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Educating for Engagement: The Influence of Physical Therapist Education on Lifelong Learning and Professional Engagement

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EDUCATING FOR ENGAGEMENT: THE INFLUENCE OF PHYSICAL THERAPIST EDUCATION ON LIFELONG LEARNING AND PROFESSIONAL ENGAGEMENT

by

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Educating for Engagement: The Influence of Physical Therapist Education on Lifelong Learning and Professional Engagement

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DEDICATION

To Ethan and Emma, my deepest wish for you is to fully engage in life, follow your passion, and make a difference by doing so.

ACKNOWLEDGMENTS

I would first like to express my deepest gratitude to the leadership team at Brooks Rehabilitation, especially Michael Spigel, Bob Rowe, Karen Gallagher, and Doug Baer. This work, and any good that may come from it, is the direct result of the time, money, and wisdom you have graciously invested in me over the past 11 years. Your incredible dedication to developing others both inspired and made this work possible. I will be forever indebted to your generosity and hope that in at least some small way I can pay forward your invaluable gift. I can't wait to see "what's next"!

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Abstract

Healthcare professions educational programs have a responsibility to develop professionally engaged lifelong learners. Knowledge of the factors important to the development of these desirable characteristics may inform educational leaders' decisions about program and curriculum design. This study aimed to investigate the relation between level of education and an orientation towards lifelong learning and future professional engagement. In addition, the influence of learners' type of motivation for continued learning, and learning goal orientation on this relation was also assessed.

A cross-sectional survey of learners from a single healthcare profession, physical therapy was conducted to investigate these relations. Physical therapist learners from across the United States at all levels of formal professional and post-professional education were included invited to participate in the anonymous online survey. Path analysis was used to analyze the relations between the included factors.

A total of 251 usable responses were included in the analysis. Results suggest that physical therapist learners increase their orientation toward lifelong learning and future professional engagement as they advance through the physical therapy education continuum. Furthermore, having greater autonomous and less controlled motivation increases this relation. Mastery goal orientation also had a positive direct effect on lifelong learning and professional engagement but this effect was independent of learners' current level of education. Implications for educational leaders in the physical therapy profession are discussed along with recommendations for future research.

Summary of Terms

Term	Operational Definition
Antecedents of Engagement	Personal, social, organizational, or environmental factors that lead to some form of engagement.
Arc of Professional Development	A bridge between professional education and fulfilment of societal role as a professional that is characterized by "sustainable, life-long growth in professional competence and commitment." (Colby & Sullivan, 2008, p. 415)
Autonomous Motivation	Motivation toward a particular action that is generated internally and is characterized by a desire to perform the action out of personal interest, value, or enjoyment.
Autonomy-Supportive Teaching	A coherent cluster of teacher-provided instructional behaviors that collectively communicate to students an interpersonal tone of support and understanding (Jang, Reeve, & Halusic, p. 687)
Burnout	"A prolonged response to chronic interpersonal stressors..." characterized by "…overwhelming exhaustion, feelings of cynicism and detachment… and a sense of ineffectiveness". (Maslach & Leiter, 2016, p. 103)
Controlled Motivation	Motivation toward a particular action that is generated externally or internally and is characterized by a desire to either receive reward or avoid punishment.
Engagement	"The harnessing of organization members' selves to their work roles…[which is] expressed physically, cognitively, and emotionally during role performance." (Kahn, 1990, p. 694)
Engagement in Healthcare Change	A positive and fulfilling, state of mind that is associated with working toward improvements in healthcare quality, access, or cost; and is characterized by a sense of vigor and dedication.
Fellow-in-Training	An individuals who is enrolled in a postprofessional fellowship program
Health Professions	Represents any of the professions involved in providing care for individuals with injury, disease, or disability including but not limited to medicine, nursing, physical therapy, and pharmacy.
Health Professions Educational Leaders	Refers collectively to any educator responsible for the development, design, and/or oversight of a health professions educational program.
Health Professions Educational Programs	Refers collectively to professional (entry-level) and postprofessional (residency and fellowship) educational programs associated with a health profession.
Health Professions Learners	Refers collectively to individuals who are enrolled in professional (entry-level) and postprofessional (residency and fellowship) health professions education programs

Health Professions Students	Individuals who are enrolled in a professional (entry-level) education program associated with a health profession.
Leadership Engagement	The physical, cognitive, and emotional expression of self through one's identity as a leader that leads to a sense of vigor and dedication toward leadership roles.
Lifelong Learning	"A set of self-initiated activities (behavioral aspect) and information-seeking skills (capabilities) that are activated in individuals with a sustained motivation (predisposition) to learn and the ability to recognize their own learning needs (cognitive aspect)." (Hojat et al., 2003, p. 434)
Locus of Engagement	The object or focus of one's engagement such as a profession, organization, role, or activity.
Mastery Goals	Goals that are internally regulated and directed toward concepts like personal development, growth, and personal sense of competence.
Multi-Loci Engagement	An experience of being engaged with two or more objects at the same time which may either enhance or detract from one another.
Outcomes of Engagement	Changes at a personal, social, organizational, or environmental level that occur as a result of some form of engagement.
Performance Goals	Goals that are externally regulated and directed toward a desire to perform better than, or a least not perform worse than, others.
Professional Engagement	Professional engagement in physical therapy is a fulfilling and enthusiastic dedication to making a positive impact on the health of individuals and society through behaviors that advance the profession of physical therapy
Resident	An individual who is enrolled in a postprofessional residency program
Scoping Review	A form of systematic review used to identify the size, scope, and type of evidence surrounding a certain topic and contextualizing this evidence in term of practice and gaps in understanding. (Levac, Colquhoun, & O'Brien, 2010)
Work Engagement	"A positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption". (Schaufeli, Salanove, González-Romá, & Bakker, 2002, p. 74)

List of Acronyms

Acronym	Term
CIPD	Chartered Institute of Personnel and Development
MMAT	Mixed Methods Assessment Tool
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRN	Pro re nata
U.K.	United Kingdom
U.S.	United States
VAS	Visual analog scale

Chapter 1: Introduction

If you wish to understand why professions develop as they do, study their *nurseries, …their forms of professional preparation.(Shulman, 2005, p. 52)*

Professions are distinguished from other occupations by their central purpose in serving the 'common good' of society. Professional education plays an essential role in preparing learners to think, act, and self-identify as professionals; developing qualities such as lifelong learning, adherence to a code of ethics, and placing the needs of the patient or client first. The challenges of professional practice such as keeping up with rapidly expanding bodies of knowledge, productivity demands, and maintaining a work-life balance can threaten the sustainability of these qualities resulting in disillusionment, professional stagnation or burnout (Colby & Sullivan, 2008; Hamilton, 2011; Veloski & Hojat, 2006).

