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Measuring Outcomes in Competence and Confidence in Clinical Skills Through the Use of Standardized Patients

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MEASURING OUTCOMES IN COMPETENCE AND CONFIDENCE IN CLINICAL SKILLS THROUGH THE USE OF STANDARDIZED PATIENTS

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ABSTRACT

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Limited literature is available concerning the use of standardized patients (SPs) in physical therapy education related to outcomes which are assessed. The purpose of our study was to investigate the effects SP implementation had on first year, doctor of physical therapy (DPT) student's communication and patient interviewing skills and their confidence in those skills.

Our study utilized a comparison group, repeated measures design with the collection of four survey instruments at pre-test and two posttest time points. The instruments for our study measured general self-efficacy (GSE), task-specific self-efficacy (Self-Perceived Communication Competence (SPCC) and Froehlich Communication Competence (FroCom) and confidence (Standardized Patient Learning Outcomes Assessment Tool for Confidence (SPLOAT). Both groups completed the survey instrument packet at all three time points, however, only the experimental group received SP encounters prior to the second and final instrument collections.

General linear model repeated measures analysis was utilized and the results indicated baseline differences for the GSE, SPCC and FroCom with the experimental group having higher average scores, thus making comparisons of the groups for these measures less meaningful. Significant improvements in average overall confidence scores (SPLOAT) were evident at each collection time point for the experimental group with significant main effects for time and group. Additionally, there was a significant interaction effect between time and group indicating the

experimental group increased in their average overall scores ranging from moderate to substantial for all time points. The experimental group performed significantly higher on the second SP encounter compared to the first. The comparison group received no SP encounters throughout the entire study, however also showed significant increases in average overall scores from the pre-test to $posttest_1$ collections but did not indicate significance at the pre-test to $posttest_2$ or for the $posttest_1$ to $posttest_2$ collections.

The increases seen in both groups could be attributed to normal maturation through the curriculum and experience over time. SPLOAT score increases were evident in both groups, however only initially for the comparison group. The SP use of the experimental group supports previous research suggesting that multiple exposures to simulation activities, such as SP, aids in the confidence improvements.

This dissertation is dedicated to my father, Stephen Williamson. His unwavering support and understanding has provided me the strength to endure the tumultuous journey of doctoral studies. This dissertation is also dedicated to the memory of my mother, Linda Rogers Williamson and grandparents, Murray and Agnes Rogers. Their constant encouragement, guidance, and love will forever live inside me.

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CHAPTER I

INTRODUCTION

The appropriate education of healthcare providers is essential to the quality of care patients receive. Proper training on effective communication and interpersonal skills helps to develop confidence in patient-provider interactions, ultimately preparing a practitioner for autonomous practice. A variety of strategies are currently being utilized by healthcare educators to prepare students for clinical practice (Doherty-Restrepo & Tivener, 2014; Yeung, Dubrowski, & Carnahan, 2013). The number and quality of learning experiences provided through clinical education can vary, leaving programs the task of providing adequate and appropriate experiences that replicate clinical practice. Simulations, with varying levels of realism, can be used to provide students with patient encounters or experiences which may or may not be seen during clinical education. A simulation is defined as the engagement of learners in life-like experiences which mimic real clinical encounters (McGaghie, Issenberg, Cohen, Barsuck, & Wayne, 2011). Simulations provide a risk-free environment for learners to master skills that are relevant and vital to successful clinical practice (Maran & Glavin, 2003). Simulation includes activities such as role play, standardized patient encounters, as well as technology such as partial task trainers or other simulators of varying fidelity (Walker & Thrasher, 2013; Yeung et al., 2013). Additionally, simulations can be standardized for a group of learners or created on an individual basis and specific to the needs of the learner (Walker, Weidner, & Armstrong, 2008).

One form of simulation involves the use of standardized patients to provide valuable realistic encounters for a learner in an environment that reduces the risk of harm to the patient. A standardized patient (SP) is an individual who has been trained to portray a particular injury or illness in a consistent manner to multiple learners (Armstrong & Jarriel, 2013; Barrows, 1987;

1993; May, Hyun Park, & Lee, 2009; Walker et al., 2008). SPs are utilized by many healthcare professionals for the teaching and the evaluation of a variety of clinical and communication skills. The utilization of SP experiences has been shown to provide valid and objective information regarding the abilities of students to synthesize didactic information and apply that knowledge in a clinical setting (Whitaker Ebbert & Conners, 2004). SPs can provide students a uniform method of teaching and evaluation that ensures basic clinical skills are acquired and exposure to common conditions are consistent (Stillman, Regan, Philbin, & Haley, 1990). The use of SP encounters have been noted in several healthcare educational programs, some of which include medical education (Barrows, 1987; Howley, Gliva-McCovney, & Thornton; 2009; May et al., 2009), nursing education (Becker, Rose, Berg, Park, & Shatzer, 2006; Vessy & Huss, 2002; Whitaker Ebbert & Conners, 2004), physical therapy education (Panzarella & Manyon, 2008; Paparella-Pitzel, Edmond, & Decaro, 2009) and athletic training education (Armstrong & Jarriel, 2013; Armstrong, Walker, & Jarriel, 2011; Walker & Weidner, 2010) to provide opportunities for both formative and summative acquisition of clinical skills and evaluation of those skills for assessment.

Statement of the Problem

Since SPs were introduced into medical education in the 1960s the acceptance and use has become more wide spread. Although SPs were not widely accepted in medical education initially (Barrows, 1987; 1993), they have since become an integral part of medical education curricula and medical board licensing examinations (Boulet, Smee, Dillion & Gimpl, 2009; Howley et al., 2009; May et al., 2009). With medical schools leading the way, many other healthcare professions have begun to utilize SPs in a variety of ways. SPs can provide an additional means of evaluating students which can supplement and enhance the traditional (pen

and paper) evaluations provided by preceptors and faculty (Whitaker Ebbert & Conners, 2004). Students are better able to focus their energies to the task at hand in an SP examination (Vessy & Huss, 2002), thus easing the transition from simulated patient encounters to actual patient encounters as well as the transfer of knowledge needed for adequate patient care (Yoo & Yoo, 2003). The use of SPs can easily be incorporated across a wide array of professional scopes. To date, the value of SP encounters has been well documented in medical education (Barrows, 1987; 1993; Boulet et al., 2009; Howley et al., 2009; May et al., 2009; Stillman et al., 1990) but has only recently been highlighted in physical therapy education (Black & Marcoux, 2002; Hale, Lewis, Eckert, Wilson, & Smith, 2006; Lewis, Bell, & Asghar, 2008; Mai, Stern, Hollman, Mlezer, Thiele, & Rosenthal., 2014; Mori, Carnahan, & Herold, 2015; Panzarella & Manyon, 2008; Paparella-Pitzel et al., 2009). Although the value of SPs has been recognized in other healthcare professions, very limited literature is available concerning the use of SPs in physical therapy education that reflects the outcomes that are being assessed through SP encounters. The assessment of outcomes through performance indicators is vital in the processes involved in curriculum development and refinement. Without the proper assessment of outcomes faculty may not truly be able to determine a student's performance in particular skills or level of knowledge in specific content areas as well as preparedness for matriculation.

Background

Physical Therapists (PTs) play an essential role in today's healthcare environment and are recognized as vital providers of rehabilitation services as well as prevention and risk reduction services (APTA, 2015). Additionally, PTs provide other professional roles such as offering consultation, education, research, and administration services in the clinical setting (APTA, 2015). The profession of physical therapy and the students within these academic programs are

similar to other healthcare professions. The goals of physical therapy educational programs are to prepare students to provide adequate, competent, and evidence-based patient-centered care in clinical and educational settings. Only in recent years have physical therapy programs begun to vocalize the perceived value of SP encounters in their curricula (Black & Marcoux, 2002; Hale et al, 2006; Lewis et al., 2008; Mori et al., 2015; Panzarella & Manyon, 2008; Paparella-Pitzel et al., 2009). The value of simulated encounters, such as SPs, has been identified in the acquisition and refinement of history taking, physical examination and communication skills (Hale et al, 2006; Lewis et al., 2008; Paparella-Pitzel et al, 2009), enhancement of clinical decision-making skills (Panzarella & Manyon; 2008), as well as in increasing confidence and decreasing anxiety about patient interactions at clinical placements (Mori et al., 2015) in physical therapy programs. Physical therapy programs desire to give students the opportunity to evaluate patients in a clinical scenario without the added pressure of harm to the patient. There are a variety of strategies (i.e., peer on peer role playing, case study scenarios and problem solving) being utilized by physical therapy programs for the assessment of student's clinical skills and competence, making it hard to draw comparisons between programs (Lewis et al., 2008; Mori et al., 2015). Experiences with a standard set of SP encounters across curriculums would help ensure equality of clinical education but the feasibility of incorporating such as system would be irrational without determining the assessment measures currently being utilized and the validity of those measures within physical therapy programs.

A variety of educational content is taught and evaluated within healthcare programming, and the ability to confidently communicate with patients is paramount in the process of providing effective healthcare. Communication involves the successful use of interpersonal skills to facilitate adequate patient-provider interactions, as well as provider-provider interactions.

Communication skills are a combination of both verbal and non-verbal skills and are considered a vital component of patient-provider interactions (Heinerichs, Cattano, & Morrison, 2013; Lewis et al., 2008; Mai et al., 2014; Makoul, 2001). The assessment of a student's clinical and communication skills and their confidence in those skills can be problematic for many professional curricula. Effective communication skills are often difficult for faculty to accurately assess due to the two-way (interpersonal) nature of an interaction between the sender and receiver involved in a therapeutic relationship. Communication involves both verbal and non-verbal skills that need to be appropriately transferred between the two parties for an effective interaction to occur. Assessment of communication skills by faculty can be daunting and challenging due to several factors such as student to faculty ratios, securing appropriate clinical sites, and higher patient acuity (Kameg, Howard, Clochesy, Mitchell, & Suresky, 2010). The difficulty in assessing learners on cognitive processes like communication skills has been recognized by medical and physical therapy educators (Barrows, 1993; Boulet et al., 2009; Dalton, Keating, & Davidson, 2009; Viet Vu & Barrows, 1994). Assessment of performance in specific competencies has evolved in both medical and physical therapy education (Boulet et al., 2009; Lo, Osadnik, Leonard, & Maloney, 2015; Murphy, Dalton, & Dawes, 2014; Panzarella & Manyon, 2008; Sears, Godfrey, Luctkar Fude, Ginsburg, Tregunno, & Ross-White, 2014; Setyonugroho, Kennedy, & Kropmans, 2015; Viet Vu & Barrows, 1994).

The apprenticeship model original to medical education has foundational basis in the concepts of modeling, socialization, reinforcement and vicarious learning (Stegmann, Pilz, Siebeck, & Fischer, 2012). Through the evolution of medical education, emphasis on patient-provider interactions and effective communication has been recognized (Carvalho, et al., 2011; Cary & Kurtz, 2013; Makoul, 2001; Maran & Glavin, 2003; Viet Vu & Barrows, 1994).

Medical education and the modeling techniques inherent in the curriculum are what have provided the foundation for the educational preparation of other healthcare professions like physical therapy (Hale et al., 2006; Lewis et al., 2008; Mai et al., 2014; Mori et al., 2015). Many professional programs, such as medicine, use checklists or other tally type scoring mechanisms for the assessment of student competence during simulated patient interactions (EdCaN, 2009; Setyonugroho et al., 2015). In lieu of checklists, many nursing programs have moved to utilizing competency assessment tools that incorporate rating scales, skill descriptions, and benchmark indicators for skill levels when assessing their students' performance during simulated patient interactions (EdCaN, 2009; Tolhurst & Bonner, 2000). There is currently a scarcity in the literature of ways in which physical therapy program faculty evaluate and assess their students prior to beginning clinical education.

Clinical education provides a hands-on learning environment for student learning and engagement while also providing the opportunity for actual patient care. Often faculty are unable to uniformly assess a student to determine preparedness for clinical education and patient care for several reasons. The definition of professional competence varies across professions but incorporates the basic values of understanding and dealing with highly variable circumstances (Dalton, Davidson, & Keating, 2011). This makes assessment difficult to standardize across students (Rathans, et al., 2002). Controlled assessments such as Objective Structured Clinical Examinations and the use of SPs have been developed in response to concerns regarding standardized and reliable measurement of student competencies (Dalton et al., 2011). Competency assessment is important when faculty are determining preparedness for matriculation of students through a program as well as competence of students in focused areas of content within a program. Controlled environments, in which practical examinations often

take place, are often not adequate to truly assess students' abilities and competence (Dalton et al., 2011; Southgate, Hays, Norcini, Mulholland, Ayers, & Woolliscroft , 2001). The validity, reliability and acceptability of a standard measurement tool for the assessment of these skills in physical therapy has only recently be established (Dalton et al., 2011; Murphy et al., 2014). The assessment tool described by Dalton et al. (2011) has been used to address clinical performance by assessing a student's professional behavior, communication skills, assessment skills, analysis and planning, intervention, evidence-based practice use and risk management as they relate to patient care and the student's preparedness for entry into autonomous patient care. The tool was developed and intended for use by supervising preceptors of physical therapy students during clinical rotations (Dalton et al., 2011; 2009), leaving a gap in the assessment modes of students prior to clinical placement while still engaged in the didactic/classroom setting.

The importance of assessing a student's professional and clinical skills prior to clinical placement should be paramount in any curricula focused on patient care. In an effort to address the gaps in assessment modes, the literature was searched to find relevant instruments capable of measuring these outcomes. From the literature several instruments were deemed appropriate for assessing a student's professional and clinical skills as well as the constructs specific to our study. Measurement of a student's perceived capabilities (self-efficacy) in generalized behaviors associated with communication prior to engagement in encounters requiring effective communication skills is necessary. In order to assess each student's general self-efficacy in patient interviewing and communication skills the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) will be utilized. To assess each student's perceived communication competence the Self-Perceived Communication Competence Scale (SPCC) by McCroskey & McCroskey (1988) will be utilized. The constructs of communication and confidence ideally should be

measured and assessed by program faculty prior to placing students within clinical settings (Carvalho et al., 2011; Cary & Kurtz, 2013) and knowing the perceptions students have about their own abilities is valuable when determining areas for improvement. Healthcare related programs emphasize the importance of good patient-provider interpersonal and communication skills. The Froehlich Communication Survey (Froehlich, Pardue, & Dunbar, 2015) will be utilized to identify each student's self-reported perception of their interpersonal communication skills. The scarcity of available literature on validated assessment tools for confidence in physical therapy lead to the use of a tool from athletic training literature for our study (Armstrong & Jarriel, 2015). The SP Learning Outcomes Assessment Tool (Armstrong & Jarriel, 2015) can enable faculty to accurately assess student confidence in the performance of a comprehensive physical examination. A more in depth review if each instrument, including psychometric properties, will be addressed in the second chapter of the dissertation.

Scope of the Problem and Consequences

The proposed study sought to examine the progression of clinical practice from a developmental approach, with foundational knowledge offered to students in classroom and laboratory settings, and with SP use in situations involving complex encounters. SP utilization requires a coordinated effort of the faculty to provide encounters that are worthwhile and meaningful. Preliminary data from a qualitative study on faculty perceptions of simulation and SP use in athletic training revealed that facility coordination, resource allocation and budgetary restraints are factors to consider when utilization is being developed (Cuchna, Walker, & Van Lunen, in press). Foundational knowledge on the current utilization strategies of SPs across disciplines has been investigated (Becker et al., 2006; Black & Marcoux, 2002; Howley et al., 2009; Mai et al., 2014; May et al., 2009; Stillman et al., 1990; Walker & Weidner, 2010; Walker

et al., 2008; Whitaker Ebbert & Conners, 2004). The information gathered on the characteristics of SP use in other healthcare professions could easily be carried over into any clinical profession such as physical therapy, nursing or athletic training. Previous qualitative research has examined factors which effect SP use in an academic setting (Cuchna et al., in press; Cuchna et al., 2017; Hoots, K., Cuchna, Walker, & Van Lunen, 2017), however, learning and performance outcomes related to SP use are limited and need to be documented further. The deficiencies in literature pertaining to outcomes related to SP use led to the development of an experimental design to assess the outcomes of SP use in an educational setting to measure self-efficacy, confidence, and communication.

Purpose of the Study

The purpose of our study was to add to the body of research in the area of standardized patients while examining the outcomes related to utilization of SPs within a curriculum. Specifically, the assessment of outcomes relating to communication and clinical skills of physical therapy students were examined. The specific aim of this project was to examine learning and performance outcomes related to the utilization of SPs within a physical therapy program.

Significance of the Study

Our study contributes to the body of research in the field of standardized patients in several ways. First, we examined the outcomes related to SP utilization in physical therapy education. Secondly, through examination of physical therapy student's self-efficacy in communication and patient interviewing skills during the first year of an academic program. Thirdly, by examination of physical therapy student's confidence in communication and patient interviewing skills during the first year of an academic program. Lastly, we examined physical

therapy student's perceived competence in communication skills during the first year of an academic program.

Theoretical Framework

Self-Efficacy Theory. Albert Bandura's Self-Efficacy Theory was utilized in our study and provided the theoretical foundation for the self-efficacy portion of our study. Bandura has published several works on Self-Efficacy (Bandura 1977a; 1993; 1997; 2004) as a stand-alone theory outside of Social Cognitive Theory (SCT) (Bandura 1977b; 1978; 1989). The main premise behind self-efficacy is rooted in the internalization and beliefs an individual has about themselves (Bandura, 1993). According to Bandura (1997), "Efficacy beliefs influence goals and aspirations. The stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them…. Self-efficacy beliefs also determine how obstacles and impediments are viewed…. Those of high efficacy view impediments as surmountable by improvement of self-management skills and perseverant effort" (p. 145).

Two types of self-efficacy can be defined; general self-efficacy and task-specific self-efficacy. General self-efficacy is an individual's perception of his or her ability to perform across a variety of situations whereas task-specific self-efficacy examines an individual's perception of his or her ability to perform the actions specific to a situation (Bandura, 1977b; 1986, 1997). Bandura's Self-Efficacy Theory posits that a positive relationship exists between task-specific communication self-efficacy and the extent to which individuals engage in interpersonal and interprofessional communication (Bandura, 1977b; 1986; 1997). In his work on Self-Efficacy Theory, Bandura describes the mediating processes involved in the theory as well as the sources of self-efficacy (Bandura 1993; 1997). The tenants of Self-Efficacy Theory are described in detail in the next section of this chapter but are characterized by a learner's

perceived ability in performing a desired skill set, such as communication skills, and facilitation of those skills in future encounters (Walker, Weidner, & Armstrong, 2015; Wamsley et al., 2012). The underlying tenants of the theory provide the theoretical framework inherent to the use of simulated environments and are further illustrated in Table 1.

Table 1.
Key Constructs in Self-Efficacy Theory and SCT and Implications for SP Use

Theory	Construct	Definition	Implication for SP Use
Self-Efficacy	Mastery Experience	The most important factor in determining self-efficacy. Successes build a person's self-efficacy while failure undermines it.	Progression from simple to complex tasks such as when a student progresses from a simulated patient to an actual patient
	Vicarious (Modeling) Experience	Refers to the ability to provide an ideal model for behavior replication.	When modeling of effective verbal and non-verbal communication techniques are present a student is primed for appropriate behavioral replication within the patient interview.
	Verbal Persuasion	Verbalization from others (often those in superior roles) to provide recognition in the capabilities of another person to achieve	Verbal and non-verbal feedback provided to learners before, during and after an SP interaction to foster self-reflection for the learner. Can be provided by faculty and/or the SP.
	Physiological and Affective States	The inherent processes within the body that occur naturally when information is being conveyed for processing	The learners perception of their ability and subsequent judgment of their performance of a task or skill
SCT	Environment	Factors external to the person	Format of an SP encounter as well as room set-up
	Behavioral Capability	Knowledge, skills and abilities of an individual to perform a behavior	Mastery learning through communication skills acquisition provided by SP encounters

Table 1. *(Continued)*

Theory	Construct	Definition	Implication for SP Use
SCT	Observational Learning	The ability of individuals to learn by observing others as well as by participating in vicarious learning	Peer on peer interactions in the classroom and lab environment prior to SP use
	Reinforcements	Responses, either positive or negative, which facilitate a behavior to be performed.	Verbal and non-verbal feedback provided by faculty and SP as well as self-reflection of the learner following encounters
	Self-Efficacy	A learner's perceived ability in performing a behavior and overcoming barriers to the behavior	Acclimate the learner to the environment and provide a step-wise approach to integrating SP use in a content area.

Content of table adapted from published literature (Bandura, 1977b; 1986, 1993, 1997; Glanz, Rimer, & Lewis et al., 2002).

The sources of self-efficacy outlined by Bandura include mastery experience, vicarious experience, verbal persuasion and physiological and affective states (Bandura, 1997). Mastery experience is marked by an individual's ability to progress from simple to complex tasks which can be seen when a student progresses from a simulated patient to an actual patient (Bandura 1993, 1997; Glanz, Rimer, & Lewis et al., 2002). Vicarious experience can be established with social modeling through observational learning and refers to the ability to provide an ideal model for behavior replication (Bandura, 1993; 1997) which is characterized by learner's modeling the actions and skills of peers (Glanz et al., 2002). Through social modeling of effective verbal and non-verbal communication techniques a student is primed for appropriate behavioral replication within the patient interview. Vicarious experience can be accomplished in a learning environment by providing the learner opportunities (i.e. peer on peer role playing, case scenarios and other simulation experiences) to watch and mimic verbal and non-verbal communication skills necessary for effective patient interviewing and care. Verbal persuasion can be facilitated

by verbal and non-verbal feedback provided to learners and should be provided before, during and after an SP interaction to foster self-reflection for the learner. The verbal persuasion involved in SP use is reinforced when feedback is given to the student by the SP, faculty, and on self-reflection of the task at hand. Physiological and affective states represent the inherent processes within the body that occur naturally when information is being conveyed for processing (Bandura, 1997). Somatic indicators affected by autonomic arousal can produce psychological stress and perceived vulnerability, ultimately affecting a learner's perception of their ability and subsequent judgment of their performance of a task or skill (Bandura, 1997).

