $\pm 3$  SD from the  $\bar{x}$ ). Of these 9, 3 were unique from those identified through the acquiescence responding procedure. These 3 participants were further examined for legitimacy of their extreme scores by checking against entry error and motivated misreporting (Osborne and Overbay, 2004). Two of the 3 outliers were identified as legitimate, based on their marginal outlier qualification and relative standing on other measures ( $< 1$ SD from the  $\bar{x}$ ). One participant, however, was identified as a motivated misreporter and was excluded from further analyses. Therefore, the total number of participants for all analyses ranged from 199 - 205 ( $N = 199 - 205$ ). A second power analysis at the  $\alpha \leq .05$  level, downward adjusted for the excluded participants, indicated a reduced, but still sufficient power for detecting the smallest hypothesized effect size ( $\geq .80$ ).

### *Procedure*

Students who volunteered to participate in the study completed a study consent form and an online battery of non-ability individual difference trait measures approximately two weeks prior to the first IP teamwork training session in October, 2009. A follow-up online survey to assess student attitudes toward IP teamwork was administered approximately 16 months later. The first questionnaire, assessing students' demographics, prior experience, and non-ability traits was administered approximately six weeks after matriculation. Students who failed to complete the online questionnaire prior to the IP teamwork session were administered a paper version of the survey to complete immediately prior to the IP teamwork session. Both surveys were of comparable length, and each took approximately 15 minutes to complete. Total time required of participants to complete this study was approximately 30 minutes.

## *Measures*

### *Predictor Measures*

#### *Dominance*

Dominance was assessed with a shortened, 6-item version of Goldberg's original IPIP assertiveness scale. Though theoretical distinctions have been made between assertiveness and dominance (e.g., Ray, 1981), the IPIP assertiveness scale shows high inter-scale reliability with the dominance subscale on the California Personality Inventory ( $\rho = .92$ , Goldberg et al., 2006). Subjects responded to each item using a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item is, "I try to lead others." An overall scale score was formed by summing responses across all items. The 6-item measure is provided in Appendix A ( $\alpha = .76$ ).

#### *Cultural Intelligence*

The newly adapted Interprofessional Teamwork Intelligence (ITI; see Kanfer, Kerry, Posnock, Robertson, & Ander, 2011) measure was developed by shortening and modifying Earley and Ang's (2003) four-dimension, 20-item cultural intelligence measure. Each item was adapted to be applicable to an interprofessional health provider scenario. Subjects responded on a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree).

#### *Motivational ITI*

The motivational ITI subscale was comprised of 6 items. Five items were adapted from Earley and Ang's (2003) original measure, while one locally developed, reverse-scored item was added to increase internal reliability. A sample item is "I enjoy working with professionals from other disciplines." An overall scale score was formed by summing responses across all items on the scale. The 6-item ITI Motivation subscale is provided in Appendix B ( $\alpha = .80$ ).

### *Cognitive ITI*

The cognitive ITI subscale was also assessed with an abbreviated, adapted version of Early and Ang's (2003) original measure. A sample item is, "I know the norms for communicating information in other healthcare professions". An overall scale score is formed by summing responses across all items ( $\alpha=.79$ ). The 3-item measure is provided in Appendix C ( $\alpha = .78$ ).

### *Behavioral ITI*

The behavioral ITI subscale was assessed with a shortened, adapted version of Early and Ang's (2003) original subscale measure. A sample item is, "I change my nonverbal behavior when the situation requires it." An overall score is formed by summing all responses across items. The 5-item measure is provided in Appendix D ( $\alpha = .77$ ).

### *Criteria Measures*

Attitudinal criterion measures were developed using a two-stage process. First, a composite measure of IP teamwork attitudes, comprised of 36 items, was locally developed by adopting items from three previously developed scales designed to assess attitudes toward various aspects of IP work. These three scales were identified for their reported psychometric evidence, leading to an exception of extant instruments in the field (Gillan, Lovrics, Halpern, Wiljer, and Harnett, 2011).

The majority of items were adopted from King et al's (2010) 'Interprofessional Socialization and Valuing Scale' designed to assess the underlying socio-cultural dynamics of collaborative practice, as well as evaluate IPE training intervention effectiveness. Three subject matter experts (SMEs) wrote thirty-four items based on 3, a-priori theorized dimensions (beliefs, behaviors, and attitudes). With a convenience sample of 124 health professional students across



12 disciplines, response data were subjected to data reduction techniques (Exploratory Factor Analysis) in order to evaluate the factor structure of the instrument. This led to removal of 10 items, resulting in a 3 factors comprised of 24 items. Seventeen of the original 24 items from the final scale were adopted based on, (a) dimension representation (more than 2 items per dimension), and (b) content relevance for the student sample.

The second attitudinal measure used was McFadyen, Maclaren, and Webster's (2007) Interdisciplinary Education Perception Scale (IEPS) designed to assess changes in pre-licensure student attitudes toward, and perceptions of, IPE. The 16-item measure is comprised of three subscales (Competency and Autonomy, Perceived Need for Cooperation, and Perception of Actual Cooperation). The internal and test-retest reliabilities, as well as structural stability of the IEPS has been extensively evaluated across multiple, diverse samples with supportive reports of Cronbach alphas, weighted kappas, and confirmatory factor analyses via structural equation modeling, respectively (Mcafadyen et al., 2007). From the original 16-item measure, 9 items were used in the current study based on (a) subscale representation (at least two items per subscale), and (b) content relevance.

The third measure providing items for the current study was Heinemann, Schmitt, and Farrell's (1999) Attitudes toward Health Care Teams Scale designed to assess IP clinicians' attitudes toward, and valuing of, team-based approaches to care for improving patient outcomes. As a result of a three-phase study exploring the psychometric properties of the instrument, the original 31-item measure was reduced to 21 items, with a three-factor solution successfully replicated in each phase of the study (Quality of Care, Costs of Team Care, and Physician Centrality). This three-factor solution was further replicated in a post-licensure student sample (Hyer, Fairchild, Abraham, Mezey, and Fulmer, 2000), and so eight of the original 21 items were

employed in the current study. Because of the limited experience of the pre-licensure sample working alongside a physician, items representing the third subscale (Physician Centrality) were excluded. Eight items were selected based on (a) subscale representation ( $> 2$  items per subscale), and (b) content relevance based on the sample's pre-licensure composition.