Professional education research conducted by the Carnegie Foundation found that a strong self-identification with one's profession and engagement in meeting the societal purpose of that profession were important to sustained professionalism (Colby & Sullivan, 2008). This role of engagement as a protective factor against negative attitudes and maladaptive work behaviors is well established in the literature (Bailey, Madden, Alfes, & Fletcher, 2017; Schaufeli & De Witte, 2017a). An extreme form of these negative attitudes and behaviors, referred to as burnout, is particularly prevalent within healthcare professions with rates reported as high as 30% to even greater than 50% (Adriaenssens, De Gucht, & Maes, 2015b; Bodenheimer & Sinsky, 2014; Moss, Good, Gozal, Kleinpell, & Sessler, 2016). Burnout among

healthcare professionals is associated with negative societal outcomes such as higher medical costs, increased medical errors, decreased quality of care, and worse outcomes for patients (Bodenheimer & Sinsky, 2014; Dimou, Eckelbarger, & Riall, 2016; Prins et al., 2009; Shanafelt, Bradley, Wipf, & Back, 2002). In contrast, increased levels of engagement among healthcare professionals have been associated with positive outcomes such as greater job and life satisfaction, improved quality of care and patient satisfaction, and decreased medical errors (Bacon & Mark, 2009; Freeney & Fellenz, 2013; Mache, Vitzthum, Klapp, & Danzer, 2014; Prins et al., 2009). Positive outcomes such as career satisfaction, knowledge currency, quality of care, and increased role in meeting societal needs have also been associated with lifelong learning (Hojat, Kowitt, Doria, & Gonnella, 2010; Li, Hurkmans, Sayre, & Vlieland, 2010; Wenghofer et al., 2015). Based on this research, the development of professionally engaged lifelong learners appears to be an important factor in healthcare professions' ability to achieve their societal purpose.

Developing Professionally Engaged Lifelong Learners

Health professions educational leaders have an important role in establishing an evidence base that supports effective strategies for increasing engagement and reducing burnout. Burnout among health professions students and residents (collectively learners) can be as high as 41-60%, and is associated with negative learning outcomes such as higher rates of unprofessional behaviors, decreased levels of empathy, higher prevalence of symptoms of depression, suicidal ideation, higher rates of substance abuse, greater likelihood of considering withdraw from the program, lower levels of readiness for practice, and greater frequency of medical errors (Bullock et al., 2017; Dyrbye & Shanafelt, 2016; Dyrbye et al., 2014; Rudman & Gustavsson, 2012). Signs of burnout appear as early as the first year of professional education and tend to increase

year over year, continuing into postprofessional educational programs such as residency (Dyrbye et al., 2014; Rella, Winwood, & Lushington, 2008). Considering the size and scope of this problem, and the implication on learner and societal health, it is important for health professions educational programs to protect learners from burnout and prepare them to become engaged healthcare professionals.

Current evidence supports the positive effects of engagement-building initiatives on reducing burnout and improving the quality of healthcare (Collier, Fitzpatrick, Siedlecki, & Dolansky, 2016; Sexton et al., 2017; Tullar et al., 2016). However, this research has primarily focused on methods for increasing engagement in the work setting. Effective strategies for developing health professions students into engaged professionals are currently unknown. In addition, available syntheses of the engagement literature are multi-industry and include international populations. Some studies show cross-cultural differences in the measurement and drivers of engagement, raising questions about the relevance and applicability of these syntheses in the U.S. healthcare context (Brunetto et al., 2013; Goliath-Yarde & Roodt, 2011). Recognizing this limitation, it is important for U.S. health professions educational leaders to take an active role in evaluating strategies intended to enhance engagement, and disseminate these findings to the community of health professions educators. Potential strategies may include developing learner selection criteria that identify students who are at greater risk of developing burnout or who are more likely to become engaged, developing educational interventions designed to foster engagement, and providing faculty training on effective teaching and mentoring strategies that minimize burnout and enhance engagement.

Although simple in concept, these changes represent a paradigm shift for health professions educational leaders who have been working to develop patient-centered healthcare

providers since patient-centeredness was identified as one of the six aims of a 21st century healthcare system by the National Institute of Medicine (2001). Only recently has a focus on the healthcare provider been recognized as important in the U.S. healthcare system (Bodenheimer & Sinsky, 2014). Developing healthcare professionals who can navigate the sometimes competing needs of self and society is a novel challenge for health professions educational leaders. The body of evidence to inform this decision-making is just emerging.

Next Steps

A greater understanding of engagement in the context of health professions and health professions education is needed. Ten years ago, a review of the engagement literature conducted by Simpson (2009a) identified a single study that included a population of U.S. healthcare professionals. Recent interests in the health and wellbeing of U.S. healthcare professionals has led to growth in engagement literature targeting this population, with 14 studies published in the years 2016 and 2017. Given the recent increase in number of studies and the overall lack of synthesis in the engagement literature specific to the U.S. healthcare context, a review of the engagement literature specific to the U.S. healthcare context is needed. Results from this synthesis would inform health professions educational leaders about the factors that enhance current U.S. healthcare professionals' engagement and allow for the evaluation of current educational practices and how they contribute or detract from future engagement. Future studies may build from this foundation by providing recruitment and selection strategies, as well as educational interventions that produce a more engaged healthcare workforce.

The work presented herein represents an early step in developing this evidence base. Chapter Two provides the results of a scoping review of the extant engagement literature focused on U.S. healthcare professionals over the last decade. Specifically, this review is designed to: (1)

identify how engagement has been operationalized and measured in the U.S. healthcare context, (2) identify the factors thought to be related to engagement in the U.S. healthcare context, and (3) determine the current evidence for antecedents and outcomes of engagement in the U.S. healthcare context.