Mediating processes are directly related to observational learning and are characterized by four distinct subfunctions or processes; attentional processes, retention processes, behavior production processes and motivational processes (Bandura, 1997). When modeling events occur learners utilize attentional processes to determine which behaviors to model and continue to model. The cognitive skills, preconceptions and value preferences of the learner all play pivotal roles in a learners attentional processing (Bandura, 1997). The second subfunction/process related to observational learning is retention processes; the ability for the learner to retain, reconstruct and retrieve registered events in their working memory (Bandura, 1997). The third process, behavior production process, involves successful retrieval to provide an appropriate course of action in a given situation based on modeling events provided prior (Bandura, 1997). The fourth and final subfunction/process involves motivational processes and relates to the influences of incentive motivators (Bandura, 1997). Motivators can be direct, vicarious, and self-produced and are affected by the perceived benefits and consequences of behavioral actions (Bandura, 1997).

Evolution of Self-Efficacy Theory from Social Cognitive Theory. SP encounters provide a learning environment that fosters the acquisition of skills and mastery of those skills through cognitive and affective processes inherent to human interaction; all of which are key concepts relative to Self-Efficacy Theory (Bandura, 1977a; 1993; 1997). Early works of Bandura in SCT were based on observational learning with behaviors being observed by others and learned to help develop one's personality (Bandura, 1977b; 1978; 1989; Glanz et al.,2002). The belief is that the cognition of the individual person is just as important as the environment where learning occurs and the behaviors being learned (Bandura, 1977b, 1978, 1989; Glanz et al., 2002). Key constructs identified by Bandura in SCT (Bandura, 1977b, 1978, 1989) that are further built on in Self-Efficacy Theory (Bandura, 1993; 1997) are behavioral capability, observational learning, environment, reinforcements, and self-efficacy. The knowledge, skills and abilities of an individual learner can be identified as their behavioral capability (Bandura, 1977b). In a simulated environment the behavioral capability inherent to our study would be communication skills and would be assessed by the standardized patient, faculty, and the content checklist for each encounter (Armstrong & Jarriel, 2013; Maran & Glavin, 2003; May et al., 2009; Walker & Thrasher, 2013; Walker et al., 2008; Wamsley et al., 2012). The perceived capability of the learner to perform specific skills, such as communication skills, is considered the leaners self-efficacy (Bandura, 1977b). Learning environment can be considered the actual physical structure where an encounter is occurring as well as the outside factors affecting a learners affective processes (Bandura, 1977b). Within simulation, specific to SP use, environment can encompass the format of the encounter to include one on one encounters or group encounters as well as the room set-up for the encounter (Fraser, Ayres, & Sweller, 2015). Reinforcements are those responses, either positive or negative, which facilitate a behavior to be

performed (Bandura, 1977b). Reinforcement in simulations, such as SP encounters, are facilitated by faculty feedback to the learner, SP feedback to the learner, as well as self-reflection on the part of the learner through video watch back and class discussion (Brett-Fleegler et al., 2012; Cooper, Singer, & Hayes, 2011; Fanning & Gaba, 2007; Rudolph, Simon, Raemer, & Eppich, 2008; Walker et al.,2015) The tenants are simplistic in nature and emphasize that an individual may learn from watching others perform the behavior, may be vicariously rewarded by watching others receive reinforcement, and are affected by response consequences which may influence the likelihood that the individual will perform behavior again (Bandura, 1977b). The construct and theory inherent to simulation use of SPs is self-efficacy. This construct is defined as the learner's perceived ability in performing a behavior as well as overcoming the barriers associated with such behavior (Bandura, 1977a;1993; 1997; Glanz et al., 2002).

The additional process of observational learning must be recognized as a facilitator of and driving force in an individual's self-perception of abilities (self-efficacy). Inherent in human nature is the ability of individuals to learn by observing others as well as by participating in vicarious learning; the notion being that an individual will be more likely to model behavior observed by others who they identify with (Bandura, 1977b). Specific to medical and physical therapy education, observational learning can be seen in peer on peer interactions of learners in the classroom and lab environment prior to SP use as well as through watching video of actual SP encounters of their own or others (Barrows, 1993; Howley et al., 2009; May et al., 2009; Panzarella & Manyon, 2008; Paparella-Pitzel et al., 2009; Stillman et al., 1990). Modeling of behaviors through the use of SPs assist students in recognizing shortcomings and strengths in cognitive development that ultimately affect skill acquisition. The modeling taking place prior to the intervention being presented in our study took place in the form of peer to peer role playing

as well as faculty to learner role playing interactions. As the evolution from the apprenticeship model into more rigorous didactic education has evolved, so have the modes available to provide modeling opportunities. Simulated learning environments have paved the way for the modern era of the professional preparation of many healthcare professions including physical therapy (Black & Marcoux, 2002; Kameg et al., 2010; Paparella-Pitzel et al., 2009; Schuwirth & van der Vleuten, 2003; Viet Vu & Barrows, 1994). The constructs within social cognitive theory provide the process an individual goes through when learning or improving skills, while the self-efficacy theory drives the motivational factors instilled in an individual to continue to pursue new knowledge and behaviors as well as refine existing skills.

Research Questions and Hypotheses

The research questions and subsequent hypotheses of the study are provided below.

Research Questions:

1. Do physical therapy students' general self-efficacy, as measured by the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?
2. Do physical therapy students' perceived communication competence as measured by the Self-Perceived Communication Competence Scale (McCroskey & McCroskey, 1988) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?
3. Do physical therapy students' self-reported perception of their interpersonal communication skills, as measured by the Froehlich Communication Survey

(Froehlich et al., 2015) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?

4. Do physical therapy students' confidence in performing a comprehensive physical exam as measured by the Confidence Assessment Tool (Armstrong & Jarriel, 2015) overall score, change over the course of a semester based on the use of SPs?
5. Do physical therapy students' confidence in patient interviewing skills, as measured by the Confidence Assessment Tool (Armstrong & Jarriel, 2015) overall score, correlate to their overall score on the SP Encounter Content Checklist?

Research Hypotheses:

H_1: Physical therapy students will have an increase in general self-efficacy through the use of SPs compared to physical therapy students with no SP use.

H_2: Physical therapy students will have an increase in self-perceived communication competence as a result of SP use compared to physical therapy students with no SP use.

H_3: Physical therapy students will have an increase in self-reported perception of interpersonal communication skills as a result of SP use compared to physical therapy students with no SP use.

H_4: Students will have an increase in confidence in performing a comprehensive physical exam through the use of SPs compared to physical therapy students with no SP use.

H_5: There will be a positive correlation between the overall scores on the Confidence Assessment tool and the SP Encounter Checklist.

Assumptions

It was assumed that all physical therapy students participating in our study could comprehend all written materials and the verbal instructions given. The assumption also exists

that all physical therapy students had the requisite knowledge appropriate to their academic level within the program of study. It was also assumed that all the participants would provide accurate and honest answers to all questionnaires and interviews.

Limitations

Our study design is not without limitations. Inherent to the study design and the sampling strategy there may be biases associated with testing effects, such as recall bias, with the instruments being completed multiple times throughout the semester. After the completion of the first (pretest) assessment the students within the program may become more comfortable with the testing measures being collected. Since the students being selected for this project are in cohorts, each cohort (control and experimental group) may have the potential for diffusion or imitation of the treatment effects. This would mean that the participants of each cohort interacted enough with each other outside the intervention setting to potentially affect the outcome of the study. The possible treatment effects would likely occur through the casual conversations and discussions that students have as they interact as a class. The threats to external validity that exist are inherent in the sampling strategy being purposive and convenient. By selecting a specific program and year within the program the results of our study will not be generalizable to all Doctor of Physical Therapy (DPT) programs or other levels of DPT students within the same or other programs. Additionally, by having a pretest prior to the implementation of the SP encounters there could be a pretest sensitization effect influencing how the group reacts to the SP encounters by being exposed to what the encounter is aimed at measuring in both competence and confidence.

Definition of Key Terms

The following terms are defined to ensure clarity of their meaning as it pertains to our study. The researcher developed all definitions not accompanied by a citation.

Communication skills are a combination of both verbal and non-verbal skills necessary for human interaction.

Confidence is the mental ability one holds in performing a specific skill or task.

General Self-Efficacy is an individual's perception of his or her ability to perform across a variety of situations (Bandura, 1977b; 1986, 1997).

Task-Specific Self-Efficacy examines an individual's perception of his or her ability to perform the actions specific to a situation (Bandura, 1977b; 1986, 1997).

Simulation involves the engagement of learners in life-like experiences which mimic real clinical encounters (McGaghie et al., 2011).

Standardized Patients are individuals formally trained to display an injury or illnesses symptoms and affect consistently to multiple students (Walker & Weidner, 2010).

SP Encounter Content Checklists are the evaluation tools utilized by the PT faculty to grade the SP Encounter. These are filled out individually by the SP for each learner they interact with.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review seminal work, as well as current literature related to the use of standardized patients in medical education and physical therapy education. Additionally, current literature on communication and interpersonal skills of providers as they relate to effective patient care are reviewed. Literature which examines the relationship of emotional barriers to the process involved in human interactions are examined as well. There is a lack of standardized modes of assessing communication and interpersonal skills of health professionals during educational preparation. This notion provides the basis for understanding the problems faced historically in medical education and then subsequently by physical therapy education in preparing students to interact effectively with patients.

Three sections comprise this chapter. Two historically relevant viewpoints are initially presented that emphasize the evolution of communication and interpersonal skills training and education in two health professions that directly relate to patient-provider interactions. The second section will describe emotional barriers; lack of confidence and anxiety, which affect cognitive and affective processes as they relate to human interaction. The third section describes the survey instruments relevant to the key constructs being examined in our study.

Historical Viewpoints of Medical and Physical Therapy Educational Perspectives of Communication Skills Training

Historically medical education preparation evolved from an apprenticeship model with trade specific work being learned by the practitioner over the course of months to years (Balcioglu, Bilge, & Unluoglu, 2015; Hodges, 2005). The development of science from both historical and educational perspectives fostered the growth of capitalism and rationality which

further transformed what is today's medical education (Hodges, 2005). Research which is foundationally based in theory has given rise to insights in new practice techniques which fostered the modern medical era of today (Hodges, 2005). This research is marked by intellectual inquiry that is problem-based and promotes solutions that increase knowledge and understanding without inhibiting the public's confidence in medical providers and the research that support the educational strategies (Hodges, 2005).

As the apprenticeship model moved to include more robust and concrete science, the evolution of modern medicine emerged to include a more holistic approach with an emphasis on evidence-based medicine and professionalism (Balcioglu et al., 2015). The modern era of medicine is based in competency that promotes reflective thinking and practice, marked by continuous professional and personal development (Balcioglu et al., 2015). The educational content of medical curricula relate to medical practice and professional skills, basic skills, clinical skills, behavioral and social science knowledge and understanding as well as content related to professional code, values and professionalism (Balcioglu et al., 2015). A key tenant in the professional aspect of the content related to medical education is communication skills, interpersonal relations, and teamwork which are core constructs in the professional preparation of any healthcare provider.

Physical therapists are an integral part of the healthcare team and work alongside physicians, nurses and a variety of other ancillary service providers (APTA, 2015; Nicholson, 2008). Historically physical therapists were regulated by provisions in their scope of care that required a physician referral in order for a patient to seek physical therapy services for treatment of a condition (APTA, 2015; Nicholson, 2008). The evolution of physical therapy practices has given rise to direct access for care which is a provision providing physical therapists the ability

to practice without the necessity of physician consultation or referral (APTA, 2015; Nicholson, 2008). The profession began in World War I in a response to the needed treatment for soldiers injured as a result of war (Nicholson, 2008). As the evolution of the profession progressed, specialty sections were developed within the profession much like medical education and the specialty classifications for residencies (Nicholson, 2008). With the provision of treating and interacting with patients, physical therapist need the same professional skills necessary for effective communication with a healthcare team and the patient.

The evolution of both medical and physical therapy education has given rise to the addition of medical models that involve professional preparation that mimics real patient care facilitating the integration of simulated learning environments (Boulet et al., 2009; McGaghie & Fisichella, 2014). A simulation involves the engagement of learners in life-like experiences which mimic real clinical encounters (McGaghie et al., 2011), while providing a risk-free environment to master skills that are critical to clinical practice (Maran & Glavin, 2003). According to Burke and Mancuso (2012), "Simulation integrates principles of social cognitive theory (SCT) into an interactive approach to learning that encompasses the core principles of intentionality, forethought, self-reactiveness, and self-reflectiveness" (p. 543). Numerous studies reflect the importance of effective communication and interpersonal skills in the training of medical professionals (Barrows, 1993; Howley et al., 2009; Kameg et al., 2010; May et al., 2009; Stillman et al., 1990).

Effective communication is vital in maintaining patient safety (Kameg, 2010). In the study by Kameg et al. (2010), students practiced communication skills with a high fidelity human simulator which provided the opportunity to achieve mastery in therapeutic communication skills prior to entering the clinical setting. Mastery is one of the key processes

identified by Bandura as necessary in the development of self-efficacy (Glanz et al., 2002). Interpersonal and communication skills have been identified as essential professional behaviors of healthcare professionals necessary for effective patient care (Barrows, 1987; 1993; Lewis et al., 2008; Mai et al., 2014). Often in healthcare professional programs, simulation with varying levels of realism, is utilized to prepare students for effective patient care. Simulation activities refer to activities such as role play, standardized patient encounters as well as technology utilized in simulations with varying levels of realism or fidelity (Walker & Thrasher, 2013; Yeung et al., 2013).

Standardized patient interactions have been utilized in medical education for over 50 years and continue to play an integral role in the professional preparation of medical students to interact with real patients (Barrows, 1987; 1993; Howley et al., 2009; May et al., 2009; Stillman et al., 1990). Norman (2012) describes the need to assess performance of medical students to provide an authentic environment which mimics the encounters medical students will have as doctors with patients. Schuwirth and van der Vleuten (2003) also emphasize the notion by stating; "authenticity should have high priority when programmes for the assessment of medical competence are being designed. This means that the situations in which a candidate's competence is assessed should resemble the situation in which the competence will actually have to be used" (pg. 65). Medical education has transformed into to a model that is preparing learners to not only assimilate and integrate the knowledge they learn in the classroom but also to be proficient in the professional roles they will be required to engage in the future through reflective and assessment mechanisms that involve learner self-awareness, self-monitoring and self-assessment of performance and competence in both clinical and professional skills (Mann, 2011). As with medical education, physical therapy education places an emphasis on effective

communication of students prior to the integration of clinical education experiences (Black & Marcoux, 2002; Hale et al., 2006; Lewis et al., 2008; Lim, et al., 2015; Mai et al., 2014; Yeung et al., 2013; Hayward, Blackmer, & Markowski, 2006). In a study of PT students, Black and Marcoux (2002) examined the feasibility of incorporating a SP program into an existing PT curricula. The researchers sought to determine if the SP use would impact acquisition of basic patient care skills and if the cost associated with such use would be beneficial (Black & Marcoux, 2002). The results indicated that the students participating in the SP experiences (experimental group) compared to those with partner role-playing (control group) had a statistically significant difference in their awareness of safety issues, communication issues and handling skills (Black & Marcoux, 2002). The researchers also found the use of SPs to be a relatively cost-effective manner to help students transition from the didactic portion of an educational program to their clinical education (Black & Marcoux, 2002). Hale et al. (2006) examined patient interviewing skills and attitudes about diabetes with first semester DPT students following interdisciplinary classroom instruction. The results of the study found that following the classroom instruction and an SP interaction, students had significant changes from baseline perceptions on appropriate interviewing and screening of patients, appropriate performance of a physical examination, recognizing the relationship between diabetes and visual changes, knowing when to refer due to being outside of their scope of practice, familiarity with the standards of care for diabetes and familiarity with the adaptive equipment commonly used for visually impaired persons (Hale et al., 2006). Hayward and colleagues (2006) noted the need for PT students to graduate with both excellence in technical clinical skills as well as those professional skills that are necessary for interacting with persons of diverse backgrounds, disabilities, and generations. Additionally, the researchers identified the challenge faced by

academic programs to accurately and successfully assess the affective domains related to attitudes, empathy, compassion, caring, integrity and communication necessary in a patient-provider interaction (Hayward et al., 2006). Assessing professional skills, such as communication, prior to clinical education experiences requires faculty to address the emotional barriers associated with low self-confidence and anxiety.

Emotional Barriers of Low Self-Confidence and Anxiety

Expert professionals and novice learners differ with regard to competence in a number of ways. Differences relate to either cognitive or affective processes. Novice learners differ in their frequency of missed cues (Boulet et al., 2009) as well as the number of plausible decision options generated (Elstein, Shulman, & Sprafka, 1978). Novice learners also have decreased ability to recognize and eliminate irrelevant cues (Boulet et al., 2009), all of which are cognitive processes. Cognitive processes alone do not differentiate between expert and novice clinicians; there are affective influences as well. Two affective emotional barriers, lack of self-confidence and anxiety, have been noted in literature to influence affective processes of learners (Boulet et al., 2009; Elstein et al., 1978) which ultimately affect student performance. In a study of physiotherapy students and perceived interpersonal skills, Lewis et al. (2008) examined the baseline anxiety and confidence scores compared to posttest scores following 4 simulated patient interactions. The study examined both first year and second year students prior to and following interactions with the SPs (Lewis et al., 2008). The results indicated that the second year students had significantly higher confidence levels and lower levels of anxiety related to communicating with real patients in the future when compared to their baseline scores (Lewis et al., 2008). In a recent study by Lim and colleagues (2015), researchers examined the impact SPs had on a cohort of physiotherapy students communication skills, confidence in interacting and working with

patients, clinical examinations skill competency and interpretation and analysis of clinical examinations. The results indicated that following the SP experiences within the students' clinical education, significant improvements were present for all of the variables of interest listed above (Lim et al., 2015). The clinical instructors within the program also agreed that the SP program improved communication and clinical reasoning skills of the students compared with other traditional clinical placements (Lim et al., 2015). These studies (Lewis et al., 2008; Lim et al., 2015) mirror research in other professions that repeated exposure to an environment or educational strategy can improve student confidence with the skills necessary to complete the encounter (Armstrong & Jarriel, 2015; Blum, Borglund, & Parcells, 2010).

General Self-Efficacy Scale

The General Self-Efficacy (GSE) Scale was developed by Schwarzer and Jerusalem (1995) as a self-report measure of self-efficacy and used to assess the strength of an individual's belief in their own ability to respond to novel or difficult situations and to deal with any associated obstacles or setbacks (Schwarzer & Jerusalem, 1995). The GSE is a 10-item scale with a total score possible of 40. Concurrent validity was established with positive correlations to emotion, optimism and work satisfaction and has negative coefficients for depression, stress, health, anxiety and burnout (Schwarzer & Jerusalem, 1995). Predictive validity was also established with a two-year follow-up study of German women, showing positive measures for self-esteem (0.40) and optimism (0.56) (Schwarzer & Jerusalem, 1995). Unidimensionality was also tested for the scale using factor analyses which showed a single factor solution, indicating that the scale does in-fact measure a unitary concept. The internal consistency of the instrument was determined by Cronbach alpha (α), with an α coefficient ranging from .76 and .90 (Schwarzer & Jerusalem, 1995). The minimal detectable change (MDC) was calculated based off

of the published psychometric properties of the GSE by Nilsson, Hagell, and Iwarsson (2015). The MDC is the statistical estimate of the smallest amount of change that can be detected by a measure that corresponds to a noticeable change in ability (Portney & Watkins, 2015). The MDC for the GSE Scale was calculated to be 4.43 points.

Several studies have looked at general self-efficacy of secondary school students (Pajares, 1996; Pajares & Kranzler, 1995). One study examined math self-efficacy in secondary school students and general mental ability on math problem-solving performance in high schoolers (Pajares & Kranzler, 1995). The researchers found that ability had a strong direct effects on self-efficacy and performance and self-efficacy had a strong direct effect on anxiety (Pajares & Kranzler, 1995). All of the strong direct effects mediated indirect effects on the other factors (Pajares & Kranzler, 1995). When looking specifically at gender differences, self-efficacy did not differ for boys versus girls, although girls did report higher anxiety (Pajares & Kranzler, 1995). In another study by Pajares in 1996, middle school gifted students' self-efficacy in math problem solving was examined. The results found that gifted girls out performed gifted boys, however their self-efficacy was not different (Parjares, 1996). The study compared the gift education students with regular education students and found that the gifted students reported higher math self-efficacy, higher self-regulated learning, and lower math anxiety (Parjares, 1996). The seminal work by Schwarzer et al. in 1995, explored general self-efficacy of East German migrants, comparing males to females. The re-test reliability of the measure was explored in a two-year period with males having an $r = 0.47$ and females $r = 0.63$ (Schwarzer et al., 1995). In a another study by Schwarzer, Mueller, and Greenglass in 1999, the researchers compared Canadian university students, German high school students and teachers in Germany to an interactive computer session for general self-efficacy. The study utilized an interactive

computer session to determine general self-efficacy and was comparable with the existing literature on the population data available for general self-efficacy (Schwarzer et al., 1999). The findings showed that men, on average, were slightly higher on general self-efficacy as compared with women, however it was only negligible for the computer session data (Schwarzer et al., 1999).