Although the 34-item, composite measure demonstrated an acceptable internal consistency estimate ( $\alpha = .78$ ) based on comparable attitudinal measures, the items comprising the measures appeared to target different components of attitudes as described by prior theorizing and research on psychological attitudes (e.g., Albarracin, Johnson, and Zanna, 2005; Ajzen, 1985; Fishbein and Ajzen, 1974). To provide greater precision on the attitudinal criteria, I next employed the Fishbein and Ajzen (1974) model of attitudinal components, to evaluate each of the composite measure items in terms of their focus on the three major components of attitudes: namely, evaluative judgments (e.g., good/bad) about teamwork, affective reactions to teamwork, and normative beliefs about teamwork. Examination of the 34 items comprising the original composite measure yielded fifteen items related to one and only one of the three attitudinal component targets: Five items to evaluative judgments, six items to affective reactions, and four items related to subjective normative beliefs. Nineteen items were judged to be unrelated to the three components (e.g., "I have gained more realistic expectations of other professionals on a team") and were omitted from further analysis.

An exploratory factor analysis using maximum likelihood extraction was conducted with the 15 target items. The maximum likelihood procedure allows for model goodness of fit tests, as well as tests of significant variable loadings on factors in the factor matrix. A 3-factor solution was specified reflecting the a-priori hypothesized scales resulting from the review of item content. The ratio of selected variables to theorized factors ( $> 3:1$ ) permitted the joint

determination of each factor (Mulaik, 1972). In addition, the ratio of subjects to variables exceeded 10:1, providing confidence in the stability of inter-item correlations and, in turn, the anticipated factor solution (Ackerman, Schneider, & Wickens, 1982). Diagnostic statistics indicated the appropriateness of factor analysis on the current data. For example, Kaiser-Meyer-Olkins test for Sampling Adequacy was significant (.78;  $p \leq .01$ ). Additionally, Bartlett's test of Sphericity was significant ( $X^2 = 1129.29, p \leq .01$ ), indicating that the correlation matrix was not an identity matrix.

Preliminary evaluation of a Scree plot output supported the extraction of three factors (Cattell, 1966). A parallel analysis (Horn, 1965) corroborated the 3-factor solution based on a comparison between eigenvalues generated in the real data and randomly generated eigenvalues from 1000 parallel datasets. Both the mean and 95<sup>th</sup> percentile eigenvalues supported the extraction of 3 factors (O'Connor, 2000). The 3-factor solution accounted for 49% of the variance, and eigenvalues for these factors are listed in Table 1 below.

Table 1.  
Eigen Values for 3-Factor Solution

Factor	Initial	Extracted	Rotated
1	4.34 (29)	3.67 (25)	2.60
2	2.64 (18)	2.72 (15)	3.14
3	1.90 (13)	1.41 (9)	2.62

*Note.* Values in parentheses = percentage variance explained.

Item loadings on the factor matrix output was muddled and not interpretable. Because the Affective Reactions and Normative Beliefs scales are conjectured as antecedents to Attitudes (Fishbein & Azjen, 1974), I expected variable scores to associate with multiple factors, i.e., complex variables. In addition, because researchers have noted the inappropriateness of forcing an orthogonal rotation for necessarily interrelated factors (Ackerman et al., 1982; Ford, MacCallum, & Tait, 1986), the extracted factors were subsequently subjected to an oblique

(direct-oblim) rotation. The pattern matrix converged in 7 iterations and, on evaluation, indicated that all items loaded on their theorized factors ( $> .5$ ) with no cross loadings exceeding  $.32$ . Table 2 displays the factor intercorrelation matrix. Based on these results, three factors were labeled “Attitudes toward IP Teams”, “Affective Reactions to IP Behavior”, and “Normative Beliefs about IP Teams.”

Table 2.  
Factor Intercorrelation Matrix

Factor	1	2	3
1	.		
2	.22	.	
3	-.17	-.34	.

*Note.* Main diagonal are unities.

Findings from the factor analyses were used to create the three attitudinal criterion measures, as follows:

*Attitudes toward IP Teamwork*

Five items were used to assess student attitudes toward working in an IP team. Participants indicated their agreement/disagreement with each item using a 6-point Likert-type scale, ranging from (1) strongly disagree to (6) strongly agree. A sample item is, “Developing a patient care plan with other team members avoids errors in delivering care.” A scale score was formed by summing responses across all items. The measure is provided in Appendix E ( $\alpha = .78$ ).

*Affective Reactions toward IP Teamwork Behavior*

This 6-item scale assessed student affective responses to IP teamwork behaviors. Participants indicated their agreement/disagreement with each item using a 6-point Likert-type scale, ranging from (1) strongly disagree to (6) strongly agree. A sample item is, “I feel

comfortable engaging in shared decision making with others on the IPT.” A score was formed by summing responses across all items, with higher scores indicative of more positive affect toward IP behaviors. The full measure is provided in Appendix F ( $\alpha = .83$ ).

#### *Normative Beliefs about IP Teams*

This four-item measure assessed students’ beliefs about the extent to which others in their profession are supportive of IP teams. Participants indicated their agreement/disagreement with each item using a 6-point Likert-type scale, ranging from (1) strongly disagree to (6) strongly agree. A sample item is, “Individuals in my profession have good relations with people in other professions.” A scale score is formed by summing responses across all items. The complete measure is provided in Appendix G ( $\alpha = .81$ ).

## Chapter 3

### Results

Descriptive statistics of all measures used in the two surveys are displayed in Table 2. Internal consistency estimates for all measures were acceptably high for the narrow constructs measured (all  $\alpha$ 's  $\geq .78$ ). Internal reliability estimates are displayed along the main diagonal of the correlation matrix for all measures included in the study (Table 3).

Table 3.  
*Descriptive Statistics of Study Variables*

Variable	# Items	M	S.D.	Range
Dominance	6	27.29	4.28	(11 – 36)
Motivational IPTI	6	26.50	2.87	(15 – 30)
Cognitive IPTI	3	11.80	2.85	(4 – 18)
Behavioral IPTI	5	23.35	3.40	(12 – 30)
IP Attitudes	5	24.53	3.57	(15 – 30)
Affective Reactions	6	28.85	3.72	(6 – 36)
Normative Beliefs	4	18.78	2.68	(7 – 24)

*Note.* *N* ranges from 203 – 205.

Evaluation of the third and fourth moments of the distribution of all study variables indicated absolute skewness and kurtosis values within acceptable ranges for normality (Skewness  $< 2$  and Kurtosis  $< 2$ ). Original hypothesized relationships between predictors and Attitudes toward IP Teams were extended to each of the three component IP Attitude measures: namely IP Attitudes, Affective Reactions, and Normative Beliefs.

