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A validation study of the APTA Professionalism in Physical Therapy : Core Values Self-Assessment

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ABSTRACT

A VALIDATION STUDY OF THE APTA
PROFESSIONALISM IN PHYSICAL THERAPY:
CORE VALUES SELF-ASSESSMENT

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Measures of student professionalism are being incorporated into both formative and summative assessments of students in medical and health professions education to heighten awareness of professionalism expectations, evaluate change over time, assess outcome of educational activities, and determine competency for progression. The *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) was developed to measure the frequency of behaviors that represent professionalism in both students and clinicians. However, psychometric analysis has not been conducted on this tool despite its use in physical therapist education. Using Messick's unified construct-based conceptualization of validity, the investigator gathered evidence to evaluate the validity of PCVSA scores used to measure professionalism in physical therapist students. The investigator conducted multiple analyses that revealed many risks to the validity of scores from this assessment. The results indicated that the total PCVSA score had greater score consistency, stability, and reproducibility than did the seven subscale scores. However, issues regarding content, structure, and generalizability prevent this tool from having summative assessment utility in physical therapist education programs. Minimal detectable change scores were calculated and may be used for formative assessment to track

development of professionalism behaviors over time. Limitations to this study include lack of sample diversity and small sample size for Part 3 of the investigation. Future research should explore content validity evidence for this tool and risks to validity using a more diverse sample.

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A VALIDATION STUDY OF THE APTA *PROFESSIONALISM IN PHYSICAL THERAPY: CORE VALUES SELF-ASSESSMENT*

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DEDICATION

I lovingly dedicate this dissertation to John, Alicia, Ashley,

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CHAPTER 1

INTRODUCTION

Over the past 20 years, the physical therapy profession grew significantly, achieving greater professional recognition and community acceptance. The American Physical Therapy Association's (APTA) desire to gain autonomy, recognition, and political power, especially in the area of reimbursement, accelerated the profession's evolution from physician-guided workers to autonomous practitioners with expectations for a high level of skill and professionalism (Murphy, 1995; Swisher & Page, 2005). During this period, all but three states enacted legislation providing some level of direct access for patients and clients, granting them the capability of visiting a physical therapist without the need for a referral from a physician (Ojha, Snyder, & Davenport, 2014). Direct access legislation raised expectations for physical therapist practice and education within the healthcare community (Ojha et al., 2014; Swisher & Page, 2005). Consequently, healthcare stakeholders such as insurance companies and physicians called for physical therapists to exhibit a heightened level of skill, knowledge, and accountability for independent decision making (Ojha et al., 2014; Swisher & Page, 2005). In addition, consumers tired of dealing with skyrocketing healthcare costs began to demand skilled providers who also exhibited exemplary professional behaviors (Frist, 2014; Wise, 2014).

In response to the changing demands of the physical therapy profession and healthcare in the 21st century, the APTA adopted Vision 2020, a strategic plan to transition to a "doctoring profession" (APTA, 2000). The APTA's strategic plan identified six key elements needed to

advance the profession of physical therapy and meet the needs of a changing healthcare environment: the Doctor of Physical Therapy degree, Evidence-Based Practice, Autonomous Practice, Direct Access, Practitioner of Choice, and Professionalism (APTA, 2000). After Vision 2020 became public, the physical therapist community debated, researched, and published multiple opinion papers, editorials, and studies regarding the six elements included in Vision 2020 (Childs & Whitman, 2005; McDavitt, 2006; Wolf-Burke, 2005). The topic of professionalism, one of the six key elements, dominated the content of publications and the focus of professional conferences over the past decade (Wedge, 2009; Reis, 2013). Cahalin (2012) reported that 12 Linda Crane lectures given during the APTA Combined Sections Meetings had addressed a component of professionalism. Since APTA's (2000) development of Vision 2020, professionalism has evolved to mean more about the individual physical therapist practitioner and the behaviors that are expected in the workplace and less about the general concepts of a profession (Swisher & Page, 2005).

According to Foord-May and May (2007), professionalism is a range of behaviors, combined with a unique body of knowledge and skills, that is necessary to a physical therapist's success. In 2002, the APTA convened a consensus conference on professionalism that culminated in the development of the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a). The core values underpinning the APTA's description of professionalism were largely based on the work of the American Board of Internal Medicine (ABIM), whose members identified six characteristics of professionalism in medicine: altruism, accountability, excellence, duty, honor and integrity, and respect for others (Table 1) (Adams, Miller, & Beck, 1996; APTA,

2000; Arnold, 2002; Markakis, Beckman, Suchman, & Frankel, 2000). According to the APTA**,**

> Physical therapists and physical therapist assistants [should] consistently demonstrate core values by aspiring to and wisely applying principles of altruism, excellence, caring, ethics, respect, communication and accountability, and by working together with other professionals to achieve optimal health and wellness in individuals and communities (APTA, 2014d).

Table 1

Comparison of the ABIM Elements of Professionalism to the PT Core Values

American Board of Internal Medicine Elements of Professionalism (Arnold, 2002)	PT Core Values (APTA, 2003a)
Altruism	Altruism
Accountability	Accountability
Excellence	Excellence
Duty	Professional Duty
Honor and Integrity	Integrity
Respect for Others	Compassion/Caring
	Social Responsibility

After 2003, the APTA's description of professionalism based on core values of the physical therapy profession became the hallmark for expectations of all physical therapists. Professionalism as defined by the APTA in the document *Professionalism in Physical Therapy: Core Values* consists of accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility (APTA, 2003a). Professionalism in physical therapy as defined by these seven core values provides the framework for this study.

With the new focus on professionalism in physical therapy, physical therapist educators and clinical instructors (CIs) soon identified that some physical therapist students needed assistance to develop the attributes and behaviors underpinning this construct. The foundational research by Hayes, Huber, Rogers, and Sanders (1999) was the first to document clinical

instructor concerns regarding non-cognitive or affective behaviors of physical therapist students. Wolf-Burke (2005), through a qualitative study of clinical instructors' perceptions of physical therapist student behaviors, identified four categories of inappropriate behaviors: attitude (e.g., arrogance), lack of interest, poor communication, and unprofessionalism (e.g., poor time management, tardiness, inappropriate dress). Davis (2009) reported that the most frequent negative behaviors of physical therapist students were tardiness, verbal disrespect, nonverbal disrespect, and dress-code violations. Through a survey of physical therapist employers, Lunnen (2002) reported that employers valued professional behaviors more highly than clinical skills in their employees, thus supporting the importance of professionalism to many physical therapist stakeholders.

The profession of physical therapy was not alone in its newfound concern regarding professionalism and the development of professional behaviors. Researchers in medicine have reported a lack of professionalism among students, interns, and residents for the past ten years (Arnold, 2002; Greysen, Chretien, Kind, Young, & Gross, 2012). Recently, Chretien, Greysen, Chretian, and Kind (2009) reported incidents of physicians and medical students posting unprofessional content online. In addition, they cited examples of medical students using profanity and discriminatory language, and coming to work intoxicated (Chretian et al., 2009). Greysen et al. (2012) reported that medical students exhibited poor communication skills when working with patients. For these reasons, communication and professionalism are now considered core competencies in most medical school and residency programs (Symons, Swanson, McGuigan, Orrange, & Akl, 2009).

In an effort to identify, develop, and evaluate professionalism, many health professions as well as medicine have developed tools to assess professionalism within the context of professional education. Nursing professionals developed *Miller's Wheel of Professionalism in Nursing* (Rhodes, Schutt, Lanham, & Bilotta, 2012) and *The Professionalism and Environmental Factors in the Workplace Questionnaire* (Baumann & Kolotylo, 2009). In 2002, faculty at the University of Indianapolis developed the *University of Indianapolis School of Occupational Therapy Student Self-Assessment for Professional Behaviors* (Carroll et al., 2002). Medical educators developed the *Penn State College of Medicine Survey of Professionalism* (Blackall et al., 2007) to evaluate professionalism in medical students. Symons et al. (2009) developed a self-assessment version of the *ABIM Patient Assessment Survey* (Yudkowsky, Alseidi, & Cintron, 2004) for medical residents.

The physical therapy profession has also developed methods to promote and evaluate professionalism. First, the APTA incorporated the seven core values identified in the consensus conference into several core documents of the profession: *Code of Ethics for the Physical Therapist* (APTA, 2010a), *Guide for Professional Conduct* (APTA, 2010b), and *A Normative Model of Physical Therapist Professional Education: Version 2004* (APTA, 2004a). In addition, by adding sample indicators and Likert-type responses to the *Professionalism in Physical Therapy: Core Values*, the APTA converted this document into a self-assessment tool for physical therapist students and practitioners (APTA, 2003b). The resulting *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b) is an assessment tool that evaluates the frequency with which respondents demonstrate each of the seven core values

(APTA, 2003b). Physical therapist education programs across the United States are using this tool for formative assessment of their students (M. Bureau, personal communication, June 19, 2014; C. E. Crandell, personal communication, June 20, 2014) as well as for research (Anderson & Irwin, 2013; Guenther, McGinnis, Romen, & Patel, 2014; Hayward & Blackmer, 2010). Despite the development of the PCVSA in 2003, and its use by physical therapist educators and researchers since that time, there are no published studies examining the psychometric properties of data obtained from this tool. The purpose of this study was to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students.

Background/Rationale for Study

Contemporary Physical Therapy Practice

The Physical Therapy profession, which began during World War I, has undergone significant transformation since its inception. The first physical therapists were women who worked as reconstruction aides with soldiers who had been debilitated by traumatic war wounds and physical injuries (Murphy, 1995). Now over 100 years old, the physical therapy profession is well-recognized in the field of healthcare, with over 200,000 practitioners (Bureau of Labor Statistics, 2014). The American Physical Therapy Association (APTA), founded in 1921, is the only professional organization for physical therapists and represents over 90,000 members in the United States (APTA, 2015). Physical therapists now work in a variety of settings with patients and clients across the lifespan and must have licensure in the state within which they want to practice (APTA, 2014a).

Physical therapists, trained in institutions of higher education, initially received a certificate indicating completion of specialized coursework (Murphy, 1995). The growth of physical therapy as a profession resulted in the need for additional specialized knowledge and skills, which prompted the move to a Bachelor's Degree in Physical Therapy (Murphy, 1995). This remained the entry-level degree of the profession until the 1980's when the APTA launched a campaign for direct access, which elicited stakeholder concerns that physical therapists did not have sufficient education to serve as the initial contact for patients' entry into the healthcare system (Swisher & Page, 2005). Stakeholders driving reimbursement and advocacy challenged the APTA to raise the level of physical therapist preparation to align with other "clinical doctors" (Swisher & Page, 2005). In response to this challenge and the desire to meet goals of the profession, the APTA advocated for the move to graduate-level education. Graduate physical therapist education, initially provided as a Master's Degree in Physical Therapy, quickly transitioned to the Doctor of Physical Therapy degree despite resistance from the medical community as well as some physical therapists (Murphy, 1995; Swisher & Page, 2005).

Physical Therapist Professional Education

To counter the critics of the move to doctoral-level education, the APTA identified that the Doctor of Physical Therapy degree (DPT) would provide the educational rigor needed to meet the level of practice identified in the *Guide to Physical Therapist Practice* (APTA, 2004b), would address the societal expectation that an autonomous healthcare practitioner is a clinical doctor, and would help to more fully realize direct access for the profession and the ability to achieve physician status for reimbursement (Swisher & Page, 2005). Currently, all but one of the

physical therapist education programs in the United States has transitioned to the DPT degree (APTA, 2014c).

Physical therapist education programs are approximately three years in length and consist of both a didactic and a clinical education component. Didactic education describes course work that occurs in the classroom and consists of topics that provide the foundation and skills for physical therapist practice. Clinical education comprises 20% of the DPT program and occurs primarily in physical therapy clinics, hospitals, rehabilitation centers, and schools (APTA, 2014c). Clinical education provides the bridge between didactic course work and physical therapist practice. During clinical education experiences (practica), physical therapist students work with clinical instructors (CIs), who are physical therapists, to provide physical therapy services to patients and clients for a pre-determined length of time. Clinical instructors use the *Physical Therapist Clinical Performance Instrument*, which is now a web-based tool (PT CPI web) to assess physical therapist student performance during clinical education (APTA, 2014b).

Physical therapist education includes an extensive background in the sciences, focusing on physics, anatomy, physiology, biomechanics, and kinesiology (APTA, 2014c). Physical therapist education curricula now incorporate not only science and skill-based instruction, but also communication, management, leadership, and ethics (APTA, 2014c). Foord-May and May (2007) stated, "as doctors of physical therapy achieve increased autonomy and take greater leadership in the provision of health care, a correspondingly higher level of professionalism is expected" (p. 6). For this reason, many physical therapist education programs incorporate

curricula that focus on the development of professionalism (Hayward & Blackmer, 2010; Santasier & Plack, 2007).

The Commission on Accreditation in Physical Therapy Education (CAPTE) accredits physical therapist education programs and is recognized by the U.S. Department of Education (USDE) and the Council for Higher Education Accreditation (CHEA). The agency grants accreditation status to qualified entry-level education programs for physical therapists and physical therapist assistants (CAPTE, 2015). Even with the need to meet physical therapist program accreditation standards, the faculty and the university in which each program is housed design each physical therapist education program to meet the individual needs of the university, the philosophy and mission of the academic institution, and the expertise and strengths of the faculty. Consequently, no two physical therapist education programs are exactly alike. For this reason, this initial study of the psychometric properties of the PCVSA will utilize the PCVSA from only one physical therapist education program. By limiting the study population to a single physical therapist education program, the investigator minimized any differences in study scores that might have occurred from differences in educational philosophy, physical therapist faculty expectations, geography, or institutional environment.

Professionalism in the Physical Therapy Profession

In 2000, the APTA adopted Vision 2020 and a strategic plan to transition to "a doctoring profession" that incorporated six key elements: the Doctor of Physical Therapy degree, Evidenced-Based Practice, Autonomous Practice, Direct Access, Practitioner of Choice, and Professionalism (APTA, 2000). An initiative that developed from this strategic plan was to

define and describe specific behaviors and actions expected of physical therapist education program graduates in respect to professionalism. In 2003, the Board of Directors of the APTA adopted *Professionalism in Physical Therapy: Core Values*, a core document on professionalism in physical therapy practice, education, and research (APTA, 2003a). *Professionalism in Physical Therapy: Core Values* identified and defined seven critical elements of professionalism: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility. This document closely resembled the ABIM's taxonomy of professional behaviors (Table 1) (APTA, 2003a; Arnold, 2002). By adding a Likert-type response scale to each of the sample behaviors, the APTA developed the document into the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b).

In addition to the *Professionalism in Physical Therapy*: *Core Values* (APTA, 2003a), there are several documents fundamental to the profession of physical therapy that underpin the importance of professionalism in the field. Following APTA's adoption of the *Professionalism in Physical Therapy*: *Core Values* (APTA, 2003a), the APTA began to integrate the core values into these core documents to more clearly define professionalism and set standards regarding it (APTA, 2004a).

Core Documents of the Physical Therapy Profession

According to the APTA, "core documents define the fundamental tenets of the association and are the documents with which all association positions, standards, guidelines, policies, procedures, and publications must comply" (APTA, 2015). Core documents of the profession that support the expectation of professionalism in physical therapy include the *Code*

of Ethics for the Physical Therapist (APTA, 2010a), *Guide for Professional Conduct* (APTA, 2010b), *Professionalism in Physical Therapy: Core Values* (APTA, 2003a), and the publication, *A Normative Model of Physical Therapist Professional Education: Version 2004* (APTA, 2004a). Each of these documents represents the expectations, values, and culture of the physical therapy profession. The core documents of the physical therapy profession substantiate the importance of teaching and assessing professionalism in physical therapist students.

Code of Ethics

In 2010, the APTA revised the *Code of Ethics for the Physical Therapist* (*Code of Ethics*) (APTA, 2010a) and adopted the revision. The *Code of Ethics* now addresses the multiple roles of the physical therapist, the core values of the profession, and the multiple domains of ethical action. It portrays the ethical obligations of all physical therapists as determined by the APTA. The *Code of Ethics* "provides expectations for standards of behavior and performance that form the basis of professional accountability to the public" (APTA, 2010a, p. 1). It defines eight ethical principles for physical therapists. In 2010, the core values from *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) were matched to each of the ethical principles, further supporting the importance of professionalism in physical therapy (APTA, 2010a).

Guide for Professional Conduct

The *Guide for Professional Conduct* (APTA, 2010b) further interprets the *Code of Ethics* and provides examples for the physical therapist of behaviors that might demonstrate the core values in the context of physical therapist practice. It provides a framework of how every physical therapist should evaluate the correctness of their actions. The *Guide for Professional*

Conduct is also intended to help guide the professional development of physical therapist students. In addition, it describes the ethical principles within the context of each core value (APTA, 2010b).

Normative Model

In 2004, the APTA updated *A Normative Model for Physical Therapist Professional Education: Version 2004* (*Normative Model*) to integrate the core values and outcomes from the 2003 Consensus Conference on Professionalism (APTA, 2004a). The *Normative Model* provides the framework for all physical therapist education and is a reference for physical therapist education programs to use when designing the curriculum for the program. The *Normative Model* reflects a broad-based consensus regarding the purpose, scope, and content of professional education. It identifies specific physical therapist tests and measures as well as interventions from the *Guide to Physical Therapist Practice* (APTA, 2004b) that describe expectations of the knowledge and skill of physical therapist program graduates. The *Normative Model* includes expectations of professionalism according to the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a).

Conceptual Framework

The conceptual framework for this study lies in the core values identified through the consensus conference on professionalism and developed into the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a). The seven core values—accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility—are based on the ABIM's definition of professionalism which developed out of the concept of "humanism"

(ABIM, 2001/1995). The humanistic philosophy places a high value on people, the individual, and the human experience and has been a part of the fundamental framework of the ABIM since 1936 (ABIM, 2001/1995). The *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) appear to reflect similar qualities and are presented here in alphabetical order without any intention for preference or ranking.

Accountability

Accountability is active acceptance of responsibility for the diverse roles, obligations, and actions of the physical therapist including self-regulation and other behaviors that positively influence patient/client outcomes, the profession, and the health needs of society (APTA, 2003a, p. 4).

Altruism

Altruism is the primary regard for or devotion to the interest of patients/clients, thus assuming the fiduciary responsibility of placing the needs of the patient/client ahead of the physical therapist's self-interest (APTA, 2003a, p. 5).

Compassion/Caring

Compassion is the desire to identify with or sense something of another's experience: a precursor of caring. Caring is the concern, empathy, and consideration for the needs and values of others (APTA, 2003a, p. 5).

Excellence

Excellence is physical therapy practice that consistently uses current knowledge and theory while understanding personal limits, integrates judgment and the patient/client perspective, embraces advancement, challenges mediocrity, and works toward development of new knowledge (APTA, 2003a, p. 6).

Integrity

Integrity is the steadfast adherence to high ethical principles or professional standards: truthfulness, fairness, doing what you say you will do, and "speaking forth" about why you do what you do (APTA, 2003a, p. 7).

Professional Duty

Professional duty is the commitment to meeting one's obligations to provide effective physical therapy services to individual patients/clients, to serve the profession, and to positively influence the health of society (APTA, 2003a, p. 8).

Social Responsibility

Social responsibility is the promotion of a mutual trust between the physical therapist as part of the profession and the larger public that necessitates responding to societal needs for health and wellness (APTA, 2003a, p. 8).

Measurement of Professionalism

Over the past decade, medical and healthcare educators recognized a need to measure professionalism and professional behaviors in all areas of the healthcare continuum. Despite the

development of tools to measure attitudes of professionalism and attempts to qualify and quantify professional behaviors, there has been little attempt to validate the scores produced by these tools (Clauser, Margolis, Holtman, Katsufrakis, & Hawkins, 2012). Researchers have not challenged reliability and validity issues such as potential geographic influences on professionalism assessment responses despite the potential for high-stakes decisions based on the resulting scores (Ferguson, Hopwood, Sinatra, & Wallmann, 2005). Several reasons may underlie this lack of academic scrutiny such as the difficulty in defining the construct *professionalism* and the lack of supportive literature providing guidance on this topic (Clauser et al., 2012).

Messick's (1989) unified construct-based concept of validity identifies six aspects of validity: content, substantive, structural, generalizability, external, and consequential. Each of these validity aspects contributes meaningful information regarding the validity of scores generated from assessments of professionalism. In addition to Messick's six aspects of validity, there are two additional sources of information that contribute to the validity decision under Messick's validity framework (Dimitrov, 2012): responsiveness and interpretability. The investigator used these established procedures for obtaining reliability and validity evidence to investigate the psychometric properties of the *Professionalism in Physical Therapy: Core Values Self-Assessment* when used with physical therapist students.

Problem Statement

The Physical Therapy profession's move toward direct access resulted in increased expectations for higher education and professionalism of physical therapists (Swisher & Page,

2005). To gain consumer trust, recognition of expertise from the medical community, and equitable reimbursement, physical therapist education was advanced to the clinical doctorate degree (Swisher & Page, 2005). Closely attending to published research on professionalism in medical education, physical therapist educators and CIs soon recognized the need for identification, assessment, and development of professionalism in physical therapist students (APTA, 2003b; Hayes, Huber, Rogers, & Sanders, 1999; Wolff-Burke, 2005). The APTA held a consensus conference that identified seven core values essential to professionalism in physical therapy. From this conference, the APTA developed the *Professionalism in Physical Therapy: Core Values Self-Assessment* (APTA, 2003b). Following the development of this assessment of professionalism, many physical therapist education programs adopted this tool for student assessment, development, and research (Anderson & Irwin, 2013; B. Cada, personal communication, January 14, 2015; Hayward & Blackmer, 2010). Despite the use of the *Professionalism in Physical Therapy: Core Values Self-Assessment* for formative assessment in graduate physical therapy (PT) programs and for research purposes, to date there has been no analysis of the psychometric properties of data resulting from the use of this tool when administered to physical therapist students.

Purpose of the Study

The purpose of this study was to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students.

Research Questions

1. What is the internal consistency reliability of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students at one university?

2. Does confirmatory factor analysis support the conceptual organization of seven core values in the *Professionalism in Physical Therapy: Core Values Self-Assessment*?

3. What is the relationship between scores on the *Professionalism in Physical Therapy: Core Values Self-Assessment* and the *Professional Practice* subscale of the PT CPI web?

4. What are the test/re-test reliability and the minimal detectable change of the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students?

Significance of the Study

Physical therapist education is a high-stakes and costly proposition. The average cost of earning a DPT degree in the United States in 2012 ranged from $45,515 for a public in-state university to $92,277 for a private university (CAPTE, 2013). The rising cost of graduate education adds increased accountability for physical therapy programs to graduate physical therapists that exhibit the high-level skills and professionalism expected in today's healthcare environment. Employers of physical therapists consistently report on the importance of professionalism behaviors in the workplace (Freeman & Rogers, 2010; Lunnen, 2001). Academic institutions have dismissed physical therapist students for unprofessional behavior during clinical education experiences (B. Cada, personal communication, January 14, 2015). Utilization of a tool that provides a reliable and valid measure of professionalism in physical therapist students will provide support for decision making on student progression or the need for remediation.