Results from the scoping review informed the development of an empirical study to investigate how advancement through the current educational process influences learners' orientation toward lifelong learning and future professional engagement in the physical therapy profession. The influence of motivation for continued learning and learning goal orientation on these relations were also assessed. This correlational, cross-sectional survey enrolled physical therapy learners at the professional (Doctor of Physical Therapy), and postprofessional (residency and fellowship) level of education from across the U.S. Structural equation modeling was planned for the analysis but was unsuccessful due to issues with model misspecification. As a result, exploratory factor analysis and path analysis were performed. Further explanation of the change in data analytic techniques are provided in Chapter Three followed by the results of the path analysis in Chapter Four and a discussion of the implications for practice and research in Chapter Five.

Assumptions and Delimitations

The scope of this study is intentionally limited to the physical therapy profession. This decision was based on the author's familiarity with the physical therapy educational process and access to the relevant study population. Conducting this initial study in a limited and familiar population will allow for testing of the proposed model and the instruments used in data collection. Future studies may test the model in additional healthcare professions or evaluate revisions to the model based on the results from this study.

Major assumptions of this study include the direction of the relations investigated in the proposed causal model. This model assumes that motivations, learning goal orientations, orientation toward lifelong learning, and future professional engagement are directly influenced by level of education; and that motivations and learning goal orientations also have indirect effects on the relations between current level of education, orientation toward lifelong learning, and future professional engagement. It is also possible that motivations, learning goal orientations, orientation toward lifelong learning, and one's tendency toward professional engagement influences learners' decision to pursue higher levels of education such as residency or fellowship programs. Other combinations of relations between factors are also possible and future studies are needed to understand the complex nature of these relations.

Additional delimitations of this study include use of orientation toward and perceived likelihood of behaviors as endogenous variables, and the cross-sectional survey design. These decisions limit the casual inferences that can be drawn from the results. The relations between orientation toward and perceived likelihood of the target behaviors and the occurrence of the actual behaviors are currently unknown. Furthermore, the lack of experimental features such as pre and post measurement limits cross-sectional surveys to correlational findings. Despite these challenges, the broad aim of this study was to provide preliminary evidence for hypothesized relations and inform the development of future research. The use of a progressive exposure exogenous variable (i.e., level of education as a physical therapist), plausibility of the relations, and a diverse sample does provide some support for a causal relation to perceptions about the target behaviors (Hill, 1965).

A final delimitation of this study is the use of modified instruments to measure most of the variables in this study. Modifications to the wording of the instruments were necessary due to

the novel context (i.e., physical therapy learners) of the study. Minimal modification to instrument wording was made to ensure relevance and understanding to the study population and to preserve the original intent of the instrument. In addition, the original Likert-type scales for the instruments were converted to a 0-100 visual analog scale (VAS). This conversion was made to reduce responder burden by creating consistency in the scoring of all instruments, and also to allow for more variance to be expressed in the data. Measurements of psychosocial factors have previously demonstrated moderate to strong correlations ($0.44 – 0.94$, $p < .001$) when measured using a VAS and Likert-type scale (Hasson & Arnetz, 2005).

Chapter 2: Review of Literature

This chapter describes the procedures and results of a literature review conducted in preparation for the research study described in subsequent chapters. An interest in understanding which professional development activities contribute to high levels of performance, persistence, and achievement among physical therapists led to the literature on work engagement. Preliminary reading of this literature identified several significant gaps in the current body of knowledge such as contextualization to the U.S. healthcare worker population, and more specifically, how this literature might apply in the context of physical therapist education. However, consistent reports of the positive influence of engagement on performance, persistence and achievement suggested engagement may be an important factor in understanding professional development. As a result, a systematically conducted review of the literature was carried out which informed the design of a subsequent research study focused on education in the physical therapy profession. A brief background on engagement is provided, followed by a detailed account of the literature review process and outcomes. This chapter concludes with a discussion of key findings from the review and describes the rationale for the empirical study described in the remaining chapters.

Background

Understanding the factors that contribute to work-related performance, persistence, and achievement has received considerable attention in both the academic and business communities. One factor of particular interest is the concept of engagement which was originally proposed by William Kahn (1990) as “the harnessing of organization members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances” (p, 694). Kahn’s concept of engagement emerged from the positive

psychology movement, focusing on the positive predictors of success and fulfilment at work as opposed to the negative characteristics associated with burnout (Schaufeli & De Witte, 2017b).

Attempts to better understand engagement have spanned countries, industries, work settings, and disciplines; leading to a divergence in the operationalization and measurement of engagement. Bailey, Madden, Alfes, and Fletcher (2017) recently reviewed the extant literature dating back to the 1990 introduction of the term engagement. This review identified six different operational definitions among 214 papers from 35 different countries and a wide variety of industries including hospitality, education, business, and healthcare. Results from this review identified the need for more contextualization of the term engagement as well as the need for more specificity regarding the locus (i.e., object) of engagement such as one's work task, organization, or profession.

One such context for the study of engagement is the healthcare industry. Healthcare workers are expected to achieve a high level of performance and achievement, often in challenging environments that demand a great deal of persistence (Mache et al., 2014; Mosley & Miller, 2015; Vinje & Mittelmark, 2008). Despite this important context, a search of the literature identified only one prior review focused on engagement among healthcare workers. In this review, Simpson (2009a) searched the healthcare, business, and psychology literature from 1992 to 2007 for studies investigating the antecedents and/or outcomes of engagement, specifically in the nursing profession. However, a lack of identified research in this area resulted in expansion of the inclusion criteria to include additional employee types such as university administrative staff, service industry workers, and teachers. Simpson's review identified 20 papers across multiple countries and context. Only eight of the studies included healthcare workers and only one of those eight included a U.S. healthcare worker population. Consistent

with Bailey's review, Simpson's findings also indicate differences in the operationalization of engagement and lacked strong evidence for the antecedents and outcomes of engagement. These findings, along with evidence of cultural differences related to engagement, formed the basis for this literature review (Brunetto et al., 2013; Goliath-Yarde & Roodt, 2011).

Purpose

The purpose of this review is to describe how the U.S. engagement literature operationalizes and measures engagement among healthcare workers; and, to identify the current evidence for the antecedents and outcomes of engagement within this population. Specifically, the review was designed to answer the following three questions:

In the context of the extant U.S. healthcare research base:

1) How has engagement been operationalized and measured?
2) What factors are associated with engagement?
3) What is the evidence regarding antecedents and outcomes of engagement?