Self-Perceived Communication Competence Scale

The Self-Perceived Communication Competence (SPCC) Scale was developed by McCroskey and McCroskey (1988) as a self-report measure of communication competence. The content of the scale was developed by the researchers to meet the need of a program aimed at looking into willingness to communicate (McCroskey & McCroskey, 1988). In the program, the subjects' perceptions of their communication competence was measured using this scale because no other appropriate self-report measure was available at the time (McCroskey & McCroskey, 1988). The scale items were chosen to reflect basic communication contexts of public speaking, talking in a large meeting, talking in a small group and talking in a dyad (McCroskey & McCroskey, 1988). The scale also addresses the common types of receivers in communication interactions; strangers, acquaintances, and friends (McCroskey & McCroskey, 1988). From the scale computations can be made for an estimate of a subject's communication competence, global self-perceived communication score as well as subscores for each of the communication context and receiver types. The reliability of the scale was established in a study sample of 344 college students for total score and all subscores (McCroskey & McCroskey, 1988). The reliability coefficients ranged from 0.44 to 0.87 with a total score reliability of 0.92 (McCroskey & McCroskey, 1988). The subscore reliability for public (0.72) was the highest context group and stranger (0.87) was the highest receiver groups (McCroskey & McCroskey, 1988). The

SPCC scale includes 12 situation items related to communication and is scored on a 0-100 percent scale and has a MDC of 10.79 based off of calculations computed from published literature (McCroskey & McCroskey, 1988).

Published work by Rosenfeld, Grant and McCroskey (1995) investigated communication apprehension and self-perceived communication competence of academically gifted students compared with at-risk student. The results of the study indicated that at-risk students were most apprehensive about speaking in groups and perceived themselves as least competence when speaking to strangers (Rosenfeld et al., 1995). The academically gifted students were least apprehensive about speaking in groups and perceived themselves most competent when speaking to strangers (Rosenfeld et al., 1995). The mean overall score for the instrument in the gifted students was 78.84 $\pm$ 15.65, which was moderately higher than the normative mean data provided in the study which was 73.70 (Rosenfeld et al., 1995). Rosenfeld and colleagues suggest specific skills training on talking strangers be provided to students as well as skills training on talking with acquaintances to assist in the problems that were noted in the studies population groups related to self-perceived communication competence (Rosenfeld et al., 1995). In a dissertation by O'Donnell (1997), looking at communication in pharmacy practice, the author examined self-perceived communication competence, willingness to communicate, communication apprehension, and role perceptions of pharmacists, preceptors of pharmacy student interns and retired pharmacists. The results indicated that the SPCC did not differ for males versus females. Additionally, in a study by Donavan and MacIntyre (2004), looking at age and gender differences in willingness to communicate, communication apprehension, and self-perceived competence, the authors examined junior high, high school and university level students. For both communication apprehension and self-perceived communication competence,

the authors found no significant gender differences between the junior high and high school student populations. However, at the university level, female students reported higher communication apprehension and lower self-perceived communication competence compared with males (Donovan & MacIntyre, 2004).

Froehlich Communication Survey

The Froehlich Communication (FroCom) Survey was developed by Froehlich, Augustoni, Arsenault and Eldredge (2014) to measure health profession students' perceptions of their communication skills following an introductory learning partnership and interprofessional course. The content of the survey was developed from expertise of interprofessional practice, teaching, continuing education and literature review of effective communication in healthcare (Froehlich et al., 2014). Additionally, the survey was piloted with occupational therapy students in a communication and culture course (Froehlich et al., 2014; 2015). Refinement of the survey and content validity were achieved through a focus group discussion with communication experts from psychology, counseling, social work, nursing, and medical education (Froehlich et al., 2014; 2015). The FroCom survey includes 25-items related to interpersonal communication in healthcare providers. The survey is scored on a 4 point Likert scale with 40-100 points possible with a MDC score of 2.29, which was based off of calculations computed from published literature (Froehlich et al., 2015).

A pilot study by Froehlich et al. (2015) was conducted to investigate the perceived communication abilities of health profession students at the undergraduate level that were enrolled introductory health professions courses utilizing multiple modes of delivery. The existing communication curriculum was utilized in the control group students (Froehlich et al., 2015). The intervention group received the original three communication lessons in the existing

communication curriculum but additionally participated in paired listening partnerships throughout the semester lasting 2-3 minutes each way (Froehlich et al., 2015). A total of 101 student from the control completed the pre-test and 95 students completed the post-test (Froehlich et al., 2015). A total of 147 from the intervention group completed the pre-test and 150 students completed the post-test (Froehlich et al., 2015). Significant differences where noted for both groups with the intervention group pre and post-test total scores means (80.6 and 86.5, $p < 0.001$) and the control group pre and post-test total score means (81.0 and 87.5, $p < 0.001$) (Froehlich et al., 2015). When looking at specific items on the survey, 16 out of the 25 items were significantly influenced by both of the curriculums being offered. The authors indicated that the instrument had adequate test re-test reliability when given two weeks following initial testing in the control group with not significant differences in mean total scores (81.0 and 84.6) (Froehlich et al., 2015). However, the authors did note instrumentation effects, indicating that some of the students reported that just by completing the survey they began the process of improving their communication skills (Froehlich et al., 2015). Extensive literature is available on effective communication in OT curricula and the learning partnerships modeled for the study in the published book chapter by the authors (Froehlich et al., 2014).

Standardized Patient Learning Outcomes Assessment Tool for Confidence Questionnaire

The Standardized Patient Learning Outcomes Assessment Tool for Confidence (SPLOAT) was developed by Armstrong and Jarriel (2015) to measure athletic training student's confidence in patient interviewing skills. The instrument was validated in a sample of 35 athletic training students (20 juniors; 15 seniors) following four SP encounters throughout the academic year that were relevant to their progression within their athletic training curriculum (Armstrong & Jarriel, 2015). Five content experts were used to establish both face and content validity of the

instrument (Armstrong & Jarriel, 2015). The internal consistency of the survey was determined by Cronbach alpha (α), with an α coefficient of 0.971 (Armstrong & Jarriel, 2015). The SPLOAT is a 17-item instrument measured on a 5 point Likert scale with an MDC of 14.37 points which was calculated from published literature (Armstrong & Jarriel, 2015). Students within the AT program completed two SP encounters per semester, totaling four SP encounters over the course of an academic year with the confidence assessment tool administered both pre and post each SP encounter with no control group (Armstrong & Jarriel, 2015). The students were from both the junior (n = 20) and senior (n=15) level cohorts (Armstrong & Jarriel, 2015). The researchers found that both levels of students had improved confidence in completing clinical evaluations with the SP (Armstrong & Jarriel, 2015). Armstrong and Jarriel (2015) found that the specific cases having significant improvements for confidence in the students related to nutrition consultation and evaluation (Z = -2.991, p = 0.004), knee evaluation (Z = -3.261, p = 0.001), concussion evaluation (Z = -3.294, p = 0.001), psychosocial intervention (Z = -3.062, p = 0.002), and general medical examination (Z = -3.524, p > 0.001). However, the cases related to evaluation of cervical spine emergency, evaluation of the low back, and evaluation of the shoulder were not significant (p < 0.05) in increasing confidence in evaluation and patient interviewing skills of the students (Armstrong & Jarriel, 2015). The researchers did not include a control group comparison and simply examined the pre and post test mean scores on the confidence assessment tool with neither group experiencing the same SP encounters (Armstrong & Jarriel, 2015). This makes drawing exact comparisons harder, however when examining the means further, overall the senior level students had higher mean scores at the pre-test compared with the junior students. This comparison result would be expected being that the academic level of student was higher and could be accounted for with normal maturation within the program

curriculum as well as the seniors having participated in more clinical experiences outside of the didactic education. The assessment tool for confidence was utilized in a study of nursing students at the undergraduate level prior to and following two separate SP encounters (Culpa-Bondal & Baker, 2016). The researchers presented the students with a 3-hour communication classroom lab prior to the experiences which included a lecture on therapeutic communication techniques, observation of a faculty interview of SP, deliberate practice with the communication techniques in groups/pairs, along with a separate 3-hour assessment lab for learning nursing process in relation to psychiatric patients (Culpa-Bondal & Baker, 2016). The survey instrument was adapted from the original instrument published by Armstrong and Jarriel (2015) and had an internal consistency of the survey was determined by Cronbach alpha (α), with an α coefficient of 0.89 (Culpa-Bondal & Baker, 2016). The modifications that were made to the instrument included the removal of the items related to clinical examination skills making the nursing version of the instrument only 10 questions. The study spanned 5 academic semesters with a total of 230 first semester psychiatric nursing students participating in the study (Culpa-Bondal & Baker, 2016). Mean total scores for confidence were analyzed at pre-encounter (M = 31.62, SD = 5.45) and post-encounter (M = 39.48, SD = 7.94) on 230 students which found significant changes ($p < 0.01$) for every question on the instrument with a large effect size ($d = 1.1$) (Culpa-Bondal & Baker, 2016). The individual item means for pre-encounter (M = 2.76) and post-encounter (M = 3.55) for questions relating to confidence in assessing patient history (items 1-4) had a very large effect size ($d = -1.4$). Additionally, those questions relating to student's confidence in interacting with patients using therapeutic communication techniques and evaluating the patient holistically (items 5-9) had a large effect size ($d = 0.99$) when comparing

pre-encounter mean scores (M = 3.48) to post-encounter mean scores (M = 4.2) (Culpa-Bondal & Baker, 2016).

CHAPTER III

METHODOLOGY

The methodology chapter describes the research design and procedures for the study. The purpose of our study was to examine the effects Standardized Patient (SP) use has on first year, doctor of physical therapy (DPT) student's communication and patient interviewing skills and their self-efficacy and confidence in those skills as compared to a matched control.

Study Design

Our study utilized a comparison group, quasi-experimental, repeated measures, pre-test – post-test design (Table 2).

Table 2.
Experimental Study Design Schematic

Group	Pre-test (week 1)	Intervention (week 11)	Post-test 1 (immediately following intervention)	Intervention (week 15)	Post-test 2 (immediately following intervention)
Experimental	O	X	O	X	O
Comparison	O	--	O	--	O

The quantitative data was obtained through the collection of four survey instruments (General Self-efficacy Scale by Schwarzer & Jerusalem, 1995, Self-Perceived Communication Competence Scale by McCroskey & McCroskey, 1988, Froehlich Communication Survey by Froehlich et al., 2015 and the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire by Armstrong & Jarriel, 2015) and a SP Encounter Content Checklist (developed by the faculty and Simulation Center Staff). In general, the independent variables of interests were group (experimental vs. comparison), gender (male vs. female), additional

credentials (no additional credentials vs. one or more additional credentials) and time (pre-test, $posttest_1$ and $posttest_2$). All instruments were collected in person by the primary researcher at both the experimental and comparison group institutions. The SP Encounter Content Checklist was only collected for the experimental group participants and was completed by the SP interacting with each individual learner. Participants were first year, DPT students at two regionally accredited institutions. There were two separate time points for implementation of the intervention (SP encounters) in the experimental program group at approximately 11 and 15 weeks into the semester. The interventions was comprised of two SP case portrayals that emphasized communication and patient-interviewing skills. All experimental program students participated in the same SP encounter during the 11^{th} week in the semester and then an additional SP encounter approximately 4 weeks later.

The dependent variables were average overall scores on the four survey collection measures (General Self-efficacy Scale, Self-Perceived Communication Competence Scale, Froehlich Communication Survey and the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire) as well as the overall score on the SP Encounter Content Checklist.

Standardized Patients

For our study, standardized patients (SPs) were utilized as patients to portray certain conditions for the physical therapy students to experience. The SPs were hired from a regional comprehensive academic medical center providing services to multiple healthcare professional programs including, medicine, nursing, physical therapy and social work. The selected experimental program has been utilizing SPs from the medical center for several years to portray conditions/situations to numerous students within the program. In general, within the

experimental program, SPs have been used to simulate different patient encounters common to physical therapy practice with an emphasis on communication and patient-interviewing skills. The SP encounters were developed through the collaboration of the PT program faculty with the SP educators at the center and have been successfully executed with several previous student cohorts. The use of SPs allows the students to interact with standardized patients with specific training on interview skills, communication and facilitative feedback. Training of all SPs took place at the regional medical center by their staff. SPs from the center are involved in a two and a half day training workshop specific to facilitative feedback and the proper use of the Master Inventory Rating Scale (MIRS) (Eastern Virginia Medical School, 2015). Additionally, each SP also participates in specific training for the cases being portrayed lasting approximately 3 hours and includes a dry run of the encounter to ensure standardization is established between individuals proving the SP role. The specific cases which were portrayed by the SPs for the experimental group can be found in Appendix I.

Sampling Procedure and Setting

The sample population for our study was a purposive convenience sample of first year, DPT students at a local university already utilizing SPs within their program (44 students in the cohort). Inclusion criteria specified that the students be currently enrolled in the first year of the DPT program at their local institution. The comparison group was a purposive convenience sample of first year DPT students at a peer-matched regional institution which did not utilize SPs prior to or within the specified time frame (30 students in the cohort). The comparison group program was matched by the curriculum progression and content. No other inclusion or exclusion criteria were used.

The experimental group already utilizes SPs in the first year of the curriculum. The cohort sizes for the fall semester of the experimental and comparison group were 44 and 30, respectively. The students of each program were asked to voluntarily participate in completing the survey instruments (General Self-efficacy Scale, Self-Perceived Communication Competence Scale, Froehlich Communication Survey and the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire). Those who volunteered to participate were given an informed consent document and provided time to read and ask questions regarding the study prior to the start of data collection. The students were reassured that their decision to participate would not jeopardize their status or matriculation in their program of study. The participants were provided with a written description of the study and given the opportunity to ask questions.

Since our study was conducted with first year physical therapy students there were potential threats to the generalizability of the data collected outside of physical therapy and outside of first year students in a DPT program. Even with such threats existing, the value in sampling this population is seen because knowing where a student perceives their abilities (perceived self-efficacy) and their confidence in completing skills at the entry of a program are important to educators, especially since the only other reference standard for the educational foundation of students admitted into DPT programs are GRE scores and undergraduate GPA.

Power Analysis. A power analysis was performed to determine an adequate sample size to be able to generalize the data to the population. Through the use of Cohen's power calculation (Cohen, 1988), to achieve 80 % power, it was determined that a total sample size of 46 participants would be necessary. Due to the predetermined cohort sizes for each participating group, there was an inability to modify group sizes to assist with meeting power.

Sample Size. A total of 60 students (37 experimental and 23 comparison) participated in the study. No students were disqualified from participation. Of the 60 who originally qualified, all 60 participants were included in all or some portion of the study. A complete description of enrollment and participant characteristics is presented in Table 3.

Table 3.
Participant Enrollment and Characteristics

		Experimental (N = 37)	Comparison (N = 23)
Age		23.43 ± 2.60 years	23.17 ± 2.77 years
Gender		18 Female 19 Male	19 Female 4 Male
Highest Academic Degree	Bachelors	37	22
	Masters	0	0
	Doctoral	0	1
	Other	0	0
Undergraduate Major	Athletic Training	1	0
	Biology	3	3
	Biology and Psychology	1	0
	Biology – Laboratory Sciences	1	0
	Biomedical Engineering	0	1
	Biomedical Science	1	0
	Cellular, Molecular, & Physiological Biology	2	1
	Communication	0	1
	Dance and Clinical Exercise Science	1	0
	Economics	1	0
	Economics and History	1	0
	Exercise Physiology	1	1
	Exercise Science	7	2
	Exercise Science and Psychology	1	0
	Health Science	3	1
	Health Science – Public Health	1	0
	Health and Exercise Science	1	0
	Human Nutrition, Foods and Exercise	3	5
	Human Health and Performance	0	1
	Film	1	0
	Kinesiology	2	2
	Kinesiology and Health	1	0
	Marine Biology	0	1
	Neuroscience	2	0

Table 3. *(Continued)*

		Experimental	Comparison
	Nutrition and Exercise	1	0
	Psychology	0	2
	Psychology and Science	1	0
	Sports Medicine	0	2
Total		37	23
Prior Exposure to SPs	Army Combat Training	1	0
Additional Credentials	ACSM – EP-C	3	0
	ACSM - EP-C; NSCA – CSCS; FMS-L1	1	0
	ATC	1	0
	CSCS	1	0
	FMS- L1	1	0
	PT Tech	1	1
	SDPT	1	0
	PTA	1	0
	PTA and CES	0	1
Total		10	2

Abbreviations: SPs = Standardized Patient; ACSM - EP-C = American College of Sports Medicine Certified Exercise Physiologist; NSCA – CSCS = National Strength and Conditioning Association, Certified Strength and Conditioning Specialist; ATC = Certified Athletic Trainer; FMS – L1 = Functional Movement Screening, Level One Certification; PT Teach = Physical Therapy Technician; SDPT = Doctor of Physical Therapy Student; PTA = Physical Therapy Assistant; CES = Corrective Exercise Specialist

Setting. The experimental portion of our study was conducted at a regional comprehensive academic medical center which has 16 simulated patient examination rooms. The SPs were all employees of the regional comprehensive medical center. The simulated patient examination rooms were set up with a standard medical bed, bedside equipment, as well as any ancillary supplies relevant to the cases being portrayed. The rooms were equipped to simulate a realistic patient care environment in an outpatient and/or acute care setting, depending on the case. The SPs were trained to simulate patients with common conditions seen by physical therapists with an emphasis on communication and patient interviewing skills. The specific cases were predetermined by the PT faculty and are provided in Appendix I. The comparison group from the peer-matched institution did not receive any SP encounters during the study time period but were given the same survey instruments (General Self-efficacy Scale, Self-Perceived

Communication Competence Scale, Froehlich Communication Survey and the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire) at the same time intervals as the experimental group.

Protection of Human Subjects. Institutional Review Board (IRB) approval from Old Dominion University and that of the peer-matched institution were obtained for our study. Participants were informed of their right to withdraw at any time and that all their information would remain confidential. All data collected remained confidential, and no personally identifiable information was used or collected on any of the questionnaires. A study identification number was utilized for each participant at pre-test and for all subsequent post-test questionnaires. The participant identification number consisted of the first two letters of the participant's last name, the participant's 2-digit birth month, and the first two letters of the participant's birth state.

Instruments and Measures

The data were collected using the following instruments: 1) Demographic questionnaire; 2) General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995); 3) Self-Perceived Communication Competence Scale (McCroskey & McCroskey, 1988); 4) Froehlich Communication Survey (Froehlich et al., 2015); 5) the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire (Armstrong & Jarriel, 2015) and 6)Standardized Patient Content Checklist (developed by medical center staff and faculty and utilized for the experimental group only).

Demographic questionnaire. The demographic questionnaire (Appendix D) was developed by the research team to collect data on the characteristics of the study participants. The questionnaire contained six questions: 1) What is your age?, 2) What is your gender?, 3)

What is the highest academic degree you have obtained?, 4) What was your undergraduate major?, 5) What, if any, prior exposure to standardized patients do you have?, and 6) What, if any, additional credentials do you hold (i.e. LMT, ATC, PTA, CSCS, CES)?

General Self-Efficacy Scale. The General Self-Efficacy Scale (GSE) by Schwarzer and Jerusalem (1995) was utilized to assess each participant's belief in their own ability to respond to generalized situations and dealing with obstacles or setbacks. The questionnaire contains 10 items measured on a 4-point Likert scale ranging from "Not at all True" to "Exactly True", which aimed to measure the participant's self-perceived abilities (self-efficacy) in completing generalized tasks. Total scores range from 10-40, with higher scores indicating more self-efficacy. The participants responded to the same questionnaire with a rating of 1 for not at all true, 2 for hardly true, 3 for moderately true, and 4 for exactly true. A copy of the GSE can be found in Appendix E.

Concurrent and predictive validity of the GSE were established by Schwarzer and Jerusalem (1995). The instrument had positive correlations with emotion, optimism and work satisfaction, and self-esteem, and negative correlations with depression, stress, health, anxiety and burnout (Schwarzer & Jerusalem, 1995). The GSE has good internal consistency, with an α coefficient ranging from .76 and .90 (Schwarzer & Jerusalem, 1995). The minimal detectable change (MDC) was calculated for the instrument and determined to be 4.43 points based off the published literature on GSE by Nilsson, Hagell, and Iwarsson (2015).

Self-Perceived Communication Competence Scale. The Self-Perceived Communication Competence Scale (SPCC) by McCroskey and McCroskey (1988) was utilized to measure each participant's perceived communication competence. The scale includes 12 situations in which communication may be necessary. Additionally, the scale addresses

communication context (types of communication interactions) and receiver types through calculated subscore totals. In response to each situation the participants rate their level of competence utilizing a zero to 100 scale, with 0 equating to completely incompetent and 100 to completely competent. A copy of the Self-Perceived Communication Competence Scale can be found in Appendix F.