#### *Correlational Analysis*

Table 4 displays the intercorrelation matrix for the predictors and three criterion measures. Two patterns of relationships, particularly, are noteworthy. First, as expected,

Motivational ITI was significantly, positively related to all three criterion measures, and professional program was also significantly, positively related to IP Attitudes and Normative Beliefs. Second, gender and age were significantly related to Motivational IPTI and to 2 of 3 criterion measures. Given these patterns of relationships, tests of the first four hypotheses proceeded with subgroup analyses in order to perform non-zero significance tests for the hypothesized relationships independently, within each program.

Table 4  
*Inter-correlation Matrix between Controls, Predictors, and Criteria*

Variable	Program	Gender	Age	Race	Dom	Motivational IPTI	Cognitive IPTI	Behavioral IPTI	IP Attitudes	Affective Reactions	Normative Beliefs
Program	-										
Gender	.39**	-									
Age	.07	.05	-								
Race	.00	-.08	-.14	-							
Dom	-.10	-.04	-.04	-.07	<b>.76</b>						
Motivational IPTI	.04	.18*	.17*	-.07	.45**	<b>.80</b>					
Cognitive IPTI	.08	.11	-.09	.05	.21**	.17*	<b>.77</b>				
Behavioral IPTI	.05	-.01	-.05	-.04	.33**	.43**	.18*	<b>.78</b>			
IP Attitudes	.29**	.21*	.10	-.07	.05	.23**	.00	.07	<b>.78</b>		
Affective Reactions	-.01	-.13	.18*	-.16	.42**	.30**	.07	.21**	.13	<b>.83</b>	
Normative Beliefs	.15*	.07	.04	.03	.16*	.18*	.08	.11	.17*	.33**	<b>.81</b>

Note. *Df* = 204. Internal reliability estimates are bolded in main diagonal. Male = 0. MD = 1, BSN = -1. Dom = Dominance. IPTI = Inter-professional Team Intelligence. \* $p \leq .05$ , \*\* $p \leq .01$ .

### Subgroup Analyses

Hypotheses 1 through 4 were tested using both correlational and ordinary least squares regression frameworks. Subgroup analyses were conducted in both frameworks to permit the use of multiple statistics that differ in sensitivity to other potentially influencing factors, such as variability in a given measure (Cohen, 1968; Whisman and McClelland, 2005). Results of subgroup analyses are shown in Table 5.

Hypothesis 1 stated that trait dominance would be negatively related to IP Attitudes. As shown in Table 3, this hypothesis was not supported. Rather, trait dominance was significantly, positively related to Affective Reactions for both the medical ( $r = .33$ ) and nursing groups ( $r = .47$ ). Trait dominance was also positively associated with Normative Beliefs, though this effect was significant only for the nursing group ( $r = .30$ ).

Hypothesis 2 stated that Motivational IPTI would positively relate to IP Attitudes. As shown in Table 3, a significant positive relationship was observed for the nursing group with each of the three criterion measures ( $r_{Attitudes} = .26$ ,  $r_{Affect} = .38$ ,  $r_{Norm} = .30$ ). For medical students, however, Motivational IPTI was only significantly related to IP Attitudes ( $r = .21$ ) and Affective Reactions ( $r = .20$ ), while showing no significant relation with Normative Beliefs. Thus, partial support was found for Hypothesis 2.

Hypothesis 3 stated that Cognitive IPTI would be significantly, positively related to IP Attitudes. As shown in Table 3, however, Cognitive IPTI was not significantly related to IP Attitudes, but was significantly positively related to Normative Beliefs ( $r = .19$ ). Further, this relationship was significant for the nursing group, only. Therefore, Hypothesis 3 was unsupported in these data.

Hypothesis 4 stated that Behavioral IPTI would be positively related to IP Attitudes. Contrary to expectations, Behavioral IPTI was found to be not significantly related with IP Attitudes. Behavioral IPTI was also unrelated to Normative Beliefs, but was positively, significantly related to Affective Reactions in both the nursing and medical student groups. Therefore, partial support was found for Hypothesis 4.



Table 5  
*Subgroup Analyses*

Criterion	Program			
	Medical		Nursing	
	Observed <i>r</i>	$\beta$	Observed <i>r</i>	$\beta$
<b>IP Attitudes</b>				
Trait				
Dominance	.05	.09	.13	.10
Motivational IPTI	.21*	.16	.26*	.19
Cognitive IPTI	-.04	.00	.02	.02
Behavioral IPTI	.18	.08	.06	.02
<b>Affective Reactions</b>				
Trait				
Dominance	.33**	.30**	.47**	.52**
Motivational IPTI	.20*	.19*	.38**	.41**
Cognitive IPTI	.06	.10	.09	.14
Behavioral IPTI	.18*	.15	.25*	.24*
<b>Normative Beliefs</b>				
Trait				
Dominance	.08	.10	.30**	.25*
Motivational IPTI	.06	.10	.33**	.29**
Cognitive IPTI	.00	-.03	.19*	.17
Behavioral IPTI	.12	.14	.09	.08

*Note.* *Df* = 194 – 204. Regression coefficients standardized, statistically controlling for demographics. \*  $p < .05$ , \*\*  $p < .01$ .

The subgroup analyses provide evidence on student characteristic-criterion relationships within-program, but do not address whether these relationships are significantly different *across* groups. Since correlations (by definition) confound moderating effects with differences in variance, tests to evaluate differences in subgroup correlations are not considered moderation analysis (Whisman and McClelland, 2005). Accordingly, because the correlation matrix indicated program was positively related to our criterion measures, further analyses were conducted to examine potential between-group differences in these relations.

A series of Fisher's R - Z transformations were used to evaluate differences between the two student groups on each of the predictor-criterion correlations. None of these tests reached significance, thus providing no evidence to support significant between-group differences in

effect sizes. However, a second series of Fisher’s R – Z transformations was also used in order to evaluate significant differences between hypothesized and observed effect sizes. One observed effect size (the positive relationship between Motivational IPTI and Affective Reactions for medical students) was found to be significantly different (lower) than the hypothesized effect size. All other significant subgroup correlations that were consistent with hypotheses did not differ significantly from hypothesized effect sizes. Additionally, F-tests indicated significant and near-significant different variances between the medical and nursing groups on multiple individual difference measures (see Table 5).

Table 6  
*F-tests of Significant Difference in Predictor Variances*

Measure	Observed F	Significance Level
Dominance	21.74 / 14.27 = 1.52*	< .05
Motivational IPTI	9.37 / 7.59 = 1.23	.14
Cognitive IPTI	8.48 / 7.42 = 1.14	.25
Behavioral IPTI	12.92 / 10.51 = 1.23	.14

Note. Critical F = 1.28 with df = 109, 104.  $\alpha = .1$ .

Because of the issues outlined above for the possible obscurity of relationships caused by different variabilities on predictor measures, a closer examination of predictor slope coefficients proceeded within an ordinary least squares framework.