Currently, the PCVSA is used largely for formative evaluation and reflection in physical therapist education programs (M. Bureau, personal communication, June 19, 2014; C. E. Crandell, personal communication, June 20, 2014). The PCVSA is also used to track student development of the core values of the profession as well as the frequency with which students exhibit behaviors that reflect these values (Anderson & Irwin, 2013). Currently, faculty base their decisions for remediation on global patterns in student self-assessment using the PCVSA that either reflect over-estimation (all 5s, representing that the student "always" exhibits that behavior/core value) or an incongruence between a student's self-perceived professionalism and that observed by faculty or clinical instructors (K. Irwin, personal communication, August 31, 2014). Without knowledge of validity and reliability, decisions based on the information from the tool could be faulty, making the utility of the PCVSA in physical therapist education programs somewhat limited. Moreover, utilization of a tool that is not supported by research to make academic decisions may place the academic institution at risk for liability (B. Cada, personal communication, January 14, 2015). In addition, the PCVSA has been used in at least three published research projects since its derivation in 2003 (Anderson & Irwin, 2013; Guenther et al., 2014; Hayward & Blackmer, 2010). The results of this exploration add to the rigor of further research in this area not only in physical therapy, but in other professions, as it highlights the use of Messick's (1989) validity framework to evaluate assessments of professionalism. Finally, this research, through calculation of minimal detectable change scores, provides physical therapist educators, researchers, and clinicians with important information on how to interpret PCVSA scores over time.

Definition of Terms

The following terms were used operationally in this study:

Academic program: that aspect of the curriculum where students' learning occurs directly as a function of being immersed in the academic institution of higher education; the didactic component of the curriculum that is managed and controlled by the physical therapist education program (APTA, 2004c, p. 67).

Accountability: active acceptance of responsibility for the diverse roles, obligations, and actions of the physical therapist including self-regulation and other behaviors that positively influence patient/client outcomes, the profession, and the health needs of society (APTA, 2003b, p. 4).

Accreditation: a process used in the United States to assure the quality of the education that students receive; a voluntary, non-governmental, peer-review process that occurs on a regular basis (CAPTE, 2013).

Affective: pertaining to emotions, values, beliefs, maturity, spirituality, self-understanding, wisdom, honesty, citizenship, and social responsibility (Goulet & Owen-Smith, 2005).

Altruism: the primary regard for or devotion to the interest of patients/clients, thus assuming the fiduciary responsibility of placing the needs of the patient/client ahead of the physical therapist's self-interest (APTA, 2003b, p. 5).

Caring: the concern, empathy, and consideration for the needs and values of others (APTA, 2003b, p. 5).

Center Coordinator of Clinical Education (CCCE): an individual who administers, manages, and coordinates clinical instructor assignments and learning activities for students during their clinical education experiences. In addition, this person determines the readiness of persons to serve as clinical instructors for students, supervises clinical instructors in the delivery of clinical education experiences, communicates with the academic program regarding student performance, and provides essential information about the clinical education program to physical therapy programs (APTA, 2004c, p. 67).

Clients: individuals who are not necessarily sick or injured but can benefit from a physical therapist's consultation, professional advice, or services. Clients are also businesses, school systems, families, caregivers, and others who benefit from physical therapy services (APTA, 2004c, p. 67).

Clinical education program: the portion of a physical therapy program that is conducted in the healthcare environment rather than the academic environment (APTA, 2004c, p. 68).

Clinical Instructor (CI): an individual at the clinical site who directly instructs and supervises students during their clinical learning experiences. This individual is responsible for carrying out clinical learning experiences and assessing students' performance in cognitive, psychomotor, and affective domains as related to entry-level clinical practice and academic and clinical performance expectations (APTA, 2004c, p. 68).

Cognitive: mental skills, knowledge (Clark, 2014).

Compassion: the desire to identify with or sense something of another's experience; a precursor of caring (APTA, 2003b, p. 5).

Competent: demonstrates skill and proficiency in a fluid and coordinated manner in rendering physical therapy care (APTA, 2004c, p, 68).

Competencies: a set of standard criteria, determined by practice setting and scope, by which one is objectively evaluated (APTA, 2004c, p. 68).

Core Values: the critical elements that comprise professionalism in physical therapy (APTA, 2003b, p. 3).

Direct Access: The ability of a physical therapist to provide evaluation and treatment to patients without the need for physician referral (APTA, 2014a).

Director of Clinical Education (DCE): an individual who is responsible for managing and coordinating the clinical education program at the academic institution, including facilitating development of the clinical education site and clinical educators. This person is also responsible for coordinating student placements, communicating with clinical educators about the academic program and student performance, and maintaining current information on clinical education sites (APTA, 2004c, p. 67).

Excellence: physical therapy practice that consistently uses current knowledge and theory while understanding personal limits, integrates judgment and the patient/client perspective, embraces advancement, challenges mediocrity, and works toward development of new knowledge (APTA, 2003b, p. 6).

Integrity: steadfast adherence to high ethical principles or professional standards; truthfulness, fairness, doing what you say you will do, and "speaking forth" about why you do what you do (APTA, 2003b, p. 7).

Physical Therapist: a person who is a graduate of an accredited physical therapist education program and is licensed to practice physical therapy (APTA, 2004c, p. 70).

Physical Therapist Professional Education: first level of education that prepares students to enter the practice of physical therapy (APTA, 2004c, p. 70).

Professionalism: defined by the APTA for physical therapists as consisting of seven core values: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility. These core values are accompanied by sample indicators that describe what the physical therapist would be doing in practice, education, and/or research if these core values were present (APTA, 2003b, p. 3).

Professional Duty: the commitment to meeting one's obligations to provide effective physical therapy services to individual patients/clients, to serve the profession, and to positively influence the health of society (APTA, 2003b, p. 8).

Practicum: the part of the curriculum within a Doctor of Physical Therapy program which consists of hands-on clinical practice (Ramsey, 2014).

Psychomotor: relating to manual or physical skills (Clark, 2014).

Simulated clinic: a controlled environment that imitates a real-life patient care setting (Mayo Foundation for Medical Education, 2015).

Social Responsibility: the promotion of a mutual trust between the physical therapist as part of the profession and the larger public that necessitates responding to societal needs for health and wellness (APTA, 2003b, p. 8).

Limitations

This study focused on examining scores from student-completed PCVSAs and the student-matched clinical instructor-completed PT CPIs from physical therapist students from one physical therapist education program in the midwestern United States. There were several limitations to this study: sample size, minimal cultural and geographic diversity, and use of student scores from a single physical therapy education program. It is not known whether the psychometric analysis would be different with a larger or more diverse sample.

Delimitations

The delimitations of this study centered on the choice of the researcher to utilize assessment scores from only one institution and physical therapist student population. The choice to use this sample was made for several reasons: 1. the researcher had access to prior student assessment data and to current students for the test-retest component of the study; 2. because this appeared to be the first psychometric analysis of PCVSA scores, utilization of one physical therapist education program helped to control for any confounding variables due to geography, curricular differences, or faculty values. However, the investigator recognizes that limiting the variability of the sample may have influenced the outcome of the generalizability aspect of the analysis.

Summary

Professionalism is a topic of great importance in physical therapist education as well as other medical and health professions education programs. Despite the development of multiple, profession-specific tools that measure professionalism in students, there is minimal published

research in medicine and any of the healthcare fields on the psychometric properties of scores derived from these tools. This study explored to what extent the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students. The results from this study contribute to the limited validity research on measures of professionalism.

Chapter 2 provides an extensive review of the literature on physical therapist education, the role of professionalism in physical therapist education, and measures of professionalism. Chapter 3 describes Messick's (1989) six aspects of validity and the study's three-part methodology that addresses each of the research questions. Chapter 4 describes the multiple statistical analyses that were used to answer the research questions. Chapter 5 provides an in-depth discussion of the results, implications for practice, limitations of the study as they pertain to practice, and recommendations for further research in this area. The Appendix provides important documents relevant to the study such as the IRB approval letter and copies of the tools used in the study.

CHAPTER 2

LITERATURE REVIEW

Introduction

In contemporary healthcare, the public holds practitioners to high standards of knowledge, skills, and professionalism (Adam, Peters, & Chipchase, 2013; Dhai & McQuiod-Mason, 2008; Frist, 2013). In addition, some researchers believe that employers value professional behaviors more than they value specialized credentials or knowledge regardless of job type (Koncz & Collins, 2007; Lunnen, 2001; Murphy, 2012). As doctors of physical therapy achieve increased autonomy with direct access and take greater leadership roles among other healthcare professionals, physical therapy stakeholders will expect a higher level of professionalism (Foord-May & May, 2007). In 2000, the American Physical Therapy Association (APTA) developed Vision 2020, a strategic plan for the profession that incorporated professionalism as one of six key elements needed to advance the profession and meet the needs of society (APTA, 2000). For these reasons, physical therapists in education, research, and practice developed a new focus on professionalism.

Healthcare educators in professional graduate programs such as medicine (Greysen et al., 2012), audiology (Diefendorf, 2003), nursing (Lima-Basto, 1995), and physical therapy (Wolff-Burke, 2005) have reported a decline in student professionalism. Specifically, medical school and physical therapist educators reported a growing concern about the lack of professionalism of

their students (Arnold, 2002; Greysen et al., 2012; Hayes et al., 1999; Markakis et al., 2000; Wolff-Burke, 2005). Medical programs expelled students for plagiarism and for violations of the Health Insurance Portability and Accountability Act (HIPAA, 1996) while in the clinical setting (Greysen et al., 2012). Medical and physical therapist educators found that some of their students had difficulty communicating with patients, receiving feedback, and exhibiting confidence in their actions (Symons et al., 2009; Wolfe-Burke, 2005). Medical and physical therapy professionals in both academic and clinical settings expressed concerns regarding professionalism among healthcare workers (Arnold, 2002; Davis, 2006). Due to these concerns, educators and practitioners participated in discussions about the definition, measurement, and teaching of professionalism (Arnold, 2002; Hayes et al., 1999; Hayward & Blackmer, 2010; Robins, Braddock III, & Fryer-Edwards, 2002; Wolff-Burke, 2005; Wolff-Burke, Ingram, Lewis, Odom, & Shoaf, 2007).

Using surveys, critical-incident reports, and consensus in terminology, healthcare professionals developed definitions of professionalism as the basis for assessment of professional behaviors and attitudes in their specific profession (APTA, 2003b; Arnold, 2002; Hayes et al., 1999; Lima-Basto, 1995). Due to concerns about the inadequacy of current methods that evaluate professionalism at the same time and in the same manner as technical competency, professionals in medicine and physical therapy developed new methods and tools to assess professionalism in their students, interns, and graduates (APTA, 2003b; Epstein & Hundert, 2002; Hayward & Blackmer, 2010; May, Kontney, & Iglarsh, 2010; Santasier & Plack, 2007). The American Board of Internal Medicine (ABIM) was one of the first organizations to develop a taxonomy to

categorize the professional behaviors of medical students (Robins et al., 2002). The ABIM taxonomy now serves as the basis for development of tools to assess professionalism including the American Physical Therapy Association's document, *Professionalism in Physical Therapy: Core Values Self-Assessment* (APTA, 2003b; Arnold, 2002).

The *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) is a tool used to assess professionalism of physical therapist students as well as seasoned clinicians. Despite the use of the PCVSA for formative assessment in graduate physical therapist (PT) programs and for research purposes, this assessment has not yet undergone investigation of its measurement properties. Current literature seems to indicate that the PCVSA is able to detect change in the professionalism behaviors of physical therapist students over time (Anderson & Irwin, 2013) or in response to a specific educational model (Hayward & Blackmer, 2010). Without sound validity evidence, any inferences made regarding the PCVSA are questionable. Although it does not appear that the PCVSA is being used for summative assessment of physical therapist students at this time, it is important for stakeholders to understand the psychometric properties of this tool to make decisions regarding its full utility in physical therapy education. The purpose of this study was to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students.

Contemporary Physical Therapy Practice

Development of a Profession

In the United States, the first programs to educate exercise professionals began as physical education programs in the early 1900s; however, it took more than 30 years for physical therapy to become a licensed profession (Moffatt, 2012; Murphy, 1995; Swisher & Page, 2005). It was not until after World War I and the polio epidemic that physicians began to recognize the work being done by physical therapists as being significant to the healthcare community (Murphy, 1995). The first physical therapists were called reconstruction aides during WWI when they worked with soldiers debilitated by traumatic war wounds and physical injuries (Moffatt, 2012; Murphy, 1995). The term "reconstruction aide" was later replaced with "physical therapist" and the profession was born (Murphy, 1995). In response to the needs of a growing profession, physical therapists pursued higher education, first receiving a certificate, then a bachelor's degree, and now graduate degrees (Moffatt, 2012; Swisher & Page, 2005).

Physical therapists are now highly recognized, respected, and educated healthcare professionals all over the world (Moffatt, 2012). Physical therapists work in many different environments such as hospitals, skilled nursing facilities, rehabilitation centers, outpatient clinics, and schools. Physical therapists treat people of all ages with a wide variety of diagnoses. The professional organization of physical therapists is The American Physical Therapy Association (APTA), which was founded in 1921 (Moffatt, 2012; Murphy, 1995). Today, the APTA represents more than 90,000 physical therapists, physical therapist assistants, and physical therapist students (APTA, 2015).

The APTA and Direct Access Legislation

Direct access is the ability of physical therapists to see patients and clients without a referral from a physician (Childs, Whitman, Sizer, Pugia, Flynn, & Delitto, 2005; Ojha et al., 2014; Swisher & Page, 2005). The APTA initiated the concept of direct access as a means to establish physical therapists as experts in their field (Swisher & Page, 2005), provide patients with "front line" services, and decrease healthcare costs (Childs et al., 2005; Ojha et al., 2014). Direct access establishes physical therapy as a profession that holds a unique body of knowledge and skill that can be received only from a licensed physical therapist (Murphy, 1995; Swisher & Page, 2005). Direct access to physical therapy allows patients to immediately seek the services of physical therapists for injuries and conditions that require physical therapy services without first having to see another healthcare provider (Childs et al., 2005; Ojha et al., 2014). Researchers reported that direct access to physical therapy services resulted in decreased time from injury to return to function, decreased referral for additional tests, and overall decreased costs (Ojha et al., 2014).

The first direct access legislation was voted into State Law in 1985 in North Carolina (Singleton, 1987). Soon after, legislators in a variety of states passed laws that affected the provision of direct access physical therapy, resulting in a wide variation of practice guidelines across the United States (Swisher & Page, 2005). Despite the APTA's support of this legislation, hospital associations, physicians, insurance carriers, some physical therapists, and physical therapist employers oppose the move toward direct access (Swisher & Page, 2005). Currently, 50 states and the District of Columbia have some form of direct access legislation for physical

therapists (APTA, 2014a). Direct access legislation continues to vary in content and coverage by state (APTA, 2014a; Swisher & Page, 2005). Similar to Illinois, most states allow physical therapists to evaluate patients without a referral, but require a referral for ongoing treatment (APTA, 2014a). Additional direct access provisions may include the ability to access physical therapy intervention for a specified length of time or number of sessions prior to seeing a physician (APTA, 2014a). The APTA and the profession's move toward direct access and physician-level reimbursement culminated in the move to DPT education, Vision 2020, and the increased focus on professionalism in physical therapy (APTA, 2010; McDavitt, 2006; Singleton, 1997).

Consumer Expectations of Healthcare Workers/Physical Therapists

Healthcare access and delivery of services have changed significantly over the past 25 years (Freeman et al., 1987; Frist, 2014; Ginsburg, 2005). The rise and fall of managed-care plans in the 80s and 90s led to growth of preferred provider organizations (PPOs) when consumers began to voice their dissatisfaction with their service providers (Ginsburg, 2005). While healthcare reform and the Affordable Care Act (2010) focused on cost savings and issues of access, consumers became educated on their health needs and preferences (Frist, 2014).

Healthcare consumers, through a variety of methods, now gain information about the quality, variety, and effectiveness of the services offered to them (Frist, 2014). Consumers can independently access information about their conditions and their bodies, and compare costs of medical procedures via information technologies as well as personal-health products (Frist, 2014). The increase in consumer-based healthcare and the rapid changes in medical and

information technologies challenge healthcare organizations to provide high-level, effective medical interventions that consumers like (Frist, 2014). Contemporary consumer-driven healthcare demands high quality healthcare services by well-educated, highly professional providers.

Vision 2020

In response to increased consumer expectations and the ongoing campaign for physical therapy direct access, the APTA adopted Vision 2020, a strategic plan for the profession (APTA, 2000). Vision 2020 incorporated six key elements: Autonomous Physical Therapy Practice, Direct Access, the Doctor of Physical Therapy degree and Lifelong Education, Evidenced-Based Practice, Practitioner of Choice, and Professionalism (APTA, 2000). From this strategic plan, the APTA developed an initiative to define and describe specific behaviors and actions expected of physical therapist program graduates with respect to professionalism. In 2002, the Education Division of the APTA held a consensus conference on professionalism in Alexandria, VA. Eighteen physical therapists known for their work in clinical practice, education, and research participated in this conference and developed the document, *Professionalism in Physical Therapy: Core Values* (APTA, 2003a).

Professionalism in Physical Therapy: Core Values (APTA, 2003a) is largely based on work conducted by medicine and the American Board of Internal Medicine (ABIM) (APTA, 2003b; Stern, 2006). Similar to medicine, the definition of professionalism in physical therapy continues to be debated and modified (APTA, 2014d; Graham, de Leeuw, & Markless, 2013). Vision 2020 served as the vision statement for the physical therapy profession until the end of

2013 when a new vision statement and strategic plan were developed by the APTA (APTA, 2014e). The new strategic plan continues to embrace the concept of professionalism under Goal 3, "[the] APTA will empower physical therapists to demonstrate and promote high standards of professional and intellectual excellence" and "promote modeling and demonstration of key values and behaviors that embrace professionalism" (APTA, 2014e). Consistent with the vision of the APTA, this study further contributes to the literature on professionalism in physical therapy.

Physical Therapist Education Today

With changing healthcare requirements in the late 1980s and demands for more highly skilled healthcare workers, the APTA promoted changes to the curricular structure of physical therapist education programs. These changes first resulted in the move to graduate education and the Master of Physical Therapy degree (MPT) and then to the Doctor of Physical Therapy degree (DPT) (APTA, 2014c; Swisher & Page, 2005). In 2000, APTA leadership presented Vision 2020 regarding the future of the physical therapy profession to address the needs of the quickly changing healthcare environment (APTA, 2000). Vision 2020 postulated that by 2020 all physical therapist education programs would provide the Doctor of Physical Therapy degree (DPT) as the entry-level degree for physical therapists to align more closely with other occupations offering entry-level doctoral degrees (e.g. podiatry, optometry, etc.; APTA, 2000). As of 2014, approximately 99% of physical therapy educational programs had transitioned to the DPT degree (APTA, 2014c).

Contemporary physical therapist education requires students to complete a 4-year undergraduate degree, apply to a PT graduate program, and then complete approximately three more years of graduate education to earn the DPT degree (APTA, 2014c). Physical therapist education, similar to medical education, has its foundation in the basic sciences of anatomy and physiology followed by evidence-based physical therapy evaluation and intervention coursework. Clinical education makes up approximately 20% of PT curricula, with all PT programs requiring a minimum of 30 weeks of full-time clinical education experience (CAPTE, 2013). As a consequence of the move to the DPT degree, educators and the public expect physical therapist students to exhibit high levels of knowledge, skills, and professional behaviors (Lopopolo, Schäfer, & Nosse, 2004; Wise, 2014).

The Commission on Accreditation in Physical Therapy Education (CAPTE) accredits physical therapist education programs and is recognized by the US Department of Education and the Council for Higher Education (CAPTE, 2013). Accreditation assures students and the public that an accredited program is provided by qualified faculty, has appropriate resources to support the program, has acceptable outcomes, and provides accurate information to students and the public about the program (CAPTE, 2013). In the United States, physical therapist students must graduate from an accredited program to obtain licensure (CAPTE, 2013).

The importance of professionalism is reflected within the accreditation standards for physical therapist education programs (CAPTE, 2011). The accreditation standards include a section on professional practice expectations (CAPTE, 2011, p. 31-33). These expectations explicitly provide objectives that represent five of the seven physical therapy core values:

accountability, altruism, compassion/caring, integrity, and professional duty. In addition, the core values of excellence and social responsibility are represented by additional professional practice objectives: communication, cultural competence, clinical reasoning, evidence-based practice, and education (CAPTE, 2011, pp. 32-33). The incorporation of the core values that underpin physical therapists' professionalism within CAPTE accreditation standards underscores the need to identify a valid and reliable method of measuring professionalism in physical therapist students.

Definitions of Professionalism

Physical therapists and other healthcare professionals are engaged in much discourse to define professionalism and identify the best methods to teach and evaluate professional behaviors. Over the past 40 years, many theorists explored multiple definitions of professionalism and professional behaviors (Arnold, 2002; Epstein & Hundert, 2002; Gleeson, 2007; Hayes et al., 1999; Markakis et al., 2000). Arnold (2002) and Markakis, Beckman, Suchman, and Frankel (2000) explored the evolution of the concept of "profession" and the growing interest in the area of non-cognitive characteristics of medical school students. These investigators described both positive and negative characteristics in the non-cognitive or affective domain as professionalism or professional behaviors (Arnold, 2002).

Epstein and Hundert (2002) defined professionalism as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual and community being served" (p. 226). Stern (2006) identified the principles of medical professionalism as excellence, humanism, accountability, and altruism. Gokenbach (2013) defined professionalism in nursing as related to

the core nursing values of honesty, responsibility, pursuit of new knowledge, belief in human dignity, equality of all patients and the desire to prevent and alleviate suffering. Tsoumas (2002) defined professionalism as the "ability to demonstrate behavior that is consistent with the expectations of the physical therapy profession" (p. 38). Gleeson (2007) expanded the definition of professionalism for physical therapists to include "communication; loyalty; membership and participation in professional organizations; appropriate dress and mannerisms; respect; behavior toward peers, patients, and those in authority; and work habits such as time management and stress management" (p. 23).

Despite the variety of definitions of professionalism in the literature, most healthcare professional organizations seem to agree on the core elements of professionalism as described by the American Board of Internal Medicine (ABIM): altruism, accountability, excellence, duty, honor and integrity, and respect for others (ABIM, 2001/1995; Adams et al., 1996; APTA, 2003a; Arnold, 2002; Markakis et al., 2000).