The reliability of the SPCC was established by McCroskey and McCroskey (1988). The total score reliability of the instrument was determined to be 0.92 with reliability coefficients ranging from 0.44 to 0.87 (McCroskey & McCroskey, 1988). The MDC for the SPCC was calculated based of the published literature by McCroskey and McCroskey (1988) and determined to be 10.79.

Froehlich Communication Survey. The Froehlich Communication Survey (Froehlich et al., 2015) was utilized to measure participant' perceptions of their interpersonal communication skills. The survey contains 25 items measured on a 4-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree", which are aimed at rating the participants' level of agreement with each statement. The participants responded to the same questionnaire with a rating of 1 for strongly disagree, 2 for disagree, 3 for agree, and 4 for strongly agree. A copy of the Froehlich Communication Survey can be found in Appendix G.

The content validity of the FroCom survey was established by Froehlich et al. (2014) through the use of an expert panel of collaborators, pilot testing with occupational therapy students in a communication and culture course, as well as through discussions with communication experts from psychology, counseling, social work, nursing, and medical education. The reliability of the instrument could not be established due to a lack of published works available on the instrument and has been utilized only by the authors who developed the

instrument (Froehlich et al., 2014; 2015). The MDC score was calculated based off of published literature by Froehlich et al. (2015) and determined to be 2.29 points.

Standardized Patient Learning Outcomes Assessment Tool for Confidence Questionnaire. The Standardized Patient Learning Outcomes Assessment Tool for Confidence by Armstrong and Jarriel (2015) was utilized to assess participant's confidence in performing a comprehensive physical examination. The questionnaire contains 17 items measured on a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree", which aimed to measure the participant's perception of confidence in patient interviewing associated with the SP encounters. There was an open-ended comment section at the bottom of the original questionnaire which was used to gain specific comments about how the SP interactions improved the student's confidence. The participants responded to the same questionnaire with a rating of 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree and 1 for strongly disagree. The participants were given the opportunity to respond to the open-ended questions at the end of the instrument. The open ended-comment included on the original questionnaire were removed from the comparison group survey forms since they did not receive any SP encounters. A copy of the Standardized Patient Learning Outcomes Assessment Tool for Confidence can be found in Appendix H.

The validity of the SPLOAT questionnaire was established by Armstrong and Jarriel, (2015) in group of athletic training students following four SP encounters throughout the academic year. Both face and content validity of the instrument were established through the use of five content experts in the development process (Armstrong & Jarriel, 2015). The instrument has good internal consistency with an α coefficient of 0.971 (Armstrong & Jarriel, 2015). The calculated MDC was determined to be 14.37 points, which was from the published literature of Armstrong and Jarriel (2015).

SP Encounter Content Checklist. The SP encounter content checklist is an objective tool utilized by the regional medical center. The content checklist is created for every case developed by the center with program faculty. The content of the checklist is formulated from MIRS items that the SP is trained to observe and objectively rate for each learner. Additionally, the content checklist is in fact a checklist of items that the faculty have deemed necessary for a learner to complete in order to successful execute the patient encounter. The content checklist has several sections, including, but limited to, introduction, chief complaint, past medical history, family history, social history, physical examination, and affective behaviors. Depending on the encounter, each section can be weighted differently. Most items within the checklist are rated on a 5-point scale ranging from 0 to 5. A score of 0 for an item indicated that the learner did not perform the task, while a score of 5 indicated that they completed the task with competence. Often the items on the checklist relate to specific questions that the learner needs to ask the patient in order to get a full picture of the patient's current condition.

Procedures

Data collection occurred over a 16-week period. For all data collection time points, the researcher followed a detailed research protocol which can be found in Appendix C. During week one of the study all participants were contacted in person by the primary researcher and given a brief description of the study. The researcher asked the potential participants about their desire to participate in the study. Once a confirmed participation status was established, informed consent forms were presented to the participant for review and signature. The researcher then distributed all four pre-test questionnaires described previously to the participants. Whether a student chose to participate or not, the SP interactions still occurred for the experimental program. If the student chose to participate, the study followed the progression in Table 4.

The study was carried out by collaboration with key faculty within both DPT programs as well as the instructor of record for the specific class in which SPs were currently being used in the experimental group. At weeks 1, 12, and 15 the survey instruments were collected at both participating programs. Additionally, for the experimental program, during week 12 and 15, immediately preceding the instrument collections, each student participated in an SP encounter. The intervention SP encounter was the same for all students but was different for each two times of administration. The demographic questionnaire was administered at pre-test only for both experimental and comparison groups and was the top form of the instrument packet in which the participants were completing by hand. All four instruments (General Self-Efficacy Scale, Self-Perceived Communication Competence Scale, Froehlich Communication Survey, and Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire) were administered at pre-test and immediately following both of the SP encounters (post $test_1$ and post $test_2$) at the center for the experimental group. The comparison group had no SP encounters in the first semester of the program and continued with normal matriculation through the program.

Table 4.
Study Schematic

	Experimental Group	**Comparison Group**
Intervention	**SP Encounters at the Regional comprehensive academic medical center**	**NO SP ENCOUNTERS**
Week 1	1. In-class recruitment took place at the end of a selected class at both experimental and comparison program institutions. 2. Informed consent was obtained during this time. 3. Following participation confirmation, the demographic questionnaire and four pretest surveys (GSE Scale, SPCC Scale, FroCom Survey and the SPLOAT for Confidence Questionnaire) were handed out to each participant.	

Table 4. *(Continued)*

	Experimental Group	Comparison Group
Intervention	**SP Encounters at the Regional comprehensive academic medical center**	**NO SP ENCOUNTERS**
Week 11	1. An SP encounter (intervention 1) emphasizing communication and patient-interviewing techniques occurred. 2. Post-test$_1$ surveys (GSE Scale, SPCC Scale, FroCom Survey, and the SPLOAT for Confidence Questionnaire) were given immediately following encounters in person	Surveys (GSE Scale, SPCC Scale, FroCom Survey, and the SPLOAT for Confidence Questionnaire) were given, in person, at the end of a selected class to those students who chose to participate.
Week 15	1. An SP encounter (intervention 2) emphasizing communication and patient-interviewing techniques occurred. 2. Post-test$_2$ surveys (GSE Scale, SPCC Scale, FroCom Survey, and the SPLOAT for Confidence Questionnaire) were given immediately following encounters in person.	Surveys (GSE Scale, SPCC Scale, FroCom Survey, and the SPLOAT for Confidence Questionnaire) were given, in person, at the end of a selected class to those students who chose to participate.

Abbreviations: GSE = General Self-Efficacy; SPCC = Self-Perceived Communication Competence; FroCom = Froehlich Communication; SPLOAT = Standardized Patient Learning Outcome Assessment Tool.

During week eleven of the study all experimental group students participated in an SP encounter (intervention 1) at the regional comprehensive academic medical center. Participants were individually scheduled to participate in the encounter. The standardized patient case was written specifically to emphasize communication and patient-interviewing techniques. The SP case scenarios are available in Appendix I. Feedback and debriefing was provided to all students, for all SP encounters at the end of each encounter by the SP playing the role of the patient and emphasized the MIRS items related to effective communication. Additionally, the instructor of record provided a group debriefing for the entire class during the next scheduled class meeting

which emphasized the general strengths and weaknesses of the class as a whole, throughout all of the SP encounters. The feedback provided was part of a standard process that occurs for each encounter regardless of participant status within the study.

Participants were given a specified amount of time to complete each encounter (25-30 mins). The SPs portraying the patient in each case completed the SP Encounter Content Checklist on the case scenario for each encounter. The participants were left alone with the SP in the exam station to demonstrate the appropriate clinical skills for their given case. The primary researcher and faculty monitored the participants by watching from the control room of the center where audio and video feeds of each exam room can be monitored. Within one week following the SP encounter, each participating student was asked to complete a pen and paper packet containing the four outcome measure survey instruments (General Self-efficacy Scale by Schwarzer & Jerusalem, 1995, Self-Perceived Communication Competence Scale by McCroskey & McCroskey, 1988, Froehlich Communication Survey by Froehlich, 2015 and the Standardized Patient Learning Outcome Assessment Tool for Confidence Questionnaire by Armstrong & Jarriel, 2015) as post-test$_1$. During this time frame the comparison participants continued with the normal didactic and lab experiences outlined by their program faculty and course matriculation but were also asked to complete a pen and paper packet containing the four outcome measure survey instruments as post-test$_1$.

During week fifteen of the study, all experimental participants completed a second SP encounter (intervention 2), different than the first, at the regional comprehensive academic medical center. These encounters were monitored by the primary researcher and faculty from the control room via audio and video feed through a camera system built into the simulation rooms. Feedback and debriefing was provided to all students for all SP encounters at the end of each

encounter by the SP playing the role of the patient and emphasized the MIRS items related to effective communication. Within one week following the SP encounter, each participate was asked to complete the pen and paper packet of the four outcome measure survey instruments as post-test$_2$. Additionally, the instructor of record provided a group debriefing for the entire class during the next scheduled class meeting which emphasized the general strengths and weaknesses of the class as a whole, throughout the SP encounters. The feedback provided was part of a standard process that occurs for each encounter regardless of participant status within the study. During this time frame the comparison participants continued with the normal didactic and lab experiences outlined by their program faculty and course matriculation but also were asked to complete the pen and paper packet of the four outcome measure survey instruments as post-test$_2$.

Data Analysis

There were two types of data collected in our study: demographic and quantitative. Demographic data were summarized using measures of central tendency and frequency distributions. All data collected by the survey instruments and the SP Encounter Content Checklist represented interval level data. All data were initially analyzed to determine which participant characteristics were impacting each survey instrument as well as if the study groups were similar at baseline. Quantitative data for the GSE scale was analyzed using a General Linear Model (GLM) repeated measures analysis. The independent variables were group (experimental vs. comparison), gender (male vs. female), and time (pre-test, posttest$_1$ and posttest$_2$). The dependent variables were the participant average overall scores on each of the survey instruments. Quantitative data for the SPCC scale was analyzed using a GLM repeated measures analysis of variance. The independent variables were group (experimental vs. comparison), additional credentials (yes vs. no), and time (pre-test, posttest$_1$ and posttest$_2$). The

dependent variables were the participant overall scores on each of the survey instruments. Quantitative data for the Froehlich Communication Survey and SP Learning Outcomes Assessment tool were independently analyzed using a GLM repeated measures analysis of variance. The independent variables were group (experimental vs. control) and time (pre-test, $posttest_1$ and $posttest_2$) for each analysis, respectively. The dependent variables were the participant overall scores on each of the survey instruments. All repeated measures analyses had a *p*-value of 0.05 which was set *a priori* and considered significant. To better evaluate the relationship between communication performance and confidence, correlation coefficients were computed, specifically Spearman's rank correlation due to the non-parametric nature of the data collected. Additionally, linear regressions were performed to further elucidate if a correlation could be drawn from the SPLOAT overall scores of $posttest_1$ and SPE CL_1 as well as from the SPLOAT overall scores of $posttest_2$ and SPE CL_2. Statistical significance was set *a priori* at $p \leq .05$.

CHAPTER IV

RESULTS

This chapter presents the results to the current study. An overview of how missing data was addressed within the statistical analyses as well as the quantitative results from the demographic data and each survey instrument are presented.

Missing Data

The presence of missing data existed within the data collected. Missing data was present in two forms; either from an entire survey instrument not being completed or an individual data point within a survey instrument not being completed. The presence of missing data was addressed in the following manner. For those survey instruments that were returned with a single entry point missing, a person mean substitution method as described by Hawthorne and Elliot (2004) was utilized. Participants missing greater than 10% of the data collected were removed from analyses. The single point missing data for our study ranged from 4 to 10% for an individual participant with no participants missing more than one single data point on any given survey instrument as well as no participants missing a single data point on more than one survey instrument for a collection or subsequent collections. In the case of entire survey instrument collection missing data, a listwise deletion was utilized. The listwise deletion method removed any participant's data from all analyses for which any individual time point collection was missing an entire survey instrument. Due to the nature of the data collection procedures, it is unknown if the participants who returned entire surveys uncompleted were removing themselves from the study or were merely absent on the day of the data collections. Due to this and an inability to carry their data forward these participants were handled in SPSS as a listwise deletion from any statistical analyses.

Data Analysis

Descriptive Statistics for Demographics. Demographic data was collected at the initial pre-test data collection for both comparison and experimental groups. A total of 37 (18 females, 19 males), first year DPT students with an age range of 20-35 years (M = 23.43; SD = 2.60 years) participated in the experimental group. A total of 23 (19 females, 4 males), first year DPT students with an age range of 21-32 years (M = 23.17; SD = 2.77 years) participated in the comparison group. To determine if there were differences among groups at baseline for the demographic characteristic of age, an independent t-test was performed. The results indicated that there were no significant differences in age between the experimental (M = 23.17, SD = 2.77) versus comparison group (M = 23.43; SD = 2.60), $t(58) = -0.37$, $p = 0.72$. Additionally, correlations were performed for each instrument baseline average score with age to see if a relationship existed. The results indicated that there were no relationships found between the GSE, SPCC, FroCom and SPLOAT baseline average scores and age. The correlation table for each of the instruments and age can be found in Appendix L. Additionally, an analysis of the baseline outcome measure average scores for each survey were compared with additional credentials as the predictor variable to determine if there were any systematic differences based on credentials. The results indicated that for the GSE baseline comparison there were no significant differences in those possessing additional credentials (M = 31.83, SD = 3.74) compared with those that did not (M = 32.31, SD = 2.82), $t(58) = 0.49$, $p = 0.63$. For the SPCC baseline comparison, results indicated there were significant differences in those possessing additional credentials (M = 92.43, SD = 6.68) compared with those that did not (M = 87.21, SD = 7.78), $t(58) = -2.13$, $p = 0.037$, with a medium to large effect size ($d = 0.72$). The FroCom baseline comparison results indicated there were no significant differences in those possessing additional credentials (M = 81.67, SD = 9.43) compared with those that did not (M = 79.23, SD

= 6.76), $t(58) = -1.03$, $p = 0.308$. Finally, for the SPLOAT baseline comparison, results indicated there were no significant differences in those possessing additional credentials (M = 51.83, SD = 14.35) compared with those that did not (M = 51.33, SD = 11.12), $t(58) = -0.13$, $p = 0.896$.

A chi-square comparison was performed for the categorical demographic variable of gender which indicated that there was a significant difference in gender between the experimental and comparison group, $X^2 (1, 60) = 6.92$, $p = 0.009$, such that there were a disproportionally less number of males in the comparison group (4 out 23, 17%) compared to the experimental (19 out of 37, 51%). All participants had obtained a bachelor's degree, which is a requirement for entrance into physical therapy program at the doctorate level. A summary of the participant demographics is provided in Table 3.

Research Question 1: *Do physical therapy students' general self-efficacy in patient interviewing and communication skills, as measured by the General Self-Efficacy (GSE) Scale (Schwarzer & Jerusalem, 1995) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?* The responses to the GSE Survey were used to address this construct. The data for this construct were collected at all three time points (pre-test, $posttest_1$, $posttest_2$). To determine if there were differences among groups at baseline for the GSE an independent t-test was performed. The results indicated that there was significant difference between the experimental (M = 33.03; SD = 3.07) versus comparison group (M = 30.91; SD = 2.40), $t(58) = -2.82$, $p = 0.007$, with a medium to large effect size ($d = 0.75$), such that the experimental group exhibited higher baseline average scores for the GSE compared to the comparison group. The results of the independent t-test for gender indicated that there was significant difference between males (M = 33.35, SD = 3.31) and females (M = 31.51,

SD = 2.58), $t(58) = 2.27$, $p = 0.029$, with a medium to large effect size ($d = 0.62$), such that the males exhibited higher baseline average scores for the GSE when compared to females. The results of the independent t-test for additional credentials indicated that there was not a significant difference between no additional credentials (M = 32.24, SD = 2.83) and additional credentials (M = 32.09, SD = 3.81), $t(58) = 0.15$, $p = 0.881$.

A repeated measures General Linear Model (GLM) was utilized to compare total scores between groups (experimental vs. comparison) and gender (male vs. females) over the three time points for within subjects effects. Mauchly's test indicated that the assumption of sphericity had been violated, $x^2(2) = 8.62$, $p = 0.013$, therefore Greenhouse-Geisser corrected tests are reported ($\varepsilon = 0.87$). The results indicate that there was a significant main effect for time, $F(1.73, 90.00) = 5.17$, $p = 0.010$. Pairwise comparisons for the main effect of time indicated no significant differences in pre-test (M = 32.27, SD = 3.08) to post $test_1$ (M = 31.79, SD = 2.74). Additionally, pre-test (M = 32.27, SD = 3.08) to post $test_2$ (M = 33.13, SD = 3.18) was not significant, $p = 0.125$. However, post $test_1$ (M = 31.79, SD = 2.74) to post $test_2$ (M = 33.13, SD = 3.18) was significant, $p = 0.007$, with a small to medium effect size ($d = 0.45$), such that the $posttest_2$ average overall scores where higher than the $posttest_1$ average overall scores. The pairwise comparisons for time are located in Appendix J.

The between subject effects indicated that there was not a significant main group effect (experimental vs. control), $F(1,52) = 1.24$, p = 0.271. However there was a significant main effect for gender, such that the males (M = 33.35, SD = 3.31) had higher average scores than females (M = 31.51, SD = 2.58), $F(1,52) = 4.28$, p = 0.043 with a medium to large effect size ($d = 0.62$). Additionally, the results indicated that there were no significant interaction effects for

time by group, time by gender, group by gender, or time by group by gender. The repeated measures table is located in Appendix J.

Research Question 2: *Do physical therapy students' perceived communication skills, as measured by the Self-Perceived Communication Competence Scale (SPCC) (McCroskey & McCroskey, 1988) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?* The responses to the SPCC Survey were used to address this construct. The data for this construct were collected at all three time points (pre-test, $posttest_1$, $posttest_2$). To determine if there were differences among groups at baseline for the SPCC an independent t-test was performed. The results indicated that there a was significant difference between the experimental (M = 90.05; SD = 6.19) versus comparison group (M = 85.37; SD = 9.32), $t(58) = -2.34$, $p = 0.023$, with a medium to large effect size ($d = 0.60$), such that the experimental group exhibited higher baseline average scores for the SPCC compared to the comparison group. The results of the independent t-test for gender indicated that there was not significant difference between males (M = 89.82, SD = 7.44) and females (M = 87.29, SD = 7.98), $t(58) = 1.22$, $p = 0.226$. The results of the independent t-test for additional credentials indicated that there was a significant difference between no additional credentials (M = 87.21, SD = 7.78) and additional credentials (M = 92.40, SD = 6.68), $t(58) = -2.13$, $p = 0.037$, with a medium to large effect size ($d = 0.72$), indicating the participants with additional credentials had higher average baseline scores compared with those with no additional credentials.

A repeated measures custom GLM was utilized to compare total scores between groups (experimental vs. comparison) and additional credentials (no additional credentials vs. additional credentials) over the three time points for within subjects effects. Both group and additional

credentials were entered into the custom GLM model as between subject factors producing results for between subject effects for each and within subject effects for time, time by group and time by additional credentials. Mauchly's test indicated that the assumption of sphericity had not been violated, $x^2(2) = 4.65$ $p = 0.098$. The results indicated that there was not a significant main effect for time, $F(2, 106) = 0.80$, $p = 0.453$. The pairwise comparisons for time are located in Appendix J. The between subject effects indicated that there was a significant group main effect, $F(1, 53) = 9.01$, $p = 0.004$; however these results are less meaningful due to the differences between groups determined at baseline. The experimental group (M = 90.88, SD = 7.28) had higher average scores compared to the comparison group (M = 85.37, SD = 8.10), with a medium to large effect size ($d = 0.72$). Additionally, the between subjects results indicated that there were no significant main effect for additional credentials, $F(1, 53) = 1.98$, $p = 0.166$.

The results also indicated that there was not a significant time by group interaction effect, $F(2, 106) = 1.70$, $p = 0.187$ and no significant interaction effects for time by additional credentials, $F(2, 106) = 0.24$, $p = 0.788$. The repeated measures table is located in Appendix J.

Research Question 3: *Do physical therapy students' perceived interpersonal communication skills, as measured by the Froehlich Communication (FroCom) Survey (Froehlich, 2013) overall score, change over the course of a semester based on the use of SPs compared to physical therapy students with no SP use?* The responses to the FroCom Survey were used to address this construct. The data for this construct were collected at all three time points (pre-test, $posttest_1$, $posttest_2$). To determine if there were differences among groups at baseline for the FroCom an independent t-test was performed. The results indicated that there were significant differences between the experimental (M = 82.08, SD = 6.89) versus comparison group (M = 75.91, SD = 6.51), $t(58) = -3.44$, $p = 0.001$, with a large effect size ($d = 0.92$) such that the experimental

group exhibited higher baseline average scores for the FroCom compared to the comparison group. The results of the independent t-test for gender indicated that there was not a significant difference between males (M = 81.57, SD = 7.82) and females (M = 78.57, SD = 6.89), $t(58) = 1.56$, $p = 0.125$. The results of the independent t-test for additional credentials indicated that there was not a significant difference between no additional credentials (M = 79.18, SD = 6.69) and additional credentials (M = 82.09, SD = 9.77), $t(58) = 0.126$, $p = 0.239$.