Methods

Arksey and O'Malley (2005) suggested a framework for conducting scoping reviews that was later updated by Levac, Colquhoun, and O'Brien (2010). Although consensus on a definition of a scoping review is lacking, there is general agreement that scoping reviews are an appropriate methodology for mapping key concepts surrounding a research topic, especially when the body of literature includes a variety of methods. In addition, scoping studies are used by researchers to "clarify a complex concept and refine subsequent research inquiries" (Levac et al., 2010, p. 1). A major criticism of scoping reviews is the lack of quality assessment of included studies which may result in judgments based on the presence of evidence as opposed to the quality of evidence (Grant & Booth, 2009). This concern was addressed by including a quality assessment which is

further described in the data extraction section. In addition, the reporting of this review follows the PRISMA statement for reporting systematic reviews where applicable (David, Alessandro, Jennifer, & Douglas, 2009).

Study identification. The search strategy used in this review was based on the previously published review by Simpson (2009a) which included papers published from 1992 to 2007. The current review evaluates the last decade of literature since Simpson's review and is inclusive of the years 2007 to 2017. Search terms were expanded to minimize the risk of missing relevant studies. The full search strategy is presented in Table 2.1. An initial search was conducted in February 2017 and included the major databases for business (ABI/Inform), education (ERIC), psychology/organizational psychology (PsycINFO), and healthcare/medicine (CINAHL, MEDLINE). In January 2018, a second search was conducted using the same terms and databases but limited the search to the year 2017 to ensure all relevant papers published in 2017 were included. Both searches were limited to papers published in peer-reviewed journals and printed in the English language.

Study selection. In total, 12,097 titles were identified in the search and reviewed independently the author and a colleague with expertise in organizational development. Each title was screened and marked to discard or to include in the next round of screening based on an a priori study selection algorithm (Figure 2.1). Only papers that were research reports and included quantitative, qualitative, or mixed methodologies were considered for inclusion in the review.

Table 2.1

Specific Search Strategy by Database

Database	Search Strategy	Limits

ABI/Inform	ab((Healthcare OR "health care" OR "health-care" OR medic* OR "health profession*" OR "Allied health" OR physician OR doctor* OR "physical therap*" OR "occupational therap*" OR "speech therap*" OR therapis* OR nurs* OR pharmac*)) AND ab(engage*) OR ab("employee engagement") OR ab("work engagement") OR ab("job engagement") OR ab("professional engagement") OR ab("engagement at work") OR ab("engage* in profession")	English Language Peer-reviewed United States Date range: 2007-01-01 to 2017-12-31
ERIC, CINAHL, PsycINFO	(Healthcare OR "health care" OR "health-care" OR medic* OR "health profession*" OR "Allied health" OR physician OR doctor* OR "physical therap*" OR "occupational therap*" OR "speech therap*" OR therapis* OR nurs* OR pharmac*) AND AB engage* OR SU "employee engagement" OR SU "work engagement" OR AB "job engagement" OR AB "professional engagement" OR AB "engagement at work" OR AB "engage" in profession*"	English Language Peer-reviewed Geographic Subset: USA Date range: 2007-01-01 to 2017-12-31
MEDLINE	((((((("healthcare"[Title/Abstract]) OR "health care"[Title/Abstract]) OR "health-care"[Title/Abstract])) OR ((((((((((("medicine"[Title/Abstract]) OR "medical"[Title/Abstract]) OR "nurs*"[Title/Abstract]) OR "physician*"[Title/Abstract]) OR "doctor*"[Title/Abstract]) OR "rehabilitation"[Title/Abstract]) OR "physical therap*"[Title/Abstract]) OR "occupational therap*"[Title/Abstract]) OR "speech therap*"[Title/Abstract]) OR "pharmac*"[Title/Abstract]))) AND (((((((("engage*"[Title/Abstract]) OR "employee engagement"[Title/Abstract]) OR "work engagement"[Title/Abstract]) OR "professional engagement"[Title/Abstract]) OR "engagement in profession"[Title/Abstract]) OR "engagement in work"[Title/Abstract]) OR "job engagement"[Title/Abstract])	English Language Published since: 2007-01-01