Professionalism in the Physical Therapy Profession

Professionalism is a range of behaviors that, when added to a unique body of knowledge and skills, is necessary to a physical therapist's success (Foord-May & May, 2007). In 2003, the Board of Directors of the APTA adopted *Professionalism in Physical Therapy: Core Values*, a core document on professionalism in physical therapy practice, education, and research (APTA, 2003a). *Professionalism in Physical Therapy: Core Values* identified and defined seven critical elements of professionalism: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility. Since that time, the APTA has integrated the

Professionalism in Physical Therapy: Core Values into the other core documents of the profession (APTA, 2004, 2010a). The 2011 version of the CAPTE accreditation standards also included objectives related to the seven core values (CAPTE, 2011). Based on the core values, the APTA now operationally defines professionalism in the following manner:

> Physical therapists and physical therapist assistants [will] consistently demonstrate core values by aspiring to and wisely applying principles of altruism, excellence, caring, ethics, respect, communication and accountability, and by working together with other professionals to achieve optimal health and wellness in individuals and communities (APTA, 2014d).

Core Documents of the Physical Therapy Profession

In addition to the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a), several documents fundamental to the profession of physical therapy underscore the importance of professionalism in physical therapy. In 2004, the APTA updated the *Normative Model for Physical Therapist Professional Education: Version 2004* (*Normative Model*) to integrate the core values and recommendations from the 2003 Consensus Conference on Professionalism (APTA, 2004a). The *Normative Model* provides the framework for all physical therapist education. In 2010, the APTA revised the *Code of Ethics for the Physical Therapist* (*Code of Ethics*) and adopted the revision (APTA, 2010a). The *Code of Ethics* now addresses the multiple roles of the physical therapist, the core values of the profession, and the multiple domains of ethical action. The *Guide for Professional Conduct* (APTA, 2010b) further interprets the *Code of Ethics* and provides examples for the physical therapist on behaviors that might demonstrate the core values. The core documents of the physical therapy profession substantiate the importance of teaching and assessing professionalism in physical therapist students.

Code of Ethics for the Physical Therapist and the *Guide for Professional Conduct*

The *Code of Ethics* identifies the fundamentals of expected behavior and practice for physical therapists (APTA, 2010a). The *Code of Ethics* outlines the standards of behavior and performance by which the public can hold physical therapists accountable. It also provides guidance for physical therapists who are facing ethical challenges (APTA, 2010a). The *Code of Ethics* contains eight principles*:* respect for the rights of others, trustworthiness and compassion toward patients, accountability for good judgments, demonstration of integrity in relationships, fulfillment of professional and legal obligations, lifelong learning as experts in the field, promotion of organizational and business practices that support patients and society, and participation in meeting the needs of society (APTA, 2010a).

The *Guide for Professional Conduct* (APTA, 2010b) furthers explains the *Code of Ethics* and is used to educate the public and other stakeholders about the values, ethical principles, and standards that guide the professional conduct of physical therapists (APTA, 2010b). The *Guide for Professional Conduct* further provides examples of how a physical therapist would demonstrate each of the ethical principles. The seven core values from the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) have been integrated throughout both documents (APTA, 2010a; 2010b).

A Normative Model of Physical Therapist Professional Education: Version 2004

The *Normative Model* (APTA, 2004a) represents the physical therapy profession's consensus on the purpose, scope and content of professional education. The *Normative Model* specifies the expectations of both academic and clinical partners in physical therapist education.

The *Normative Model* includes expectations for professional behaviors. The core values from the *Professionalism in Physical Therapy: Core Values* document (APTA, 2003a) were integrated into the 2004 update of the *Normative Model* (APTA, 2004a). The *Normative Model* also incorporates concepts from the *Generic Abilities* (May, Morgan, Lemke, Karst, & Stone, 1995), a list of professional behaviors identified as being important for the success of physical therapist students (Wolfe-Burke, 2005). The *Normative Model* requires that both the academic institutions and the clinical facilities that they work with to provide clinical education are responsible for professionalism development of physical therapist students (APTA, 2004a).

Conceptual Framework

The conceptual framework for this study is the seven core values that make up the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a). Members of the Consensus Conference on Professionalism identified and defined seven core values that represent professionalism in physical therapy and are believed to be integral to the profession (APTA, 2003b). The core values of accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility are similar to the American Board of Internal Medicine's definition of professionalism and are grounded in the medical literature (APTA, 2003b; Arnold, 2002).

American Board of Internal Medicine and Humanism

Professionalism has been a part of physician certification since 1936 and was largely based on attitudes and values regarding patient care (ABIM, 2001/1995). However, in the 1980s and 1990s, interest in "humanism" in medicine and "humanistic qualities" re-emerged and the

American Board of Internal Medicine (ABIM) used these qualities as the foundation for their definition of professionalism and the driving force behind Project Professionalism (ABIM, 2001/1995). Humanism is a philosophy that places a high value on people, the individual, and the human experience (ABIM, 2001/1995). Project Professionalism was the multi-year undertaking of the ABIM "to enhance the evaluation of professionalism as a component of clinical competence and to promote the integrity of internal medicine" (ABIM, 2001/1995, p. 1). The authors of *Project Professionalism* (ABIM, 2001/1995) state, "Respect for others is the essence of humanism, and humanism is both central to professionalism, and fundamental to enhancing collegiality among physicians" (ABIM, 2001/1995, p. 6). With their focus on humanistic qualities, the ABIM developed six attitudes and behaviors "that serve to maintain the patient interest above physician self-interest ... altruism, accountability, excellence, duty, service, honor, integrity, and respect for others" (ABIM, 2001/1995, p. 2).

The *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) reflects similar qualities to those established in the ABIM definition of professionalism and are presented in alphabetical order without any intention for preference or ranking (APTA, 2003a). The following section identifies the operational definitions for the core values as well as two of the sample behavioral indicators for that core value (APTA, 2003a).

Accountability

Accountability is active acceptance of responsibility for the diverse roles, obligations, and actions of the physical therapist including self-regulation and other behaviors that positively influence patient/client outcomes, the profession, and the health needs of society. Two of the ten

sample indicators for this core value are: 1) responding to the patient's/client's goals and needs, and 2) seeking and responding to feedback from multiple sources (APTA, 2003a, p. 4).

Altruism

Altruism is the primary regard for or devotion to the interest of patients/clients, thus assuming the fiduciary responsibility of placing the needs of the patient/client ahead of the physical therapist's self-interest. Two of the five sample indicators for this core value are: 1) placing patient's/client's needs above the physical therapist, and 2) providing pro-bono services (APTA, 2003a, p. 5).

Compassion/Caring

Compassion is the desire to identify with or sense something of another's experience; a precursor of caring. Caring is the concern, empathy, and consideration for the needs and values of others (APTA, 2003a, p. 5). Two of the eleven sample indicators for this core value are: 1) understanding the socio-cultural, economic, and psychological influences on the individual's life and their environment, and 2) understanding an individual's perspective (APTA, 2003a, p. 5).

Excellence

Excellence is physical therapy practice that consistently uses current knowledge and theory while understanding personal limits, integrates judgment and the patient/client perspective, embraces advancement, challenges mediocrity, and works toward development of new knowledge. Two of the eleven sample indicators for this core value are: 1) demonstrating

investment in the profession of physical therapy, and 2) internalizing the importance of using multiple sources of evidence to support professional practice and decisions (APTA, 2003a, p. 5).

Integrity

Integrity is the steadfast adherence to high ethical principles or professional standards; truthfulness, fairness, doing what you say you will do, and "speaking forth" about why you do what you do. Two of the twelve sample indicators for this core value are: 1) abiding by the rules, regulations, and laws applicable to the profession, and 2) adhering to the highest standards of the profession (practice, ethics, reimbursement, institutional review board, honor code, etc.) (APTA, 2003a, p. 6).

Professional Duty

Professional duty is the commitment to meeting one's obligations to provide effective physical therapy services to individual patients/clients, to serve the profession, and to positively influence the health of society. Two of the seven sample indicators for this core value are: 1) demonstrating beneficence by providing "optimal care," and 2) facilitating each individual's achievement of goals for function, health, and wellness (APTA, 2003a, p. 6).

Social Responsibility

Social responsibility is the promotion of a mutual trust between the physical therapist as part of the profession and the larger public that necessitates responding to societal needs for health and wellness. Two of the twelve sample indicators for this core value are: 1) advocating for the health and wellness needs of society, including access to health care and physical therapy

services, and 2) promoting cultural competence within the profession and the larger public (APTA, 2003a, p. 7).

Expectations of Professional Behavior in Physical Therapist Students

Changing healthcare requirements, consumerism, and reports of unethical behavior by healthcare workers have stimulated an increased focus on accountability and professionalism in the workplace (Frist, 2014; Furze, Black, Peck, & Jensen, 2011). Consumers are now empowered to demand quality and value in the healthcare services that they receive (Frist, 2014). Murphy et al. (2002) reported that accountability within professional healthcare education mandates that educational programs produce graduates who possess the attributes that patients require. Healthcare educators, employers, and practitioners convey the importance of professionalism in the literature despite the lack of clearly defined components (Davis, 2009; Davis, King, Wayne, & Kalishman, 2012; Freeman & Rogers, 2010; Frist, 2014). With the physical therapy profession's achievement of direct access and the advancement to the Doctor of Physical Therapy degree, physical therapist educators established an increased awareness of professionalism and the need to address the development of professional behaviors in physical therapist students (Hayward & Blackmer, 2010; Santasier & Plack, 2007; Wise, 2014).

Competence in physical therapy practice requires practitioners who not only have expert knowledge, but also "skills, values, attitudes, and beliefs that allow physical therapists to interact effectively with patients" (Plack, 2006, p. 37). Tsoumas (2002) reported that physical therapist students and educators both agreed on the importance of several professional behaviors: commitment to learning, use of constructive feedback, problem solving, professionalism,

responsibility, critical thinking, and communication skills. Davis (2006) concurred with Tsoumas' findings that students supported the importance of professional behaviors.

Clinical instructors, experienced physical therapists, and physical therapist employers reported concerns regarding underdeveloped professional behaviors among physical therapist students (Hayes et al. 1999; Lunnen, 2001; Wolff-Burke, 2005) and graduates (Stumbo, Thiele, & York, 2007). Investigators cited generational differences (Gleeson, 2007; Stumbo et al., 2007), unclear communication about professional behavior expectations (Gleeson, 2007; Lunnen, 2001), and lack of a clear definition of professional behavior (Lunnen, 2001; Wolff-Burke, 2005) as contributing to workplace concerns and ineffective clinical performance (Hayes et al., 1999). In contrast, Davis found relatively few complaints regarding unprofessional behavior of physical therapist students in his survey of 376 clinicians. The clinicians reported that the most frequently reported unprofessional behaviors among physical therapist students in this study were tardiness, dress code violations, and nonverbal and verbal disrespect (Davis, 2006). Despite concerns of unprofessional behavior among physical therapist students, researchers established similar identification and prioritizing of professional behavior components among students, clinical supervisors and employers (Freeman & Rogers, 2010; Lunnen, 2001), as well as physical therapists from the generations labeled baby boomers and Generation Xers (Stumbo et al., 2007).

Expectations of Professional Behavior in Physical Therapist Graduates

Lunnen (2001) and Lopopolo et al. (2004) found that employers valued technical knowledge less than they valued skills related to communication, cultural practice, responsibility, and the ability to work in teams. The top five ranked attributes identified by employers were

ethical behavior, integrity, flexibility, strong work ethic, and positive attitude (Lunnen, 2001). Both students and clinical supervisors agreed that responsibility was the most important attribute and stress management the least important attribute (Freeman & Roger, 2010). Similar to Lunnen's (2001) findings, Adam et al. (2013) reported that employers of physical therapists and occupational therapists required professional behaviors that included the ability to establish rapport, manage time efficiently, and maintain confidentiality. Employers in New York considered professional behaviors strongly in consideration of hiring new graduates (Mathwig et al., 2001).

Assessments of Professional Behavior

Out of the need to evaluate professionalism and professional behaviors, educators and researchers in medicine and healthcare developed several models, inventories, and survey tools (APTA, 2003b; Blackall et al., 2007; Carroll et al., 2002; Hayward & Blackmer, 2010; Keen, Klein, & Alexander, 2003; May et al., 2010; Santasier & Plack, 2007; van Mook et al., 2010). Medicine developed *The Pennsylvania State College of Medicine Professionalism Questionnaire*, a self-assessment tool to evaluate professionalism attitudes in medical students (Blackall et al., 2007). Physician assistant educators developed a tool to measure students' self-perception of professionalism and change over time (Knight, Higgins, Moser, & Groh, 2009). The nursing profession, frequently on the forefront of discussions regarding affective behavior, developed the *Professionalism and Environmental Factors in the Workplace Questionnaire* (Baumann & Kolotylo, 2009).

Physical therapy was not far behind medicine in its search for a method to evaluate professionalism and professional behaviors of physical therapist students. In 1991, May et al. introduced the first model for the evaluation of professional attributes of physical therapist students, that later evolved into *The Generic Abilities*. Many years later physical therapist educators, researchers, and clinicians developed the *Professionalism in Physical Therapy: Core Values Self-Assessment* (APTA, 2003A). Santasier and Plack (2007), two physical therapist educators, developed qualitative methods of reflective essays and graphic metaphors to assess professional behaviors in physical therapist students. Hayward and Blackmer (2010) developed a model for teaching and assessing core values development in physical therapist students through the use of standardized patient cases, a virtual community of practice, and student and standardized patient interactions.

Academicians and researchers have deliberated over methods to measure professionalism and the challenges inherent in assessing affective behaviors (Hayes et al., 1999; Hayward & Blackmer, 2010; Markakis et al., 2000; Santasier & Plack, 2007). As physical therapist educators prepare future physical therapists for entrance into the workforce, identifying appropriate methods to teach and evaluate professional behavior is essential to the advancement of physical therapy in a challenging health care environment. In addition, documentation of student professional behavior performance throughout the professional program may be critical to monitor change in professional growth, remediate when necessary, and resolve issues of progression (Ferguson, Hopwood, Sinatra, & Wallmann, 2005). For these reasons, it is essential

that educators and researchers in all healthcare fields identify valid and reliable tools to measure professionalism and the behaviors associated with this construct.

Contemporary Measures of Professionalism and Professional Behavior

The Physical Therapist Generic Abilities

In 1991, the physical therapy program faculty at the University of Wisconsin-Madison developed a self-assessment tool for physical therapist students that assessed the attributes, characteristics, and behaviors that were required of the physical therapy profession at that time (May et al., 1995). *The Physical Therapist Generic Abilities* identified ten behaviors that they believed were critically important to physical therapy practice: commitment to learning, interpersonal skills, communication skills, effective use of time and resources, use of constructive feedback, problem-solving, professionalism, responsibility, critical thinking, and stress management (Hayes et al., 1999; May et al., 1995; Wolff-Burke, 2005). Eight of the ten behaviors involved affective or non-cognitive skills (May et al., 1995; Wolff-Burke, 2005). *The Physical Therapist Generic Abilities* became a popular tool used widely by physical therapist education programs. Jette and Portney (2003) investigated the construct validity of *The Physical Therapist Generic Abilities* using principal components factor analysis. One hundred eighty-three students participated in their study. Jette and Portney's analysis identified seven factors (professionalism, critical thinking, professional development, communication management, personal balance, interpersonal skills, and working relationships), but only one factor (professionalism) accounted for a significant amount of the total variance. The other six factors

accounted for only 5 percent or less of the total variance; however, the authors reported that their study supported construct validity of this tool (Jette & Portney, 2003).

Despite the widespread use of *The Physical Therapist Generic Abilities* by physical therapist professional programs, educators continued to search for a method to evaluate professionalism that was more similar to those used in medicine (Stumbo et al., 2007). In 2010, May, Kontney, and Iglarsh updated *The Physical Therapist Generic Abilities* and renamed the document to *Professional Behaviors for the 21st Century* to reflect the changing requirements of entry-level physical therapists as the profession advances to the Doctor of Physical Therapy degree and autonomous practice (May, Kontney, Iglarsh, 2010; Stumbo et al., 2007). As yet, there are no published studies regarding the utility and psychometrics of this updated tool.

The Pennsylvania State College of Medicine Professionalism Questionnaire

A task force at the Pennsylvania State College of Medicine developed *The Pennsylvania State College of Medicine Professionalism Questionnaire* (*PSCOM Professionalism Questionnaire*) in response to the need for a tool to measure professionalism in the medical school curriculum (Blackall et al., 2007). The *PSCOM Professionalism Questionnaire* is a 36-item survey based on the American Board of Internal Medicine's (ABIM) elements of professionalism (altruism, accountability, excellence, duty, honor and integrity, and respect for others). The questionnaire, which measures attitudes toward professionalism, was developed with four parallel forms for medical students, medical residents, clinical faculty, and basic science faculty. The surveys consisted of six clusters of six items representing each of the ABIM elements. The respondents responded to each item using five-point Likert-type response options

and also rank-ordered each item within the cluster based on its relative importance (Blackall et al., 2007).

The developers of the *PSCOM Professionalism Questionnaire* conducted a validation study of the scores from this new instrument. They performed principal component analysis of items from 765 completed surveys. The developers found evidence of construct validity mirroring five of the ABIM elements but suggested refinement of two of the elements. In addition, they examined internal consistency reliability of the survey items and found strong reliability for scores from six of the seven scales (.71-.78), and moderate reliability for scores from the "respect" scale (.51). Through principal component analysis, seven items emerged as representing attitudes toward professionalism: accountability, enrichment, equity, honor and integrity, altruism, duty, and respect. The authors concluded that the *PSCOM Professionalism Questionnaire* more precisely defined elements of professionalism and reflected the actual views of professionalism in medical education slightly different from those of the ABIM as the element "excellence" was removed from the *PSCOM Professionalism Questionnaire* (ABIM, 2001/1995; Blackall et al., 2007).

Physician Assistant (PA) Students' Self-perception of Professionalism

Knight et al. (2009) developed a measurement tool to assess physician assistant students' professionalism that reflected the Standards of the Accreditation Review Commission on Education for the Physician Assistant. During the development process, the authors identified four conceptual qualities of professionalism: excellence, humanism, accountability, and altruism (Knight et al., 2009). The 15-item questionnaire was designed to measure physician assistant

(PA) students' attitudes and behaviors regarding professionalism and was based on the conceptual parameters of the ABIM. The questionnaire consisted of seven demographic variables and 15 professionalism questions measured using Likert-type items with five response categories (Knight et al., 2009).

Knight et al. (2009) utilized the questionnaire to examine the differences between 43 students' self-assessment of professionalism at the onset of the PA curriculum and after two semesters of didactic study. Due to attrition, only 34 students completed the questionnaire at time 2. The authors reported that their self-assessment tool identified a negative change in professionalism attitudes and behaviors of the PA students in "commitment to the service of others," "open mindedness," and "professional attire" (Knight et al., 2009). Physician assistants used this tool to predict professionalism in PA students based on personality characteristics (Moser & Dereczyk, 2012) and to evaluate and compare PA students' attitudes and behaviors regarding professionalism at the start of two different PA programs (Noronha, Blattner, Workman, Lee, & Meyer, 2010). Despite the use of the PA student professionalism questionnaire, there are no known studies regarding the reliability and validity of scores resulting from this tool.

Professionalism and Environmental Factors in the Workplace Questionnaire

The *Professionalism and Environmental Factors in the Workplace Questionnaire* (PEFWQ) for nurses was developed and tested from 2005 to 2007 (Baumann & Kolotylo, 2009). The purpose of this tool was "to determine key professionalism attributes and key environmental attributes that influence the professionalism of nurses (Baumann & Kolotylo 2009, p. 2218). This

tool was developed in three phases: item generation, pre-testing, and pilot testing. Unlike the tools in medicine and physical therapy, which were based on the ABIM's concepts of professionalism, the nursing self-assessment of professionalism was generated from concepts in the nursing literature such as knowledge, competence, control of nursing practice, and governance (Baumann & Kolotylo, 2009).

After items were generated, the authors subjected the resulting survey to examination of both face and content validity. The content validity analysis was completed in three steps by a total of 22 experts in the field of nursing (Baumann & Kolotylo, 2009). Psychometric testing of data from the PEFWQ began in the second phase using a sample of 46 nurses and consisted of item analysis, validity, and reliability testing. Pre-testing resulted in item reduction and modification of the original questionnaire into two components, professionalism and environment; 13 subscales, and 105 items (Baumann & Kolotylo, 2009). Pilot testing of the PEFWQ was conducted on a total of 848 nurses. Internal consistency was estimated using Cronbach's alpha ($\alpha = .96$), as well as average inter-item and corrected item-total correlations. Exploratory factor analysis using principal axis factoring resulted in 15 extracted factors. A scree plot and parallel analysis indicated a 13-factor structure and resulted in a final 82-item questionnaire. Test-retest reliability was conducted on a sample of 111 nurses and showed a strong correlation coefficient ($r = .70$) (Baumann & Kolotylo, 2009). Baumann and Kolotylo (2009) concluded that scores from the PEFWQ exhibited preliminary validity and reliability and suggested confirmatory factor analysis and a more diverse population for further testing. The authors recommended that this self-assessment tool be used to help nurses reflect on their

practice and to develop methods to support professionalism in practice and healthy work environments (Baumann & Kolotylo, 2009).

Self-Assessments

Over the past two decades, medical school and health professions educators have developed tools and established methods that measure students' development of and change in professional behaviors and attitudes (Anderson & Irwin, 2013; Pearson & Hoagland, 2010). These methods include surveys (APTA, 2003b; Blackall et al., 2007; Carroll et al., 2002; May et al., 2010; van Mook et al., 2010), essays (Hayward & Blackmer, 2010; Santasier & Plack, 2007; Stern, Frohna, & Gruppen, 2005) and written comments (Frohna & Stern, 2005). The majority of the methods used to evaluate professionalism include a component of student self-assessment. Self-assessment is embedded into the theoretical underpinnings of the physical therapy profession. The APTA *Guide for Professional Conduct* (APTA, 2010b) under Principle 6A – Professional Competence states, "Maintaining competence is an ongoing process of self-assessment." Orest (1995) defines self-assessment as "the clinician's ability to assess his or her own skills, to identify educational needs, to evaluate progress, and to determine strengths and weaknesses of performance" (p. 824). Self-assessment is related to increased competence and motivation (Orest, 1995). Physical therapist education programs utilize self-assessments to determine student learning styles, provide student self-appraisals to compare perceived performance with actual performance within a set of criteria (APTA, 2006), and to monitor changes in student professional behaviors (APTA, 2003a; Blackmer & Hayward, 2007).

Despite the popularity of self-assessment tools, researchers have questioned the accuracy of the data (Davis et al., 2006). In addition, researchers also identified problems with the definition, criteria, and measurement in self-assessment tools (Eva & Regehr, 2005). To address these concerns, researchers and educators recommended that students and clinicians receive formal training in the area of self-assessment to maximize the accuracy and effectiveness of this assessment method (Eva & Regehr, 2005; Orest, 1995).