A repeated measures GLM was utilized to compare total average scores between groups (experimental vs. comparison) over the three time points for within subjects effects. Mauchly's test indicated that the assumption of sphericity had not been violated, $x^2(2) = 1.56$, $p = 0.458$. The results showed that there was a significant main effect for time, $F(2, 108) = 7.66$, $p = 0.001$. Pairwise comparison for the main effect of time indicated no significant differences in pre-test (M = 79.84, SD = 7.51) to $posttest_1$ (M = 81.95, SD = 9.11), $p = 0.070$ as well as $posttest_1$ (M = 81.95, SD = 9.11) to $posttest_2$ (M = 84.16, SD = 8.10), $p = 0.458$. However, pre-test (M = 79.84, SD = 7.51) to $posttest_2$ (M = 84.16, SD = 8.10) was significant, $p=0.000$, with a medium effect size ($d = 0.55$), such that the $posttest_2$ average overall scores where higher than the pre-test average overall scores. The pairwise comparisons for time are located in Appendix J. The between subject effects indicated that there was a significant group main effect, $F(1,54) = 9.72$, $p = 0.003$, however these results are less meaningful due to the differences between groups determined at baseline. The experimental group (M = 84.04, SD = 12.72) had higher average scores compared to the comparison group (M = 78.56, SD = 9.53) with a medium effect size ($d = 0.49$). Additionally, the results indicated that there were no time by group interactions, $F(2,108) = 2.02$, $p = 0.137$. The repeated measures table is located in Appendix J.

Research Question 4: *Do physical therapy students' confidence in patient interviewing skills, as measured by the SP Learning Outcomes Assessment Tool for Confidence (SPLOAT) (Armstrong & Jarriel, 2015) overall score, change over the course of a semester based on the use of SPs?* The responses to the SP Learning Outcomes Assessment Tool Survey were used to address this construct. The data for this construct were collected at all three time points (pre-test, $posttest_1$, $posttest_2$). To determine if there were differences among groups at baseline for the SPLOAT an independent t-test was performed. The results indicated that there was not a significant difference between the experimental (M = 51.49, SD = 13.51) versus comparison group (M = 51.35, SD = 8.33), $t(58) = -0.05$, $p = 0.961$. Levene's test for equality of variances was violated, as such the equal variances not assumed data was reported. The independent t-tests for gender indicated that there was not significant difference between males (M = 53.91, SD = 14.13) and females (M = 49.89, SD = 9.82), $t(35.25) = 1.20$, $p = 0.239$. Levene's test for equality of variances was violated, as such the equal variances not assumed data was reported. The results of the independent t-test for additional credentials indicated that there was not a significant difference between no additional credentials (M = 51.33, SD = 11.02) and additional credentials (M = 51.91, SD = 15.04), $t(58) = -0.148$, $p = 0.883$.

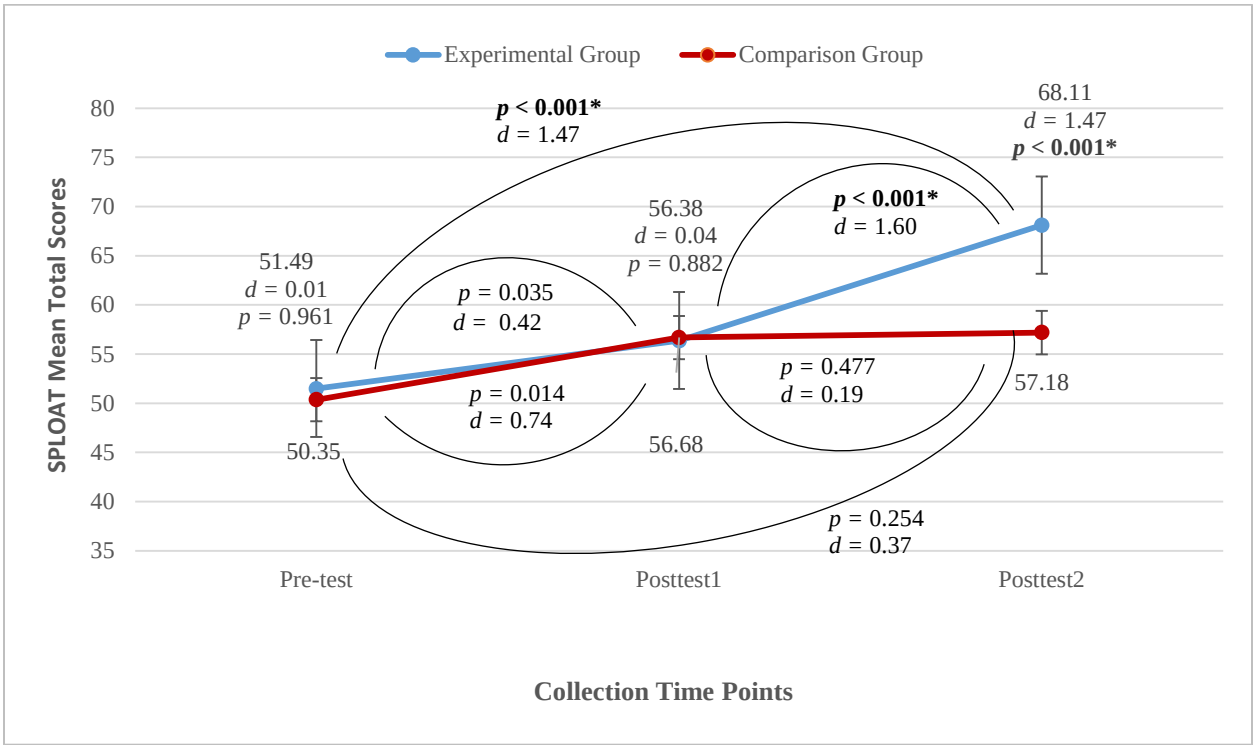
A repeated measures GLM was utilized to compare total scores between groups (experimental vs. comparison) over the three time points for within subjects effects. Mauchly's test indicated that the assumption of sphericity had been violated, $x^2(2) = 10.15$, $p = 0.006$, therefore Greenhouse-Geisser corrected tests are reported ($\varepsilon = 0.85$). The results show that there was a significant main effect for time, $F(1.70, 91.97) = 36.89$, $p \leq 0.001$. Pairwise comparison for the main effect of time indicated significant differences in all three time point comparisons, at pre-test (M = 50.89, SD = 11.79) to $posttest_1$ (M = 56.62, SD = 7.50, $p = 0.002$), with a medium

effect size (d = 0.58), at posttest$_1$ (M = 56.62, SD = 7.50) to posttest$_2$ (M = 64.23, SD = 9.56, $p \leq$ 0.001), with a large effect size (d = 0.89), and at pre-test (M = 50.89, SD = 11.79) to posttest$_2$ (M = 64.23, SD = 9.56, $p \leq 0.001$), with a large effect size (d = 1.24). The pairwise comparisons for time are located in Appendix J. Additionally, there was a main effect for group, $F(1, 54) = 4.15$, $p = 0.047$, such that the experimental group (M = 58.77, SD = 9.34) had higher average scores compared to the comparison group (M = 54.71, SD = 11.64) with a small to medium effect size (d = 0.38).

The results indicated that there was a significant time by group interaction effect, $F(1.70,91.97) = 10.51$, $p \leq 0.001$. To investigate these results further, independent t-tests were performed at all three time points (pre-test, posttest$_1$, and posttest$_2$) with group as the predictor variable. Dependent t-tests were also performed for both groups, comparing pre-test to posttest$_1$, posttest$_1$ to posttest$_2$, and pre-test to posttest$_2$, to determine where the group differences were present. Due to multiple independent and dependent t-tests being performed, an adjusted significance level was utilized, $p \leq 0.006$. The results for the independent t-test at the posttest$_1$ time point indicated no significant differences between experimental (M = 56.38, SD = 6.03) and comparison (M = 56.68, SD = 9.39), $p = 0.882$. However, at the posttest$_2$ time point there were significant differences, with the experimental group (M = 68.11, SD = 8.59) having higher average scores compared to the comparison group (M = 57.18, SD = 6.07), $t(57) = -5.24$, $p <$ 0.001, with a large effect size (d = 1.47). Figure 1 depicts the pattern of the interaction for time by group for the dependent t-test results. Examination of the pattern in Figure 1 shows the experimental group starting off only slightly higher than the comparison group at pre-test with no significance between the groups. At the posttest$_1$ time point the comparison group mean scores are slightly higher than the experimental group, however these results were not significant either.

However, at the final posttest$_2$ time point the experimental group mean scores significantly increase compared with the comparison group with a large effect size. Figure 1 also depicts the steady increase in average scores for the experimental group for each time point. From pre-test to posttest$_1$ the experimental groups average scores did not show a significant change. However, from posttest$_1$ to posttest$_2$ and pre-test to posttest$_2$ the experimental group did show significant changes for both comparisons. For the comparison group, the pre-test to posttest$_1$ average scores did not show a significant increase. Additionally, at the posttest$_1$ to posttest$_2$ and pre-test to posttest$_2$ time comparisons showed no significant changes. The repeated measures table is located in Appendix J.

Figure 1. SPLOAT Pattern for Time by Group Interaction



Research Question 5: *Do physical therapy students' confidence in patient interviewing skills, as measured by the Confidence Assessment Tool (Armstrong & Jarriel, 2015) overall score, correlate with their overall score on the SP Encounter Content Checklist?* The overall scores on the SPLOAT and SP Encounter Checklist (SPE CL) were used to address this construct. First, a paired samples t-test was performed to determine if there were differences between SPE CL_1 and SPE CL_2. The results indicated that there was a significant difference between the overall scores on SPE CL_1 (M = 80.31, SD = 6.09) and SPE CL_2 (M = 85.06, SD = 10.69), $t(35) = -2.26$, $p = 0.030$, with a medium to large effect size of ($d = 0.55$). This indicated that the experimental group performed significantly better on the second SP encounter compared with the first SP encounter. A simple linear regression was performed to further elucidate if a correlation could be drawn from the SPLOAT overall scores of $posttest_1$ and SPE CL_1. The results indicated that there was not a significant relationship between any of the $posttest_1$ survey instrument collections and the SPE CL_1, $F(4, 29) = 1.21$, $p = 0.327$, with an $R^2 = 0.143$. Additionally, a linear regression was performed to further elucidate if a correlation could be drawn from the SPLOAT overall scores of $posttest_2$ and SPE CL_2. The results indicated that there was not a significant relationship between any of the $posttest_2$ survey instrument collections and the SPE CL_2, $F(4, 30) = 0.62$, $p = 0.653$, with an $R^2 = 0.076$.

CHAPTER V

DISCUSSION

This chapter includes an overview of the findings, implications for physical therapy curricula and students, and the research limitations.

Overview of Demographic Findings

The study participant characteristics largely mirrored the characteristics found to be most prevalent in DPT programs across the United States (APTA, 2016). The demographic data of the participants was compared with data reported by the Physical Therapy Centralized Application System (PTCAS) for the 2015-2016 academic year (APTA, 2016). PTCAS, for the utilized reporting year, contains the admissions data for 201 physical therapy education programs, representing 9,227 applicants. Across the United States, those programs utilizing the PTCAS had an average age of accepted applicants of 22.91 years, ranging from 16-55 years (APTA, 2016). This closely mirrored our experimental and comparison groups, with 23.43 years (20-35 years) and 23.17 years (21-32 years), respectively. With regards to highest level of academic achievement, the two participant groups mirrored the applicant pool utilized by PTCAS for the 2015-2016 academic year. Of the 5,717 total accepted applications from PTCAS, 3,562 were Bachelor of Science Undergraduate Majors and 955 were Bachelor of Arts Undergraduate Majors, which were the two designations with the largest number of accepted applicants (APTA, 2016). Of the participants from the experimental group, all 37 had obtained Bachelor degrees with no distinction given to Bachelor of Science or Arts. Of the participants from the comparison group, 22 had obtained Bachelor degrees, again with no distinction for Bachelor of Science or Arts. One participant (4.45%) from the comparison group did have an earned

Doctoral Degree. This was also comparative to the PTCAS admission data which reported 5 of the 5,717 applicants (less than 1%) holding earned Doctoral Degrees (APTA, 2016).

There were key differences in gender demographic data for the two participant groups. For example, the comparison group had a disproportionally less number of males in the participant pool. The comparison group participant cohort was 23, with only 4 males. On average, accepted PTCAS applicants, were predominately female for the 2015-2016 reporting year, with 5,634 females compared to 3,567 males (APTA, 2016). This would also indicate that the experimental group participant cohort varied from the PTCAS data reported as well with 19 males and 18 females participating. The demographic questions pertaining to participants possessing additional credentials was treated as a categorical variable and coded dichotomously (0 = no additional credentials, 1 = one or more additional credentials). This categorical variable was independently compared for each survey outcome measure to determine if there were systematic differences based on additional credentials. Only the SPCC comparison indicated that additional credentials significantly increased average baseline scores for this measure with a large effect size (d = 0.88). There is no existing literature pertaining to physical therapy students with additional credentials for admissions data, however, conclusions could be drawn that a person who undergoes additional training to possess and/or maintain additional credentials such as those indicated by the participants, could have a higher self-perceived ability in communication and patient interview skills. Most of the additional credentials listed by the participants were related to personal training certifications or credentials of other entry-level healthcare providers such as Certified Athletic Trainer (ATC), Physical Therapy Assistant (PTA), or Physical Therapy Technician (PT Tech), all of which involve some degree of professional communication with either a client or patient.

General Self-Efficacy (GSE)

Scores for the GSE improved over time between $posttest_1$ to $posttest_2$. These score changes are difficult to explain as they happened over a very short time period (4 weeks) and are not supported by other research studies examining aspects of self-efficacy (Carr & Volberding, 2014; Martiz, 2004). Maritz (2004) evaluated learning outcomes of physical therapy students participating in a clinically-based experiential learning course, and collected the GSE Scale at the beginning of an academic semester and then at the end of the semester. Students within the second year of a professional masters' of physical therapy program were allocated to either an experiential learning group (n=11) or a traditional learning group (n=17) (Maritz, 2004). The two groups had similar mean scores at baseline (p = .09) as well as at the posttest (p = .20), indicating that the self-efficacy of the students was not altered based on the participation in a clinically-based experiential learning course versus a traditional didactic course (Maritz, 2004).

Carr and Volberding (2014) examined athletic training student's self-efficacy through the collection of the Self-Efficacy in Athletic Training Student (SEATS) instrument to explore if self-efficacy changes were seen over the course of one year for each gender separately. Time was a contributing factor to the changes of perceived self-efficacy across all 3 time points examined (Carr & Volberding, 2014). The authors examined the individual components of the scale and determined that females had greater increases across the 3 measures, and for more of the components of the scale (12 out of 16) compared with the males (5 out of 16) (Carr & Volberding, 2014). However, no true gender analysis was conducted to compare the males and females for mean scores as well as no baseline comparison of the groups was performed to determine if differences existed initially. The authors also suggested the need for development of interventions that increase student perceptions of their efficacy to help to increase student

performance on a given task (Carr & Volberding, 2014). These recommendations were in reference to research suggesting that students' self-evaluation of their abilities often differs from faculty evaluation of their abilities (Arnold, Willoughby & Calkins, 1985) and clinical experience and levels of confidence in students have no predictive value when assessing the performance abilities of students (Morgan & Cleave-Hogg, 2002).

Within our study, males had significantly higher average overall scores than females for the GSE. As noted in the foundational works by Schwarzer et al. (1999), gender differences in self-efficacy are not universal and are not generally consistent. Some studies have examined general self-efficacy of secondary school students and reported no significant gender differences in the study populations (Pajares, 1996; Pajares & Kranzler, 1995). However, in a comparison of Canadian university students, German high school students and teachers in Germany, the results indicated that men, on average, were slightly higher on general self-efficacy as compared with women (Schwarzer et al.,1999). The difference in male average scores compared to female average scores could be considered a less meaningful finding due to the difference not meeting the MDC threshold of 4.43 points (Schwarzer et al., 1995).

Pajares and Kranzler (1995) suggested that high-ability students have stronger self-efficacy and are more acutely attuned to their perceived abilities resulting in more accurate self-perceptions in both generalized and task-specific skills. Students in a physical therapy program could arguably be considered higher in abilities when examining the entrance criteria for admissions. DPT program applicants for both programs utilized in our study needed a large number of science driven pre-requisite courses (i.e. Biology with lab, Anatomy and Physiology with lab, Chemistry with Lab and Physics with Lab), a minimum Graduate Record Examination (GRE) score of 1000, and a minimum GPA of 3.0 overall to be considered for entrance.

Additionally, per the admissions criteria listed on the program website, the comparison program participants had to have a 3.25 GPA in all pre-requisite coursework that were not considered general core courses. The experimental group had significantly higher average GSE scores compared to the comparison group at baseline and we are unsure why this was present. Our GSE scores were slightly higher than other reported work within the general population (Scholz, Gutierrez-Dona, Sud, & Schwarzer, 2002), and were similar to those within another study examining physical therapy students outcomes (Martiz, 2004).

Utilizing a baseline measure to gauge general-self-efficacy is important when attempting to draw comparisons between general and task-specific self-efficacy, as well as when gauging the effectiveness of an intervention gear-marked for a given task and performance of such task. Educators should utilize the information gathered from baseline GSE scale scores to appropriately gather information about the learners' perceived abilities in the generalized tasks associated with basic social and professional interactions.

Perceived Communication Abilities

Baseline differences were observed between groups at the initial instrument collection for both the SPCC and FroCom, with the experimental group having higher average scores compared to the comparison group. Due to these baseline differences being present the results are considered less meaningful. Both instruments have been used in very limited capacity in healthcare populations to assess learner perceptions of their communication skills and abilities (Rachmi & Khotimah, 2010; Froehlich et al., 2015). A study conducted in third and fourth year medical students in Indonesia utilized the SPCC to investigate self-confidence in communication competence and communication skills as risk factors for communication apprehension and reported that regardless of the presence of good communication skills, low self-perceived

communication competence increased the sub component of public communication apprehension (Rachmi & Khotimah, 2010). The researchers posit the notion that medical students need to be given broader opportunities to practice and develop their communication skills if the educational process is truly going to foster competent communication in actual patient care, suggesting the use of various communication skills learning activities, trainings, and group discussions to further foster effective communication skills of students (Rachmi & Khotimah, 2010). A study of undergraduate health profession students conducted by Froehlich et al. (2015) examined an introductory learning partnership and interprofessional course with the experimental group receiving communication lessons, a standard communication curriculum, and paired listening partnership, while the control group received only the standard communication curriculum content. Significant differences were seen in each group when comparing pre-test to posttest mean scores, however the authors did not complete a between group comparison therefore it is unknown if the groups were different from each other (Froehlich et al., 2015).

The use of SPs and other simulation activities in the development and assessment of communication skills within healthcare educational programming has been examined and compared (Lane & Rollnick, 2007; Williams & Song, 2016). Williams and Song (2016) performed a review of literature pertaining to the effectiveness of simulated patients in facilitating the development of clinical competence of healthcare students and found 22 out of the 33 studies included in the review assessed communication and/or patient interviewing skills of the student practitioners involved in each study. Sixteen of the 22 studies investigated communication skills of various healthcare education students through the use of SPs and concluded that programs utilizing SPs resulted in better performance compared to students with no SP utilization for communication skills training (Williams & Song, 2016). In a different

review of literature performed by Lane and Rollnick (2007), 23 studies evaluated communication skills training by comparing the use of simulated patients to role-play. Lane and Rollnick (2007) reported several of the included studies had no statistical significance for differences in communication skills following intervention for those utilizing simulated patients versus role-playing. The need for more well-designed studies and the inclusion of the psychometric properties of the measurement tools within the studies was discussed by Lane and Rollnick (2007). However, even with extensive literature available on the use of SPs or other simulated activities in the development and assessment of communication skills, there is a lack of consistency in the measurement tools being utilized by educators to assess the communication aspects of the SP or simulation activities. Each of the included studies within the review conducted by Williams and Song (2016) utilized a different assessment tool to evaluate the student's communication skills with the SP. There is a vast availability and amount of assessment tools being utilized within healthcare educational programming making comparisons between each study difficult.

In non-healthcare related research, Rosenfeld and colleagues (1995) investigated academically gifted students and SPCC, finding that significantly lower communication apprehension existed in these students for dyadic (communication interactions between two people) and group (two or more people involved in an communication interaction) contexts when compared to national norms, and was significantly higher when in the context of strangers (Rosenfeld, et al., 1995). Normative data provided for the SPCC overall score (Rosenfeld et al., 1995; O'Donnell, 1997) was lower than participants from our study, supporting the notion that DPT students may have higher perception of communication competence from the start of their program and thus perform higher on scales addressing communication aspects associated with

group and individual interactions. Additionally, in the foundational works of McCroskey and McCroskey (1988), the authors suggest that those with initial high levels of communication competence have higher levels of willingness to communicate. The constructs of willingness to communicate, communication apprehension, and self-perceived competence have been recognized factors contributing to an individual's perceived ability in communication across various contexts and situations (McCroskey & Baer, 1985; McCroskey & McCroskey). Often individuals perceive themselves as inadequate communicators on self-report measures when they demonstrate actual competence in communication with objective measurements of performance (McCroskey & McCroskey, 1988). Willingness to communicate has been investigated in various academic levels of students (Donavan & McIntyre, 2004; McCroskey & Baer, 1985). Donavan and McIntyre (2004) investigated willingness to communicate, communication apprehension, and self-perceived competence in junior high, high school and university students finding that females at the university level had higher communication apprehension while males had higher self-perceived competence with no significant gender differences at the high school or junior high levels (Donavan & McIntyre, 2004). The results from Donovan and McIntyre's (2004) data do not support the results found within our study, as no significant gender differences were found at our baseline and thus were not included in the analysis. Important to note is that all three time points of the participants within our study had higher mean overall scores compared to the university mean overall scores from the published literature by Donavan and McIntyre (2004). The baseline average scores from both groups within our study were higher than the normative data provided by McCroskey & Baer (1985) being conducted in college level students. McCroskey and Baer (1985) also noted that willingness to communicate is personality-based, and further investigations were conducted to address the constructs of willingness to

communicate (Rosenfeld et al, 1995) and a persons perceived ability in communication competence (McCroskey & McCroskey, 1988). The personality factors associated with communication and perceived ability in such skills may have an impact on students preparing to be practitioners, such as the DPT students within our study. Communication apprehension could affect a student's willingness to communicate as well as their perceived ability in their communication competence (SPCC). The verbal nature involved in physical therapy provider's interactions with patients provides added support for the notion that students entering into the profession of physical therapy are individuals who may already have a higher willingness to communicate in general because of the nature of the interactive profession as a whole which would translate to the potential for higher levels of communication competence.