Figure 2.1. Study Selection Algorithm

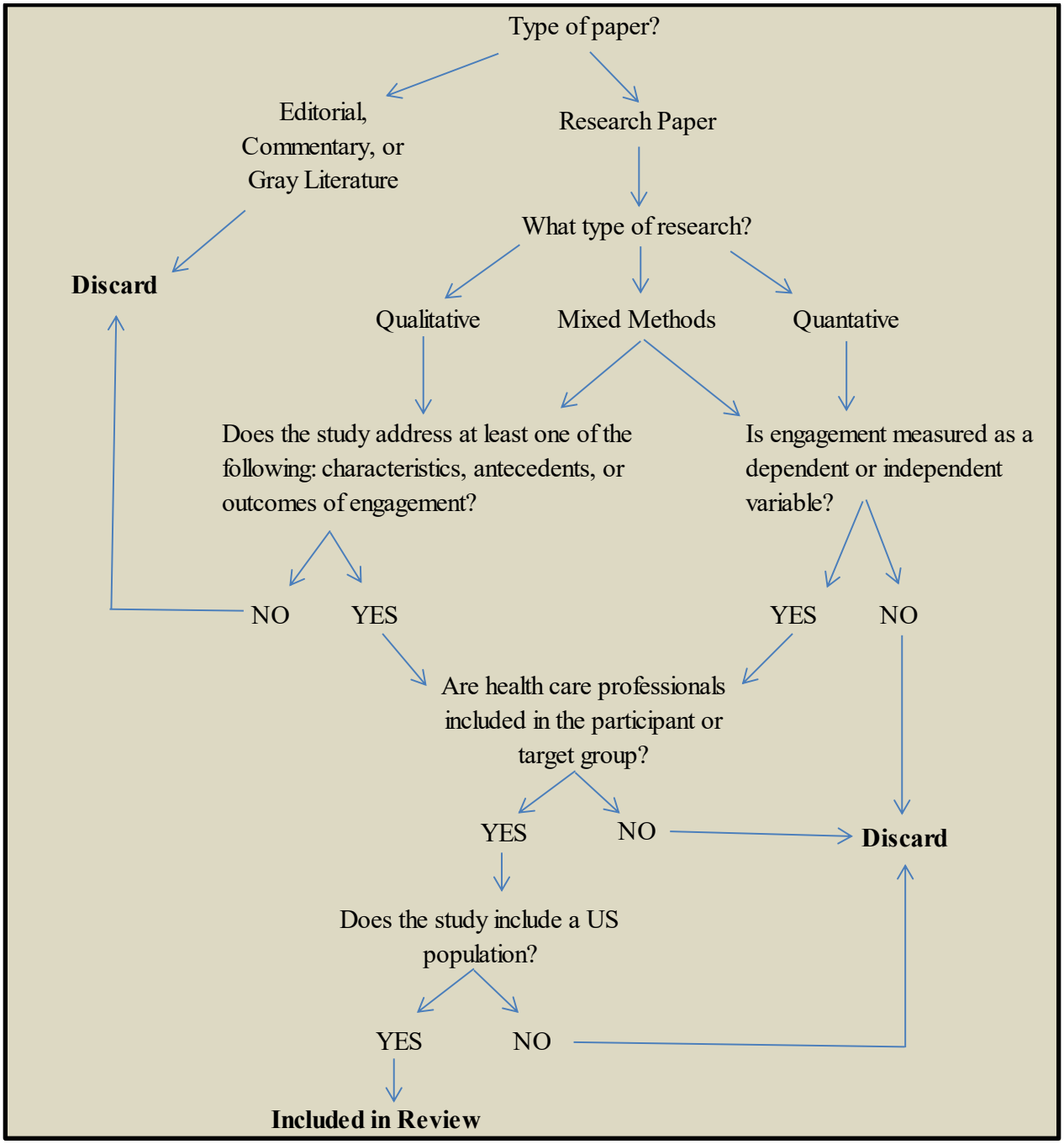


Figure 2.1. Decision algorithm used to determine inclusion or exclusion during abstract and full text review process. Included studies were research reports that either measured engagement as an independent or dependent variable (quantitative studies) or addressed the characteristics, antecedents, or outcomes of engagement (qualitative studies) in a U.S. healthcare worker population.

In addition, studies considered for inclusion had to either include engagement as an independent or dependent variable (quantitative studies), or specifically address characteristics, antecedents, or outcomes of engagement (qualitative studies). Additional inclusion criteria included a study population of healthcare workers working in the U.S. Papers using the term engagement as a synonym for participation with no further operationalization or measurement were excluded from this review. All papers where the decision to discard or advance was uncertain were advanced to the next round of screening.

All titles marked to advance to the second round of screening by at least one of the reviewers were retained, resulting in 1,247 abstracts undergoing review. Likewise, all abstracts marked for advancement to the third round by at least one reviewer were retained, resulting in 328 papers undergoing full text review by both reviewers. Any discrepancies regarding inclusion or exclusion recommendations after the full text review were discussed by both reviewers until agreement was reached. A PRISMA-style flow diagram for the study selection process is provided in Figure 2.2.

Data extraction. Next, data from the included studies was extracted into a data-charting form developed specifically for the purpose of answering the research questions (Levac et al., 2010). Primary data elements extracted from each study included: (1) the type of engagement addressed in the study (e.g., work engagement, job engagement); (2) the definition of engagement provided along with the related citation; (3) the method for measuring engagement in the study; (4) the types of healthcare professionals included in the study; (5) the study methodology and design characteristics; (6) all factors purported to be related to engagement in any way; and (7) all factors considered to be antecedents or outcomes of engagement in the study.