*Linear Regression Analyses*

Subgroup linear regression analyses were conducted to examine the within-group predictive power of the hypothesized variables, after controlling for demographics. Overall, inclusion of the hypothesized predictor variables added an additional 4 – 10% of variance accounted for in the criterion measures for nurses, while adding 13 – 24% to the prediction equation across criteria for medical students. Significant results for subgroup regressions varied by criteria, and so are interpreted separately, below.

No significant subgroup regression results were found for IP Attitudes. For Affective Reactions, however, significant findings were obtained from five subgroup regressions and are displayed, below, in Figures 1 - 3. As shown in Figure 1, and consistent with previous within-group correlational analyses, Dominance was positively, significantly related to Affective Reactions for both medical and nursing groups, albeit opposite the hypothesized direction. As the regression equations show in Figure 1, medical students scoring 1 standard deviation (SD) above the mean on the measure of Dominance corresponded with a .30 SD increase on Affective Reactions to IP Behavior. Similarly, for nursing students, a 1 SD increase on Dominance resulted in a .52 SD increase on Affective Reactions to IP Behavior.

Motivational IPTI, too, emerged as a significant predictor of Affective Reactions across programs. As hypothesized, medical students scoring 1 SD above the mean on Dominance resulted in a .19 SD increase on Affective Reactions. For nursing students, a single SD increase on Motivational IPTI resulted in a .41 SD increase on Affective Reactions (see, Figure 2).

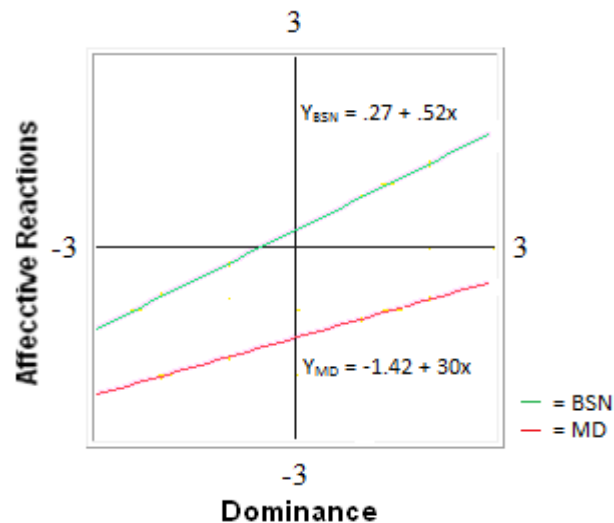


Figure 1. Residualized subgroup relationships between Dominance and Affective Reactions.

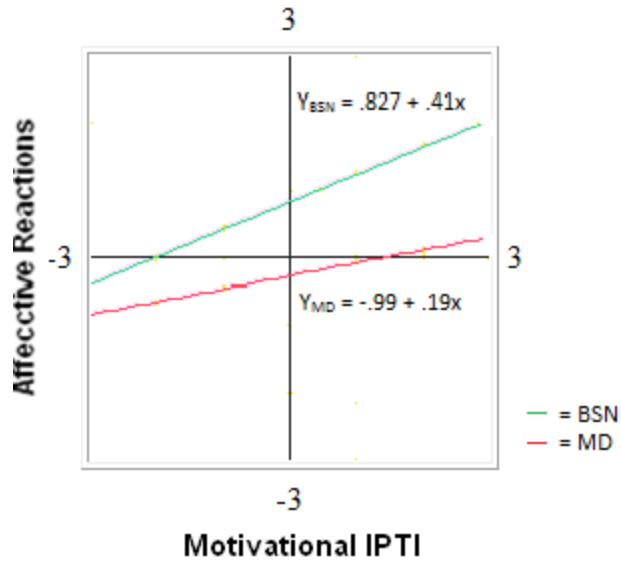


Figure 2. Residualized subgroup relationships between Motivational IPTI and Affective Reactions.

Behavioral IPTI emerged as a significant predictor of Affective Reactions, but for the nursing group only. As shown in Figure 3, nursing students scoring 1 SD above the mean on the Behavioral dimension of IPTI corresponded with a .24 SD increase on Affective Reactions. While the standardized regression coefficient for medical students on Behavioral IPTI was in the hypothesized direction, it failed to reach significance. No other hypothesized predictors were found to be significantly related to Affective Reactions.

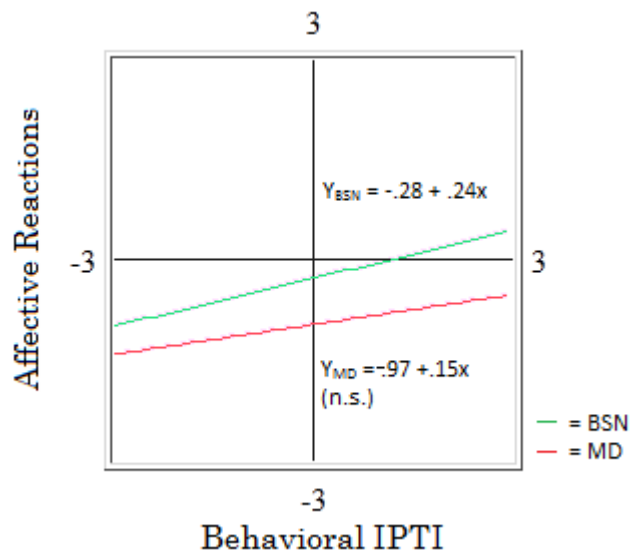


Figure 3. Residualized subgroup relationships between Behavioral IPTI and Affective Reactions.

Two subgroup regressions were found to be significant for Normative Beliefs. However, both significant prediction equations were limited to the nursing group only. These results are displayed in Figures 4 and 5, below.