Effective communication skills are necessary in both social and professional interactions. Identifying the needs and comfort level of learners prior to professional provider interactions occurring could facilitate improvement in future professional interactions of the learners as well as identify areas to emphasize in communication curriculum content within a given program. Task-specific self-efficacy or perceived ability of learners has been examined in a variety of learners (Donavan & McIntyre, 2004; McCroskey & Baer, 1985; O'Donnell, 1997; Rachmi & Khotimah, 2010; Rosenfeld et al., 1995). Willingness to communicate, communication apprehension, and communication competence are constructs that influence a learners' self-perceived communication competence and can directly affect their interactions encountered on a daily social and professional basis. An educators' ability to identify this task-specific self-efficacy construct can aid in curriculum development and sequencing as well as assist with clinical education planning that fosters effective and meaningful clinical assignments to meet the needs of learners.

Standardized Patient Learning Outcomes Assessment Tool for Confidence (SPLOAT)

The experimental group had higher average overall confidence scores when compared to the comparison group. Additionally, the experimental group confidence scores increased over time with each collection time point, while the comparison group showed the largest increases initially from the first to second collections, then plateaued, however none of the time points were statistically significant. The overall mean change score for the pre-test to $posttest_2$ time point comparison for our study was 13.34 points, indicating a meaningful change was not present when compared to the MDC calculation of 14.37 points (Armstrong & Jarriel, 2015).

Armstrong and Jarriel (2015) and Culpa-Bondal and Baker (2016) examined undergraduate professional students in athletic training and master of nursing students through the utilization of the SPLOAT, respectively. Culpa-Bondal and Baker (2016) investigated masters of nursing student's confidence both prior to and following two SP encounters with a lecture on therapeutic communication and lab exercises and found increases in confidence scores over time. This is supported by the findings of Armstrong and Jarriel (2015) who found increases in confidence of athletic training students at the junior and senior level following two SP encounters each semester over the course of an academic year. The results of our study support previous research indicating that SP encounters improve the confidence of learners over the course of a semester or an academic year (Armstrong & Jarriel, 2015; Culpa-Bondal and Baker, 2016).

Other published works in athletic training support confidence improvements through the use of SP encounters (Walker & Weidner, 2010b; Walker, Weidner & Armstrong, 2015). Walker and Weidner (2010b) examined undergraduate athletic training student's perceptions of the realistic nature and comfort level with future lower extremity evaluations following a lower

extremity orthopedic evaluation course with SP encounters integrated into the course. The participants completed an SP Encounter Feedback Form containing Likert scale items, with results indicated that 86-93% of the participants felt the SP encounters made them feel more comfortable about future SP and real patient evaluations (Walker & Weidner, 2010b). In a qualitative study examining first and second semester undergraduate athletic training students perceptions of small group SP encounters and individual case-based simulations, the authors found that both forms of clinical experiences for students provided increased confidence and challenged them to reflect on their experiences and think about future evaluations (Walker et al., 2015). Both groups participated in a crossover design involving both clinical experiences following classroom instruction on the content area of the SP mock evaluation and then participated in a qualitative interview about their experiences (Walker et al., 2015).

SP Content Checklist and SPLOAT

Although performance scores and confidence scores increased over time, there were no relationships found between the SPLOAT and SPE Content Checklist. The findings from each measure should be treated independently and should not be interpreted together. Several studies in healthcare educational programming have investigated the evaluation of self-confidence as it relates to clinical competence and have reported the benefits of SP use when attempting to increase student confidence in patient care and clinical practice (Armstrong & Jarriel, 2015; Blum et al., 2010; Culpa-Bondal & Baker, 2016; Lim et al., 2015; Lewis et al., 2008). The confidence of a learner in clinical and professional skills associated with patient-provider interactions are important to assess within any healthcare profession to ensure that professional preparation for patient care has occurred and can be seen in the practice of the students graduating from such programs. However, validated instruments that can measure subjective

content like self-efficacy, perceived competence and confidence are difficult to find. Often faculty focus on the competence aspect of skill development and mastery and learners' confidence in their abilities while developing, performing, and subsequent mastery of such skills is left unexamined.

There are several facets that affect a learners' confidence in skills. Armstrong and Jarriel (2015) stated that repeated exposure to clinical experiences have a greater potential to improve student confidence which is why they designed a study that included multiple patient care situations. Additionally, the results of their study helped to support such notions with significant increases in student confidence and ability to complete clinical evaluations (Armstrong & Jarriel, 2015). Blum and colleagues (2010) also mirrored the thoughts of Armstrong and Jarriel (2015), noting that continued application of simulation activities aids in the transferability of knowledge from the laboratory to the clinical environment with the goal of simulation being the creation of greater contextual realism for learners. Historically, student confidence in nursing programs have been assessed through observation of student to patient interactions leaving a gap in capturing the students' self-perception of their confidence (Blum et al., 2010). Researchers examined self-confidence of students with a control group utilizing traditional task trainers and student volunteers for demonstration of skill competency while the experimental group used a high fidelity human patient simulator for laboratory activities (Blum et al., 2010). Both groups were enrolled in the same 13-week didactic course and completed the same health assessment skills in the laboratory activities (Blum et al., 2010). Student self-confidence and competence were assessed at both midterm and final by the student's themselves and faculty and the results indicated that both groups progressed equally regardless of teaching mode with no statistical significance (Blum et al., 2010). Within physiotherapy, researchers examined first and second

year student baseline perceived interpersonal skills through anxiety and confidence scores compared with posttest scores following SP encounters (Lewis et al. (2008). The results indicated that the second year students had significantly higher confidence levels and lower levels of anxiety related to communication which suggested transferability to the students' communication with real patients in the future (Lewis et al., 2008). Lim and colleagues (2015), examined the impact SPs had on a cohort of physiotherapy students' communication skills, confidence in interacting and working with patients, clinical examinations skills competency, and interpretation and analysis of clinical examinations. The results indicated that significant improvements were present following the SP encounters for the variables of interest and clinical faculty additionally indicated that they recognized that the SP program improved communication and clinical reasoning skills of the students (Lim et al., 2015).

It is important to note that the experimental group participant's program curriculum utilizes peer on peer role playing and group activities that are incorporated for practicing clinical skills during the semester the study was conducted. Additionally, the students received two more practice SP sessions between the $posttest_1$ and $posttest_2$ time points that were not recorded with each case varying for each student. The added role playing and practice could have enhanced the experimental group performance on the SP encounters as well as contributed to the increase in confidence scores for the SPLOAT. The comparison group also utilized peer on peer role playing and group activities for practicing clinical skills during the study time period. However, for both groups these activities were not monitored or measured so it is unknown how these activities may have contributed to the results of the study.

Research Implications

There are several implications from this investigation of measurable outcomes related to SP use within a physical therapy program. The first implication concerns the use of a theory to drive the investigation of self-efficacy in learners. Self-Efficacy Theory is well supported as a theoretical framework (Bandura, 1993; 1997) which can be used to investigate learners' perceived abilities in performing communication skills necessary for patient-provider interactions. The constructs of the theory suit themselves well in the recognized educational strategies being utilized in physical therapy programs, such as peer to peer or faculty to learner role playing, within simulations as well as standardized patient use. However our study was only able to partially test Self-Efficacy Theory because not all of the constructs within the theory were addressed in the methodology employed. The processes of mastery experiences, vicarious experiences, and verbal persuasion help learners achieve recognition of their capabilities (Bandura, 1993, 1997) but were constructs not directly addressed or tested by our study. The psychological and contextual factors that exist within human behavior help support the use of Self-Efficacy Theory as a driver to support the communication and patient interviewing practices of physical therapy programs as they prepare learners for patient-provider interactions. The confidence component of our study was able to test Self Efficacy Theory and support its use as a viable framework for utilization within healthcare educational programming which utilize standardized patient experiences to increase confidence in professional provider interactions.

The second implication relates to the measurement of learner outcomes within a healthcare discipline. We utilized instruments which aligned with constructs of self-efficacy theory and confidence. Consistency of measurement and evaluation of these constructs within healthcare educational programming is lacking. Uniform measurement across programs through the use of reliable instruments to collect subjective self-reported data on learners has not been

seen in the literature relating to communication skills training throughout healthcare programming. The general self-efficacy (Schwarzer et al., 1995), self-perceived communication competence (McCroksey & McCroskey, 1988), communication competence (Froehlich et al., 2015) and confidence (Armstrong & Jarriel, 2015) scales utilized within this dissertation proved to be valuable in assessing the very subjective nature of perceived capabilities in human interaction. The ability of the instruments within our study to detect change was not seen across all aspects of the study. Only the confidence component of the study was able to successfully measure and detect change in the participants thus supporting its use for educational faculty to make changes in curricular content and activities which relate to confidence in communication skills. The data collected from each instrument, if utilized in other health professional student populations, could help educators within those programs to facilitate better sequencing of their didactic coursework as well as foster better recognition of the learner's capabilities over the course of an entire curriculum if collected at the beginning and towards the end of an academic program. However, short-term use of the measures may not be justified as many of the instruments were not able to detect change in the participant groups. It is important for educators to recognize the value in collecting these measures prior to interpersonal and interprofessional interactions occurring which has been supported by previous research (Carvalho et al., 2011; Cary & Kurtz, 2013). Having an objective rating of a learner's perceived ability in communication can help faculty better facilitate areas for improvement within an existing academic program. Faculty will be able to emphasize keys areas of the curriculum that need more attention in both the didactic and laboratory environment and that need improvement programmatically. The objective measures can also help in the development of additional

strategies or activities to build communication competence and skills and will provide baseline data for comparisons later.

The final implication relates to the use of SPs as a valid educational strategy to help improve learner self-efficacy and confidence in patient-provider interactions. Competency performance assessment within healthcare professional programs is a necessary component to curriculum development and has driven the evolution in educational strategies to assist in learner performance assessment (Boulet et al., 2009; Lo et al., 2015; Murphy et al., 2014; Panzarella & Manyon, 2008; Sears et al., 2014; Setyonugroho et al., 2015; Viet Vu & Barrows, 1994). The use of SPs has been noted in several healthcare professional curricula as a beneficial tool to prepare students for patient-provider interactions without added harm to the patient (Becker et al., 2006; Black & Marcoux, 2002; Howley et al., 2009; Mai et al., 2014; May et al., 2009; Stillman et al., 1990; Walker & Weidner, 2010; Walker et al., 2008; Whitaker Ebbert & Conners, 2004). While the results of our study may not directly support the use of SPs for improved communication competence or skills, our study was only conducted within the first semester of an academic program with no other real patient or SP encounters available during the study time period. One could assume that with repeated exposure to SP and real patients, along with the inherent communication skills required for such interactions, that additional improvements would occur over time. Additionally, it has been noted in literature and now through the results of our study that multiple exposures can also improve confidence in communication and patient interviewing skills (Armstrong & Jarriel, 2015; Blum et al., 2010; Lewis et al., 2008; Lim et al., 2015.

Research Limitations

This dissertation study was not without limitations. The purposive and convenience sample used for our study made adjustments to the sample size impossible. Additionally, data

were only collected in first year DPT students, therefore the results cannot be generalized to other levels of students within a DPT program, nor can these results be generalized to all DPT programs. The initial baseline differences of the participant groups provide rationale for the results with non-significant findings. However, the testing effects of recall bias may have additionally contributed to the results due to the fact that the instrument measures were collected three times with the final two time points being 4 weeks apart. The repeated exposures to the instruments may have made the participants more comfortable with the testing measures and potentially could have inadvertently increased scores for the measures. It is likely that diffusion or imitation of the treatment effect occurred as the participant groups were in cohorts. The groups independently interact closely with each other on a daily basis and likely through casual conversations may have discussed the study outside of the collection times which could have influenced collections of the measures. This also speaks to the potential pre-test sensitization effect that could have influenced how either group rated themselves on subsequent collections. As well as in the experimental group, pre-test sensitization effect could have influenced how the participants interacted with the SPs, as they were now innately aware of the encounters aims; measuring competence and confidence in communication and patient interviewing skills.

CHAPTER VI

CONCLUSIONS

Primary Contributions of the Study

Our study contributes to the body of knowledge related to both SP use and measurable outcomes in academic programming. The use of SPs was identified as a factor contributing to the experimental group's higher average scores as they progressed through the normal maturation and experiences offered by the program. The use of SPs within the experimental group also helps to support previous research suggesting that multiple exposures to simulation activities, such as SPs, aids in the confidence improvements and competence of learners.

The use of both objective and self-report measures were utilized within our study. Though the baseline average scores of the general self-efficacy, self-perceived communication competence and communication competence scales were higher in the experimental group, the value in collecting these measures over the course of a semester or program should be recognized. Without knowing the perceived level of students on both generalized and task-specific skills prior to the implementation of an intervention makes drawing conclusions about such interventions difficult. Without having the baselines average scores collected, this dissertation study would not have been able to justifiably identify that the confidence assessment tool was the only survey instrument showing no differences between experimental and comparison groups from the beginning. Additionally, with regards to objective measures, the SP content checklist was able to be compared for both the encounters experienced by the experimental group, showing that there were performance increases that were significant between the two time points. This helps support the notion that multiple SP encounters improve performance.

Suggestions for Future Research

With the inherent limitations to this dissertation provided above the value of examining the use of SPs within healthcare professional programming is still recognized. Future research should attempt to decrease the limitations recognized by our study as well as those found in the literature related to SP use. Although a control group was utilized by our study in an effort to strengthen the research design, the baseline data provided by the two groups was significantly different for three of the four collected measures. Potential solutions in future research would be to utilize a control group within the same cohort of students with random assignment in order to help further ensure that the groups would be similar at baseline. Additionally, researchers could conduct the investigation through the use of more than two academic programs, as an attempt to strengthen baseline comparisons and subsequent study results. Our study only followed the participants through one academic semester so long-term effects over the course of an entire academic year or program could not be drawn. The long-term effects could be valuable to program administrators when determining where in a program to utilize SPs as well as how often to incorporate such use.

Once objective data is available on a variety of specific cases identified as beneficial to learners, educators can then confidently make decisions about the cases they chose to utilize. Future research should identify the specific case content to help educators make sound judgements for case selection. Future research should also support the continued use of objective outcome measures, such as content checklists, so educators can have valid and reliable outcome measures to collect programmatic data with. Continued use of valid and reliable self-report measures should also be utilized by program faculty.

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IRB Identifier: [redacted]

APPENDIX A: STUDENT INFORMED CONSENT DOCUMENT - Experimental

PROJECT TITLE: Measuring Outcomes in Competence and Confidence in Clinical Skill Through the Use of Standardized Patients

INTRODUCTION:
The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. The purpose of this study is to investigate the effects Standardized Patient (SP) use has on first year, doctor of physical therapy student's communication and patient interviewing skills and their confidence in those skills.

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DESCRIPTION OF RESEARCH STUDY:
Few studies have been conducted looking into the subject of Standardized Patients (SPs) use in Physical Therapy Education Curricula. None of them have addressed the use of SPs in physical therapy education that reflects the outcomes that are being assessed through SP encounters.
If you decide to participate, then you will be asked to complete the collection of several survey instruments at three different time points (pre-test and two additional post-test time points). Each collection time point will take approximately 20 minutes to complete all survey instruments. Additionally you will be invited to participate in a qualitative focus group if you have completed all instrument collection measures and at all time points. The survey instruments at the initial data collection will be comprised of a demographic survey as well as several additional instruments. All survey instruments will be used to gain a better understanding of your perceived self-efficacy, confidence and communication skills.
Upon the completion of all time point collections, experimental group members will be invited to participate in a qualitative focus group. The focus group will last approximately 30-45 minutes and will be conducted within 2-4 days following the end of the previously described data collection. Approximately 100 of participants will be participating in data collection involving the survey instruments with an additional 20 participants in qualitative portion of the study.

EXCLUSIONARY CRITERIA:
To the best of your knowledge, you should not have a language barrier that would keep you from participating in this study. All participants must be currently enrolled in the first year of a Doctor of Physical Therapy Program. Participants' age range will be from 18-65 years.

RISKS AND BENEFITS:

RISKS: If you decide to participate in this study, then there is a risk that you may share some personal or confidential information, or that you may feel uncomfortable answering questions about yourself or talking about some of the topics. This risk will be minimalized by stressing that your participation is voluntary. You do not have to answer any question if you feel the question(s) are too personal or if talking about them makes you uncomfortable.
BENEFITS: There are no perceived benefits for participating in this research.

COSTS AND PAYMENTS:
The researchers want your decision about participating in this study to be absolutely voluntary. The researchers are unable to give you any payment for participating in this study.

NEW INFORMATION:
If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

CONFIDENTIALITY:
The researchers will take reasonable steps to keep private information, such as survey instrument responses, focus group transcripts and participant identity confidential. Data will be kept confidential with the use of a participant identification number and pseudonym that will be assigned to each participant. The data for each participant will all be stored under the participant identification number and/or corresponding pseudonym. The research team members will be the only ones who know the connection between your name, participant number and pseudonym. If you choose to withdraw from the study, all your data will be erased and/or destroyed. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

Survey Instrument Data and transcriptions of the focus group will be stored in a locked cabinet in office 3118A of the Health Science Building, College of Health Science at Old Dominion University for a minimum of five years. Electronic data will be kept on a password protected jump drive, which will also be stored in the same cabinet. After five years, the audio files and field notes will be destroyed and the electronic data will be erased.

WITHDRAWAL PRIVILEGE:
Your participation in this study is completely voluntary. You may choose to stop participation in the study at any time for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You may also chose to participate in only the quantitative portion (survey instrument collections) and not the qualitative (focus group) portion of the study. If you choose to withdraw from the study, you may also choose to withdraw your data. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled.

COMPENSATION FOR ILLNESS AND INJURY:
If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such harm. In the event that you suffer injury as a result of participation in any research project, you may contact Jennifer Cuchna, Principal Investigator and Health Service Research PhD Student at 919-244-0527 at Old Dominion University, Dr. George Maihafer the current IRB chair at 757-683-4520 at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

VOLUNTARY CONSENT:

By signing this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them:

Bonnie Van Lunen, PhD, ATC, FNATA, Responsible Project Investigator, Graduate Program Director, Post-Professional Athletic Training Education, Old Dominion University can be contacted at 757-683-3516.

Jenn Cuchna, MBA, MEd., ATC, VAT-L, Co-Investigator, Doctoral Student, Health Service Research Program, Old Dominion University can be contacted at 919-244-0527.

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. George Maihafer, the current IRB chair, at 757-683-4520, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by signing below, you are telling the researcher YES, that you agree to participate in this study. The researcher should give you a copy of this form for your records.

Subject's Printed Name & Signature	**Date**

INVESTIGATOR'S STATEMENT:

I certify that I have explained to this subject the nature and purpose of this research, including benefits, risks, costs, and any experimental procedures. I have described the rights and protections afforded to human subjects and have done nothing to pressure, coerce, or falsely entice this subject into participating. I am aware of my obligations under state and federal laws, and promise compliance. I have answered the subject's questions and have encouraged him/her to ask additional questions at any time during the course of this study. I have witnessed the above signature(s) on this consent form.

Investigator's Printed Name & Signature	**Date**

IRB Identifier: [redacted]

APPENDIX B: STUDENT INFORMED CONSENT DOCUMENT - Comparison

PROJECT TITLE: Measuring Outcomes in Competence and Confidence in Clinical Skills Through the Use of Standardized Patients

INTRODUCTION:
The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. The purpose of this study is to investigate the effects Standardized Patient (SP) use has on first year, doctor of physical therapy student's communication and patient interviewing skills and their confidence in those skills.

RESEARCHERS:
Bonnie Van Lunen, PhD, LAT, ATC, FNATA, Responsible Project Investigator, Professor, College of Health Sciences, School of Physical Therapy and Athletic Training, Old Dominion University, Norfolk, VA 23529.

Jenn Cuchna, MBA, MEd., LAT, ATC, Doctoral Student, Health Service Research Program, College of Health Sciences, Old Dominion University, Norfolk, VA 23529.

Robert J. Cramer, PhD, Associate Professor, School of Community and Environmental Health Sciences, Old Dominion University, Norfolk, VA 23529.