Figure 2.2. Flow Diagram for Study Selection

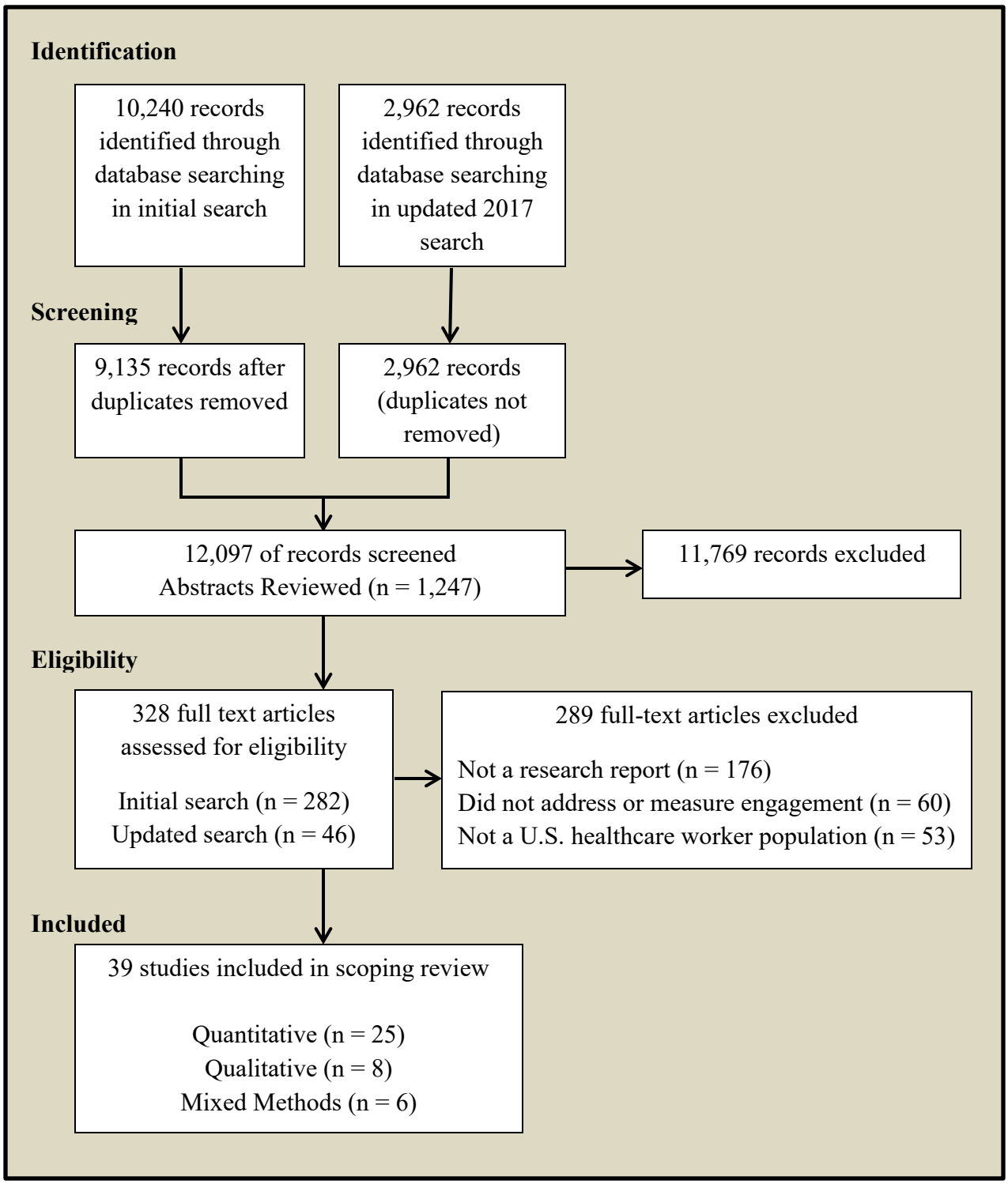


Figure 2.2. PRISMA-style flow of information through four stages of evidence synthesis

Additional data elements describing the purpose of the study, participant characteristics, and methods used to assess the factors related to engagement were also collected to provide greater breadth and depth to the interpretation of findings.

During the data extraction, each paper was also reviewed for methodological quality using the Mixed Methods Assessment Tool (MMAT) and given one of four quality scores ranging from low (25% of criterion met) to high (100% of criterion met) methodological quality (Pluye et al., 2011). The MMAT is a 19-item instrument that allows reviewers to assess the methodological quality of qualitative, quantitative, and mixed methods studies using a single critical appraisal tool. Scoring reliability for the MMAT ranges from fair agreement (κ = .21-.40) to excellent agreement (κ = .81-1.00) with the lower agreement found in the qualitative items (Souto et al., 2015).

Results

Scope and quality. The search of U.S. healthcare, business, psychology, and education literature between 2007 and 2017 identified 39 studies addressing healthcare worker's engagement (included studies marked by asterisk in reference section). Quantitative methodologies were the most commonly used (64%, n = 25) followed by qualitative (21%, n = 8) and mixed methods (15%, n = 6). The majority of these studies included nurses (72%, n = 28) followed by physicians (26%, n = 10) and administrators (23%, n = 9). Occupational, physical, and speech therapists were collectively included in only four studies (10%) as were pharmacists (10%, n = 4). Twelve studies (31%) included either support personal, non-clinical personal, or a variety of participants without clearly distinguishing job roles or professional designations.

Results of the quality assessment using the MMAT revealed that just over half of the studies (54%, n = 21) received lower quality scores, with 6 studies meeting only 25% of the

quality criteria and 15 meeting 50% of the criteria. Only six (15%) of the 39 studies received a high methodological score by meeting 100% of the quality criteria with the remaining 12 (31%) studies meeting 75% of the criteria. All of the studies were retained for further analysis as is consistent with methods for scoping reviews (Levac et al., 2010). The quality score for individual studies will be discussed in the sections related to the factors associated with engagement.

Operationalization and measurement of engagement. Results from the current review identified a lack of consistency in the operationalization and measurement of engagement which is consistent with prior multinational and multi-industry reviews (Bailey et al., 2017; Simpson, 2009a). Thirteen different terms were used to identify various forms of engagement (Table 2.2).

Table 2.2

Definitions by Forms of Engagement

Form of Engagement	Given Definition/Description	Source
Employee/Work Engagement	A positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption. (p. 74)	(Schaufeli et al., 2002)
	Personal engagement is the simultaneous employment and expression of a person's 'preferred self' in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional), and active, full role performances. (p. 700)	(Kahn, 1990)
	An engaged nurse should be inspired by his/her hospital, willing to invest discretionary effort, likely to recommend employer, and planning to remain with the hospital for the foreseeable future. (p. 15)	(Advisory Board Company, 2007)

	Personal involvement in and commitment to the work that motivates an employee to invest greater time, energy, and initiative in completing job assignments. (p. 222)	(Bacon & Mark, 2009)
	The relationship an individual has with his/her work, is related to employees' decisions regarding their employment, their commitment to the organization and their behaviour and interactions in the workplace. (pp. 170-171)	(Collini et al., 2015)
	Enthusiasm for and immersion in one's work and the extent to which that work meets the worker's needs. (p. 336)	(Rathert et al., 2009)
Job Engagement	The level of absorption and dedication an employee has toward his or her job, reflecting the degree to which employees apply their entire selves to their work roles. (p. 38)	(Owens et al. 2016)
Staff Engagement	Practices that help ensure employees' awareness and personal stake in the organization's vision and its current level of success in pursuing that vision. (p. 219)	(McAlearney et al., 2011)
Nurse Engagement	An engaged nurse should be inspired by his/her hospital, willing to invest discretionary effort, likely to recommend employer, and planning to remain with the hospital for the foreseeable future. (p. 15)	(Advisory Board Company, 2007)

Engaged Leadership/ Leadership Engagement	Model the personal qualities they are encouraging in their organization (eg, persistence, willingness to take risks, attention to outcomes, and personal accountability). Leaders should adopt a facilitative style that empowers staff to create and experiment with solutions that will move the organization toward its goals. Finally, leaders should be adaptive by providing 'visible and sustained leadership to lead overall culture change' as well as the concrete tools and strategies for achieving change. (p. S35)	McMullen et al., 2013)
Nurse Manager Engagement	Engaged nurse managers are identified by 10 signature behaviors: (1) mission driven, (2) generativity, (3) ardor, (4) identification, (5) boundry clarity, (6) reflection, (7) self-regulation, (8) attunement, (9) change agility, and (10) affirmative framework. (p. 120)	(Mackoff & Triolo, 2008a)
	Longevity and excellence. (p. 170)	(Mackoff & Triolo, 2008b)
Physician Engagement in Healthcare Change	Doctors' willingness to alter their behaviour and to involve themselves in the process of change. (p. 42)	(Kreindler et al., 2014)
Physician Engagement in Health Disparities	A multistage process that includes 1) awareness of the issue, 2) reflection on the issue and one's potential role in addressing it, 3) empowerment, or the realization that one has the capacity to make a difference, and 4) action undertaken to address the issue. (p. 775)	(Alexander et al., 2008)
Physician Engagement in Quality Improvement	Physicians who exhibited personal involvement in the QI project, including a commitment to working within the QI team structure. (p. 467)	(Caverzagie et al., 2009)