Professionalism in Physical Therapy: Core Values Self-Assessment

During a consensus conference on professionalism, 18 physical therapists constructed the *Professionalism in Physical Therapy Core Values* (APTA, 2003a). These eighteen physical therapists were identified as having expertise in physical therapy practice, education, and research (APTA, 2003b). By using Likert-type items to assess these core values, the APTA developed the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b). The APTA developed this tool to increase awareness about the core values and self-assess the frequency with which physical therapists or physical therapist students demonstrated the seven core values based on sample indicators (APTA, 2003b). Similar to the *PSCOM Professionalism Questionnaire* (Blackall et al., 2007), the PCVSA is based on the ABIM's elements of professionalism (Table 1) (APTA, 2003a; Stern, 2006). However, the PCVSA consists of seven core values whereas there are only six elements of professionalism identified by the ABIM (Arnold, 2002). The APTA in its development of the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) included social responsibility in their list of core values, which they defined as "the promotion of a mutual trust between the profession and the

larger public that necessitates responding to societal needs for health and wellness" (APTA, 2003a).

The PCVSA consists of seven core values that underscore the construct *professionalism*: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility. Each of the seven core values has multiple sample behavior indicators that are rated on an ordered categorical response scale from 1 to 5 (1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Frequently, and 5 = Always) for a total of 68 items (APTA, 2003b). The importance of the core values to physical therapy has been reinforced in their integration into the core documents of the profession as well as their integration into the updated *Physical Therapist Clinical Performance Instrument* (PT CPI), which is the assessment tool most widely used to measure performance outcomes of physical therapist students during clinical education experiences (APTA, 2004a; 2010a; 2006). In addition, Guenther et al. (2014) reported that six of the seven core values were well integrated into physical therapy practice of a small sample of 20 clinicians.

Since its inception, the PCVSA has been used by physical therapist professional programs and researchers to evaluate the change of physical therapist students' professionalism over time (Anderson & Irwin, 2013; Cahalin, 2012; Hayward & Blackmer, 2010). Anderson and Irwin (2013) reported increased professionalism scores on the PCVSA at the end of the PT program when compared with student scores at the end of their first academic year, which included 3 weeks of clinical education. Hayward and Blackmer (2010) reported increased scores on the PCVSA after students participated in a new method for teaching and reinforcing

professionalism behaviors. Despite the use of the PCVSA in physical therapist education and for research, there are no published studies of its psychometric properties.

Physical Therapist Clinical Performance Instrument

The APTA first developed the *Physical Therapist Clinical Performance Instrument* (PT CPI) in 1997, then revised and updated it in 2006 (Roach et al., 2012), and transitioned it from a paper-based instrument to a web-based system in 2008 (PT CPI web) (APTA, 2014b). Physical therapist education programs use the PT CPI web to assess student performance at the midterm and the end of a clinical experience (APTA, 2014b). The PT CPI web has 18 performance measures that evaluate the essential components of practice that educators and practitioners expect of a physical therapist clinician at entry-level. The scale has six performance levels (beginning, advanced beginner, intermediate, advanced intermediate, entry-level, and beyond entry-level), and five performance dimensions (supervision/guidance, quality, complexity, consistency, efficiency). The first six performance criteria of the PT CPI web fall under the heading of "Professional Practice" and consist of Safety, Professional Behavior, Accountability, Communication, Cultural Competence, and Professional Development (APTA, 2006). These performance criteria have many sample behaviors that closely resemble the sample indicators of the PCVSA (Table 2). To use the ordinal data for research purposes, the developers assigned numbers to each of the anchor categories as well as to the increments between each anchor (Table 3).

Between 2005 and 2006, investigators examined the psychometric properties of the PT CPI web on 196 completed midterm and 171 final PT CPIs (Roach et al., 2012). They found that

Table 2

Comparison of *Professional Practice* Sample Behaviors in the PT CPI web (APTA, 2006) with *Core Values* Sample Indicators in the PCVSA (APTA, 2003b)

Professional Practice Items	Core Values
Safety	**Integrity(IN), Professional Duty(PD), Excellence(EX)**
Requests assistance when necessary (e)	Knowing one's limitations and acting accordingly (IN8)
Ensures the safety of self, patient, and others throughout the clinical interaction (d)	Preserving the safety, security, and confidentiality of individuals in all professional contexts (PD3)
Demonstrates awareness of contraindications and precautions of patient intervention (c)	Demonstrating high levels of knowledge and skill in all aspects of the profession (EX5)
Professional Behavior	**Accountability(AC),Compassion/Caring(CC),Integrity**
Seeks feedback from clinical instructor related to clinical performance (l)	Seeking continuous improvement in quality of care (AC8)
Values the dignity of patients as individuals (k)	Demonstrating respect for others and considers others as unique and of value (CC11)
Demonstrates integrity in all interactions (d)	Being trustworthy (IN6)
Accountability	**Accountability, Altruism (AL), Integrity**
Identifies, acknowledges, and accepts responsibility for actions and reports errors (b)	Acknowledging and accepting consequences of his/her actions (AC3)
Places patient's needs above self-interests (a)	Placing patients/client's needs above the physical therapist's (AL1)
Adheres to legal practice standards including all federal, state/providence, and institutional regulations related to patient care an fiscal management (f)	Abides by the rules, regulations, and laws applicable to the profession (IN1)

(continued on following page)

Table 2 (continued)

Communication	**Accountability, Compassion/Caring**
Demonstrates professionally and technically correct written and verbal communication without jargon (f)	Communicating accurately to others (AC6)
Communicates with the patient using language the patient can understand (m)	Communicating effectively, both verbally and non-verbally, with others taking into consideration individual differences in learning styles, language, and cognitive abilities, etc. (CC4)
Cultural Competence	**Compassion/Caring, Social Responsibility(SR)**
Incorporates an understanding of the implications of individual and cultural differences and adapts behavior accordingly in all aspects of physical therapy services (a)	Understanding the socio-cultural, economic, and psychological influences on the individual's life in their environment (CC1)
Discovers, respects, and highly regards individual differences, preferences, values, life issues, and emotional needs within and among cultures (d)	Promoting cultural competence within the profession and the larger public (SR2)
Professional Development	**Accountability, Excellence. Professional Duty**
Seeks out additional learning experiences to enhance clinical and professional performance (f)	Pursuing new evidence to expand knowledge (EX8)
Provides to and receives feedback from peers regarding performance, behaviors, and goals (k)	Seeking and responding to feedback from multiple sources (AC2)
Participates in professional activities beyond the practice environment (j)	Involved in professional activities beyond the practice setting (PD4)

Note. small letters (a, b, c, etc.) represent the individual sample behaviors identified under each *Professional Practice* Item in the *Physical Therapist Clinical Performance Instrument.* The capital letters paired with a number represent the core value with the specific sample indicator under that core value in the *Professionalism in Physical Therapy: Core Values Self-Assessment.* Adapted from http://www.apta.org/ search.aspx?q=professionalism, with permission of the American Physical Therapy Association.

the PT CPI web had strong internal consistency with a Cronbach's alpha of .99 (Roach et al., 2012). As anticipated, the PT CPI web scores increased as students progressed from the midterm to the end of their clinical experience (Roach et al., 2012). A confirmatory factor analysis generally supported the three-factor structure of Professional Practice, Patient Management, and Practice Management. However, three of the items did not respond as anticipated, which culminated in a re-organization of the items and a restructuring of the PT CPI web into just two sections, Professional Practice and Patient Management (APTA, 2006).

Table 3

Ordered-Categorical Response Options and Assigned Numerical Values for PT CPI Web

Beginner	1
Advanced Beginner	5
Intermediate	9
Advanced Intermediate	13
Entry-Level	17
Above Entry-Level	21

Significance and Purpose

As healthcare has evolved into a consumer-based system, the physical therapy profession has advanced its standing among the healthcare team (APTA, 2014a; Frist, 2014). These advancements in physical therapy led to the development of the Doctor of Physical Therapy degree as the entry-level degree of the profession (APTA, 2014c). The APTA, in promoting

Vision 2020 and the move to a "doctoring profession," challenged professional physical therapist education programs to graduate physical therapists that have high levels of knowledge and skill as well as exemplary standards of professionalism. For this reason, educators must identify and agree upon professionalism expectations for physical therapist students during both didactic and clinical education. Assessments need to reflect a mutually defined construct of professionalism for physical therapist students. To provide accurate data on professional development, monitor change in professional growth, intervene when necessary, and make decisions regarding academic progression, the assessment tools must be able to demonstrate sufficient reliability and validity to justify the decisions made using them.

Despite the rising interest in teaching and assessing professionalism in medicine and other health professions, there is a paucity of information in the literature on the psychometrics of any of the currently used professionalism assessments. In addition, an increasing number of research articles report using recently developed measures of professionalism to show change in professional behaviors without scientific support for the appropriateness and accuracy of these tools. The purpose of this study was to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students.

The results of this study help begin to fill the large gap in the literature involving the reliability and validity of scores from assessments of professionalism. This study also contributes to the knowledge base about assessments of professionalism in physical therapy. The results from this study may help educators and researchers make informed decisions about the tools that

they use to evaluate professionalism and change in this construct. Due to the importance of professionalism in the physical therapy profession, it is essential that decisions regarding student progression, remediation, and disciplinary action be based on evidence-based behaviors and tools that define professionalism in physical therapy along with other measures of physical therapy knowledge and skills.

Summary

Chapter 2 provided an overview of the profession of physical therapy, the rising importance of professionalism in healthcare, and introduced measures of professionalism being utilized in medical and health professions education. Hayes' et al. (1999) seminal work illuminated concerns about professionalism in physical therapist students. Concerns about professionalism in physical therapist students joined those of medicine and other health professions. The APTA strategic plan Vision 2020 addressed the issue of professionalism in physical therapy. Similar to medicine and other health professions, physical therapy developed a tool to measure the frequency with which physical therapists and physical therapist students demonstrated behaviors indicative of seven core values that underpin the construct *professionalism*. Despite concerns regarding lack of professionalism in the workplace and the development of several tools to measure professionalism in medical and health professions students, there is little known research on the psychometric properties of data from these tools. This study examined the reliability and validity of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessments* that were completed by physical therapist students. Chapter 3 will describe the research methods and sample that were used in this study.

CHAPTER 3

RESEARCH METHODS

Introduction

Healthcare consumers, employers, accreditors, and educators have increased their focus on professionalism as a key component of healthcare delivery over the past decade (APTA, 2003b; Chassin, 2013; Frist, 2014; Lunnen, 2001). For this reason, educators in medicine and the health professions have developed new approaches to teaching and assessing professionalism (Arnold, 2002; Hayward & Blackmer, 2010; Scarpaci, 2007). Instruments now exist to evaluate professionalism in medicine (Blackall et al., 2007), nursing (LNN, 2013), occupational therapy (Carroll et al., 2002), and physical therapy (APTA, 2003b). However, there is little, existing research that assesses the psychometric properties of scores resulting from these tools, possibly due to the difficulty in defining professionalism (Clauser et al., 2012).

In 2003, the American Physical Therapy Association (APTA) developed an instrument, *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA), to measure professionalism of both physical therapist students and practitioners. They developed the PCVSA to increase awareness and provide a self-assessment of the behaviors that physical therapist students and physical therapy practitioners should demonstrate in daily practice to reflect professionalism (APTA, 2003b). Despite the use of this tool for formative assessment in physical therapist education programs and in research studies (Anderson & Irwin, 2013; Hayward & Blackmer, 2010), there are no known investigations of the measurement properties

of data resulting from this instrument. As physical therapy programs strive to find ways to objectively evaluate professionalism, it is imperative that the tools that are being used stand up to critique and legal scrutiny (B. Cada, personal communication, January 14, 2015). Without sound psychometric analysis of scores resulting from the PCVSA, its future utility in physical therapist education is uncertain. The purpose of this study is to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b) provides valid and reliable measurement of professionalism in physical therapist students. In keeping with current philosophies regarding validity, Messick's (1995) unified construct-based model of validity was utilized as the framework to provide validity evidence for this study.

According to Messick (1995), validity is "an overall evaluative judgement of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretation and actions on the basis of test scores or other modes of assessment" (p. 741). Due to the importance of assessments for high-stakes decision making such as academic progression, scholarship, job promotion, and political consequence, principles of validity apply to all types of assessments (Messick, 1995). Messick's unified construct-based conceptualization of validity considers not only the validity of the scores from assessments but the inferences regarding these scores. This model consists of six types of validity evidence: content, substantive, structural, generalizability, external, and consequential (Table 4). Moreover, Dimitrov (2012) recommends that additional validity criteria, responsiveness and interpretability, be added to Messick's unified construct-based theory. Responsiveness is the ability of the assessment to detect change over time. Interpretability addresses how scores are understood and

communicated, by those without significant knowledge of psychometrics, in an accurate and meaningful way (Dimitrov, 2012). Although all types of evidence contribute to the validity argument, minimally, a compelling argument should be made from the available evidence resources to justify test interpretation and use (Messick, 1995). This investigator used multiple sources of evidence from Messick's unified construct-based model as well as the additional criteria of responsiveness and interpretability to examine the validity of the PCVSA.

Prior to beginning the study, the protocol was reviewed by Northern Illinois University's Institutional Review Board (IRB) and was found to meet the criteria for exemption.

Research Design

This quantitative, descriptive study had three parts: 1) analysis of internal consistency reliability and structural validity of existing physical therapist student scores from the PCVSA, 2) analysis of the structural validity of scores from the *Physical Therapist Clinical Performance Instrument – web version* (PT CPI web) (APTA, 2006) from existing PT CPI web scores on a subset of students from the sample in Part 1, followed by analysis of predictive validity of PCVSA scores with the the *Professional Practice* subscale of the PT CPI web, and 3) analysis of test-retest reliability of new student scores from the PCVSA, followed by calculation of minimal detectable change (MDC). Instruments involved in this study were the PCVSA and the PT CPI web.

Table 4

Messick's (1995) Six Aspects of Validity and the Methods Used to Gather Validity Evidence

Messick's Aspects of Validity	Component of each Aspect used to Explore Validity Evidence	Statistical Method Used
Content – content relevance, representativeness, and technical quality	Face validity evidence	
Substantive –theoretical rationale for observed consistencies in test responses; includes process models of task performance and empirical evidence about respondent engagement	Correlation patterns among part scores (subscales), score stability, representative sampling	Data screening, internal reliability consistency using Cronbach's alpha, latent regression
Structural – the conformity of the scoring structure with the structure of the domain at issue	Exploration of the 7 factor structure of the PCVSA	Confirmatory Factor Analysis
Generalizability- examines the extent to which score properties and interpretations generalize to and across population groups, settings, and tasks	Exploration of the relationship between the PCVSA and the PT CPI web, Exploration of the PCVSA scores across time	Latent regression analysis *t*-test and *ICC*
External – convergent and discriminant evidence from multitrait - multimethod comparisons	Exploration of the relationship between the PCVSA and the PT CPI web	Latent regression analysis
Consequential-appraises the value implications of score interpretation as a basis for action as well as the actual and potential consequences of test use.	Intended or unintended consequences of score interpretation and use Assessment of invariability	Review of item, missing data, Latent regression analysis including age and gender

Instrumentation

Professionalism in Physical Therapy: Core Values Self-Assessment

The *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b) is a tool that allows physical therapists and physical therapist students to self-assess the frequency with which they exhibit seven core values that are "essential to professionalism in physical therapy" (APTA, 2003b, p. 3). Eighteen physical therapists developed the PCVSA during a consensus conference facilitated by the APTA's Education Division in 2002. These physical therapists utilized research from medicine about professionalism, the American Board of Internal Medicine's elements of professionalism, as well as core physical therapy documents to develop the seven core values and subsequently the PCVSA (APTA, 2003b). The core values that provide the foundation for professionalism in physical therapy are accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility (APTA, 2003a).

The PCVSA consists of an introduction, directions on how to use the self-assessment, and a definition of each core value with sample indicators "that describe what one would see if the physical therapist [student] was demonstrating that core value in his/her daily practice" (APTA, 2003b, p. 4). The authors of the PCVSA further describe "daily practice" as "what the physical therapist would be doing in practice, education, and/or research if these core values were present" (APTA, 2003b, p. 3). The seven core values are arranged in alphabetical order with mutually exclusive sample indicators for each of the core values. There are five to twelve sample indicators under each of the seven core values with 68 total items (Table 5). The PCVSA

user is directed to circle a number from 1 to 5 (1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Frequently, and 5 = Always) on each sample indicator (APTA, 2003b). The PCVSA administrator may calculate the sum of item scores for each core value or calculate the sum of all 68-item scores for a total PCVSA score. Higher scores on the PCVSA are more desirable than low scores as the score represents the frequency with which the respondent has exhibited behaviors representative of professionalism (minimum total score = 68; maximum total score = 340). At the end of the PCVSA directions is a section titled "Analyze the Completed Self-Assessment" which includes several reflective questions for the user and steps to take to strengthen the integration of the core values into practice. There is a final statement urging the respondent to "conduct periodic re-assessments of … core value behaviors to determine the degree to which … performance has changed in … professionalism maturation" (APTA, 2003b, p. 3). At the time of this study, there was no known published information regarding the psychometric properties of scores resulting from the PCVSA.

Table 5

Distribution of Sample Indicators in the PCVSA

Accountability	10
Altruism	5
Compassion/Caring	11
Excellence	11
Integrity	12
Professional Duty	7
Social Responsibility	12

Physical Therapist Clinical Performance Instrument: Version 2006

In 1997, the APTA developed the *Physical Therapist Clinical Performance Instrument* (PT CPI) for physical therapist education programs to assess student performance during clinical education experiences (APTA, 1997). Between 1997 and 2003, 90% of United States physical therapist education programs and 13 Canadian physiotherapy programs purchased and used the PT CPI for student assessment (Roach et al., 2012). In 2006, a committee appointed by the APTA revised the PT CPI to reflect the profession's transition to a clinical doctorate, incorporate new PT core documents such as the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a), decrease the number of items from 24 to 18, and change the item response format from a discrete visual analogue format to an ordered categorical scale format (APTA, 2006; Roach et al., 2012). This updated PT CPI: Version 2006 consists of 18 performance criteria that are grouped into two categories: Professional Practice and Patient Management. The first six performance criteria of the PT CPI: Version 2006 are grouped under the category "Professional Practice" and consist of Safety, Professional Behavior, Accountability, Communication, Cultural Competence, and Professional Development (Table 2) (APTA, 2006). The remaining twelve performance criteria are grouped under the second category, Patient Management. The two-subscale structure was derived from a factor analysis of this tool during the revision phase (Roach et al., 2012). In 2008, the Education Section of the APTA worked with a technology company to transition the PT CPI: Version 2006 from a paper-based instrument to a web-based tool, PT CPI web (APTA, 2014b).

The 18 performance criteria of the PT CPI web describe the essential components of practice that are expected of a physical therapist clinician at entry-level (APTA, 2014b). Physical therapists who are CIs and physical therapist students use the PT CPI web to evaluate student performance at the midpoint (midterm) and end (final) of each clinical education experience. Ordered categorical response options for the 18 performance criteria are comprised of six performance levels (beginning, advanced beginner, intermediate, advanced intermediate, entry-level, and beyond entry-level) with consideration of five performance dimensions (supervision/guidance, quality, complexity, consistency, efficiency) (APTA, 2006). Within the tool, each performance criterion has sample behaviors to help define that criterion. In addition, Appendix C of the PT CPI: Version 2006 further describes rating criteria for each of the six performance levels and provides definitions for each performance dimension (APTA, 2006). All 18 performance criteria receive a rating that can be transformed to a numerical score using the six performance levels as anchors with three distinct intervals between each anchor (Table 3) (PT CPI Web 2.0) . Each of the anchors is defined in terms of amount of supervision required, consistency of performance, complexity, clinical reasoning ability, and percentage of a full-time physical therapist's caseload (APTA, 2006; Roach et al., 2012). Users of the PT CPI web are instructed to rate student performance in relationship to one or more of the six anchors, noting that the scale is a continuum of performance from "Beginning Performance" to "Beyond Entry Level" (APTA, 2006). All users of the PT CPI web must complete web-based training on the use of this tool provided by the APTA (APTA, 2006). Directors of Clinical Education (DCEs) access the CI and student PT CPI web scores via the website (PT CPI Web 2.0) and utilize these scores

along with other clinical education course requirements to determine a final course grade and make decisions for student progression.

Part 1

A systematic assessment of the PCVSA was required to determine whether the PCVSA and its seven core values (latent traits) were consistent with the construct *professionalism* (Foster & Cone, 1995). Furthermore, this validity investigation consisted of many parts that were both interdependent and complementary to provide the best evidence regarding the utility of the PCVSA (Messick, 1994a). The investigator began this process by gathering validity evidence for Messick's (1995) substantive and structural aspects of validity through examination of item responses, score stability, and test structure to answer the following research questions:

1. What is the internal consistency reliability of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students at one university?
2. Does confirmatory factor analysis support the conceptual organization of seven core values in the *Professionalism in Physical Therapy: Core Values Self-Assessment*?

Sample

The investigator utilized 274 completed PCVSAs from physical therapist (PT) students from the classes of 2009-2014 for Part 1 of the study. Students were graduates of a small private university in the midwestern United States. Students from these graduating classes were White (87%), Asian (7%), Hispanic/Puerto Rican (1%), Asian/Hispanic (1%), and Other/Not Identified (4%). The majority of the students lived in the same state as the university (75%) and matriculated into the program with a bachelor's degree (97%). The sample consisted of 195

(71%) female students and 79 (29%) male students. This gender distribution was similar to the national profile of physical therapists (APTA, 2014). The mean age of the sample was 24 years with a range of 22 years to 40 years. Ninety-two percent of the students reported their undergraduate areas of study: 43% health, 41% science, and 8% other. Table 6 provides more information regarding undergraduate areas of study.

Two hundred and seventy-four physical therapist students completed the PCVSA following Practicum I, a three-week clinical education experience at the end of their first didactic year in the physical therapist education program. The students completed the PCVSAs as a routine part of the clinical education curriculum during a clinical education meeting within a 2-week time period following Practicum I. The DCEs reviewed the PCVSAs and stored them in locked file cabinets within the physical therapist education program offices. Practicum I is an initial, full-time three-week clinical education experience that takes place at the end of the first academic year of the 35-month physical therapist education program (Table 7).

The investigator used responses from physical therapist student PCVSAs following Practicum I for this part of the study for several reasons: 1) Practicum I is the student's first clinical education experience as a Doctor of Physical Therapy student; therefore, it was the first time that the behaviors that represent professionalism were evaluated in the clinical setting, which provided a wide range of scores from which to analyze relationships; 2) students had not utilized the PCVSA prior to Practicum I; therefore, there was no concern about bias in scores due to a "learning" effect; and 3) students returned to campus directly following completion of Practicum I, so their memory of their performance was fresh.