Stacy E. Walker, PhD, ATC, Associate Professor of Athletic Training, Ball State University, Muncie, IN 47306

DESCRIPTION OF RESEARCH STUDY:
Few studies have been conducted looking into the subject of Standardized Patients (SPs) use in Physical Therapy Education Curricula. None of them have addressed the use of SPs in physical therapy education that reflects the outcomes that are being assessed through SP encounters.
If you decide to participate, then you will be asked to complete the collection of several survey instruments at three different time points (pre-test and two additional post-test time points). Each collection time point will take approximately 20 minutes to complete all survey instruments. The survey instruments at the initial data collection will be comprised of a demographic survey as well as several additional instruments. All survey instruments will be used to gain a better understanding of your perceived self-efficacy, confidence and communication skills.
Approximately 100 of participants will be participating data collection involving the survey instruments.

EXCLUSIONARY CRITERIA:
To the best of your knowledge, you should not have a language barrier that would keep you from participating in this study. All participants must be currently enrolled in the first year of a Doctor of Physical Therapy Program. Participants' age range will be from 18-65 years.

RISKS AND BENEFITS:
RISKS: If you decide to participate in this study, then there is a risk that you may share some personal or confidential information, or that you may feel uncomfortable answering questions about yourself or talking about some of the topics. This risk will be minimalized by stressing that your participation is voluntary. You do not have to answer any question if you feel the question(s) are too personal or if talking about them makes you uncomfortable.

BENEFITS: There are no perceived benefits for participating in this research.

COSTS AND PAYMENTS:
The researchers want your decision about participating in this study to be absolutely voluntary. The researchers are unable to give you any payment for participating in this study.

NEW INFORMATION:
If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

CONFIDENTIALITY:
The researchers will take reasonable steps to keep private information, such as survey instrument responses and participant identity confidential. Data will be kept confidential with the use of a participant identification number that will be assigned to each participant. The data for each participant will all be stored under the participant identification number. The research team members will be the only ones who know the connection between your name and participant number. If you choose to withdraw from the study, all your data will be erased and/or destroyed. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

Survey Instrument Data will be stored in a locked cabinet in office 3118A of the Health Science Building, College of Health Science at Old Dominion University for a minimum of five years. Electronic data will be kept on a password protected jump drive, which will also be stored in the same cabinet. After five years, the audio files and field notes will be destroyed and the electronic data will be erased.

WITHDRAWAL PRIVILEGE:
Your participation in this study is completely voluntary. You may choose to stop participation in the study at any time for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. If you choose to withdraw from the study, you may also choose to withdraw your data. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled.

COMPENSATION FOR ILLNESS AND INJURY:
If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such harm. In the event that you suffer injury as a result of participation in any research project, you may contact Jennifer Cuchna, Principal Investigator and Health Service Research PhD Student at 919-244-0527 at Old Dominion University, Dr. George Maihafer the current IRB chair at 757-683-4520 at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

VOLUNTARY CONSENT:
By signing this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them:

Bonnie Van Lunen, PhD, ATC, FNATA, Responsible Project Investigator, Graduate Program Director, Post-Professional Athletic Training Education, Old Dominion University can be contacted at 757-683-3516.

Jenn Cuchna, MBA, MEd., ATC, VAT-L, Co-Investigator, Doctoral Student, Health Service Research Program, Old Dominion University can be contacted at 919-244-0527.

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. George Maihafer, the current IRB chair, at 757-683-4520, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by signing below, you are telling the researcher YES, that you agree to participate in this study. The researcher should give you a copy of this form for your records.

Subject's Printed Name & Signature	**Date**

INVESTIGATOR'S STATEMENT:

I certify that I have explained to this subject the nature and purpose of this research, including benefits, risks, costs, and any experimental procedures. I have described the rights and protections afforded to human subjects and have done nothing to pressure, coerce, or falsely entice this subject into participating. I am aware of my obligations under state and federal laws, and promise compliance. I have answered the subject's questions and have encouraged him/her to ask additional questions at any time during the course of this study. I have witnessed the above signature(s) on this consent form.

Investigator's Printed Name & Signature	**Date**

APPENDIX C: DATA COLLECTION PROCEDURES

Data Collection Procedures Outline

Separate Informed Consent and Data Collection Days Procedures:

Informed Consent Day:

- Introduce researcher(s) to the potential participants.
- Describe the study to potential participants.
    - Name of Study
    - Note that there will be 3 data collection time points outside of this informed consent session
    - Each data collection should take no more than 20 minutes to complete.
    - Brief description of the demographic survey and the four survey instruments.
    - Operational definitions for Self-Efficacy, SPs, and Confidence.
- Ask if there are any questions so far.
- Go over Informed consent forms (pass out 2 forms per person; one to sign and one to keep for themselves).
    - Verbally read the informed consent to the potential participants.
    - Instruct them that once the researcher leaves the room to have them sign the form if they are willing to participate.
    - If not willing to participate just return the forms to the envelope at the front of the room.
    - Instruct them that one copy if for them to keep while the signed one will be returned to the envelope at the front of the room.
    - Have the last person seal the envelope and bring to the researcher in the hall.
- Ask if there are any questions before leaving the room.

Data collection Days:

- Upon return for data collections briefly review the demographic survey and 4 instruments.
- Hand out an instrument packet out to everyone in the room.
- Inform entire room of the procedure for creating the unique participant identifier that will need to be at the top of all participant packets.
- Instruct the participants to complete the packet and place the packet in the envelope in the front of the room once the researcher has left the room.
- Instruct the last person to seal the envelope and return to the researcher in the hall.
- Leave the room while the participants fill out instruments.

Same Day Informed Consent and Data Collection Procedures:

Informed Consent and Pretest Collection Day:

- Introduce researcher(s) to the potential participants.
- Describe the study to potential participants.
    - Name of Study
    - Note that there will be 3 data collection time points outside of this informed consent session
    - Each data collection should take no more than 20 minutes to complete.
    - Brief description of the demographic survey and the four survey instruments
    - Operational definitions for Self-Efficacy, SPs, and Confidence.
- Ask if there are any questions so far.
- Go over Informed consent forms (pass out 2 forms per person; one to sign and one to keep for themselves).
    - Verbally read the informed consent to the potential participants.
    - Ask if there are any questions about the informed consent form.
- Instruct the room that once they decide whether or not they want to participate to come up to the front of the room and turn in the informed consent form to the designated person. (Bringing 3rd party – Lauren)
- Inform entire room of the procedure for creating the unique participant identifier that will need to be at the top of all participant packets.
- Ask if there are any questions.
- Researcher will leave the room and wait in the hall while the following procedures occur.
    - Designated person will hand an instrument packet to those who have signed the informed consent form.
    - Once they have completed the instrument packet they will return it to the designated person who will place it in an envelope and seal it after the last instrument packet is turned in.

Data collection Days:

- Upon return for data collections briefly review the demographic survey and 4 instruments.
- Hand out an instrument packet out to everyone in the room.
- Inform entire room of the procedure for creating the unique participant identifier that will need to be at the top of all participant packets.
- Instruct the participants to complete the packet and place the packet in the envelope in the front of the room once the researcher has left the room.
- Instruct the last person to seal the envelope and return to the researcher in the hall.
- Leave the room while the participants fill out instruments.

APPENDIX D: DEMOGRAPHIC QUESTIONNAIRE

Participant ID Number: _____
(first 2 letters of last name, 2 digit birth month, 2 letter birth state)

Demographic Questionnaire:

1) What is your age? _____

2) What is your gender? _____

3) What is the highest academic degree you have obtained?
   a) Bachelors
   b) Masters
   c) Doctoral
   d) Other (Please specify)_____

4) What was your undergraduate major?

_____

5) What, if any, prior exposure to standardized patients do you have? (Please be specific)
_____
_____
_____

6) What, if any, additional credentials do you hold (I.E. LMT, ATC, PTA, CSCS, CES)? (Please specify.
_____
_____
_____

APPENDIX E: GENERAL SELF-EFFICACY SCALE (GSE)

Pre-test: White Post-test 1: Green Post-test 2: Blue

Participant ID Number: _____
(first 2 letters of last name, 2 digit birth month, 2 letter birth state)

Directions: General Self-efficacy is an individual's perceived ability in performing generalized tasks. **Please check the box that best reflects you agreement with the following statements.**

The total score is calculated by finding the sum of the all items. For the GSE, the total score ranges between 10 and 40, with a higher score indicating more self-efficacy.

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough.	□	□	□	□
2. If someone opposes me, I can find the means and ways to get what I want.	□	□	□	□
3. It is easy for me to stick to my aims and accomplish my goals.	□	□	□	□
4. I am confident that I could deal efficiently with unexpected events.	□	□	□	□
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	□	□	□	□
6. I can solve most problems if I invest the necessary effort.	□	□	□	□
7. I can remain calm when facing diffuculties because I can rely on my coping abilities.	□	□	□	□
8. When I an confronted with a problem, I can usually find several solutions.	□	□	□	□
9. If I am in trouble, I can usually think of a solution.	□	□	□	□
10. I can usually handle whatever comes my way.	□	□	□	□

Reference:

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-NELSON.

APPENDIX F: SELF-PERCEIVED COMMUNICATION COMPETENCE SCALE

Pre-test: White Post-test 1: Green Post-test 2: Blue

Participant ID Number: _____
(first 2 letters of last name, 2 digit birth month, 2 letter birth state)

Directions: Below are 12 situations in which you might need to communicate. People's abilities to communicate effectively vary a lot and sometimes that same person is more competent to communicate in one situation than in another. **Please indicate how competent you believe you are to communicate in each of the situations described below. Indicate in the space provided at the left of each item your estimate of your competence.**

Presume 0 = completely incompetent and 100 = completely competent.

_____ 1. Present a talk to a group of strangers.

_____ 2. Talk with an acquaintance.

_____ 3. Talk in a large meeting of friends.

_____ 4. Talk in a small group of strangers.

_____ 5. Talk with a friend.

_____ 6. Talk in a large meeting of acqaintances.

_____ 7. Talk with a stranger.

_____ 8. Present a talk to a group of friends.

_____ 9. Talk in a small group of acquaintances.

_____ 10. Talk in a large meeting of strangers.

_____ 11. Talk in a small group of friends.

_____ 12. Present a talk to a group of acquaintances.

Scoring: To compute the subscores, add the percentages for the items indicated and divide the total by the number indicated below.

Public: 1 + 8 + 12; divide by 3.

Meeting: 3 + 6 + 10; divide by 3.

Group: 4 + 9 + 11; divide by 3.

Dyad: 2 + 5 + 7; divide by 3.

Stranger: 1 + 4 + 7 + 10; divide by 4.

Acquaintance: 2 + 6 + 9 + 12; divide by 4.

Friend: 3 + 5 + 8 + 11; divide by 4.

To compute the total SPCC score, add the subscores for Stranger, Acquaintance, and Friend. Then divide the total by 3.

Reference:

McCroskey, J., & McCroskey, L. (1988). Self-report as an approach to measuring communication competence. *Communication Research Reports, 5*(2), 108-113.

APPENDIX G: FROEHLICH COMMUNICATION SURVEY

Pre-test: White Post-test 1: Green Post-test 2: Blue

Participant ID Number: _____
(first 2 letters of last name, 2 digit birth month, 2 letter birth state)

Developing effective interpersonal communication is an ongoing process for health care practitioners. The purpose of this survey is to help you identify your strengths, areas for improvement and goals related to effective interpersonal communication.

Please circle the respoonse that best reflects your agreement with the following statements.
1 Strongly Disagree (Much Improvement Needed), 2 Disagree (Moderate Improvement Needed), 3 Agree (Some Improvement Needed), or 4 Strongly Agree (Little Improvement Needed).

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
1. I can listen without interrupting.	SD	D	A	SA
2. I can keep my mind free of distractions while listening.	SD	D	A	SA
3. I can allow for silences.	SD	D	A	SA
4. When appropriate, I can offer steady eye contact while listening.	SD	D	A	SA
5. I am aware of body language while listening.	SD	D	A	SA
6. My posture and facial expression show interest and caring.	SD	D	A	SA
7. I don't fidget while listening.	SD	D	A	SA
8. I can build rapport with others.	SD	D	A	SA
9. I appropriately maintain confidentiality.	SD	D	A	SA
10. I can maintain compassion while listening.	SD	D	A	SA
11. I can determine when to ask open and closed-end questions.	SD	D	A	SA
12. I can identify and reflect emotional and verbal content.	SD	D	A	SA
13. I can maintain mental focus when listening to someone who is upset.	SD	D	A	SA
14. I can effectively use restatement and clarification in a conversation.	SD	D	A	SA
15. I can judge when to redirect someone in a conversation.	SD	D	A	SA
16. I can convey hopefulness.	SD	D	A	SA
17. I can summarize what someone has shared in a conversation.	SD	D	A	SA
18. I can judge when someone is ready to hear information or advice.	SD	D	A	SA
19. I am concise when I speak.	SD	D	A	SA
20. I am clear when I speak.	SD	D	A	SA
21. I can be appropriately assertive in interactions with others.	SD	D	A	SA
22. I can use humor effectively.	SD	D	A	SA
23. I can judge when to use touch during conversations.	SD	D	A	SA

24. I understand the importance of seeking an interpreter when I don't understand the language of a client.	SD	D	A	SA
25. I can communicate effectively with people from different cultural groups.	SD	D	A	SA
COLUMN TOTALS				
TOTAL	/100			

Communication skills I want to be better at:
1._____
2._____
3._____

APPENDIX H: SP LEARNING OUTCOMES ASSESSMENT – CONFIDENCE

Pre-test: White Post-test 1: Green Post-test 2: Blue

Participant ID Number: _____
(first 2 letters of last name, 2 digit birth month, 2 letter birth state)

Directions: Please circle the statement that best reflects you agreement with the following statements.
1 Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree, or 5 Strongly Agree.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I am confident in my abilities to identify what questions to ask while obtaining a patient history.	SD	D	N	A	SA
2. I am confident in my abilities to generate follow-up questions to a patient's response.	SD	D	N	A	SA
3. I am confident knowing when I have obtained enough information from a patient history.	SD	D	N	A	SA
4. I am confident selecting appropriate palpations.	SD	D	N	A	SA
I am confident selecting appropriate special or diagnostic tests.	SD	D	N	A	SA
6. I am confident interpreting special or diagnostic test results.	SD	D	N	A	SA
7. I am confident formulating differential diagnosis.	SD	D	N	A	SA
8. I am confident formulating a patient's treatment plan.	SD	D	N	A	SA
9. I am confident providing appropriate patient education about an injury, illness, or condition.	SD	D	N	A	SA
10. I am confident dealing with difficult patients (e.g., difficult diagnoses, personalities).	SD	D	N	A	SA
11. I am confident evaluating and treating diverse patient populations (e.g., gender, age, race, culture).	SD	D	N	A	SA
12. I am confident using appropriate verbal communication.	SD	D	N	A	SA
13. I am confident using appropriate non-verbal communication.	SD	D	N	A	SA

14. I am confident in using appropriate professional language when interacting with patients.	SD	D	N	A	SA
15. I am confident in my abilities to evaluate a patient holistically (e.g., connection to kinetic chain or general medical).	SD	D	N	A	SA
16. I am confident in knowing my abilities and limitations, and refer patients to appropriate medical professionals as needed.	SD	D	N	A	SA
I am confident in my abilities as a physical therapist.	SD	D	N	A	SA
Column Total					
Total	/85				

Reference:

Armstrong, K., & Jarriel, A. (2015). Standardized patient encounters improved athletic training students' confidence in clinical examination. *Athletic Training Education Journal, 10*(2), 113-121. doi: 10.4085/1002113

APPENDIX I: STANDARDIZED PATIENT CASES FOR EXPERIMENTAL GROUP

STANDARDIZED PATIENT PROTOCOL

Institution: Eastern Virginia Medical School
Old Dominion University PT Program
PT655: Clinical Problem Solving I

Case Title #2: Acute Achilles Tendonitis (Fall 15)
TIME FRAME: _40 minutes___

SUMMARY OF CASE

Opening Statement:
"This is so painful! I don't think I'll be able to go back to work on Thursday if I can't walk!"

Chief Complaint: R posterior ankle pain (intermittent)

History of Present Illness:
The patient, age _____ has been training for a half marathon for the past 2 months. Over the past few days, wore and new pair of running shoes and did a 8 mile run, 9 mile run, and a 10 mile run. Each day felt some soreness during and especially after the run, felt pain. Rated pain as 7/10 post run but decreased to 4/10 with rest and ice. Yesterday, was running after the dog and felt a sharp searing pain into the back of the R ankle (point to Achilles tendon area). Had to sit down and "hobbled" back to house. Neighbor took to ER, x-rays taken (-), given an Ace wrap and crutches. Told it" was OK to put weight on it" but he/she does not want to put weight on the foot. Feels dizzy at times "could it be from the pain?" The patient describes the current pain as a constant throbbing. The pain also becomes a searing, unbearable pain with any movement or weight distribution.

Supposed to follow-up with regular doctor next week. ER doc says the patient can return to work if he/she can walk well enough for crutches/walker.

Past Medical History:
Heart surgery 5 years ago to "fix a bad valve" (possible birth defect)
Diabetic (type 1 – diagnosed as a teenager) takes insulin 2x/day using a sliding scale
HTN - 1 year- recommended to watch diet and cut down on salt (takes Norvasc)
Carpal tunnel syndrome in both wrists (diagnosed last year)
Seasonal allergies – Clarinex (pill)

Family History:
Mother died of ovarian cancer
Father living, has osteoarthritis

Social History:
Married, lives in an older apt building (in Ghent) 3rd floor; no elevator. There is a railing on the right side of the steps between the landings.

Works as a 7th grade teacher (science); has been off work since the injury yesterday but needs to go back on Thursday. The middle school is 3 stories; there is an old elevator but at the very back of the school on the opposite side of patient's science lab.

STANDARDIZED PATIENT PROTOCOL

Presentation:
He/she is initially cooperative but gets annoyed once they learn that they have to learn to walk. Frustrated and angry that they have been training for a half marathon and now cannot walk with the crutches and has tremendous pain.

Pain tolerance is poor; in a pain scale of 1-10, rates the pain a 15+/10. Wants spouse to do everything for him/her because he/she is "temporarily disabled."

Right ankle should be wrapped in an ACE wrap. Crutches should be adjusted too high; digs into your armpits – given to you that way from the ER.

Standard Questions/Challenges to Interviewer:

"How am I supposed to teach school on Thursday?!? I can barely make it down the steps!"
"It hurts too much to put any weight on my foot like the nurse told me to do."
"You have no idea how much this hurts!"

Physical Examination Findings:
--Right foot wrapped up in an ACE wrap. If student takes the wrap off (and they should), tell them that the Achilles areas was very swollen but that you were icing it constantly so the swelling looks much better today.
--Patient will use crutches
--Right ankle/foot pointed downwards somewhat (resting position off bed) and patient can move ankle ¼ of the ROM with significant pain. Both DF and PF increase pain. PROM DF increases pain.
--Can move the toes but sore.
--Sensation is diminished Right foot distal to malleoli (if pressed; thought it was like this before injury).
--Learner should check capillary refill or dorsalis pedis (diabetic)
--Knee and hip motion is full but mildly painful on the right due to the fall
--Occasional complaints of wrist tingling and pain if the student asks the SP to push on the table or assistive device is too long
--Vital signs (SP's own)

**The students don't know yet how to measure range of motion in the LEs and only know some strength assessments. They do know how to take vitals and should take your BP given your history of HTN.
**Student should do some exam, drape you properly (there should be a drape sheet on table), teach transfers, bed mobility, and gait (on level and steps) WBAT R emphasizing heel-to-toe gait pattern. Should not let you "walk up on your toes".

MD Orders: Eval & Rx ; gait WBAT R

Radiology: x-ray of ankle (-) for fracture

STANDARDIZED PATIENT PROTOCOL

OPENING SCENARIO

(Patient name) referred for “Evaluation & Treat”

Dx: Right ankle injury; WBAT Right LE

Dr. Larry Jones

ODU Orthopedic Specialists

3118 Hampton Blvd.

Norfolk, VA 23529

(757) 683-4000

STANDARDIZED PATIENT PROTOCOL CONTENT CHECKLIST

ODU PHYSICAL THERAPY PROGRAM
PT 655 @ EVMS (First SP session)
FALL 2015 – This will be online in Metils Web.