Engagement in Activities of Legitimacy	Participation in professional meetings, membership in societies, developing quality and process improvement projects, acknowledgment as full member of a team, engagement with clinical leadership and policy and procedure development. (p. 477)	(McLemore et al., 2015)
Professional Engagement	Professional engagement is an energizing state of mind characterized by vigor, dedication, and focus. It requires continual learning and keeping up with the profession of pharmacy, and a desire to advance the profession. It is a persistent and pervasive affective-cognitive state, where: Vigor = high energy and mental resilience, Dedication = strongly involved in one's profession with a sense of significance, enthusiasm, inspiration, pride, and challenge, and Absorption = fully concentrated, in tune to what is going on around one and happily engrossed in one's profession. (p. 3)	(Aronson et al., 2012).
	The professionally engaged pharmacist thinks and behaves in ways that positively affect patients' health and advance the profession's values and societal mission. (p. 406)	(Miklich et al., 2016).

The most commonly identified terms were *work engagement* (n = 17) and *employee engagement* (n = 9). These terms are considered interchangeable and will be collectively referred to as work engagement henceforth (Schaufeli & De Witte, 2017b). Work engagement accounted for 26 (67%) of the 39 studies included in the review. The terms nurse manager engagement, physician engagement in health disparities, and professional engagement were each used in two of the reviewed studies with each of the remaining terms only being used in one study.

A total of 18 different definitions or descriptions were used to describe the 13 identified forms of engagement. The most common definition of engagement, represented in 16 (41%) of the reviewed studies, comes from the work of Schaufeli, Salanove, González-Romá, and Bakker (2002) – "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (p. 74). The next most commonly used definition, used in only three studies, was the original definition of engagement proposed by Kahn (1990). A range of other engagement definitions were identified but only used in one or two studies. All of the definitions recognized engagement as a set of beliefs and/or behaviors, with variability in which beliefs and behaviors were conceptualized as engagement both within and between the 13 identified forms of engagement.

The review by Bailey et al. (2017) grouped studies of work engagement into one of six categories based on operational definition. Although useful in grouping studies that address differing operational definitions related to one form of engagement, the current review included multiple forms of engagement and therefore required a different approach to the grouping of studies. After reviewing the themes of engagement among the included studies, locus of engagement (i.e., object of engagement) was identified as a useful means of grouping similar studies. This choice of categorization criteria is also aligned with recommendations that future research address the locus of engagement (Bailey et al., 2017). Using locus of engagement as a conceptual lens, the 39 reviewed studies were grouped into four categories of engagement: *work engagement*, *leadership engagement*, *professional engagement*, and *engagement in healthcare change*. Table 2.3 provides a list of studies classified under each locus of engagement along with the instrument used to measure engagement. The measurement instruments are discussed in the contexts of the locus of engagement in the following sections.

Table 2.3

Locus of Engagement and Measurement Instrument by Study

Locus of Engagement	Studies	Measurement Instrument	Properties (Cronbach's alpha)
Work Engagement	(Anderson et al., 2009)	Study-specific employee engagement questionnaire	Not Reported
	(Bacon & Mark, 2009)	RN unit tenure (months) NECCS (used 16 items)	Not Reported
	(Rathert et al., 2009)	Nine items from May, Gilson, & Harter (2004)	.57
	(Simpson, 2009)	9-item UWES	Full scale = .92 Subscale = .79 - .86
	(Palmer et al., 2010)	UWES	Full scale = .90 Subscales = .70 - .85
	(Lawrence, 2011)	UWES	Not Reported
	(McAlearney et al., 2011)	N/A - Qualitative	N/A
	(Rivera et al., 2011)	NES DoE	NES = .84 DoE = .97
	(Warshawsky et al., 2012)	UWES	.89
	(Brunetto et al., 2013)	9-item UWES	Not Reported
	(Havens et al., 2013)	9-item UWES	Not Reported
	(Wonder, 2013)	17-item UWES	Subscales = .78 - .87
	(Kuykendall et al., 2014)	NES	Not Reported
	(Mason et al., 2014)	17-item UWES 9-item UWES	UWES-17 Full scale = .92 UWES-9 Full scale= .82-.86 Subscales = .75-.87

	(Aboumatar et al., 2015)	N/A - Qualitative	N/A
	(Collini et al., 2015)	6 items taken from the HR Solutions 'Sweet 16'	.91
	(Agarwal & Karpouzian, 2016)	15-item UWES	Not Reported
	(Byrne et al., 2016)	18-item JES 17-item UWES	JES = .93 - .96. UWES = .93 - .95.
	(Collier et al., 2016)	Gallup Q^{12}	Not Reported
	(DiNapoli et al., 2016)	9-item UWES	Full scale = .91 Subscales = .75 - .84
	(Fragoso et al., 2016)	18-item JES 17-item UWES	JES = .95 UWES = .91
	(Owens et al., 2016)	9-item JES	.94 - .96
	(Siller et al., 2016)	9-item UWES	Full scale = .93 Subscales = .74 - .88
	(Tullar et al., 2016)	Participation in an engagement program	N/A
	(Byrne et al., 2017)	18-item JES	.96
	(Perrigino et al., 2017)	Study-specific employee engagement questionnaire	.85
	(Sexton et al., 2017)	JD-R - Workforce engagement related scales	.82-.92
	(Wonder et al., 2017)	17-item UWES	.77 - .91
	(Yang et al., 2017)	9-item UWES	.85 - .99
Leadership Engagement	(Mackoff & Triolo, 2008a)	NMEQ	N/A - Interview protocol
	(Mackoff & Triolo, 2008b)	NMEQ	N/A - Interview protocol
	(McMullen et al., 2013)	N/A - Qualitative	N/A