Table 6

Undergraduate Areas of Study by Category (*n* = 253)

Health Area (43%)	Basic Science (41%)	Other (8%)
Health science	Biology	Liberal Arts and Science
Nutrition	Kinesiology	Anthropology
Psychology	Biomedical Sciences	General Education
Physical Education	Chemistry	Theatre
Exercise Science	Cell and molecular biology	Packaging
Community Health		English
Allied Health		Political Science
Movement sciences		Foreign Languages
Athletic Training		Religious Studies
Public Health		Math and Economics
Life Science		Business Administration
Therapeutic recreation		Management
		International Affairs
Physical Therapist Assistant		Sociology
Emergency Medical Tech.		Personal Finance
		Management
		Hospitality Tourism

Table 7

Timeline of Completion of the Professionalism: Core Values Self-Assessment (PCVSA)

PCVSA	Completion within the PT Program
First completion	Summer quarter 2nd professional year - within 2 weeks following the end of Practicum I
Second completion	Winter quarter 2nd professional year – between week 6 and week 8 of the quarter as part of a simulated clinic experience. Prior to Practicum II
Third completion	Spring quarter 3rd professional year – one week after the end of Practicum IV

Procedure

The investigator manually transferred all data from the individual PCVSAs to a master Excel spreadsheet. The data included demographic information such as age at time of matriculation into the program, gender, and undergraduate area of study to describe the sample. The investigator de-identified the data by removing student names and/or student ID numbers. Each case was assigned a numeric code for tracking purposes. The investigator maintained confidentiality of data by keeping completed PCVSAs in a locked file cabinet separate from de-identified study data in the locked office of the investigator.

Statistical Analysis

The investigator used SPSS Statistics for Windows 22 (SPSS, 2013) and Mplus (Muthén & Muthén, 1998-2012) for statistical analysis of data. The investigator used standard data screening procedures to assess missing data, test for normality, and evaluate potential impact of outliers on data analysis (Field, 2009). The investigator calculated means and ranges for age, frequencies and percentages for gender, and undergraduate area of study to describe the characteristics of the participants in the sample. In accordance with other validity studies in the fields of medicine and physical therapy (Blackall et al., 2007; Roach et al., 2012), the investigator calculated Cronbach's alpha for the total PCVSA score and for each of the seven core value subscale scores using data from the completed PCVSAs to examine internal consistency reliability. Gable and Wolf (1993) reported that reliability estimates of 0.70 or higher are acceptable for affective measures (p. 217). The investigator established *a priori*

reliability of 0.70 on both the total PCVSA score as well as the subscale scores as sufficiently high for decision making.

In addition, the investigator completed a confirmatory factor analysis (CFA) using the individual item scores from the PCVSA to test the validity of the hypothesized seven-factor structure of the PCVSA. CFA is frequently "used in later stages of scale validation after the underlying structure has been established on prior empirical and/or theoretical grounds" (Dimitrov, 2009, pp. 31-32). Blackall et al. (2007) used confirmatory factor analysis in their validation study of the *Penn State College of Medicine Professionalism Questionnaire*.

The investigator examined the theoretical seven-factor model utilizing several goodness of fit indices including the chi-square statistic (χ^2), χ^2/df ratio, the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and standardized residuals. The investigator used multiple indices because CFA relies upon multiple statistical tests to evaluate the adequacy of model fit with the data (Brown, 2006; Geiser, 2013). Guidelines for model fit were based upon the work of Hu and Bentler (1999), and Hair, Black, Babin, Anderson, and Tatham (2006), who defined acceptable fit as a relatively small, non-significant chi square statistic (χ^2) ($p > .05$), χ^2 /df < 3, CFI > .95, TLI > .95, RMSEA $\leq$ .05 or .06, 90% CI < .06, SRMR>.06 (.09 better).

Part 2

The investigator continued the assessment of the PCVSA by gathering validity evidence for Messick's (1995) generalizability and external aspects of validity to answer the following research question:

3. What is the relationship between scores on the PCVSA and the Professional Practice subscale of the PT CPI web?

Foster and Cone (1993) suggested that the accuracy of a measure can be established by comparing that measure with physical evidence of the behavior. Messick (1994a) supported the use of empirical data as a way to gather generalizability evidence. For this reason, physical therapist students' assessment of their professionalism was further examined by analyzing the relationship between their scores on the PCVSA after Practicum I and their CIs' scores on the Professional Practice items of the PT CPI web at the end of Practicum II.

The investigator conducted an analysis to determine whether student scores from the initial completion of the PCVSA were predictive of CI scores of those same students on the PT CPI web Professional Practice subscale at the end of Practicum II, almost one year later. If the initial PCVSA scores were found to have a strong level of predictability for CI scores at the end of Practicum II, physical therapy Directors of Clinical Education (DCEs) would be able to make evidence-based decisions about those students who require remediation of professional behaviors before they re-entered the clinical environment. In addition, the investigator examined the PCVSA and PT CPI web data to determine whether a correlation (positive or negative) existed based on the integration of the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a) into the PT CPI web (APTA, 2006). According to Messick (1995), convergent correlation patterns are important to substantiate the meaning of the construct being assessed.

Sample

To address this research question, a subset of the student PCVSAs from Part 1 was used along with the PT CPI web assessments that had been completed by their clinical instructors (CIs) at the end of Practicum II from the classes of 2010-2014 (n = 220). CIs complete the PT CPI web at the end (final) of Practicum I, II, III, and IV (Table 8) based on student clinical performance at each level. The investigator used existing CI scores from the Professional Practice subscale of the PT CPI web from Practicum II with the matching student PCVSA data described in Part 1 to answer research question three.

The matched PCVSA and PT CPI web student sample (n = 220) consisted of 159 (72.3 %) female students and 61 (27.7 %) male students who had a mean age of 24.51 years, closely resembling characteristics of the original sample. In order to include age into the latent regression analysis, student age was divided into two groups. One hundred and forty-nine of the students who reported age (n = 211) were between the ages of 21-24 years and 62 (28%) of the students were between the ages of 25-40 years.

Table 8

Location of Physical Therapy Clinical Education Experiences within the PT Program

Name	**Length**	**Location within PT Program**
Practicum I	3 weeks - 40 hours/weeks	End of first didactic year
Practicum II	10 weeks – 40 hours/week	End of second didactic year
Practicum III	10 weeks – 40 hours/week	End of third didactic year
Practicum IV	10 weeks – 40 hours/week	Final clinical experience, one week after Practicum III

Student scores from the PCVSA at the end of Practicum I were used for the same reasons as stated in Part 1. In addition, Practicum II PT CPI web scores were used because Practicum II is the first long clinical education experience (10 weeks) that the students participate in after the majority of their foundational physical therapy didactic coursework is completed. In addition, the completion of Practicum II PT CPI web occurs roughly 1 year after the completion of the initial PCVSA. Although Practicum II performance expectations are substantially greater than those for Practicum I, Practicum II is still an intermediate experience that allows a lot of flexibility for growth. Practicum III and IV, which are final clinical experiences, were not used for this analysis as they have expectations for a high (75% - 100%) caseload that contribute to scoring of the PT CPI web (APTA, 2006; Roach et al., 2012). Scoring for the Professional Practice items at the end of the final clinical experiences could be skewed depending on a CI's strict adherence to caseload expectations as a student moves through Practicum III and Practicum IV.

The PT CPI web has a two-subscale structure: Professional Practice and Patient Management. The first six items of the PT CPI web fall under the category Professional Practice (APTA, 2006). These six items have sample behaviors that are similar to those of the PCVSA (Table 2). For this reason, the student PCVSA subscale and total scores were correlated with to the Professional Practice subscale scores of the CI-completed PT CPI web that were completed at the end of Practicum II. PCVSA and CPI web scores were analyzed to determine whether PCVSA scores were able to predict scores on the PT CPI web Professional Practice subscale, whether there was any correlation between the scores, and whether there was any relationship with gender or age.

Procedure

The investigator transferred the CI scores from the PT CPI web Practicum II to the master Excel spread sheet, matching each set of CI scores with the student's corresponding initial PCVSA scores using the student's name and identification number. Once the student PCVSAs and the CI PT CPI web scores were matched, the investigator removed the students' names and identification numbers and replaced them with a numerical code for purposes of data screening and analysis. The investigator maintained confidentiality of the participants' data as described in Part 1.

Statistical Analysis

In preparation for the latent regression analysis of the PCVSA and PT CPI web data, the investigator examined the two-factor structure of the PT CPI web by conducting a confirmatory factor analysis (CFA) and re-ran the CFA on the PCVSA using the data subset (n = 220). The purpose of this examination was to strengthen the argument for the two-factor structure of the PT CPI web reported by Roach et al. (2012) and provide support for utilization of the combined Professional Practice PT CPI web item scores for the latent regression analysis.

Next, the investigator performed latent regression analysis using the PCVSA and the PT CPI web data as well as the demographic information of gender and age (grouped). The independent latent variables were seven Core Values derived from the CFA of the PCVSA data. The dependent latent variable was Professional Practice, derived from the CFA of the PT CPI web data. After the initial latent regression analysis, the variables *gender* and *age* were entered into the equation. Next, second order latent regression was performed using Professionalism as

the independent latent variable derived from the seven Core Value latent variables and Professional Practice as the dependent latent variable.

To determine the results from the latent regression analyses, the investigator first examined the model parameters, as discussed in Part 2, for model fit. Then the investigator examined the unstandardized regression coefficients to determine the predictability of the independent (exogenous variables) on the dependent (endogenous) variable. Statistically significant unstandardized regression coefficients would support the ability of the student-generated PCVSA scores after Practicum I to predict the CI-generated PT CPI web scores after Practicum II. Whereas non-significant unstandardized regression coefficients would indicate that the model did not support a predictive relationship. In addition, standardized regression coefficients R^2 values indicate the proportion of variability in each endogenous variable that is explained by the model (Geiser, 2013). High R^2 values would support a strong relationship between the independent and dependent variables and low R^2 values would indicate a poor relationship between the PCVSA and PT CPI web scores (Geiser, 2013). The revised PT CPI: Version 2006 (APTA, 2006) included components of the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a). For this reason, the investigator anticipated that a relationship would exist between the student self-assessment on the PCVSA and their corresponding CI assessment on the PT CPI web.

Part 3

The investigator completed the assessment of the PCVSA by gathering additional validity evidence for Messick's (1995) generalizability and consequential aspects of validity as well as

responsiveness and interpretability as recommended by Dimitrov (2012). This investigation answered the final research question:

4. What are the test/retest reliability and the minimal detectable change of the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students?

This final exploration had two parts: 1. Examination of score stability when the PCVSA was completed by physical therapist students at two different times spaced one week apart, and 2. Assessment of minimal detectable change (MDC) to determine the magnitude of score change that is required to represent an actual change in the frequency of behaviors that represent professionalism in physical therapy practice.

Sample

The investigator used a new sample of PCVSA scores from current physical therapist students ($N = 30$) from the same university as indicated in Part 1 and Part II of this study. The sample was made up of 27 female (90%) and 3 male students (10%). Students from the class of 2016 had an average age of 23 years, and 74% reported their home state as that of the university.

These students completed the PCVSA during their second simulated clinic course, which took place during the winter quarter of their second academic year on campus as part of their regular coursework (Table 7).

Procedure

The physical therapist students completed the PCVSA for the second time during class in January 2015 following their simulated clinic experiences. One to two weeks after the second completion of the PCVSA, the same students were asked to complete the PCVSA for the third

time as part of this study. The investigator chose the one- to two-week time interval as it was a long enough interval to diminish effects due to memory, but short enough to minimize potential score change due to maturation, learning, or practice (Dimitrov, 2009).

The investigator recruited student participation in this study by providing them with a written description of the test-retest reliability study from a standardized information sheet. The investigator next provided each student with a consent form requesting their participation in the study, which included access to his or her second completion of the PCVSA, completion of a third PCVSA one to two weeks later, and use of both of their PCVSA scores for research purposes.

The investigator chose the second-year students for completion of the test-retest reliability part of this study for two reasons. First, these students were already familiar with the PCVSA because they had completed it after Practicum I. However, they were at least 7 months past their first completion of the PCVSA, which should have ensured a "fresh" perspective toward answering the questions. In addition, the second completion of the PCVSA occurred within an academic quarter and did not follow a high-stakes clinical experience, as does the first completion of the PCVSA. For this reason, student scores from the PCVSA at Time 2 and Time 3 should more accurately represent the test items and minimize any influence on learning (from the first use of the tool) and outside influences such as from recent experience with a clinical instructor.

Following both administrations of the PCVSA, the investigator matched each pair of PCVSAs by student name and/or identification number. The investigator then de-identified and

re-coded the matching PCVSA into numeric case numbers. The investigator transferred each pair of matched PCVSA scores from Time 2 and Time 3 to a master Excel spread sheet. The investigator maintained confidentiality of data by keeping completed PCVSAs in a locked file cabinet separate from de-identified study data in the locked office of the investigator.

Statistical Analysis

The investigator analyzed the relationship between the PCVSA scores from the PT students' second and third completion of the PCVSA using a paired *t*-test, the intraclass correlation coefficient, the standard error of measurement (SEM), and the calculation for minimal detectable change (MDC). The investigator completed standard data screening on the sample (Field, 2009). Test-retest reliability was estimated by paired *t*-tests and the intraclass correlation coefficient (ICC) of the seven PCVSA subscale scores and the total score at two different times. (Dimitrov, 2009). Because the PCVSA measures behaviors that should be stable over a short period of time such accountability and altruism, the paired *t*-test and the ICC are able to provide an estimate of score stability. A non-significant *t*-test or an ICC close to "1" would represent a strong relationship between the scores from the two administrations of the test and would lend support to score stability for the PCVSA.

In addition to the ICC, the investigator calculated the *SEM* on the PCVSA scores. The *SEM* is a measure of absolute reliability. Smaller *SEM*s would indicate greater consistency between scores and smaller measurement error (Riddle & Stratford, 2013). The *SEM* was calculated as follows (Reis et al., 2009):

$$SEM = SD_{baseline} \times \sqrt{1 - ICC}$$

Here, *SD* denotes the standard deviation at Time 1 (2nd completion of PCVSA) from the test-retest data.

Finally, the investigator calculated the *MDCs* to determine with statistical confidence the amount of change in PCVSA subscale and total scores that would represent an increase beyond measurement error (Williams, Piva, Irrgang, Crossley, & Fitzgerald, 2012). The *MDC*s were calculated at the 90% and 95% levels of statistical confidence using the following formula (Haley & Fragala-Pinkham, 2006):

MDC_{90} = 1.65 x $SD_{baseline} \times \sqrt{2(1 - ICC)}$

MDC_{95} = 1.96 x $SD_{baseline} \times \sqrt{2(1 - ICC)}$

The square root of 2 was added to the equation to account for errors associated with repeated measures.

Summary

Chapter 3 described the sample, methods, and statistical analyses that were used to answer the research questions and provided validity evidence under Messick's unified construct-based validity model. Data for this study was gathered on former and current student PCVSAs and former student PT CPIs from a physical therapist education program in the midwestern United States. Data access was available to the researcher as the co-Director of Clinical Education in the Physical Therapy Program following IRB approval. Statistical analysis was used to describe the validity aspects substantive, structural, generalizability, external, and consequential as well as the responsiveness and interpretability of the PCVSA scores from the

physical therapist students (Dimitrov, 2012; Messick, 1995). The statistical analyses examined evidence of the PCVSA's score relationship with scores from the Professional Practice section of the PT CPI Web. Calculation of minimal detectable change was completed. In Chapter 4, the results from the statistical analyses are presented. In Chapter 5, the investigator discusses the results to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b) provided valid and reliable measurement of professionalism in physical therapist students.

CHAPTER 4

RESULTS

This chapter presents the results of the psychometric evaluation of the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b). This psychometric evaluation has three parts. Part 1 of the psychometric evaluation includes an assessment of internal consistency and confirmatory factor analysis of the PCVSA. In addition, Part 2 evaluates the relationship between the PCVSA and the *Physical Therapist Clinical Performance Instrument* – web version (PT CPI web) (APTA, 2006). Finally, Part 3 examines test/retest reliability and computes minimal detectable change of the PCVSA.

Part 1

Sample Characteristics

The investigator utilized 274 completed PCVSAs from physical therapist (PT) students from the classes of 2009-2014 for Part 1 of the study. Students were graduates of a small private university in the Midwest. Students from these graduating classes were white (87%), Asian (7%), Hispanic/Puerto Rican (1%), Asian/Hispanic (1%), and Other/not identified (4%). The majority of the students lived in the same state as the university (75%) and matriculated into the program with a bachelor's degree (97%). The investigator used standard data screening procedures to assess missing data, test for normality, and evaluate potential impact of outliers on data analysis (Field, 2009). The investigator found three variables that had more than 5% of responses missing

(Accountability 10 - 17 responses, Altruism 2 - 11 responses, and Integrity 11 - 14 responses). These items appeared to represent activities that licensed physical therapists but not physical therapist students would participate in, thus supporting the high frequency of missing responses (Table 9). Seven cases with three or more missing responses were identified and eliminated from the data set to improve accuracy of statistical reporting. Univariate outliers (values that were more than 3 standard deviations from the mean) were reviewed and retained because the range of the values within the scale (1-5) was very limited and removal of the outliers would minimize variability within the data. The investigator retained 267 cases for analysis (N=267). Kolmogorov-Smirnov and Shapiro-Wilks tests of normality on the PCVSA individual items suggest that the sample had a significantly non-normal distribution, $p < .001$. Table 10 provides information regarding the means, ranges, and standard deviations for the PCVSA individual item scores.

The sample consisted of 190 (71%) female students and 77 (29%) male students, which closely represents the U.S. distribution of physical therapists (Bureau of Labor, 2014). The mean age of the sample was 24.6 years with a range of 22 years to 40 years. Ninety-two percent of the students reported their undergraduate areas of study: 43% health, 40 % science, and 9 % other. Table 11 provides more information regarding undergraduate areas of study.

Internal Consistency Reliability

The investigator computed Cronbach's alpha to examine research question 1: *What is the internal consistency reliability of scores from the PCVSA when completed by physical therapist students at one university?*

Table 9

PCVSA Items with High Number of Missing Responses

PCVSA Item location and number	**Item**
Accountability #10	Educating students in a manner that facilitates the pursuit of learning.
Altruism #2	Providing pro-bono services.
Integrity #11	Choosing employment situations that are congruent with practice values and professional ethical standards.

Table 10

PCVSA – 68 Variables Descriptive Statistics (*N*= 267)

Construct/Item	Missing Items	Mean	Range	SD	Skewness
Accountability					
Item 1	0	4.32	3-5	0.58	-0.18
Item 2	0	3.89	2-5	0.70	-0.04
Item 3	0	4.55	2-5	0.62	-1.25
Item 4	0	4.23	3-5	0.66	-0.29
Item 5	1	4.75	3-5	0.48	-1.61
Item 6	1	3.86	1-5	0.79	-0.43
Item 7	0	3.83	2-5	0.72	-0.27
Item 8	0	4.06	2-5	0.77	-0.26
Item 9	0	3.55	1-5	1.60	-0.57
Item10	11	2.70	1-5	1.33	0.11
Altruism					
Item 1	0	4.30	3-5	0.56	0.81
Item 2	5	1.75	1-5	1.03	1.33
Item 3	1	2.35	1-5	1.19	0.51
Item 4	0	3.32	1-5	0.97	-0.18
Item 5	0	4.30	2-5	0.70	-0.69

(continued on next page)

Table 10 (continued)

Compassion/Caring					
Item 1	0	4.02	2-5	0.76	-0.40
Item 2	0	4.12	2-5	0.67	-0.30
Item 3	0	4.04	1-5	0.93	-0.85
Item 4	0	4.07	2-5	0.69	-0.23
Item 5	1	3.99	1-5	0.78	-0.46
Item 6	0	4.14	2-5	0.72	-0.34
Item 7	0	4.30	3-5	0.67	-0.45
Item 8	0	4.59	3-5	0.55	-0.92
Item 9	0	4.21	2-5	0.69	-0.44
Item10	0	4.35	3-5	0.62	-0.38
Item11	0	4.75	3-5	0.44	-1.31
Excellence					
Item 1	1	4.03	2-5	0.86	-0.49
Item 2	0	3.62	2-5	0.83	0.07
Item 3	1	3.53	1-5	0.86	-0.18
Item 4	1	4.06	2-5	0.76	-0.41
Item 5	1	3.36	1-5	0.82	0.24
Item 6	0	3.34	2-5	0.75	0.05
Item 7	0	3.82	2-5	0.72	-0.15
Item 8	0	3.64	1-5	0.79	-0.07
Item 9	0	3.93	1-5	0.83	-0.49
Item10	0	3.89	2-5	0.76	-0.23
Item11	3	3.56	1-5	0.90	-0.24
Integrity					
Item 1	0	4.84	3-5	0.38	-2.11
Item 2	0	4.56	2-5	0.59	-1.04
Item 3	0	4.09	2-5	0.71	-0.19
Item 4	0	4.00	1-5	0.90	-0.87
Item 5	0	4.10	1-5	0.82	-0.91
Item 6	0	4.89	4-5	0.32	-2.47
Item 7	0	4.23	2-5	0.78	-0.86
Item 8	0	4.45	3-5	0.60	-0.57

(continued on next page)

Table 10 (continued)

Item 9	1	3.44	1-5	1.16	-0.54
Item10	0	3.80	1-5	1.12	-0.75
Item11	8	3.15	1-5	1.47	-0.32
Item12	2	3.57	1-5	1.15	-0.58
Prof Duty					
Item 1	0	4.16	2-5	0.71	-0.36
Item 2	0	4.19	2-5	0.70	-0.42
Item 3	0	4.63	2-5	0.55	-1.28
Item 4	0	2.86	1-5	1.08	0.23
Item 5	0	3.66	1-5	1.06	-0.31
Item 6	1	2.97	1-5	1.19	0.03
Item 7	0	4.64	2-5	0.59	-1.52
Soc Resp					
Item 1	1	3.28	1-5	1.38	-0.18
Item 2	0	3.32	1-5	1.13	-0.20
Item 3	0	3.05	1-5	1.15	-0.17
Item 4	0	2.97	1-5	1.24	-0.02
Item 5	0	2.30	1-5	1.15	0.67
Item 6	0	2.84	1-5	1.13	0.08
Item 7	0	1.89	1-5	1.00	1.11
Item 8	0	2.60	1-5	1.14	0.26
Item 9	0	3.08	1-5	0.99	0.02
Item10	0	2.66	1-5	1.09	0.29
Item11	1	2.67	1-5	1.19	0.25
Item12	1	2.52	1-5	1.17	0.37

Table 11

Undergraduate Areas of Study by Category (*n*=246)

Health Area (43%)	Basic Science (40%)	Other (9%)
Health science	Biology	Liberal Arts and Science
Nutrition	Kinesiology	Anthropology
Psychology	Biomedical Sciences	General Education
Physical Education	Chemistry	Theatre
Exercise Science	Cell and molecular biology	Packaging
Community Health		English
Allied Health		Political Science
Movement sciences		Foreign Languages
Athletic Training		Religious Studies
Public Health		Math and Economics
Life Science		Business Administration
Therapeutic recreation		Management
Physical Therapist Assistant		International Affairs
Emergency Medical Tech.		Sociology
		Personal Finance Management
		Hospitality Tourism

Reliability of scores signifies the degree to which the scores are accurate, consistent, and reproducible when the testing conditions vary: different raters, different tools that measure the same construct, or different environments (Dimitrov, 2012). The score that a person receives on an assessment (X) is made up of the "true" score (T) plus random error (E) (Dimitrov, 2012).

$$X = T + E$$

Reliability is an inverse index of measurement error. Therefore, a small amount of error results in a greater degree of reliability and a large amount of error results in a lesser degree of reliability.