Case Title: **Acute Achilles Tendonitis**
Patient Name:_____
Student(s): _____
Date: _____

CONTENT CHECKLIST

I. PRELIMINARY

_____ Assesses room for equipment and set up
_____ Gets proper supplies if needed

II. INTRODUCTION

_____ Student introduces self by name
_____ Student identifies his/her role or position as student
_____ Student asks or uses patient's name
_____ Establishing patient trust
_____ Uses respectful tone of voice (non-judgmental or condescending)
_____ Student positions themselves in relation to patient

III. INTERVIEW AND HISTORY

_____ Chief complaint
_____ Location of problem – Right posterior foot
_____ Intensity of pain, progression – 7/10 after run; decreases with rest and ice
_____ Past 2 mo. training for a half marathon; yesterday, running after dog –sharp pain (15+/10) into back of lower leg
_____ Went to ER, x-rays taken (-); given crutches; told to bear weight
_____ PMHx: Heart surgery 5 yrs ago, HTN, diabetes, Carpal tunnel bilateral, seasonal allergies
_____ Meds – Clarinex (allergies); Norvasc (HTN med); Insulin; Tylenol 3; Ibuprofen
_____ Occupation – 7th gr. science teacher. Off since the injury but needs to go back Thursday
_____ Marital status – married
_____ Family history – mother died of ovarian CA; father has OA
_____ Alcohol/tobacco – smoker x 5 years (1/2 ppd); a few martinis/mojitos a week
_____ Support systems at home – spouse, friends in the area
_____ Previous level of activity – active, goes to YMCA (weight trains, cardio machines)
_____ Home environment (steps, rugs, bathrooms, railings) – 3rd floor apt w/o elevator, railing

IV. EXAMINATION

_____ Inspects area by taking off the Ace wrap
_____ Palpation of ankle and foot bony and soft tissue structures – tender Achilles tendon middle to superior portions; Post talofibular ligament
_____ Active range of motion (grossly) of LE's – limited ankle, can move toes - painful
_____ Active range of motion (grossly) of UE's (check triceps for using crutches)
_____ MMT of quad/ham and hip; triceps
_____ Checks sensation (light touch diminished R foot/ankle)

STANDARDIZED PATIENT PROTOCOL CONTENT CHECKLIST

_____Checks capillary refill or dorsalis pedis
_____ Checks blood pressure
_____ Uses proper technique for blood pressure

V. BED MOBILITY EXERCISES:

_____ Sitting
_____ Turning side to side
_____ Moving to side of bed
_____ Instructs patient in supine ⇔ sit

_____ Clear instructions
_____ Maintains comfort
_____ Appropriate speed of movement
_____ Does not cause injury
_____ Ensures safety
_____ Proper draping techniques
_____ Stress safety awareness

VI. TRANSFER TRAINING:

_____ Sitting balance established
_____ Selects appropriate transfer technique
Type:_____
_____ Patient instructed in each part of activity (e.g. positioning chair, placement of arms, correct posturing.)
_____ Properly manipulates wheelchair parts
_____ Assess sit ⇔ stand ability prior to gait training.

_____ Clear instructions
_____ Maintains comfort
_____ Appropriate speed of movement
_____ Does not cause injury
_____ Ensures safety
_____ Proper draping techniques
_____ Stress safety awareness

VII. GAIT TRAINING:

WB Status: FWB TDWB WBAT NWB R / L
_____ Assesses gross UE/LE strength before gait training
_____ Properly adjusts assistive device
_____ Demonstrates gait pattern
_____ Guards patient safety
_____ Selects appropriate assistive device
_____ Properly instructs gait pattern
_____ Uses the appropriate level of guarding
_____ Instructs patient on stairs

_____ Gait belt
_____ Crutches
_____ Walker (standard or wheeled)
_____ Straight cane
_____ Quad cane
_____ Forearm crutches
_____ Wheelchair

VIII. <u>Affective behavior</u>:

Poor	**Fair**	**Good**	**Excellent**	
1	2	3	4	Develops Rapport
1	2	3	4	Good eye contact
1	2	3	4	Clear Instructions
1	2	3	4	Ensures safety
1	2	3	4	Proper draping
1	2	3	4	Encourages & answers questions

_____ Does not cause injury
_____ Proper draping techniques
_____ Stress safety awareness

Additional Comments:

STANDARDIZED PATIENT PROTOCOL

Institution: Eastern Virginia Medical School
ODU Physical Therapy

Case Title: **Total Knee Replacement** 2016 (REV 2016)

History X Physical Exam X Training X

Anticipated time needed: 45 minutes

SUMMARY OF CASE

Opening Statement: *"I never thought having knee surgery would be so bad!"*

Chief Complaint:

50-60 year old male/female a RIGHT total knee replacement 2 days ago. (text is in the masculine gender, but applies to both genders)

History of Present Illness:

Has had knee pain (5/10-10/10 depending on activities) for the past year – it has increased gradually over the past year to where he is unable to enjoy any of his activities (golf), difficulty at work, and with daily activities. The pain was achy, stiff in morning and increased pain at the end of the day. Took anti-inflammatory medication which helped some but pain started to really limit him over the past 3 months. He saw an orthopedic physician about 9 months ago and decided to go forth with a new knee. *SP should have some 4x4s or 2x2s folded lengthwise and taped to the anterior knee, approximately 6-7" long. You can put today's date on the dressing tape w/Sharpie.

Present Surgery:

Surgery was 2 days ago. PT held yesterday because patient had a fever and was not feeling well. Drain pulled and bulky post-op dressing just removed this morning. Was told to not disturb/change this dressing. Pain is currently 5/10 but just took some pain meds. When tries to move the leg pain increases to 9/10 across the entire knee.

Was not allowed to get out of bed yet and has had to use a bedpan. He feels dizzy when student it's him up (orthostatic HTN) but eases up after a few minutes. Today, pain is "different" – post- surgical pain. Feels "numb" on the outside of the knee.

Past Medical History:

- Exertional asthma for 15 years, medication Albuterol (red and yellow puffer)
- Arthritis in left knee also, but not as bad "my doctor says it's not quite bone on bone yet!"
- Mild congestive heart failure discovered upon hospital admissions
- HTN (high blood pressure) – takes meds ("Can't remember the name" "little white pill") Diagnosed with HTN in their mid-20's (this should be good for all SP ages!) Norvasc 5 mg/day.
- Type 1 DM (diabetes) – takes insulin 2x/day. Diagnosed in mid-20's – Takes Humulin on a sliding scale based on blood sugar levels. Sometimes forgets to take sugar levels though. Has some decreased sensation to light touch and sharp/dull (vibration intact, proprioception intact) on the bottoms of feet. Protective sensation intact (monofilament testing).

STANDARDIZED PATIENT PROTOCOL

Family History:
- Father had osteoarthritis; HTN; prostate CA
- Mother had "brittle bone disease" (osteoporosis)
- Both parents are deceased

Social History:
- Married, responsible for invalid spouse's daily care. This has been an area of concern, since the painful knee has caused some problems with caring for spouse. Used to golf but no time anymore.
- Spouse suffered a stroke 1 year ago, needs help with daily living activities.
- Lives in a 1 story house, bedrooms downstairs – 3 steps to enter home
- Works as engineer part-time; had to shorten work in order to assist in spouse's care. Has another caregiver to help when at work.
- Has not incorporated any special equipment into the house except a safety bar in the bathtub.
- While hospitalized, daughter has been taking care of spouse. Pt. is concerned because she works part-time at the local mall and has small children and a family of her own. Patient is afraid it will be too much work for her.
- Smokes cigarettes - since 20's, cut down numerous times (if female- quit when pregnant) but has always smoked. When diagnosed with asthma 15 years ago; cut down to 1 pack per week. 2 ppd before asthma dx.
- Alcohol - 1 drink at night.

Presentation:

Cooperative, yet hesitant to move knee due to pain. Apprehensive of getting up. Do not go overboard with pain complaints!! Sometimes breathing heavy or wheezing during treatment (This should cue the student to auscultate the lung sounds)

Standard Questions/Challenges to Interviewer:

"Will the pain ever go away?", "I can't believe I wanted to get this surgery?"

Physical Examination Findings:

Inspection – Anterior knee covered with dressing. It was just changed by the nurse; tell student not to take it off. Can also tell that they had an ice pack on it all night so the swelling is decreased from yesterday
Palpation – tender if palpated around the incision/dressing area.
Vital signs and Circulation tests – SPs own vitals. They might palpate the dorsalis pedis pulse (on top of foot) or capillary refill of toes.

ROM (Passive is slightly more than active; i.e. when student moves leg/knee, slightly more motion)
- Decreased knee flexion ROM = 30-80 degrees. (Meaning you can't straighten your knee the whole way – too painful when at -30 degrees extension – and you can only bend just shy of 90 degrees) Makes it hard to stand up because you can't "get your leg under you"
- Supine: cannot actively life R leg up on own.
- Ankle ROM is fine – a bit sore but can move it slowly; hip ROM is OK if they lift the leg for you (you can't hold it up there yourself) but you can't lift it on own

Strength – UE's (upper extremities) and noninvolved (left) leg are 5/5 (normal). Right Hip difficult to assess due to knee pain. Knee strength is 2/5 (can contract the muscle but can't lift it or bend the whole way). Right ankle/foot 5/5

STANDARDIZED PATIENT PROTOCOL

Sensation – Absent on lateral right knee; decreased to light touch, sharp dull bottoms of both feet; intact to monofilament testing and proprioception testing.

Bed mobility – Requires moderate assistance for lying down to sitting, especially the first time.

Transfers – sit to stand with minimal assistance and verbal instruction and encouragement

Ambulation & Safety - requires close guard and many verbal cues to teach pt. how to ambulate with crutches/walker PWB (Partial Weight Bearing). Pt. is tired after about 20 feet and complains of pain. Learner should be empathetic, yet firm in encouraging to continue to work through the session but may get a chair to let you sit down and rest, if needed.

If they do not guard you (i.e. stand slightly behind and lateral to you with a hand on the gait belt), lose your balance and almost fall – careful now.
If they are in good position, they should be able to "steady" you!
They should not have an "iron grip" on the gait belt that impedes your mobility either!!
The gait belt should be snug, not loose hanging down on the hips or strap hanging down to floor to trip over.
The learner should never leave you alone once up standing to get something that they need (something from evaluation kit, clipboard, etc.); they should also not leave you sitting on the edge of the bed "dangling" without supervision.

Please note: Hopefully, they will teach you how to ambulate steps in the stairwell but I do not expect it due to the time limitations. If they do want to do the stairwell, please break out of character to walk to stairwell, and then go back into character once there (to save time)

STANDARDIZED PATIENT PROTOCOL

Patient Information

Referral:
Right total knee replacement 2 days ago. Evaluate & Treat; PWB up to 70%

EXAMINER TASKS

1. Conduct a history/interview of the patient
2. Perform a relevant physical examination
3. Perform treatment
4. Document your findings (SOAP note form)

STANDARDIZED PATIENT PROTOCOL CONTENT CHECKLIST

Case Title: Total Knee Replacement
SP Name: _____
Learner Name _____

CONTENT CHECKLIST (Metils)

INTRODUCTION (3%)

_____ Examiner introduces self by name
_____ Examiner identified his/her role or position
_____ Examiner asks or uses patient's name

CHIEF COMPLAINT (20%): prior to surgery

_____ Onset - one year ago
_____ Progression - increasing pain over the past 9 months (5-10/10)
_____ Location - right knee
_____ Radiation – when really bad, feels like it goes into lower leg
_____ Quality - initially constant ache to sharp pain, stiff prior to surgery
_____ Intensity – 5/10 when doesn't move to 9/10 when moves
_____ Alleviating factors - no movement
_____ Aggravating factors – bending, moving
_____ Precipitating events – increased over past 3 months;
_____ Surgery two days ago
_____ PT held yesterday due to slight fever and not feeling well
_____ Associated symptoms - none
_____ Environment/physical considerations - lives in 1 story house; has 3 steps to enter
_____ Current medications - Anti-inflammatory, pain medication, Asthma medication
_____ Secondary problem: mild congestive heart failure discovered upon admission.

PAST MEDICAL HISTORY (10%)

_____ Past illnesses - Asthma X 15 years
_____ Arthritis/congenital
_____ HTN
_____ DM – type 1
_____ Operations, injuries, accidents - SP uses own (focused on SP scars- make it simple!)
_____ Allergies (drugs, foods, environmental agents) - none

FAMILY HISTORY (1%)

_____ Mother had osteoporosis
_____ Father OA, HTN, prostate CA
_____ Both decreased

SOCIAL HISTORY (6%)

_____ Occupation – a. part-time engineer b. asks about job requirements
_____ Marital Status -married
_____ Alcohol - 1 drink per night
_____ Tobacco - smokes 1 pack per week since 10-15 years
_____ Support systems - family (dtr) lives close for help; part time caregiver
_____ Daily living activities: some affected due to knee pain
_____ Invalid spouse – main caregiver elicits patient concerns:

STANDARDIZED PATIENT PROTOCOL CONTENT CHECKLIST

PHYSICAL EXAM CHECKLIST (50%)

_____ Wash hands before examining patient

Inspection:

_____ Knee area (for swelling, bandage, overall condition)

Vital Signs

_____ BP and heart rate

_____ Auscultation of lungs

Palpation:

_____ Soft tissue around bandage

_____ Palpate pulses in lower extremities OR capillary refill

Sensation:

_____ Absent on lateral right knee; decreased to light touch; sharp/dullon bottoms of feet;

_____ Intact to monofilament testing bottoms of feet

_____ Intact to proprioception testing on bottoms of feet

ROM: Active and Passive:

- **Ankles: (normal but moves slowly due to knee pain on right)**

_____ Dorsiflex the ankle (bring foot up)

_____ Plantar flex the ankle (bend foot down)

_____Inversion of the ankle (turn foot in)

_____Eversion of the ankle (turn foot out)

- **Knees: Can't move on own – needs help**

_____ Flexion: bend right knee to about 80 degrees

_____ Extension: can only straighten out to -30 degrees

_____ Extension & Flexion UNINVOLVED knee: (normal)

_____ Uses goniometer to measure

- **Hips:**

_____ Right hip assessed (needs help to lift leg)

_____ Left hip normal

_____ Gross testing of UE ROM

Strength Assessment

_____ Gross testing of UEs

_____ Student assesses strength of UNINVOLVED leg

_____ Student assesses hip strength bilateral (right hip difficult due to knee pain)

_____ Student attempts to assess strength of Right knee (quad set or attempt to left leg off bed – can't)

_____ Student assesses ankle/foot strength bilateral

Transfers & Gait

_____ Teaches to get up to sitting and back in bed

_____ Teaches to stand up using assistive device

_____ Explains weight bearing restriction (PWB)

_____ Instructs patient in proper heel to toe gait pattern; no more than 70% PWB

_____ Instructs patient on steps

_____ Adjusts assistive device properly

_____ Uses gait belt

STANDARDIZED PATIENT PROTOCOL CONTENT CHECKLIST

AFFECTIVE BEHAVIORS (10%)

Excellent (3) Good (2) Fair (1) Poor (0)

_____ Clear instructions to patient
_____ Demonstrates gait pattern
_____ Proper draping
_____ Does not cause injury
_____ Patient felt safe at all times
_____ Good eye contact
_____ Develops rapport with patient
_____ Exhibits confidence during session
_____ Explains findings and discusses progression of PT treatment
_____ Explains how physical therapy will benefit them

* You can add comments at the end of the checklist on 1 thing that they did well and 1 thing that could be improved upon.

COMMENTS:

APPENDIX J: CORRELATION TABLE BETWEEN AGE AND MEASURES AT BASELINE

Table 5.

Spearman's Correlations Between Age and Measures at Baseline

Source at Baseline	*Mean*	*sd*	*Age*	*GSE*	*Age*	*SPCC*	*Age*	*FroCom*	*Age*	*SPLOAT*
Age	23.33	2.65	1.00	-0.05						
GSE	32.21	2.99	-0.05	1.00						
Age	23.33	2.65			1.00	0.08				
SPCC	88.26	7.81			0.08	1.00				
Age	23.33	2.65					1.00	-0.12		
FroCom	79.72	7.34					-0.12	1.00		
Age	23.33	2.65							1.00	-0.21
SPLOAT	51.43	11.71							-0.21	1.00

***Note. *p* < .05**

APPENDIX K: REPEATED MEASURES ANOVA AND PAIRWISE COMPARISONS TABLES

Table 6.1.
GSE Within Subjects Effects and Between Subject Effects

Source	*SS*	*df*	*MS*	*F*	*P*
GSE Within Subjects Effects					
Time	44.46	1.73	25.69	5.17	*0.010
Time*Group	8.56	1.73	4.95	0.10	0.364
Time*Gender	5.89	1.73	3.41	0.69	0.486
Time*Group*Gender	2.62	1.73	1.52	0.31	0.706
Error (Time)	447.29	90.00	4.97		
GSE Between Subjects Effects					
Group	20.41	1	20.41	1.24	0.271
Gender	70.51	1	70.51	4.28	*0.043
Group*Gender	14.40	1	14.40	0.87	0.354
Error	856.10	52	16.46		

Abbreviations: *SS* = Sum of Squares; *df* = degrees of freedom; *MS* = Mean Square; *GSE* = General Self-Efficacy.
* indicates $p < .05$.

Table 6.2.
SPCC Within Subjects Effects and Between Subject Effects

Source	*SS*	*df*	*MS*	*F*	*P*
SPCC Within Subject Effects					
Time	46.86	2	23.43	0.80	0.453
Time*Group	99.91	2	49.95	1.70	0.187
Time*Add Creds	14.03	2	7.01	0.24	0.788
Error (Time)	3112.25	106	29.36		
SPCC Between Subjects Effects					
Group	1150.48	1	1150.48	9.01	*0.004
Add Creds	252.34	1	252.34	1.98	0.166
Error	6769.84	53	127.73		

Abbreviations: *SS* = Sum of Squares; *df* = degrees of freedom; *MS* = Mean Square; *SPCC* = Self-Perceived Communication Competence.
* indicates $p < .05$.

Table 6.3.
FroCom Within Subjects Effects and Between Subject Effects

Source	*SS*	*df*	*MS*	*F*	*P*
FroCom Within Subjects Effects					
Time	484.34	2	242.17	7.66	*0.001
Time*Group	127.79	2	63.90	2.02	0.137
Error (Time)	3412.68	108	31.60		
FroCom Between Subjects Effects					
Group	1180.40	1	1180.40	9.72	*0.003
Error	6556.99	54	121.43		

Abbreviations: *SS* = Sum of Squares; *df* = degrees of freedom; *MS* = Mean Square; *FroCom* = Froehlich Communication Scale.
* indicates $p < .05$.

Table 6.4.
SPLOAT Within Subjects Effects and Between Subject Effects

Source	*SS*	*df*	*MS*	*F*	*P*
SPLOAT Within Subjects Effects					
Time	3824.43	1.70	2245.52	36.89	*0.000
Time*Group	1089.93	1.70	639.95	10.51	*0.000
Error (Time)	5597.88	91.97	60.52		
SPLOAT Between Subjects Effects					
Group	647.50	1	647.50	4.15	*0.047
Error	8425.68	54	156.03		

Abbreviations: *SS* = Sum of Squares; *df* = degrees of freedom; *MS* = Mean Square; *SPLOAT* = Standardized Patient Learning Outcomes Assessment Tool.
* indicates $p < .05$.

Table 6.5.
Pairwise Comparisons for Time Main Effect

Source	*(I)Time*	*(J)Time*	*Mean Diff (I-J)*	*Std. Error*	*P*	*95% CI*	
						Lower	*Upper*
GSE	1	2	0.27	0.41	1.000	-0.74	1.28
	2	3	-1.44	0.45	*0.007	-2.55	-0.37
	1	3	1.17	0.56	0.125	-0.22	2.56
SPCC	1	2	1.70	1.34	0.629	-1.61	5.02
	2	3	-1.04	1.18	1.00	-3.96	1.89
	1	3	-0.67	1.53	1.00	-4.44	3.11
Froehlich	1	2	-2.56	1.10	0.070	-5.28	0.15
	2	3	-1.70	1.17	0.458	-4.61	1.20
	1	3	4.27	1.01	*0.000	1.77	4.61
SPLOAT	1	2	-5.95	1.61	*0.002	-9.94	-1.97
	2	3	-6.12	1.09	*0.000	-8.82	-3.42
	1	3	12.07	1.46	*0.000	8.47	15.67

Abbreviations: *GSE* = General Self-Efficacy; *SPCC* = Self-Perceived Communication Competence; *Froehlich* = Froehlich Communication Scale; *SPLOAT* = Standardized Patient Learning Outcomes Assessment Tool
* indicates $p < .05$.

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December 2012: MBA - Organization and Leadership, Methodist University, Fayetteville, NC
June 2005: MEd. - Interdisciplinary Tract, Campbell University, Buies Creek, NC
May 2003: B.S. in Health Sciences, emphasis in Athletic Training, University of Central Florida, Orlando, FL

MOST RELEVANT EXPERIENCE

May 2015 – Present: Standardized Patient at Eastern Virginia Medical School, Sentara Center for Simulation and Immersive Learning, Professional Skills Teaching and Assessment, Norfolk, VA
August 2013 – Present: Graduate Assistant to the Post-professional Athletic Training Program at Old Dominion University, Norfolk, VA
August 2005 – August 2013: Assistant Athletic Trainer/Instructor at Methodist University, Fayetteville, NC
January 2006 – May 2007: Adjunct Instructor at Fayetteville Technical Community College, Fayetteville, NC
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MOST RELEVANT PUBLISHED OR IN PREPARATION PAPERS

Cuchna JW, Walker SE, Van Lunen BL. (in press). Athletic training educators' use and perceptions of simulations and standardized patients: Part 2. *Athletic Training Education Journal.*
Cuchna JW, Walker SE, Van Lunen BL. (2017). *Athletic training educators' use and perceptions of simulations and standardized patients: Part 1.* Manuscript submitted for publication.
Hoots KM, *Cuchna J*W, Walker SE, Van Lunen BL. (2017). *Faculty Perception of Standardized Patient Use in Athletic Training Education: Part 1.*Manuscript in preparation.
Cuchna JW, Hoots KM, Walker SE, Van Lunen BL. (2017). *Faculty Perceptions of Standardized Patient use in Athletic Training Education: Part 2.* Manuscript in preparation.

MOST RELEVANT RESEARCH PRESENTATIONS

Cuchna JW, Walker SE, Van Lunen BL**.** *Athletic Training Educators' Use and Perceptions of Simulations and Standardized Patients.* National Athletic Trainer's Association Clinical Symposium and Expo 2016, Baltimore, MD., (June 23rd, 2016) Doctoral Poster Award Finalist.