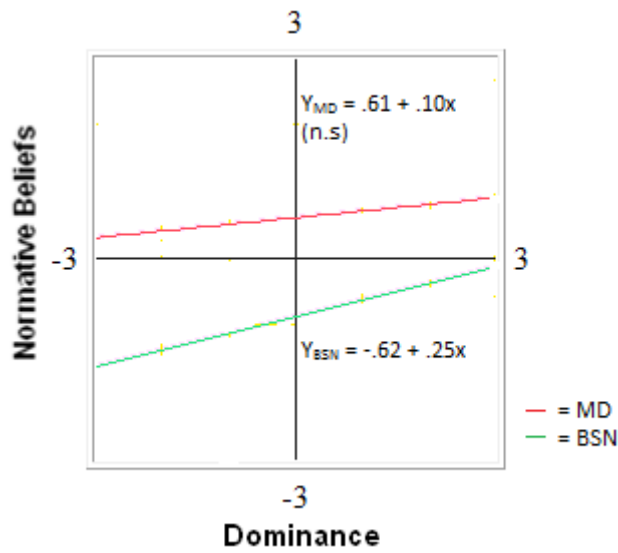
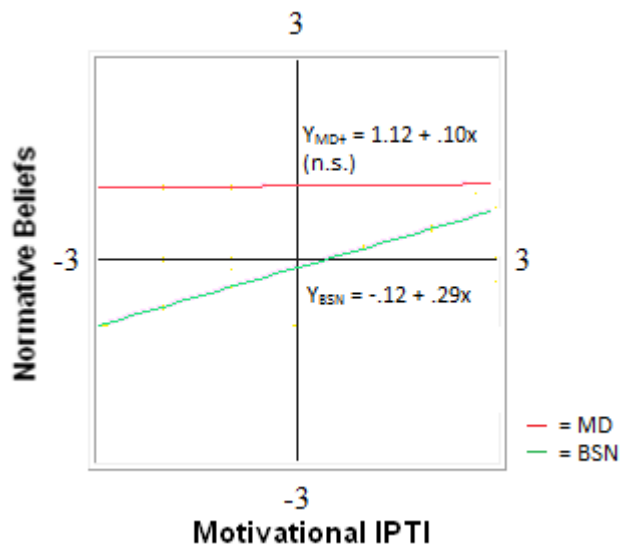


Figure 4. Residualized subgroup relationships between Dominance and Normative Beliefs.



*Figure 5. Residualized subgroup relationships between Motivational IPTI and Normative Beliefs.*

Results indicated that nursing students scoring 1 SD above the mean on Dominance resulted in a .25 SD increase on Normative Beliefs. Again, the direction of this relationship was contrary to what was hypothesized. For Motivational IPTI, however, the hypothesized direction was significant, such that a single SD increase on Motivational IPTI corresponded with a .29 SD increase on Normative Beliefs. Similar to Affective Reactions, the standardized regression weight for medical students was in the hypothesized direction, but failed to reach significance.

#### *Hierarchical Linear Regression Analyses*

In order to examine the relative impact of program and hypothesized predictors on IP training outcomes, both variables were entered into a series of 4-step hierarchical regression models using the forward entry method. Demographic variables (age, race, gender) were entered in the first step, followed by professional program (medical vs nursing) in the second step testing for mean-program differences on the criterion measures. Next, the hypothesized predictor variables (Dominance, Motivational IPTI, Cognitive IPTI, and Normative Beliefs) were entered into the third step in order to test for its incremental validity, over and above professional program. The inclusion of the predictor variables in the third step allowed for each professional program to be modeled with a separate regression line with different intercepts, but identical slopes. Finally, in order to follow-up from earlier subgroup analyses, a program x predictor interaction term was added in the fourth step in order to assess the incremental variance accounted for by allowing slopes to vary across program. It is also important to include the interaction term after all component terms have been entered in the regression equation in order to avoid confounding the additive and multiplicative effects (Cohen, 1978). Also, because of the inappropriate calculation of standardized product terms in the statistical package used here

(SPSS, 19.0), unstandardized regression coefficients will be interpreted (Friedrich, 1982).

Significance of the added interaction term is evidence of significantly different slopes between

the two groups. Table 5 displays the results from these analyses.

Table 7.  
*Hierarchical Regression Analyses*

Predictor	IP Attitudes				Affective Reactions				Normative Beliefs			
	Step				Step				Step			
	1	2	3	4	1	2	3	4	1	2	3	4
Constant	-1.75**	-1.21*	-.77	-.76	-.30	-.42	-.42	-.37	-.74	-.38	-.23	-.21
<i>Controls</i>												
Gender	.43**	.27	.18	.17	-.33*	-.29	-.31*	-.34*	.06	.03	-.01	-.01
Age	.05*	.04*	.03	.03	.05*	.05**	.05**	.05**	.15	.01	.01	.01
Race	-.06	-.06	-.06	-.06	-.13*	-.13*	-.10	-.10	.02	.07	.07	.07
Program		.19**	.22**	.22**		-.04	.00	.01		.13	.15	.14
<i>Traits</i>												
Dominance			.02	.02			.35**	.34**			.13	.10
Motivational ITI			.20*	.20*			.11	.11			.11	.11
Cognitive ITI			-.03	-.03			.00	.00			.02	.04
Behavioral ITI			-.03	-.03			.04	.05			.02	.03
<i>Interaction</i>												
Program x Dominance				.01				.11				.05
Program x Motivation ITI				.02				.03				.11
Program x Cognitive ITI				.02				-.04				.07
Program x Behavioral ITI				-.03				.03				-.10
$R^2$	.07	.10	.14	.14	.07	.07	.26	.27	.01	.02	.07	.09
$R^2_{change}$		.03	.04	.00		.00	.18	.02		.01	.05	.02
$F_{change}$	4.80**	6.15**	1.94	.06	4.95**	.29	11.63*	1.06	.74	2.52	2.28	1.09

Note.  $DF_{(numerator, denominator)} = 3 - 8, 185 - 196$ . Regression coefficients are standardized. ITI = Interprofessional Team Intelligence. \*  $p \leq .05$ , \*\*  $p \leq .01$ .

As shown in Table 4, gender and age were significant predictors of IP Attitudes in the first step, such that, on average, females and older students reported more positive IP Attitudes, accounting for 7% of the variance. Professional program membership was also a significant predictor of IP Attitudes in the second step, accounting for an additional 3% of the variance, beyond that of demographic variables. Inspection of the standardized beta coefficients indicates

that students in the nursing program, on average, scored .19 SDs higher on IP Attitudes compared to all health provider students in the sample. Adding the hypothesized traits in step three of the model did not result in a significant F-change. However, because the overall model remained significant, interpretation of the standardized beta coefficients proceeded.

Interpretation of the standardized regression coefficients indicated that students scoring 1 SD above the mean on Motivational IPTI resulted in a .20 SD increase on IP Attitudes. It is also important to note that Program remained a significant predictor in this step, indicating a significant mean difference between program and grand mean on IP Attitudes, at the unweighted grand mean of Motivational IPTI. Finally, adding the product term into the fourth step did not add significant predictive variance to the model. While the overall model remained significant, no product terms yielded a significant beta weight, indicating non-significant differences in slopes across programs.

For the prediction of Affective Reactions to IP Behavior, on average, males reported significantly less positive Affective Reactions toward IP Behavior. In addition, older students reported more positive Affective Reactions toward IP Behavior. Professional program failed to account for significant variance in the second step. The inclusion of trait variables in the third step, however, improved the predictive power of the model, accounting for an additional 18% of the variance in Affective Reactions. Inspection of the standardized beta coefficient indicated that students scoring 1 SD above the mean on Dominance resulted in a .35 SD increase on Affective Reactions. This significant relationship, however, is not in the hypothesized direction. Again, the addition of the program x trait interaction term into the fourth step failed to account for significant variance in the model, suggesting non-significantly different slopes for Dominance across programs.