Cronbach's alpha (Cronbach, 1951) is a well-known reliability coefficient in classical test theory. Alpha is a measure of internal consistency reliability. Internal consistency reliability estimates are based on the average correlation among items within a test in a single administration of the test (Dimitrov, 2012). Alpha quantifies the degree to which survey responders consistently answer items in a set. The value of alpha generally increases as the inter-correlations among test items increase, thus indicating the degree to which a set of items measures a single unidimensional latent construct (Meyers, Gamst, & Guarino, 2013). It is a numeric value between 0.0 to 1.0 with a higher value indicating less measurement error and a lower value indicating greater measurement error. Alpha assumes that each item measuring a construct is equally salient to that construct (e.g., a tau-equivalent model). Guidelines for interpreting alpha are as follows: > .9 is excellent, >.8 is good, >.7 is acceptable, >.6 is questionable, >.5 is poor and <.5 is unacceptable (George & Mallory, 2003).

The investigator calculated Cronbach's alpha for the composite PCVSA score (using all 68 items) as well as for each of the seven subscales (Accountability – 10 items, Altruism – 5 items, Compassion/Caring – 11 items, Excellence – 11 items, Integrity – 12 items, Professional Duty – 7 items, Social Responsibility – 12 items). Alpha coefficients for the subscale scores ranged from $\alpha = .69$ (Altruism) to $\alpha = .94$ (Social Responsibility), indicating near-adequate to excellent internal consistency reliability (Table 12). The Accountability and Altruism subscales exhibited lower alpha coefficients, .70 and .69, respectively when compared with the other five subscales. On the Accountability subscale, if item 9 were deleted, the value of alpha would increase to

α = .75. The Altruism subscale also exhibited a lower alpha coefficient α = .69 with low inter-item correlations between AL2 and AL5 (.061), AL1 and AL2 (.141), and AL1 and AL3 (.114). The value of alpha for the entire 68-item PCVSA was α = .97, indicating excellent internal consistency reliability.

Table 12

Internal Consistency Reliability of the the Total PCVSA and Subscale Scores

Subscale	# Items	Alpha
Accountability	10	.70
Altruism	5	.69
Compassion/Caring	11	.89
Excellence	11	.90
Integrity	12	.85
Professional Duty	7	.81
Social Responsibility	12	.94
PCVSA Total	68	.97

Confirmatory Factor Analysis

The investigator used confirmatory factor analysis (CFA) to examine research question 2: *Does confirmatory factor analysis support the conceptual organization of seven core values within the PCVSA?*

Confirmatory factor analysis is one component of structural equation modeling that tests a hypothesized theoretical measurement model's fit to the data. CFA is frequently used to evaluate instruments that purport to measure difficult-to-define psychosocial constructs such as professionalism (Swisher, Beckstead, & Bebeau, 2004). Swisher et al. further describe CFA:

"Specifically, CFA is a measurement model of the relationships of indicators (observed variables) to factors (latent variables) as well as the correlations among the latter" (p. 788). They go on to say,

> With CFA, each observed variable has an error term, or residual associated with it[,] that expresses the proportion of the variance in the variable that is not explained by the factors. These error terms also contain measurement error due to any lack of reliability in data for the observed variables. (p. 788)

For these reasons, the investigator used CFA to study the structural validity of data obtained from the PCVSA, a multi-item, multi-scale instrument.

The investigator performed CFA on data from the PCVSA using Mplus 7.3 (Muthén & Muthén, 1998-2012). The investigator examined the theoretical 7-factor model utilizing several goodness-of-fit indices, including the chi-square statistic (χ^2), χ^2/df ratio, the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and standardized residuals. The investigator used multiple indices because CFA relies upon multiple statistical tests to evaluate the adequacy of model fit with the data (Brown, 2006; Geiser, 2013). Guidelines for model fit were based upon the work of Hu and Bentler (1999) and Hair et al. (2006), who defined acceptable fit as a relatively small, non-significant chi-square statistic (χ^2) ($p > .05$), $\chi^2/df < 3$, CFI > .95, TLI > .95, RMSEA $\leq$ .05 or .06, 90% CI < .06, SRMR>.06 (.09 better). Per Hu and Bentler (1999),

> An adequate cutoff criterion for a given fit index should result in minimum Type I error rate (i.e., the probability of rejecting the null hypothesis when it is true) and Type II error rate (i.e., the probability of accepting the null hypothesis when it is false). (p. 5)

The chi-square (χ^2) statistic tests the hypothesis that the covariance matrix between the theoretical model and the true model are equal (Geiser, 2013). However, large sample sizes (greater than 200) can artificially inflate χ^2, thereby reducing the accuracy of this index (Brown, 2006). For this reason, it is important to analyze other fit indices prior to making a decision about model fit (Brown, 2006). The comparative fit index (CFI) compares the fit of the target model to the fit of a baseline model, which is called the "independence model" in Mplus (Muthén & Muthén, 1998-2012). The independence model assumes that there are no relationships between any of the variables (Geiser, 2013).The Tucker-Lewis index (TLI) is similar to the CFI; however, it is considered a "non-normed" fit index and compensates for the effect of model complexity. The root mean error of approximation (RMSEA) coefficient is another measure of approximate model misfit that is sensitive to the number of model parameters and relatively insensitive to sample size (Brown, 2006). Standardized root mean square residuals (SRMR) are coefficients that, when small, indicate that the variances, covariances, and means closely represent the model (Geiser, 2013). An additional index, χ^2/df, was utilized in this analysis to provide an alternative model evaluation index; however, there is some controversy over what number represents good or bad model fit (Brown, 2006). Hair et al. (2006) recommend a χ^2/df of less than 3. Standardized residuals represent the difference between the observed variances, covariances and means and the model-implied values (Geiser, 2013). Large standardized residuals indicate a covariance/correlation that does not fit well within the model parameterization. Finally, model modification indices provide the investigator with information about the model restrictions that can be relaxed to obtain a better model fit. Large modification indices may be a sign of a global

problem with model fit, and may suggest alterations to the model, but only if these alterations make sense from a theoretical perspective (Geiser, 2013).

The investigator treated the item responses as ordinal variables using WLSMV (robust weight least squares) estimation (Brown, 2006). However, the observed values for one item (INT6) in the data did not vary beyond two distinct values, which resulted in empirical estimation difficulties (specifically, a non-positive definite matrix). Therefore, the investigator used a random number generator to randomly select three cases in which to substitute the values 1, 2, 3: case 44, case 95, and case 113. The purpose of the numerical substitutions was to introduce a minute amount of variability into the data without substantially altering the data for the CFA. Results from the subsequent CFA for this 7-factor model showed adequate fit, with, χ^2=3533.320,

p <.001; χ^2/df = 1.61, CFI = 0.932, TLI = 0.929, RMSEA = 0.048 with 90% C.I. 0.045-0.051 (Table 13).

Standardized residuals were evaluated for extreme values and no values greater than 2 or less than -2 were identified. Modification indices were reviewed and large modification indices (greater than 20) were found for CC by AL2 (48.726), SR by AL2 (39.143) and SR by PD4 (38.739). Modifying the model in accordance with these indices did not result in a significantly improved model fit.

Table 13

Confirmatory Factor Analysis of the PCVSA Seven-Factor Model (APTA, 2003b)

Latent Factors and their Observable Variables	Unstandardized Factor Loadings	Two-tailed *p*-value
Accountability by:		
1. Responding to patient's/client's goals …	1.000*	
2. Seeking and responding to feedback …	0.849	0.00
3. Acknowledging and accepting consequences …	0.927	0.00
4. Assuming responsibility for learning …	0.932	0.00
5. Adhering to code of ethics …	0.780	0.00
6. Communicating accurately to others …	0.822	0.00
7. Participating in the achievement of health goals …	1.008	0.00
8. Seeking continuous improvement …	1.052	0.00
9. Maintaining membership in APTA …	0.347	0.00
10. Educating students …	0.839	0.00
Altruism by:		
1. Placing patient's/client's needs above the PTs.	1.000*	
2. Providing pro-bono services.	0.598	0.00
3. Providing PT services to underserved …	0.635	0.00
4. Providing patient/client services that go beyond …	0.869	0.00
5. Completing patient/clients care …	0.927	0.00
Compassion/Caring latent factor measured by:		
1. Understanding the socio-cultural … influences …	1.000*	
2. Understanding an individual's perspective.	1.085	0.00
3. Being an advocate for patient's/client's needs.	1.021	0.00
4. Communicating effectively …	0.973	0.00
5. Designing patient/ client programs … are congruent with …needs	1.084	0.00
6. Empowering patients/clients to achieve …	1.125	0.00
7. Focusing on achieving the greatest well-being …	1.196	0.00
8. Recognizing and refraining from acting on one's … biases.	0.716	0.00
9. Embracing the patient's/clients emotional and psychological aspects of care.	1.022	0.00
10. Attending to the patient's/client's … needs …	0.991	0.00
11. Demonstrating respect for others …	0.997	0.00

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Table 13 (continued)

Excellence by:		
1. Demonstrating investment in the profession …	1.000*	
2. Internalizing the importance of using multiple sources of evidence …	1.099	0.00
3. Participating in integrative and collaborative practice …	1.271	0.00
4. Conveying intellectual humility …	1.106	0.00
5. Demonstrating high levels of knowledge …	1.265	0.00
6. Using evidence consistently …	1.201	0.00
7. Demonstrating a tolerance for ambiquity.	1.162	0.00
8. Pursuing new evidence to expand knowledge.	1.205	0.00
9. Engaging in acquisition of new knowledge …	1.120	0.00
10. Sharing one's knowledge with others.	1.204	0.00
11. Contributing to the development and shaping of excellence …	1.223	0.00
Integrity by:		
1. Abiding by the rules, regulations, and laws …	1.000*	
2. Adhering to the highest standards of the profession …	1.067	0.00
3. Articulating and internalizing stated ideas …	1.273	0.00
4. Using power … judiciously.	1.136	0.00
5. Resolving dilemmas …	1.309	0.00
6. Being trustworthy.	1.054	0.00
7. Taking responsibility …	1.348	0.00
8. Knowing one's limitations …	1.142	0.00
9. Confronting harassment and bias …	0.947	0.00
10. Recognizing the limits of one's expertise …	1.276	0.00
11. Choosing employment situations …	1.196	0.00
12. Acting on the basis of professional values …	1.288	0.00
Professional Duty by:		
1. Demonstrating beneficence …	1.000*	
2. Facilitating each individual's achievement …	1.069	0.00
3. Preserving safety, security, and confidentiality …	0.748	0.00
4. Involved in professional activities …	0.869	0.00
5. Promoting the profession …	0.810	0.00
6. Mentoring others …	0.847	0.00
7. Taking pride in one's profession.	0.768	0.00

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Table 13 (continued)

Social Responsibility by:		
1. Advocating for the health and wellness needs of society …	1.000*	
2. Promoting cultural competence …	1.064	0.00
3. Promoting social policy …	1.163	0.00
4. Ensuring that existing social policy is in the best interest of the patient/client.	1.118	0.00
5. Advocating for changes in laws …	0.957	0.00
6. Promoting community volunteerism.	0.959	0.00
7. Participating in political activism.	1.096	0.00
8. Participating in achievement of societal health goals.	1.125	0.00
9. Understanding of current community wide, nationwide, and worldwide issues …	1.030	0.00
10. Providing leadership in the community.	1.111	0.00
11. Participating in collaborative relationships …	1.067	0.00
12. Ensuring the blending of social justice …	1.112	0.00

Note.*In MPlus, the first factor loading is fixed to 1 by default in order to identify the metric of the latent variables (Geiser, 2013). All parameter estimates are statistically significant at the $p < .001$. Adapted from http://www.apta.org/ search.aspx?q=professionalism, with permission of the American Physical Therapy Association.

Part 2

The following research question was investigated using latent regression analysis:

What is the relationship between scores on the PCVSA and the Professional Practice subscale of the PT CPI web?

Sample Characteristics

To address this research question, a subset of the student-completed PCVSAs was matched with their clinical instructor (CI) completed PT CPIs (Practicum II) from the classes of

2010-2014 (*n*=220). The investigator used standard data screening procedures to look for missing data, test for normality, and evaluate potential impact of outliers on data analysis (Table 13) (Field, 2009). Univariate outliers (values that were more than 3 standard deviations from the mean) were reviewed and retained because the range of the values within the PCVSA scale (1-5) was very limited and removal of the outliers would minimize variability within the data. There were no outliers that were more than 3 standard deviations from the mean in the PT CPI web data.

The matched PCVSA and PT CPI web student sample (*n* = 220) consisted of 159 (72.3 %) female students and 61 (27.7 %) male students who had a mean age of 24.51 years, closely resembling characteristics of the original sample. To facilitate the use of age in the latent regression analysis, student age was divided into two groups: those 22-24 years old were assigned a "0" and those 25-40 years were assigned a "1" as a new variable within the data. One hundred and forty-nine of the students who reported age (*n* = 211) were between the ages 21-24 years and 62 (28%) of students were between the ages of 25-40 years.

Confirmatory Factor Analysis

Prior to completing latent regression analysis on the PCVSA and the PT CPI web, the investigator repeated the CFA on the PCVSA subset (*n* = 220) described previously, and completed a new confirmatory factor analysis on the PT CPI Web to verify its two-factor structure: Professional Practice and Patient Management. Because the response options for the PT CPI web spanned a much wider range of values (1-21), these data were treated as continuous

as suggested by Rhemtulla, Brosseau-Liard, and Savalei (2012), and estimation carried out using robust maximum likelihood (MLR) due to non-normality of the indicators.

Table 14

PCVSA and CPI Variable Descriptive Statistics (n = 220)

Construct/Item	Missing Items	Mean	Range	SD	Skewness
Accountability					
Item 1	0	4.34	3-5	0.58	-0.21
Item 2	0	3.95	2-5	0.67	-0.03
Item 3	0	4.59	2-5	0.60	-1.31
Item 4	0	4.28	3-5	0.66	-0.37
Item 5	1	4.77	3-5	0.46	-1.85
Item 6	1	3.91	1-5	0.77	-0.44
Item 7	0	3.84	2-5	0.72	-0.26
Item 8	0	4.12	2-5	0.73	-0.27
Item 9	0	3.75	1-5	1.52	-0.79
Item 10	14	2.77	1-5	1.33	0.05
Altruism					
Item 1	0	4.58	3-5	0.55	-0.82
Item 2	10	1.71	1-5	1.02	1.44
Item 3	1	2.37	1-5	1.22	0.53
Item 4	0	3.35	1-5	0.98	-0.20
Item 5	0	4.31	2-5	0.71	-0.76
Compassion/Caring					
Item 1	0	4.04	2-5	0.77	-0.44
Item 2	0	4.19	2-5	0.65	-0.30
Item 3	0	4.08	1-5	0.92	-0.83
Item 4	0	4.08	2-5	0.70	-0.28
Item 5	0	4.00	1-5	0.79	-0.57
Item 6	0	4.18	2-5	0.70	-0.42
Item 7	0	4.34	3-5	0.67	-0.52
Item 8	0	4.63	3-5	0.54	-1.08
Item 9	0	4.26	2-5	0.65	-0.31
Item 10	0	4.38	3-5	0.59	-0.34
Item 11	0	4.77	3-5	0.42	-1.28

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Table 14 (continued)

Excellence					
Item 1	1	4.03	2-5	0.90	-0.55
Item 2	0	3.65	2-5	0.82	0.07
Item 3	0	3.55	1-5	0.87	-0.18
Item 4	0	4.07	2-5	0.77	-0.42
Item 5	1	3.36	1-5	0.83	0.30
Item 6	0	3.37	2-5	0.76	0.03
Item 7	0	3.83	2-5	0.76	-0.16
Item 8	0	3.66	1-5	0.83	-0.18
Item 9	0	3.92	1-5	0.85	-0.56
Item 10	0	3.91	2-5	0.78	-0.30
Item 11	3	3.59	1-5	0.93	-0.28
Integrity					
Item 1	0	4.85	3-5	0.37	-2.24
Item 2	0	4.59	2-5	0.58	-1.20
Item 3	0	4.10	2-5	0.73	-0.29
Item 4	0	3.96	1-5	0.93	-0.87
Item 5	0	4.13	1-5	0.85	-1.02
Item 6	0	4.90	4-5	0.30	-2.69
Item 7	0	4.25	2-5	0.81	-0.90
Item 8	0	4.50	3-5	0.59	-0.69
Item 9	2	3.41	1-5	1.18	-0.52
Item 10	0	3.69	1-5	1.14	-0.82
Item 11	13	3.07	1-5	1.49	-0.24
Item 12	3	3.56	1-5	1.19	-0.59
Prof Duty					
Item 1	0	4.17	2-5	0.71	-0.33
Item 2	0	4.19	2-5	0.73	-0.53
Item 3	0	4.64	2-5	0.54	-1.28
Item 4	1	2.89	1-5	1.12	0.21
Item 5	0	3.61	1-5	1.08	-0.31
Item 6	1	3.03	1-5	1.24	0.07
Item 7	0	4.65	2-5	0.57	-1.44

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Table 14 (continued)

Social Responsibility					
Item 1	1	3.28	1-5	1.14	-0.22
Item 2	0	3.38	1-5	1.15	-0.25
Item 3	1	3.09	1-5	1.18	-0.20
Item 4	1	3.00	1-5	1.24	-0.01
Item 5	1	2.37	1-5	1.15	0.60
Item 6	0	2.85	1-5	1.12	0.06
Item 7	0	1.94	1-5	1.00	1.03
Item 8	0	2.63	1-5	1.16	0.27
Item 9	0	3.09	1-5	1.00	0.06
Item 10	0	2.68	1-5	1.13	0.30
Item 11	1	2.73	1-5	1.18	0.17
Item 12	2	2.57	1-5	1.16	0.31
PCVSA Total=340		253.66	171-340	34.14	0.15
PT CPI Professional Practice Subscale					
Item 1	0	15.35	7-21	2.427	-0.35
Item 2	0	15.86	9-21	2.649	-0.28
Item 3	0	15.31	9-21	2.467	-0.37
Item 4	0	15.04	7-21	2.525	-0.01
Item 5	0	15.45	9-21	2.589	-0.27
Item 6	0	15.05	7-21	2.649	-0.20
PP Total Score=126		92.06	50-126	13.825	0.31
PT CPI Patient Management					
Item 7	0	13.78	6-21	2.669	-0.089
Item 8	0	13.70	5-21	2.877	-0.181
Item 9	0	13.87	6-21	2.683	-0.029
Item 10	0	13.73	7-21	2.653	0.076
Item 11	0	13.51	7-21	2.590	0.085
Item 12	0	13.84	1-21	2.715	-0.447
Item 13	1	14.07	7-21	2.562	-0.181
Item 14	0	14.30	5-21	2.610	-0.250
Item 15	0	14.62	9-21	2.657	-0.058
Item 16	0	13.81	2-21	2.944	-0.322
Item 17	0	14.09	5-21	2.762	-0.148
Item 18	0	13.56	1-21	3.311	-0.527

This sample was a subset of the original sample with IN6 reporting only two responses (4 and 5). Therefore, using a random number generator, the investigator again substituted the values 1, 2, 3 for case 89, case 163, and case 125 to introduce a minute amount of variability into the data without substantially altering the data for the CFA for the PCVSA (*n*=220).

CFA goodness of fit indices on the PCVSA (*n* =220) supported the seven-factor model fit: χ^2 = 3034.471, p <.001, χ^2/df = 01.39, CFI = .946, TLI = .944, RMSEA = 0.042. Next the investigator completed CFA on the PT CPI web using MLR (robust maximum likelihood) estimation. Two models were examined on the PT CPI web data, a two-factor model with uncorrelated errors, and a single-factor model comprised solely of the Professional Practice subscale of the PT CPI web. The two-factor model showed good fit to the data: χ^2 = 303.743, p <.001, χ^2/df = 02.27, CFI = 0.944, TLI = 0.936, RMSEA = 0.076, SRMR = .036 (Table 15).

A single-factor model was also evaluated using solely the PT CPI web Professional Practice items to support use of this latent variable for the latent regression analysis. CFA in Mplus 7.3 (Muthén & Muthén, 1998-2012) using MLR estimation supported excellent model fit for the data: χ^2= 7.895, p = 0.5447, χ^2/df = 0.877, CFI = 1.000, TLI = 1.003, RMSEA = 0.00, SRMR = 0.012.

Latent Regression

Latent regression is a type of linear structural equation modeling (SEM) that is used to model complex relationships between continuous variables at the latent level (Geiser, 2013). Latent regression utilizes latent variables (factors) that have been adjusted for measurement error. According to Geiser (2013),

> This procedure has the advantage that errors of measurement can be taken into account explicitly for both the independent and the dependent variables(s). Furthermore, SEMs with latent variables allow us to obtain estimates of the reliabilities of the manifest variables. The explicit consideration of measurement error leads to a more precise estimation of the parameters of the regression model (as parameters of a latent structural model) compared to manifest regression analyses with observed variables that are not adjusted for measurement error. (p. 40)

Table 15

Confirmatory Factor Analysis of the PT CPI web Two-Factor Model (APTA, 2006)

Latent Factors and their Observable Variables	Unstandardized Factor Loadings	Two-tailed *p*-value
Professional Practice by:		
1. Safety	1.000*	
2. Professional Behavior	1.080	0.00
3. Accountability	1.034	0.00
4. Communication	1.063	0.00
5. Cultural Competence	1.023	0.00
6. Professional Development	1.053	0.00
Patient Management by:		
7. Clinical Reasoning	1.000*	
8. Screening	1.046	0.00
9. Examination	1.032	0.00
10. Evaluation	1.024	0.00
11. Diagnosis and Prognosis	0.998	0.00
12. Plan of Care	0.959	0.00
13. Procedural Interventions	0.968	0.00
14. Educational Interventions	0.990	0.00
15. Documentation	0.943	0.00
16. Outcomes Assessment	1.048	0.00
17. Financial Resources	0.996	0.00
18. Direction and Supervision of Personnel	1.059	0.00

Note.*In MPlus, the first factor loading is fixed to 1 by default in order to identify the metric of the latent variables (Geiser, 2013). All parameter estimates are statistically significant at the $p < .001$. Adapted from http://www.apta.org/PTCPI/, with permission of the American Physical Therapy Association.

Latent regression utilizes latent exogenous (independent) variables and latent endogenous (dependent) variables that have been derived through CFA. Latent multiple regression is useful to determine the predictive quality, if any, of one (or more) exogenous variables on a second endogenous variable. In latent regression, the investigator looks for model fit and the amount of variance that can be accounted for in the model by one or more of the latent independent variables (Field, 2006; Geiser, 2013).