For the prediction of Normative Beliefs, no demographic variables significantly predicted the criterion. In addition, professional program, hypothesized trait measures, and their interaction failed to significantly add predictive power to Normative Beliefs. Inclusion of all variables accounted for only a total of 9% of the variance in Normative Beliefs.

To explore the relatedness of the predictor variables vis-à-vis the criterion measures, an exploratory hierarchical regression analysis was conducted in which the entry sequence of program and trait variables was reversed. Interestingly, the pattern of relationships did not change across criteria. This outcome indicates that the impact of program on the criteria was unique from the non-ability predictors assessed in the current study. While some support was found for the predictive validity of the hypothesized trait variables, modest support was also found for the predictive validity of program. Examining their relative and joint impact, however, helps to clarify the role that professional program may play in attitudes toward inter-professional teamwork.

Following the reverse-ordered hierarchical regression, another exploratory analysis was conducted in order to model the between- and within-program variance in the criteria measures. This analysis helps illustrate the utility of program as an explanatory variable for student scores on the criteria measures employed in this study. This proceeded by using program to estimate three unconditional means models for each outcome measure. Parameter estimates derived from this model permit the calculation of intra-class-correlation coefficients, which indicate the systematic variance in a criterion that resides between level-2 predictors (program) (Raudenbush and Bryk, 2002). Within-program variance is derived by simply subtracting the intra-class correlation coefficient from 1. Results of these analyses are reported in Table 6.

Table 8.

*Calculations of Within-Between Systematic Variance in Inter-professional Outcomes*

Criterion	ICC <sub>1</sub> (between-program)	1 - ICC <sub>1</sub> (within-program)
IP Attitudes	$1.65 / (11.92 + 1.65) = .12$	$1 - (.12) = 88\%$
Affective Reactions	*	*
Normative Beliefs	$.20 / ((7.09 + .20) = .03$	$1 - (.03) = 97\%$

*Note.*  $N = 194 - 205$ .

Evaluation of the intra-class-correlation coefficients indicate a small percentage of systematic variance in the IP outcome measures resides between programs. This may be expected, given the early (pre-licensure) timing of this study along a student's training, limiting the influence of professional program. It also suggests that there is considerable systematic variance within-program that remains unaccounted for, at least, with the predictors used in the current study.

## Chapter 4

### Discussion

The findings of this study provide support for the role of student individual differences in personality traits on IP teamwork training program outcomes for pre-clinical health provider students. Results indicated that individual differences not only influenced IPE-related outcomes, but that these person variables were influential beyond that of the student's professional affiliation. Knowledge of student proclivity to adopt positive attitudes toward IP teamwork upon matriculation may help to not only target individuals for different training delivery, but may also be used in consideration of which students might benefit most from early inter-professional experiences via placement or extra-curricular enterprises (Barr et al., 2005).

The significant positive association observed between Dominance and Affective Reactions to IP behavior was unexpected. In hindsight, this surprising result may be due for two possible reasons. First, the operationalization of Dominance in this study may be problematic. In this study, the high inter-scale correlation between Goldberg's IPIP Assertiveness and Gough's CPI Dominance subscale provided the rationale for the current operationalization. However, Butt and Fiske (1968) suggested that even though both scales may assess aspects of Dominance (and so show a positive association), the Gough [CPI] scale focuses on a Dominance in terms of a form of leadership whereas the 16 PF highlights behavioral tendencies with respect to aggressive Dominance in the environment (Butt and Fiske, 1968, *p*513). This distinction between socialized and aggressive forms of Dominance has been investigated and supported in more recent research, as well (Anderson and Kilduff, 2006). In the present study, the positive association between Dominance, as assessed by the Goldberg IPIP measure (assessing a more socialized form of

leadership dominance), may reflect health provider students' disposition toward gaining influence in an IP team, rather than the influence of individual differences in more aggressive manifestations of Dominance (that were expected to be negatively related to IP attitudes). That is, individuals higher on the Goldberg IPIP scale might be more apt to endorse IP attitudes as a means of achieving leadership Dominance. .

A second plausible explanation for the unexpected positive association between Dominance and Affective Reactions to IP behavior relates to the content of the IP training. For instance, the Agency for Healthcare Research and Quality's (AHRQ) instructional manual for TeamSTEPPS devotes an instructional section on encouraging and detailing scenarios that justify assertiveness. More broadly, Oandasan and Reeves (2005) indicate that assertiveness is, in fact, a positive person characteristic in IP collaborations and so is encouraged among students during early IPE programs. Therefore, to the extent that the training content used in the current study advocated assertive behavior in an IP team, individuals may have actually scored higher on the Dominance measure while reporting appetitive reactions toward IP behavior. Coupling these two pieces of evidence of discriminant construct and content validity of training material, it is possible that alternative operationalizations for socially disagreeable forms of Dominance may yield results closer to hypothesized relationships. Related, it may be that more socialized forms of Dominance erode under high-pressure scenarios or lengthy, fatigue-inducing work shifts. In either case, the emergence of Dominance as a robust predictor of IP outcomes, here, suggests that individual differences in Dominance as they relate to IP attitudes are more than a structural characteristic of professional program and require further investigation. Last, the predictive validity found for Dominance as a facet-level determinant of IP attitudes further bolsters arguments for the calibration of predictor-criteria relations (Burch & Anderson, 2008).

The predictive validity found for Motivational and Behavioral IPTI provides the first empirical evidence linking professional differences to differences between cultures. Consistent with findings from Ang and her colleagues, healthcare students in this study who reported higher levels of Motivational IPTI also reported more comfort in engaging with students from other professions. This is an important finding in light of counterarguments for early IPE that warn of the risk of eliciting anxiety and negative affect by compelling students from different professions to interact prior to establishing a professional identity (Parsell & Bligh, 1998). The current findings also suggest that some students may actually be more comfortable integrating interprofessional interactions into the early construction of their professional identities. Research has demonstrated program differences in the the strength of professional identity at matriculation (Adams, Hean, Sturgis, & Clark, 2006). However, the effects of individual differences on the construction of professional identities remain unknown. Evidence presented here, however, suggests that non-ability individual differences may have effects, unique to one's program, in the early stages of professional training and socialization. Last, as noted in the introduction, IPTI's emergence as a significant predictor accrues evidence for the utility of non-ability variables, beyond that of broad trait measures, such as the Big Five.

Although a positive association was expected between the Cognitive IPTI and IP Attitudes, the lack of a significant relationship obtained between these variables may be due to the early stage in professional development at which IP training took place. Since student knowledge of the norms and practices of other professions is typically acquired through collaborative work experiences "...those who possess high cognitive and metacognitive CQ, but who lack motivational CQ may strive for cultural knowledge through books and observations but refrain from seeking real interactions..." (Ng, Van Dyne, and Ang, 2009, p.521), perhaps

students were limited in their ability to accurately self-report Cognitive IPTI. Whether possessing higher knowledge of another profession's norms and practices actually influences the frequency of IP behavioral engagements, however, cannot be determined in the current study.

It should also be noted that professional program remained a significant predictor of IP attitudes even after the inclusion of non-ability individual differences. Reversing the entry of predictors indicated that program continued to account for unique variance in IP Attitudes. Given the large amount of unaccounted for variance, however, it is unclear whether identification of more relevant individual difference variables would explain away the observed effect of program. Future research to examine other personality traits that may be differentially associated with professional program is needed to clarify whether the professional program effects observed in this study reflect distinct program experiences or communalities due to program selection practices.

The failure to find significant interactions between professional program and non-ability traits was unexpected, but does not negate the possibility that other individual differences may interact with program in their prediction of IP outcomes. There are a number of known sources that may have lead to the inability to detect moderation effects in the current study (Aiken and West, 1991; McClelland and Judd, 1993), including inadequate sample size and imperfect internal reliability of component measures. In addition, two other explanations may be put forth. First, the descriptive statistics of the study variables, while within traditional ranges of normality, also indicated a somewhat leptokurtic distribution. As McClelland and Judd (1993) suggested, this would influence the joint distribution of variables in a way that would adversely affect the ability to detect moderating effects. In other words, the positive kurtosis reported for the current study variables indicate that variance in the distribution is reflective of fewer extreme

responders, making the detection of interaction effects more difficult. In addition to the distributions of the component variables, evaluation of the subgroup regression analyses indicate that all slopes between groups were in the same direction. Detection of ordinal, rather than disordinal, interactions is notoriously more difficult (Maxwell and Delaney, 2004). These issues suggest that further attention be paid to the potential impact of professional program as a moderator of person characteristic effects on IP attitudes and other IPE learning outcomes.

While the current study set out to examine the predictor space for IPE outcomes, evidence for a multi-factor structure of the criteria measures indicates that further validation of extant IPE instruments is needed. For example, the identification of three related, but separable factors, suggests that student attitudes toward IP teams is not a unitary construct. Collapsing these related factors may obscure important predictor-criteria relationships. This possibility was explored by repeating subgroup and hierarchical regression analyses with an aggregate attitudinal measure (3 factors summed to form single composite). Supporting the obscuring of relationships, in the subgroup analyses, the former positive association between Behavioral IPTI and Affective Reactions failed to reach significance with the new composite attitudinal measure. In addition, the positive association between Cognitive IPTI and Normative Beliefs (for Nursing students) emerged non-significant with the new composite attitudinal measure. Extending to the hierarchical analyses, program also failed to demonstrate significant predictive validity for the new composite attitudinal measure. This is in conflict with evidence, here, demonstrating that both program and individual differences are predictive of Attitudes toward IP Teams. On the other hand, program did not contribute to students' affective reactions toward IP behavior, while individual differences added 18% to the prediction equation. This finding may have implications for identifying students across programs that are more receptive to engage in early IP

interactions. Surprisingly, neither individual differences nor program significantly predicted students' normative beliefs regarding IP relations. This latter finding may be explained by the relative role of peers, compared to instructors, in shaping early normative beliefs about IP relations among pre-clinical health students (Barr et al., 2005). Future research should seek to continue understanding the factorial structure of IPE outcomes in order to clarify the effects of IP training. Delineation of lower-level IP outcomes may also hold great import as explanatory mechanisms for higher-level consequences, as taxonomized by Hammick (2000). For example, perhaps normative beliefs, as a result of IP training, may also function as an antecedent of organizational change, while affective reactions toward IP behavior may be less implicative of such change.

Extrapolating further, and echoing others' concerns as to the psychometric soundness of IPE evaluation tools (Gillan et al, 2011; Thannhauser, Russell-Mayhew, & Scott, 2010), the demonstration of reliable and valid instruments will likely pace progress for future IPE initiatives. Moreover, the publication of instruments without supportive psychometric evidence may hinder progress in the field. A more concerted effort toward developing standardized assessments for IPE outcomes would not only make program implementation more feasible via resource reduction, but also promote the synthesis of evidence for IPE effectiveness across institutions.

Taken together, the results obtained in this study provide support for the role of person and professional program determinants of IPE outcomes. To date, IPE researchers have focused almost exclusively on the impact of IP training per se, with less attention on the role that student attributes and professional program may have on IP training outcomes. The findings of the present study complement prior IP team training research by emphasizing the role of factors



other than training content that may influence IP outcomes. Of course, without a control group, statements of causality cannot be made. However, given the variance in IP outcomes explained by the non-ability predictors employed in this study, IP program managers may be able to further improve the efficacy of training by taking into account, not just training content, but also IP trainee characteristics. Indeed, calculations of the systematic variance that resided within and between professions indicated markedly more variation within (than across) professions. This finding is evidenced in prior studies that fail to provide meaningful interpretations of program differences on IPE criteria.

In light of IPE's objective to reduce professional barriers, it behooves researchers to not merely identify program differences, but to explain their causes. Failure to do so limits interpretation of IP training outcomes at program levels and, for all intensive purposes, may be counterintuitive. For instance, stating that nursing students are greater than medical students on a variable of interest may only allow for program-level remediation, which may be effective, but certainly inefficient. Instead, identifying which students *across* programs vary on a given IPE criteria permits more granular interpretations and offers a greater variety of plausible solutions. For instance, students similarly low on Affective Reactions toward IP behavior may benefit more by IP clinical placements, rather than IP classroom instruction (Pettigrew and Tropp, 2006). On the other hand, students low on Normative Beliefs may benefit more from classroom instruction, perhaps by faculty outside their own program, or mere observation of IP working, rather than placement.

### *Theoretical Implications*

The results from this study extend research on individual differences in cultural intelligence to a new domain, namely, healthcare. Similar to the expatriate context in which

cultural intelligence has been most frequently assessed, modern healthcare delivery frequently requires that individuals with different histories and professional cultures work together effectively as a team for the purpose of patient safety. Evidence for the role of person variables in IP training strongly suggests that IP researchers go beyond the, currently dominant, social psychology frameworks, such as Social Identity (Tafjel and Turner, 1979) and Self-Categorization Theory (Turner et al., 1987), and consider alternative theoretical frameworks such as cultural intelligence (Earley and Ang, 2003), that emphasize, rather than marginalize, the role of individual differences. Though early IP studies evaluated the effects of IPE at a program-level, recently, there has been an increase in the use of longitudinal studies, tracking individuals over years of their professional training (Pollard & Meirs, 2008). As such, the adoption of individual-level perspectives may reduce statistical biases introduced by level of theory misspecification (Rousseau, 1985).