In the first latent regression analysis, the investigator utilized the seven latent variables derived from CFA of the PCVSA to examine their relationship to the single latent variable, Professional Practice (PPC) from the PT CPI web (Table 15). The investigator treated the data for estimation purposes as categorical (for PCVSA scores) and continuous (for PT CPI web scores). Goodness of fit indices indicated that the model fit the data reasonably well despite the significant chi-square value: χ^2= 3385.925, p <.001, χ^2/df = 1.30, CFI = 0.950, TLI = 0.948, RMSEA = 0.037 with 90% CI 0.033 to 0.041.

When the structural model was examined, the unstandardized regression coefficient of the latent variable PPC on the latent variable AC (-1.013) was not statistically significant (z =-0.801, p =0.423), indicating that AC is not a predictor of PPC. This pattern was evident for each of the seven latent variables with small and non-significant regression coefficients on each of the remaining six variables: AL (-0.184, z = -0.370, p = 0.711), CC (0.567, z = 0. 696, p = 0.486), EX (0.614, z = 0.927, p = 0. 354), IN (-0.172, z = -0.222, p = 0.824), PD (0.381, z = 0.541, p = 0.589). SR (-0.172, z = -0.403, p = 0.687). In addition, the investigator examined the relationship between gender and age and PPC. Gender and age were also not predictors of PPC:

gender (0.464, z = 1.339, p = 0.180) and age (by groups) (0.252, z = 0.757, p = 0. 449) (Table 16).

In latent regression, the R^2 value indicates the proportion of variability in each endogenous variable that is explained by the model (Geiser, 2013). The model shows predominantly low R^2 values, further indicating a poor relationship between the seven latent variables from the PCVSA and the single latent variable Professional Practice from the PT CPI Web.

Table 16

Latent Regression Analysis of Professional Practice on Core Values

Factor	***Regression Coefficient***	***z- score***	***p value***
Accountability	-1.01	0.801	0.423
Altruism	-0.18	-0.370	0.711
Compassion/Caring	0.57	0.696	0.486
Excellence	0.61	0.927	0.354
Integrity	-0.17	-0.222	0.824
Professional Duty	0.38	0.541	0.589
Social Responsibility	-0.72	-0.403	0.687
Gender	0.46	1.339	0.180
Age	0.25	0.757	0.449

Note. Non-significant ($p < .05$) p values indicate that PCVSA subscale scores do not predict the sum of the Professional Practice items from the PT CPI web.

Additionally, a second order latent regression model was constructed looking at the relationship between the Professional Practice section of the PT CPI web and the total PCVSA score representing the latent variable, Professionalism (PRO). Goodness of fit indices indicated that the second order model fit the data reasonably well despite the significant chi-square value: χ^2= 3492.645, p <.001, χ^2/df = 1.30, CFI = 0.950, TLI = 0.948, RMSEA = 0.037. When the

second order structural model was examined, the unstandardized regression coefficient of the latent variable PPC on the latent variable PRO (0.038) was not statistically significant (z = -0.157, p =0.875), indicating that PRO is also not a predictor of PPC. In addition, the standardized factor loading (0.011) of PPC on PRO shows a very poor correltation between the latent variable PRO from the PCVSA and the latent variable PPC from the PT CPI Web.

Part 3

The following research question was answered using the intraclass correlation coefficient and the calculation for minimal detectable change.

What are the test/re-test reliability and the minimal detectable change of the Professionalism in Physical Therapy: Core Values Self-Assessment (PCVSA) when completed by physical therapist students?

Sample Characteristics

To answer this research question, the investigator used a new sample of PCVSA scores from 30 current physical therapist students from the same university as in Parts 1 and 2 of this investigation. The sample was made up of 27 female (90%) and 3 male students (10%). Students from the class of 2016 had an average age of 23 years, and 74% reported their home state as that of the university.

Standard data screening was completed on the sample (Field, 2009). All items had complete data except for two missing responses for ACC10 at both Time 1 and Time 2. The differences between the seven subscale scores and the total PCVSA score at Time 1 and Time 2 were used for the analysis in Part 3 and exhibited a normal distribution (Table 17). One case (#5)

was removed due to extreme scores (3 or more standard deviations above the mean) on 13 items (Field, 2009). Case #5 scored all items on the second completion of the PCVSA at the highest score of 5, less than 2 weeks after completing the first assessment, bringing into question the authenticity of this participant's response. This case was removed as it violated the assumption that all participants would complete the assessment honorably. Analysis was completed on the remaining sample (*N*=29).

Table 17

Descriptive Statistics for Subscale and Total PCVSA Score Difference (*N*=29)

Subscale and Total Score Differences	Mean Differences T1-T2	SD	Skewness	Tests of Normality Kolmogorov-Smirnov/ Shapiro-Wilk
Accountability	-0.379	2.920	-0.400	$p = .200$ & $p = .232$
Altruism	-0.758	3.323	-1.142	$p = .000$ & $p = .006$
Compassion/Caring	-1.103	2.820	-0.113	$p = .109$ & $p = .095$
Excellence	-1.379	4.902	0.788	$p = .200$ & $p = .277$
Integrity	-0.620	5.367	-0.295	$p = .151$ & $p = .600$
Professional Duty	-0.414	3.727	-0.418	$p = .200$ & $p = .093$
Social Responsibility	-0.552	6.511	-0.014	$p = .200$ & $p = .722$
PCVSA Total	-5.207	18.999	-0.230	$p = .183$ & $p = .326$

Note: p is *p* value. SD is standard deviation.

Test/Re-test Reliability

Test/re-test reliability can be examined in several ways. This investigator performed 3 separate computations on the PCVSA dataset to evaluate test/re-test reliability: paired *t* -test, intraclass correlation coefficient (*ICC*), and minimal detectable change (*MDC*).

Paired *t*-Test

The investigator performed a paired *t* -test on the PCVSA subscale and total scores from time 1 and time 2 using SPSS Statistics for Windows 22 (SPSS, 2013). The function of paired *t* -tests is to examine the means between two groups and to test the null hypothesis that the means are statistically the same. The investigator set the level of significance a priori to .05. The results of the paired *t*-tests (Table 18) indicated that the *p-values* were non-significant, with the exception of the subscale Compassion/Caring (t (28) = -2.107, p =.044) and therefore the null hypothesis was not rejected for all but the one subscale, indicating that the PCVSA scores appeared to be similar at Time 1 and Time 2. Although *t*-tests inform similarity of means, they do not provide information about how similar the two means are (Field, 2009). For this reason, the investigator used additional statistical measures to further explore the relationship of the PCVSA scores.

Intraclass Correlation Coefficient

Reliability measurements indicate to what extent scores from a particular measure are free from measurement errors (Field, 2009). Reliability can be described as either relative or absolute. If a measure has high relative reliability then repeated measurements will show similar coefficient (*ICC*) is a measure of relative reliability. *ICC* is calculated as true score variance/observed score variance and is a unit-less number from 0-1. Larger values indicate greater reliability (Riddle & Stratford, 2013). An "*ICC* above .75 is considered to demonstrate good reliability …" (Reis et al., 2009, p.570). Because the PCVSAs were completed by the same students within a two-week period, the investigator expected the *ICC*s to be high.

Table 18

Paired *t*-test Results

Pair time1 and time2	Mean	SD	Std. Error Mean	*t*	df	Sig.. (2-tailed)
AC	-0.38	2.92	0.54	-0.699	28	.490
AL	-0.76	3.32	0.62	1.229	28	.229
CC	1.10	2.82	0.52	2.107	28	.044
EX	1.39	4.90	0.91	1.515	28	.141
IN	-0.62	5.37	1.00	-.623	28	.539
PD	-0.41	3.73	0.69	-.598	28	.555
SR	-0.55	6.51	1.21	-.456	28	.652
Total	5.21	18.99	3.528	1.48	28	.151

Intraclass correlation coefficients were calculated on the PCVSA total and subscale scores at Time 1 and Time 2. The investigator used the two-way mixed model with absolute agreement because the rater is fixed and the subjects are random. The absolute agreement was used as the investigator wanted to determine how close the scores matched and not solely the linear relationship between the two sets of scores.

The *ICC*s for test-retest reliability were high on the Total Score (*ICC* = .896, $p<.001$), Social Responsibility subscale (*ICC* =.923, $p<.001$), Compassion/Caring subscale (*ICC* = .872, $p<.001$), and Accountability subscale (*ICC* = .845, $p<.001$). The *ICC*s were moderate for the Altruism subscale (*ICC* = .723, $p<.05$), Integrity subscale (*ICC* = .725, $p<.05$), Excellence

subscale (*ICC* = .696, $p<.05$, and Professional Duty subscale (*ICC* = .648, $p<.05$), indicating increased variability due to random error (Table 19).

Standard Error of Measurement

In addition to relative reliability, there is absolute reliability. With absolute reliability, repeated measurements will have scores that show minimal variability (Reis et al., 2009). The standard error of measurement (*SEM*) is a measure of absolute reliability. Smaller *SEM*s indicate greater consistency and smaller measurement errors (Riddle & Stratford, 2013). The *SEM* was calculated as follows (Reis et al., 2009):

$$SEM = SD_{baseline} \times \sqrt{1 - ICC}$$

Here, *SD* denotes the standard deviation at Time 1 from the test-retest data. The SEM for the PCVSA total score was 6.24 and the subscale SEMs ranged from 1.00-2.70. Ideally, to increase confidence that the scores from a particular measure are reliable, the scores would exhibit high *ICC*s and low *SEM*s (Table 19).

Minimal Detectable Change

Minimal detectable change (*MDC*) is the magnitude of change that represents true change beyond measurement error (Reis et al., 2009). The *MDC* is based on the Reliability Change Index (Jacobson et al., 1984). *MDC* takes into account the standard error of measurement, the standard deviation, and test-retest reliability, usually in the form of an intraclass correlation coefficient using the following formula (Haley & Fragala-Pinkham, 2006):

$$MDC = z_{\text{confidence}}\, SD_{\text{baseline}} \text{ x } \sqrt{2(1 - ICC)}$$

Here, $z_{confidence}$ denotes the z-score associated with the desired level of confidence. For this research, the investigator calculated the *MDC* at the 90% and 95% confidence levels; therefore, the formulas used were as follows:

$$MDC_{90} = 1.65 \times SEM \times \sqrt{2}$$

$$MDC_{95} = 1.96 \times SEM \times \sqrt{2}$$

SEM was calculated as described previously. The square root of 2 was added to the equation to account for errors associated with repeated measures. Table 19 presents the *MDC* for each subscale and for the total PCVSA score. Minimal detectable change scores were rounded to whole numbers for clinical utility. The *MDC* scores represent the minimal amount of change that is not likely to be due to chance (Haley & Fragala-Pinkham, 2006). Therefore, the investigator has determined with 90% confidence that the MDC for the total PCVSA score when used with physical therapist students at a university in the Midwest is 13 points.

Table 19

ICC, SEM, and MDC Calculations from PCVSA Subscale and Total Scores

PCVSA and Subscale	ICC	SEM	MDC_{90}	MDC_{95}
Accountability	.845	1.57	4	4
Altruism	.723	1.94	4	5
Compassion/Caring	.872	1.58	4	4
Excellence	.696	2.80	6	8
Integrity	.725	3.06	7	8
Professional Duty	.648	2.04	5	6
Social Responsibility	.923	3.39	8	9
Total PCVSA	.896	5.4	13	15

Summary

The results of this study provided a variety of information regarding the validity and reliability of scores obtained from the *APTA Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist (PT) students. The items were developed by a panel of experts in the field of physical therapy and exhibit face validity evidence. That is, they appear to address behaviors that a person would identify as professional or representing professionalism. Psychometric analysis provided support for the seven-factor structure when examined by confirmatory factor analysis. In addition, the PCVSA when completed by PT students did not have significant predictive value for student scores on the Clinical Performance Instrument (PT CPI web) when completed by clinical instructors. However, when the reliability of scores from the PCVSA was examined, the total PCVSA score exhibited a greater degree of internal consistency reliability and test-retest reliability then did the subscale scores, supporting the use of the total PCVSA score for decision making. Minimal detectable change scores were calculated for each subscale as well as the total PCVSA score. In Chapter 5, the investigator will elaborate on these research findings, their implications, and recommendations for future research in this area.

CHAPTER 5

DISCUSSION

This chapter presents a discussion of the analysis of the results provided in Chapter 4. This chapter includes relevance of the findings to the research questions and implications for physical therapy education as well as research. Limitations of the study and recommendations for future research in this area are also presented.

The purpose of this study was to determine the extent to which the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides a valid and reliable measurement of professionalism in physical therapist students.

Research Questions

The following research questions were addressed in this study:

1. What is the internal consistency reliability of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students at one university?
2. Does confirmatory factor analysis support the conceptual organization of seven core values in the *Professionalism in Physical Therapy: Core Values Self-Assessment*?
3. What is the relationship between scores on the PCVSA and the Professional Practice subscale of the PT CPI web?

4. What are the test/retest reliability and the minimal detectable change of the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students?

Findings

Internal consistency reliability of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment* ranged from 0.690 to 0.938 on the seven subscales and 0.966 on the total PCVSA score.

Confirmatory factor analysis supported the seven-factor structure of the *Professionalism in Physical Therapy: Core Values Self-Assessment.*

Latent regression analysis revealed that no relationship exists between the *Professionalism in Physical Therapy: Core Values Self-Assessment* and the Professional Practice Section of the *Physical Therapist Clinical Performance Instrument*.

Student PCVSA scores after Practicum I did not predict clinical instructor scores after Practicum II.

Subscale scores produced fair to good test-retest reliability and the total PCVSA score exhibited excellent test-retest reliability (*ICC* = .896). Minimal Detectable Change scores were calculated on both the subscales and the total PCVSA scores. MDC for total PCVSA with a 90% confidence interval is 13, and 15 for the 95% confidence interval.

Professionalism attitudes, values, and behaviors gained popularity and interest in the healthcare community over the last two decades due to reports of unprofessional behaviors among workers and demands for higher levels of professionalism from consumers (Dhai & McQuoid-Mason, 2008; Frist, 2014). Within the physical therapy profession, members identified

professionalism as one of the main requirements needed to gain public trust and rise to the status of a "doctoring profession" (APTA, 2000). The focus on professionalism among medical and health professionals resulted in significant discourse on how to define, identify, and measure this construct (Gleeson, 2007; Graham et al., 2013) at the same time that incidents of unprofessional behaviors of medical residents and health professions students were being documented in the literature in (Greysen et al., 2012; Wolfe-Burke, 2005). The American Board of Internal Medicine (ABIM) launched Project Professionalism in the 1990s to explore the concept of professionalism (ABIM, 2001/1995). Using their humanistic values as the foundation, the ABIM developed six elements to describe professionalism in medicine: Altruism, Accountability, Excellence, Duty, Honor and Integrity, and Respect for others (ABIM, 2001/1995). Following the lead of the ABIM, other health professions developed their own list of values, attitudes, and behaviors reflective of professionalism; however, most of these lists were closely based on the six elements identified by the ABIM (APTA, 2003a; Knight et al., 2009).

In 2003, the American Physical Therapy Association (APTA) held a consensus conference at which attendees, using the prior work of medicine, developed the *Professionalism in Physical Therapy: Core Values* (APTA, 2003a). The seven core values—Accountability, Altruism, Compassion/Caring, Excellence, Integrity, Professional Duty, and Social Responsibility—closely resemble the ABIM's elements of professionalism. Following the conception of the *Professionalism in Physical Therapy: Core Values,* Likert-type response options were added to each of the 68 items to form the *Professionalism in Physical Therapy: Core Values Self-Assessment* (PCVSA) (APTA, 2003b). The intent of the PCVSA was to

provide a mechanism through which both physical therapist students as well as clinicians could become familiar with the core values of the profession as well as be able to evaluate the frequency in which they performed the core values and changes over time (APTA, 2003b). Soon after the development of the PCVSA, it was integrated into many physical therapist education programs as a means to monitor changing professionalism behaviors in students, identify outcomes of educational activities focused on improving professionalism, and provide information to students about professionalism expectations relevant to clinical practice (Anderson & Irwin, 2013; Hayward & Blackmer, 2010; K. Irwin, personal communication, August 31, 2014). In 2006, with the update of the *Physical Therapist Clinical Performance Instrument – web version (*PT CPI web), the seven core values were integrated into the Professional Practice items (items 1-6) of the PT CPI web.

Despite the utilization of the PCVSA in physical therapist education and research, there are no known studies that examined the validity or reliability of the scores from the PCVSA when used with physical therapist students. Without psychometric analysis to support the validity and reliability of these scores, their utility for decision making is limited. In this time of high professionalism expectations from physical therapist educators, clinicians, and consumers, it is essential that tools be found that can withstand the rigors of examination and scrutiny. For this reason, Messick's (1995) unified construct-based concept of validity provided the framework for the psychometric analysis of the PCVSA in this study.

Validity of the PCVSA is predicated on whether data from this self-assessment tool actually measure what they purport to measure, that is, professionalism (Dimitrov, 2012). If the

PCVSA provides valid and reliable measurement of professionalism in physical therapist students, that means that the PCVSA generates scores that reflect meaningful differences in professionalism among the students completing the assessment (Dimitrov, 2012). Within Messick's (1995) unified construct-based concept of validity, there are six aspects of validity: content, substantive, structural, generalizability, external, and consequential. Each of these validity aspects contribute meaningful information regarding the validity of PCVSA scores. In addition to Messick's six aspects of validity are two additional sources of information that contribute to the validity decision under Messick's validity framework (Dimitrov, 2012): responsiveness and interpretability. Each of these validity components will be discussed as part of the analysis of the findings.

The content aspect of validity is frequently the first aspect of validity that is examined in a validation study. Although content validity was not explored in depth in this study, it is important to note that a review of the literature provided support for face validity evidence for the PCVSA. The medical literature on professionalism, especially that of the American Board of Internal Medicine (ABIM), provided support for the seven core values that underpin the PCVSA (ABIM, 2001/1995). Stronger empirical evidence for the content aspect of validity could have been provided via qualitative research methods using an expert panel of reviewers to assess content relevance, representativeness, and technical quality (Messick, 1995). However, this level of examination was not completed due to time and resource constraints.

Research Question 1

This research question asked, "What is the internal consistency reliability

of scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students at one university?"

The data analysis results for Research Question 1 provided information regarding Messick's (1995) substantive aspect of validity. The substantive aspect of validity "refers to theoretical rationales for observed consistencies in test responses" (Dimitrov, 2012, p. 43). This aspect of validity gathers evidence through cognitive modeling, behavioral correlates, and scale functioning. The analysis for this part of the investigation was based on a sample (N = 267) from graduated physical therapist students from the graduating classes of 2009-2014 from a single institution. The sample consisted of 190 (71%) female students and 77 (29%) male students. The mean age of the sample was 24.6 years with a range of 22 years to 40 years. Ninety-two percent of the students reported their undergraduate areas of study: 43% health, 40 % science, and 9 % other. As the data for this study came from students who had already graduated, analysis of scale functioning was the only method available to gathering evidence for this aspect of validity. Scale functioning provides evidence for the substantive aspect of validity when observed responses on multiple choice tests or rating scales are consistent with the intended response characteristics of these items. Scale functioning may include looking at item responses and score stability (Dimitrov, 2012).

Prior to analyzing score stability, data screening provided information relevant to scale functioning. The frequency of missing responses for three items (Accountability10 -17 missing items, Altruism2 – 11 missing items, and Integrity11 – 14 missing items) appeared to be unusual when compared to the rest of the 68 items. Upon review of these items, the three questions all

appeared to represent activities in which licensed physical therapists and not physical therapist students would participate (Accountability10-educating students, Altruism2-providing pro bono services, and Integrity11-choosing employment situations). In addition, the mean scores of two of the three items were low--Accountability10 – 2.70 and Altrusim2 – 1.75—supporting that most students never (1), rarely (2), or only occasionally (3) performed these behaviors.

Interestingly, Guenther et al. (2014) reported, in their study of twenty physical therapists that had completed the PCVSA, that these same three items were also problematic for the clinicians. The item Accountability10, regarding the education of students, received the lowest mean score of all ten items in this subscale. Both PCVSA items Altruism2 and Integrity11 exhibited the full range of frequency responses, unlike the rest of the items within these subscales. The presence of items that do not "fit" with the rest of the items provides a risk to the substantive validity aspect. The authors of the *Professionalism in Physical Therapy: Core Values Self-Assessment* (APTA, 2003b) may want to further investigate these items to determine their appropriateness within the core value construct that they purport to represent. Inconsistencies in items among clinicians may represent an incongruency in the overall definition of the core value or be a reflection of the demands of maintaining high levels of professionalism while meeting increased demands for productivity and efficiency in today's changing healthcare environment (DiCarlo, 2015).

Internal consistency reliability signifies the degree to which scores are stable and reproducible. Cronbach's alpha is a measure of internal consistency reliability that provided validity evidence for the substantive aspect of validity. Alpha was excellent for the total score of

the PCVSA (α = .966), which indicated good score stability for the 68 PCVSA items and provided support that the PCVSA measures a single unidimensional latent construct, professionalism. However, the value of alpha was not consistent across the seven subscale scores ranging from α = .690 (Altruism) to α = .938 (Social Responsibility), indicating questionable to excellent internal consistency reliability. The Accountability and Altruism subscales exhibited lower alpha coefficients (.701 and .690) when compared with the other five subscales. The analysis indicated that if Accountability item 9 (maintaining APTA membership) were removed, the alpha coefficient would increase to .749. This item stands out as problematic in several of the validity analyses throughout the study. Perhaps the poor performance of this item reflects the history of this specific physical therapy program to not require students to become members of the APTA or it may reflect a dichotomy between students who can and who cannot bear the financial burden of professional dues despite the student discount (APTA, 2015). American Physical Therapy Association (APTA) membership also appeared to be problematic in the Guenther et al. (2014) study, with this item exhibiting the widest item frequency distribution. Requiring APTA membership as an indication of professionalism may actually represent a larger problem when less than half of all physical therapists are members of this professional organization (APTA, 2015).

The low inter-item correlations within the Altruism scale may reflect a dichotomy between altruistic behaviors that occur within a physical therapist's work day of providing patient care with those that fall outside of the traditional workday that are neither typical nor convenient. For students, the expectation to do "more" while they are still in school may be too

large an expectation; however, Guenther et al. (2014) reported similar differences in clinician responses to the altruistic items regarding providing pro bono services and services to underserved and underrepresented populations. The subscale Altruism poses a risk to the content and substantive aspects of validity and warrants further investigation.

In addition, the unequal number of items in each of the subscales (5 items in the Altruism subscale compared with 12 items in the Integrity and Social Responsibility subscales) along with the large range of alpha values for the subscale scores may contribute to problems with the seven- subscale structure. The structural aspect of validity will be explored more under Research Question 2.

The evidence provided in support of Research Question 1 indicates that there is a risk to the content and substantive validity of the scores from the PCVSA. For this reason, users of this assessment tool need to interpret the responses from the individual items and the subscale scores with caution. However, the excellent internal consistency reliability coefficient for the total PCVSA score supports the PCVSA as a measure of professionalism. For this reason, utilization of the total score of the PCVSA is recommended for decision making about professionalism in physical therapist students.