### *Practical Implications*

Further research on the role of individual differences in IP teamwork training may also be practically useful for the ultimate development of a more tailored program that can provide training content to healthcare students based on student need. For example, Thistlethwaite and Nisbet (2007) suggested a “stream” (*p.69*) model of IP delivery, where skills that are most relevant to a health provider’s place in training are taught. Individuals predisposed to respond more favorably to IP initiatives (high in Motivational IPTI) may be farther along this stream. Conversely, students who are less receptive to interprofessionalism (low on Motivational IPTI) may benefit from extended placement alongside individuals from other programs (Pettigrew & Tropp, 2006). In this way, students may still be able to perform rounds that ensure the

acquisition of necessary clinical knowledge, but design rotations such that higher exposure is afforded earlier for students who may be less likely to engage in IP behavior.

Results of the current study not only benefit IP intervention planners and facilitators, but may encourage IP facilitators and faculty to convey the realities of working in today's healthcare system and the benefits afforded by interprofessional collaborations. These faculties who, arguably, have the most face-time with students early in training may be particularly effective in shaping student attitudes by signaling beliefs of their perceived prototypes (Ibarra, 1999). Additionally, identifying individuals who more readily endorse attitudes toward IP teamwork may serve an ambassadorial role through clinical placement alongside students from other professions. For example, faculty who were consulted as part of a larger, overarching study related to the one conducted here, reported that students are differentially exposed to IP practice as a function of their clinical placement, and that they rarely share team membership with students from other professions. Because IP practice may vary across treatment facilities, placement with similarly trained students may provide an exceptional opportunity for enacting skills learned in early IP training.

### *Limitations*

There are several limitations to the current study that warrant note. First, because attitudes were assessed only once, it was not possible to assess attitude change as a function of the IP training. Also, because of the wide-scale implementation of the IP training intervention, a control group was not feasible, which prevents statements of causality. Therefore, the observed effects of program and trait variables, whether on the training experience or on post-training clinical engagement, are indeterminable. Further research that permits evaluation of training effects, independent of traits and program influences, is needed for further progress in

understanding how traits affect different mechanisms in the formation of IP attitudes. Such research may also have potentially valuable implications for determining the efficacy of different IP training deliveries, both in terms of length and content. Finally, although the person variables were assessed over one year prior to assessment of the criterion variables, the common self-report format creates a potential for common method bias.

## **Chapter 5**

### **Conclusion**

The findings provide evidence for the multiple sources of influence on IPE-related criteria in an IP training program introduced early in professional healthcare training. In particular, the findings suggest that student attributes play a significant role in IP attitudes after training. The demonstration of non-training influences on IP attitudes following training provides support for the notion that student attributes may influence both the effectiveness of early IP healthcare training, as well as contribute to the development of stereotypes of other professions (Carpenter, 1995). In contrast to expectations, I found that high levels of dominance were positively, rather than negatively related to measures of interprofessional team intelligence and IP attitudes. Additional research should further explore the role of dominance as a person, rather than structural, variable in relation to IP outcomes. Alternative operationalizations or implicit measures may be employed to understand how construct validities and response biases affect dominance – IP outcome relationships.

Additional research is also needed to clarify other key individual differences that may contribute to IP outcomes and the mechanisms by which they operate in the formation of IP attitudes. In addition, the predictive validity of adapted Cultural Intelligence measures for early IP Attitudes warrants ongoing evaluation of its impact when students are placed into clinical rounds. As McCallin (2001) summarized, “Role socialization in the health professions is strong, and the call for collaboration relies on changing attitudes” (p.421). In summary, the findings of this study make the case for the role of individual differences in contributing to attitude

formation. Perhaps these attitudes can affect socialization processes toward the establishment of new, inter-professional roles.

## Appendix A

### The IPIP – Assertiveness Subscale (abbreviated)

1. I automatically take charge.
2. I let myself be pushed around (reverse-scored)
3. I know what I want.
4. I can easily push myself forward.
5. I try to lead others.
6. I stick up for myself.

## Appendix B

### Motivational IPTI scale (adapted)

- 63. I enjoy interacting with people in other healthcare professions
- 69. I am confident that I can work with people from other healthcare professions.
- 71. I am confident I can deal with the stresses of working in an inter-professional healthcare team.
- 74. I do not like to socialize with people in different professions. (reverse-coded)
- 80. I am interested in understanding the norms and values in other healthcare professions.
- 83. I enjoy working with professionals from other disciplines.



## Appendix C

### Cognitive IPTI Subscale (adapted)

1. I know the norms for communicating information in other healthcare professions.
2. I know the beliefs and values of other healthcare professions.
3. I know what is appropriate for expressing myself with other healthcare professionals.

## Appendix D

### Behavioral IPTI Subscale (adapted)

1. I change how I speak and what I say when the situation requires it.
2. I change my nonverbal behavior when the situation requires it
3. I use pauses and silences differently to suit different situations.
4. I vary the rate of my speaking when the situation requires it.
5. I alter my facial expressions when the situation requires it.

## Appendix E

### Attitudes toward IP Teams Scale

1. The give and take among team members help them to make better patient care decisions.
2. The IPT approach improves the quality of patient care.
3. Developing a patient care plan with other team member avoids errors in delivering care.
4. Developing an IPT patient care plan is excessively time consuming (reverse-scored).
5. Working in an IPT unnecessarily complicates things most of the time (reverse-scored).

## Appendix F

### Affective Reactions to IP Behavior Scale

1. I feel comfortable clarifying misconceptions with other members of the team about the role of someone in my profession.
2. I am comfortable engaging in shared decision making with others on the IPT.
3. I feel comfortable debating issues in a team.
4. I feel comfortable in accepting responsibility delegated to me within a team.
5. I feel comfortable speaking out within the team when others are not keeping the best interest of the patient in mind.
6. I feel comfortable initiating discussions about sharing responsibility for client care.

## Appendix G

### Subjective Normative Beliefs about IP Teams Scale

1. Individuals in my profession are able to work closely with individuals in other professions.
2. Individuals in my profession think highly of other related professions.
3. Individuals in my profession have good relations with people in other professions.
4. Individuals in my profession are willing to share information and resources with other professionals.

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