Research Question 2

This research question asked, "Does confirmatory factor analysis support the conceptual organization of seven core values in the *Professionalism in Physical Therapy: Core Values Self-Assessment*?"

The structural aspect of validity is an important aspect of Messick's validity evidence. According to Messick (1995), "the structural aspect of validity appraises the fidelity of the scoring structure to the structure of the construct domain at issue" (p. 745). The same sample that was used to answer question 1 above was used to answer Research question 2 (N = 267). Confirmatory factor analysis (CFA) appears to support the conceptual organization of the seven core values in the PCVSA. Several fit indices (CFI, TLI, RMSEA, and χ^2/df) all support good model fit; however, χ^2 was large and significant. In addition, as indicated under Research Question 1, there was decreased correlation between individual items within two of the subscales (Accountability and Altruism) that may have also affected the overall structure of the assessment. A large sample size can inflate χ^2 and decrease the accuracy of this index. However, there was also indication, through the CFA, of a poor-fitting item, AC9, within the latent factor, Accountability. This item, which addresses membership in the American Physical Therapy Organization (APTA), appeared to decrease the internal consistency reliability of the Accountability subscale as well. For this reason, although there appears to be structural validity evidence for the PCVSA, this aspect of validity warrants further exploration.

Research Question 3

This research question asked, "What is the relationship between scores on the PCVSA and the Professional Practice subscale of the PT CPI web?"

The data analysis results for Research Question 3 provided information regarding Messick's (1995) generalizability and external aspects of validity. Generalizability, according to Messick (1995), is the extent to which score properties and interpretations generalize to and

across population groups, settings, and tasks. The generalizability aspect of validity includesdifferential prediction. The external aspect of validity is supported by evidence of criterion relevance through correlational analysis (Dimitrov, 2012). In order to answer Research Question 3, differential prediction provided support for the generalizability aspect of validity and correlational analysis provided support for the external aspect of validity, both via latent regression analysis (Dimitrov, 2012).

The sample used to answer Research Question 3 was a subset of the original PCVSA student scores from the physical therapist students and their matched clinical instructor PT CPI web scores (n = 220). The matched PCVSA and PT CPI web student sample (n = 220) consisted of 159 (72.3 %) female students and 61 (27.7 %) male students who had a mean age of 24.51 years, closely resembling characteristics of the original sample. To facilitate the use of age in the latent regression analysis, student age was divided into two groups, those 22-24 years old were assigned a "0" and those 25-40 years were assigned a "1" as a new variable within the data. One hundred and forty-nine of the students who reported age (n=211) were between the ages 21-24 years and 62 (28%) of students were between the ages of 25-40 years.

In preparation for the latent regression analysis, CFA was completed on the PT CPI web supporting the two-factor structure of Professional Practice and Practice Management as identified by Roach et al. (2012). A subsequent CFA was completed on just the Professional Practice items of the PT CPI web which showed an excellent model fit for the single factor model and supported the use of the Professional Practice latent variable in the latent regression analysis with the PCVSA. Confirmatory factor analysis carried out on the subset of the PCVSA

scores again supported the seven-factor model with fit indices similar to those identified using the full component of PCVSA scores.

Differential prediction considers "the consistency of the relationship between the target construct and an external criterion across population groups" (Dimitrov, 2012). Because the core values of the physical therapy profession (APTA, 2003a) were integrated into the updated PT CPI web (APTA, 2006), it was hypothesized that a linear positive relationship would exist between student scores on the PCVSA after Practicum I and CI scores on the PT CPI web Professional Practice subscale for those same students after Practicum II almost one year later. However, a predictive relationship was not found between any of the exogenous variables (seven core value latent variables and the professionalism latent variable) and the endogenous variable (professional practice). In addition, the latent regression model indicated a poor correlational relationship between each of the PCVSA latent variables and the Professional Practice latent variable. Moreover, neither gender nor age predicted Professional Practice.

It is not known whether the apparent poor relationship between these two tools, each of which purports to measure aspects of professionalism within physical therapy, is due to the content or context of the assessments or to differences in professionalism attitudes of students and their clinical instructors. It is reasonable to consider that the lack of a relationship between the PCVSA and the PT CPI web may rest on the inability of the PT CPI web to fully measure professionalism in the same way as the PCVSA. Whereas the PCVSA measures students' perception of their professionalism, the PT CPI web measures professionalism behaviors. Futhermore, Gleeson (2007) suggested that people of different generations may interpret and

personify the *Professionalism in Physical Therapy: Core Values* differently. Therefore, it is conceivable that these differing perspectives of professionalism and not the tools themselves influenced the comparison of scores from the PCVSA and the PT CPI web. The results of the latent regression analysis pose a risk to both the generalizability and external aspects of validity. The analysis for Research Question 4 will further address the reliability aspect of generalizability.

Research Question 4

This research question asked, "What are the test/retest reliability and the minimal detectable change of the *Professionalism in Physical Therapy: Core Values Self-Assessment* when completed by physical therapist students?"

A new sample of PCVSA scores from 30 current physical therapist students from the same institution as the previous samples of physical therapist graduates was used to answer Research question 4. This sample was made up of 27 female (90%) and 3 male students (10%). Students from the class of 2016, had an average age of 23 years old, and 74% reported their home state as that of the university. One case was removed from the sample during standard data screening, leaving a sample of $N = 29$ completed PCVSAs for analysis.

The data analysis results for Research Question 4 provided additional information regarding Messick's (1995) generalizability aspect of validity. The minimal detectable change calculations also provided support for responsiveness and interpretability, additional evidence for score validity (Dimitrov, 2012). Responsiveness addresses an instrument's ability to detect changes in scores and contributes to external validity evidence. Interpretability is an aspect of

validity that has to do with how well quantitative scores are translated into qualitative meaning, especially for those without training in psychometrics (Dimitrov, 2012).

The results of a paired *t*-test and calculation of intraclass correlation coefficients provided support for the generalizability and external aspects of validity. Non-significant *t*-statistics for all but one PCVSA subscale (Compassion/Caring, t=2.107, p = .044) and a non-significant total PCVSA score support test score stability over time. The *Professionalism in Physical Therapy:Core Values Self-Assessment* (PCVSA) *ICC* subscale scores ranged from moderate .648 (Professional Duty) to high .923 (Social Responsibility), indicating variability in how closely the PCVSA scores matched when the assessment was completed by PT students within a two-week time span. However, the total PCVSA score exhibited a high *ICC* of .896. Despite the small sample size for this group of analyses, both the *t*-test and *ICC* results provide some support for the reliability aspect of generalizability.

In addition, the minimal detectable change scores were calculated for each PCVSA subscale and for the total PCVSA score using a formula that includes the *ICC* calculations. The MDC calculations provide information about responsiveness that is able to be interpreted accurately by groups of people with varying levels of training in psychometrics. This calculation lends significant support to score validation, as it supports utility of the PCVSA to measure change over time or following intervention. Consequential validity will be discussed following a discussion of risks to invalidity.

Invalidity

No discussion of validity under Messick's construct-based model (1995) is complete without addressing sources of invalidity. Messick (1995) identified two major sources of invalidity, construct underrepresentation and construct-irrelevant variance. In construct underrepresentation the focus of the assessment is too narrow and fails to include important dimensions of the construct. The PCVSA is at risk for construct underrepresentation due to the significant variability in the number of items in each of the subscales (5-12). As discussed earlier, altruism is a difficult to define concept; however, with only five items it does not appear to be represented to the same extent as the social responsibility and integrity subscales, which both have twelve items. Future analysis of this tool should consider the strength of each of the items as representative of the core value being measured and adapt the tool to provide a better balanced representation of each of the core values underpinning professionalism.

The second source of invalidity in Messick's (1995) construct-based validity model is construct-irrelevant invalidity. This source of invalidity requires a factoral invariance analysis which was not completed as part of this study.

Consequential Validity

In order to complete this psychometric analysis of PT student scores from the *Professionalism in Physical Therapy: Core Values Self-Assessment,* it is important to discuss Messick's sixth and final type of validity, consequential validity. Messick (1994) postulates that performance assessments must be evaluated by the same validity criteria, both evidential and consequential, as do other assessments. When evaluating the consequential aspect of validity of

the PCVSA, the intended consequences are that students and clinicians are able to self-assess and monitor their professionalism development over time. Another intended consequence of the PCVSA from the APTA, perhaps, is to instill their view of professionalism into PT education and clinical practice by making this tool freely available at no cost to both members and non-members through the APTA website. The second hypothesized intended consequence although on the surface it appears benign, brings into question issues of fairness due to the potential biases of items regarding organizational membership, prior exposure to clinic work, and pro bono services to the underserved.

Unintentional consequences of the PCVSA development have to do with its use by educators and researchers who have been searching for ways to provide objective measurement of professionalism of physical therapist students. Without previous psychometric analysis to support score validity, utilization of the PCVSA as an outcome measure to record changes from educational activities must be viewed with caution. In addition, prior studies that looked at student PCVSA score changes over time, until now, have not had score change parameters or reliability measures to support conclusions.

Implications

Professionalism is an ongoing area of concern for educators, practitioners, and consumers of medical and healthcare services. Lack of professionalism has been related to low patient satisfaction (Ginsburg, 2005), unemployment (Mathwig et al., 2001), disciplinary actions (Greysen et al., 2012), and dismissal from graduate school (B. Cada, personal communication, January 14, 2015). Professionalism has become a high-stakes concern in the United States where

healthcare reform combined with a consumer-based system increased competitiveness in the workplace and put a greater emphasis on patient satisfaction (Dhai & McQuoid-Mason, 2008). Medical and health profession educators are challenged to find mechanisms through which to evaluate the level of professionalism in their students.

The PCVSA, developed by the APTA (2003b), is one mechanism that has assisted physical therapy programs to track professionalism growth in their students. The results from this validity study support the use of the PCVSA as a formative measure that shows score stability and test-retest reliability. The minimal detectable change calculation on the PCVSA total score can help educators determine when actual change has occurred in the frequency with which a student exhibits the behaviors that underscore professionalism in physical therapy.

In addition, the seven-subscale structure of the PCVSA was supported through confirmatory factor analysis. However, the subscale Altruism did not perform as well as the other subscales, bringing into question whether the items are easily understandable or appropriate for physical therapist students. In addition, three items exhibited a high level of missing responses. These items appear to have greater relevance for the physical therapist clinicians then for students. Perhaps the APTA would consider revising the PCVSA to remove items that do not pertain to either group or develop a student version of the PCVSA separate from the clinician version.

A confirmatory factor analysis of the PT CPI web confirmed its two-subscale structure with excellent one-factor model fit of the six Professional Practice items. Despite the similarities in some of the PT CPI web sample behaviors to the PCVSA (Table 2), latent regression analysis

did not identify any relationship between the two tools as measures of professionalism. Therefore, it may be important for educators to continue to use both tools to gain the most comprehensive knowledge regarding professionalism of their students. Without evidence of a predictive relationship between the two measures, scores on the PCVSA cannot be used to identify students who may have professionalism problems at a later time during their clinical education. Although the PCVSA may have utility in physical therapist programs for formative assessment, the multiple risks for validity identified through statistical analysis means that the tool is not appropriate for summative assessment, and inferences made from this tool should be interpreted with caution.

Professionalism is a complex construct that may vary based on the expectations and culture of healthcare organizations. For this reason, future assessments of professionalism in physical therapist students should focus on professionalism behaviors and attitudes that are common among physical therapist employers and represent the expectations of today's healthcare environment. A professionalism assessment that only focuses on behavioral expectations and attitudes, unique from knowledge and skills, and is completed by clinical instructors during clinical education experiences, would provide physical therapist students and educators with the most authentic indication of students' readiness to enter the profession.

Recommendations

The investigator has several recommendations based on the results of this study. First, the results of this study support the use of the PCVSA for formative and not summative assessment. When using the PCVSA for formative assessment, use only the total PCVSA score as the total

score exhibited greater score consistency, stability, and reproducibility than did the seven subscale scores. Administrators of the PCVSA should utilize the minimal detectable change scores to determine actual change in professionalism over time. Authors of the PCVSA may want to consider: 1. Removing items that do not reflect behaviors of both students and clinicians, 2, re-evaluating items in each subscale to eliminate bias, and 3. Adding or removing items to facilitate a more balanced respresenation of each core value.

Suggestions for Future Research

Professionalism is a hard-to-define construct. Despite the many assessment tools that have been developed to evaluate professionalism attitudes, values and behaviors, there is still not a globally agreed-upon definition of this construct. For this reason, future researchers should look at qualitative analysis to explore current professionalism expectations in academic and workplace environments.

In addition, core values within medicine and other health professions should be compared against the ABIM's (2001) six elements to discern similarities and reasons for differences to better understand and define professionalism through different professional lenses. The concept of humanism should be explored further to see whether other health professions are founded on similar principles of people, individuals, and the human experience. During the Blackall et al. (2007) validation study of the *Penn State College of Medicine Professionalism Questionnaire*, they uncovered differences among the six ABIM (2001) elements of professionalism and modified the elements inherent in the questionnaire by adding "enrichment" and "equity" and eliminating "excellence." Further investigation of professionalism attitudes versus behaviors may

also lend additional information and guidance on the best methods to evaluate this construct (Blackall et al., 2007)

Specific to the PCVSA, future research should include expert analysis of items in the PCVSA perhaps in the form of small groups to better examine the content aspect of validity. Expert participants in this qualitative analysis would need to represent various areas of physical therapy practice, ages, genders, and culture as well as non-APTA members. Finally, this study should be repeated at other institutions in other geographic areas in order to more clearly examine the effect of diversity on PCVSA scores.

Limitations

This study of the PCVSA was based on student scores from one physical therapy program in the midwestern United States. The sample had minimal cultural and geographic diversity. The sample size was not large (N = 267) for Part 1 and (n = 220) for Part 2 and very small (N = 29) for Part 3. It is not known whether the psychometric analysis would be different with a larger or more diverse data set. In addition, all the data were from students who had graduated over the past 5 years from this institution. During that 5-year time frame, the physical therapy faculty had been stable with only one addition and no attrition or retirements. It is unknown whether the beliefs and values of the individual physical therapy faculty influenced any of the student PCVSA scores.

The investigator chose to utilize scores from PCVSAs completed at specific points in the physical therapy curriculum centered around clinical education. It is not known what effect, if any, the curricular content and expectations had on student completion of the PCVSA. The

investigator also made assumptions that the student and clinical instructors had completed the assessment tools accurately and fairly. In at least one case (Part 3), it was evident that a student did not take his or her participation in the study seriously as upon repeated completion of the PCVSA, the student marked all 68 items at the highest level, indicating that he or she performed all of the behaviors all the time. This case was identified as an outlier and removed from the analysis.

This study was also limited by the type of analysis that was completed on the PCVSA. Messick's unified construct-based theory predicates that validity evidence comes from six different aspects. The research questions and analysis in this study focused predominantly on three of the aspects: substantive, structural, and generalizability. Future studies need to explore the content, external, and consequential aspects of validity more thoroughly.

Summary

Chapter 5 discussed the analysis of the findings from Chapter 4 as they relate to professionalism in physical therapist education, practice, and research. Professionalism is an important topic in physical therapy as well as all areas of medicine and healthcare. The need to develop instruments that produce valid and reliable scores will continue to grow as health professions educators and clinicians strive to meet the high expectations of their professions as well as meet the demands of a consumer-based healthcare environment.

The results from this psychometric analysis using Messick's unified construct-based validity model support the use of the PCVSA for formative assessment of professionalism of physical therapist students. However, issues regarding content, structure, and generalizability

prevent this tool from having summative assessment utility in physical therapist education. When using the PCVSA for formative assessment in physical therapist education, it is important to identify that this tool reflects the philosophies of the American Physical Therapy Association leadership and not necessarily all licensed physical therapists. It is also important to note that certain item responses may be biased by prior experience or generational beliefs regarding professionalism behaviors. When using the PCVSA to evaluate change in student professionalism behaviors over time, the total PCVSA score should be used as it exhibits greater stability, consistency, and reproducibility than do the subscale scores.

Because of the multiple risks to score validity identified in this paper, the investigator recommends that the PCVSA not be used to support high-stakes decisions regarding progression or need for remediation. When educators use assessments to make high-stakes decisions they need to be confident that the scores from these tools reflect the construct to be measured without bias, are generalizable across populations and contexts, and exhibit consistent high levels of validity and reliability.

Although the study findings have importance for physical therapist educators, clinicians, and researchers, the PCVSA needs to be used with caution due to study limitations of sample size, lack of cultural diversity, and use of data from only a singular institution. In addition, the focus of this study addressed only some of the components of Messick's unified construct-based validity model. Future studies should focus on expanding this study to other physical therapist programs in other areas of the country. Future studies should also include qualitative as well as quantitative data to more fully explore the complexity of the construct *professionalism*. Finally,

medical and healthcare professionals are encouraged to continue to explore methods that will accurately and consistently evaluate professionalism.

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APPENDICES

APPENDIX A

LETTER FROM NORTHERN ILLINOIS UNIVERSITY INSTITUTIONAL REVIEW BOARD

NORTHERN ILLINOIS UNIVERSITY
Office of Research Compliance and Integrity
Lowden Hall 301 · DeKalb, IL 60115 2584
815-753-8588 · Fax 815-753-1631 · www.niu.edu/orci

Exempt Determination

09-Jan-2015
Deborah Anderson
Counseling, Adult and Higher Education

RE: Protocol # **HS15-0003 "A validation study of the APTA Professionalism in Physical Therapy: Core Values Self-Assessment"**

Dear Deborah Anderson,

Your application for institutional review of research involving human subjects was reviewed by Institutional Review Board #2 on **08-Jan-2015** and it was determined that it meets the criteria for exemption, as defined by the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects, 45 CFR 46.101(b), 2, 4

Although this research is exempt, you have responsibilities for the ethical conduct of the research and must comply with the following:
Amendments: You are responsible for reporting any amendments or changes to your research protocol that may affect the determination of exemption and/or the specific category. This may result in your research no longer being eligible for the exemption that has been granted.
Record Keeping: You are responsible for maintaining a copy of all research related records in a secure location, in the event future verification is necessary. At a minimum these documents include: the research protocol, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to participants, all correspondence to or from the IRB, and any other pertinent documents.

Please include the **protocol number** (**HS15-0003**) on any documents or correspondence sent to the IRB about this study.

If you have questions or need additional information, please contact the Office of Research Compliance and Integrity at 815-753-8588.

APPENDIX B

RESEARCH STUDY INFORMATION LETTER

Research Information Form

Title of Study: A Validation Study of the APTA Professionalism in Physical Therapy: Core Values Self-Assessment

Hello, my name is Deborah Anderson. I am conducting a study to fulfill the requirements of my doctoral degree in Adult and Higher Education from Northern Illinois University. The purpose of this study is to determine to what extent the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides valid and reliable measurement of professionalism in physical therapist students. This study has three parts. You are being asked to participate in part three of this study.

You have completed the *Professionalism in Physical Therapy: Core Values Self-Assessment* as part of your Preparation for Clinical Education II course. As part of this research study, you are now being asked to complete the *Professionalism in Physical Therapy: Core Values Self-Assessment* **again**, 1-2 weeks after the first completion. Data from your assessments will be utilized to compute test/retest reliability of the *Professionalism in Physical Therapy: Core Values Self-Assessment*. It should take you approximately 15 -20 minutes to complete the *Professionalism in Physical Therapy: Core Values Self-Assessment.*

When you have completed your **second** *Professionalism in Physical Therapy: Core Values Self-Assessment* please place it in the marked envelope in the PT Program office. Please make sure to put your student ID on the form. Once your forms are paired, all identifying information will be removed. Results from this study will be reported in total and not individually.

Your completion is this study is completely voluntary. Your participation in this study is not related to the Preparation for Clinical Education II course and will not affect your course grade in any way. Mr. Irwin, the course coordinator for the Preparation for Clinical Education II course, will not know who completes the second survey and who does not. Your decision to complete the second *Professionalism in Physical Therapy: Core Values Self-Assessment* will not influence your relationship with the investigator, the instructor, or the PT Program.

Your completion of the second *Professionalism in Physical Therapy: Core Values Self-Assessment* and turning in that assessment in the marked envelope in the PT Program office establishes your consent to participate in this research study.

Thank you very much for participating in this study!

Deborah K. Anderson, PT, MS, PCS
Doctoral Student
Northern Illinois University
Department of Counseling,
Adult and Higher Education
dander@midwestern.edu
630-515-7281

APPENDIX C

CONSENT FORM

Research Consent Form

Participant Name/Code:_____ Date:_____

Title of Study: A Validation Study of the APTA Professionalism in Physical Therapy: Core Values Self-Assessment,

Researcher:
Deborah K. Anderson, PT, MS, PCS
Doctoral Student
Northern Illinois University
Department of Counseling,
Adult and Higher Education

I agree to participate in the research project titled, "*A Validation Study of the APTA Professionalism in Physical Therapy: Core Values Self-Assessment",* being conducted by Deborah Anderson, a doctoral student at Northern Illinois University and a faculty member at Midwestern University, Physical Therapy Program. I have been informed that the purpose of this study is to determine to what extent the *Professionalism in Physical Therapy: Core Values Self-Assessment* provides a valid and reliable measurement of the construct, professionalism, in physical therapist students. Specifically, I have been asked to participate in one part of this study focused on looking at test/retest reliability of the *Professionalism in Physical Therapy: Core Values Self-Assessment.*

I understand that if I agree to participate in this study, I will be asked to do the following

Complete the *Professionalism in Physical Therapy: Core Values Self-Assessment* 1-2 weeks after completing this assessment as a course assignment in Preparation in Clinical Education II. I understand that it will take me approximately 15-20 minutes to complete this assessment.

Allow the researcher to utilize the scores from both of my completed *Professionalism in Physical Therapy: Core Values Self-Assessments* to compute test/retest reliability of this tool.

I understand that participation in this project is voluntary and I have the right to stop at any time without penalty or prejudice.

I understand that if I have any additional questions concerning this study, I may contact Deborah Anderson, PT, MS, PCS, principal investigator, at dander@midwestern.edu or 630-515-7281 about any concerns I have about this project. I understand that I may also contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588 or James Woods,

Director of Research and Sponsored Programs, at 630-515- 6173 or jwoods@midwestern.edu with any questions about research with human participants at Midwestern University.

I understand that the intended benefits of this study include helping physical therapists better understand the validity and reliability of the *Professionalism in Physical Therapy: Core Values Self-Assessment* and the usefulness of this tool in physical therapist education.

I have been informed that the potential risks and/or discomforts I could experience during this study are minimal and only relate to the time that it takes me to complete the assessment. I understand that all information gathered during this study will be kept confidential. All assessments will be stored in locked file cabinets in the researcher's office. I understand that my assessments will be de-identified and data analyzed on password protected computers. The results from this study will be reported in total. I understand that my information will only be viewed by authorized research faculty.

I understand that I will not receive any compensation for participation in this study.

I understand that my consent to participate in this project does not constitute a waiver of any legal rights or redress I might have as a result of my participation, and I acknowledge that I have received a copy of this consent form.

Signature Participant Date

Signature Researcher Date