	(Aboumatar et al., 2015)	N/A - Qualitative	N/A
Professional Engagement	(Aronson et al., 2012)	N/A - Delphi study	N/A
	(McLemore et al., 2015)	N/A - Qualitative	N/A
	(Miklich et al., 2016)	N/A - Delphi study	N/A
Engagement in Healthcare Change	(Vanderbilt et al., 2007)	N/A - Qualitative	N/A
	(Alexander et al., 2008)	9-item AREA	Alpha Not Reported AGFI = .91
	(Caverzagie et al., 2009)	N/A - Qualitative	N/A
	(Kreindler et al., 2014)	N/A - Qualitative	N/A

*Note***.** Psychometric properties are reported only as they relate to the studies included in the review; N/A = Not applicable, UWES = Utrecht Work Engagement Scale, JES = Job Engagement Scale, RN = Registered Nurse, NECCS = Nursing Expertise and Commitment to Care Scale, NES = Nursing Engagement Survey, DoE = Drivers for Engagement from the Nursing Engagement Survey, JD-R = Job Demands-Resources Questionnaire, NMEQ = Nurse Manager Engagement Questionnaire, AREA - Awareness Reflection/Empowerment Action Questionnaire, AGFI = Adjusted Goodness of Fit Index

Work engagement. Studies were grouped under work engagement if the locus of engagement in the study was one's place of employment, job, work tasks or assignments, or role as an employee. In total, 29 (47%) of the reviewed studies investigated work engagement which were inclusive of the terms work engagement, employee engagement, job engagement, staff engagement, and nurse engagement. Despite the common focus on employees' engagement with their work, nine different definitions of engagement were represented along with 13 different methods of assessing engagement. The most common instrument for measuring work engagement was the Utrecht Work Engagement Scale which is available in a variety forms ranging from three to 17 items (Schaufeli, 2017). The Utrecht Work Engagement Scale was used in 15 (52%) of the 29 studies and consistently demonstrated good internal consistency ($\alpha > 0.74$) when reported. The next most commonly used instrument was the Job Engagement Scale

originally developed by Rich, Lepine, and Crawford (2010). The Job Engagement Scale was used in four (14%) of the reviewed work engagement studies and also demonstrated good internal consistency ($\alpha > .93$) for both the nine and 18 item versions.

Other standardized instruments for measuring work engagement included questionnaires developed by consulting firms such as the HR Solutions 'Sweet 16' (Avatar HR Solutions, 2012), the Advisory Board Nursing Engagement Scale (Advisory Board Conpany, 2018) or the Gallop Q^{12} (Gallup Inc., 2018). Several studies either extracted specific items from existing scales (Bacon & Mark, 2009; Rathert, Ishqaidef, & May, 2009; Sexton et al., 2017) or developed study-specific questionnaires (Anderson, Linden, Allen, & Gibbs, 2009; Perrigino, Dunford, Troup, Boss, & Boss, 2017). Two studies used proxy measures of engagement which included number of months working in a particular hospital unit (Bacon & Mark, 2009) and participation in an engagement program (Tullar et al., 2016). An additional two studies used qualitative methodology to describe the relation between work engagement and high-performing healthcare organizations (Aboumatar et al., 2015; McAlearney et al., 2011). Internal consistency for the various instruments ranged from ($\alpha = .57 - .97$) when reported.

In summary, review of the operationalization and measurement of work engagement in the U.S. healthcare worker literature demonstrates a strong influence from the definition of engagement proposed by Schaufeli et al. (2002) and measured by the Utrecht Work Engagement Scale. Beyond this operationalization there is some clustering around the definition of engagement offered by Kahn (1990) and measured using the Job Engagement Scale, followed by a variety of other operational definitions and methods of measurement that only appear in one or two studies. Work engagement was also the only form of engagement addressed by consulting firms which use proprietary instruments to measure engagement.

Leadership engagement. Studies were grouped under leadership engagement if the locus of engagement in the study was one's role as a leader. Four (10%) of the 39 reviewed studies were classified as leadership engagement studies with two of the studies (Mackoff & Triolo, 2008a; 2008b) representing different analyses from the same data set. As with work engagement, definitions of engagement focused on beliefs and behaviors. However, the beliefs and behaviors representing leadership engagement were different from those represented in work engagement. One potential reason for this difference is that all of the leadership engagement studies used qualitative methodologies to identify emergent themes as opposed to using established definitions to test hypotheses.

For example, Mackoff and Triolo (2008a, 2008b) used a 90-minute interview protocol called the Nurse Manager Engagement Questionnaire to identify the values, characteristics, and experiences associated with nurse manager engagement. Results from this pair of studies suggest that engaged nurse managers demonstrate longevity and excellence, and are: (1) mission driven, (2) take pleasure in developing others, (3) passionate, (4) able to identify with the work and those they supervise, (5) able to establish clear boundaries, (6) reflective, (7) self-regulated, (8) attuned to diverse perspectives and needs, (9) able to embrace change, and (10) have a positive outlook. McMullen and colleagues (2013) conducted interviews with nine members of senior leadership from six healthcare organizations resulting in a model of an engaged leader as someone who models desired personal qualities, facilitates and empowers staff, and is adaptive to change. The study by Aboumatar et al. (2015) identified both work engagement and leadership engagement as aspects of high-performing healthcare organizations and is therefore represented in both categories. However, neither work engagement nor leadership is well defined in this study making interpretation of the findings challenging.

In summary, review of the conceptual definitions and measurement of leadership engagement in the U.S. healthcare worker literature demonstrates the limited role leadership engagement has played in the literature over the last decade. Given the lack of studies on the topic, a lack of consensus on the definition of leadership engagement is not surprising. Furthermore, the lack of a clear definition has also impeded the ability to measure leadership engagement among U.S. healthcare workers. This area of engagement provides ample opportunity for future research.

Professional engagement. Studies were grouped under professional engagement if the locus of engagement in the study was one's profession (e.g. pharmacy). Three studies were classified as professional engagement studies with two related to the pharmacy profession (Aronson, Janke, & Traynor, 2012; Miklich, Reed, Mattingly, & Haines, 2016) and one related to nursing (McLemore, Levi, & James, 2015).

The two studies led by Aronson and Miklich used a Delphi technique to develop a definition of professional engagement in the pharmacy profession while McLamore and colleagues used results from interviews with nurses to define engagement as participation in a set of professional activities. Similar to the McLamore study, the Aronson and Miklich studies also identified behaviors considered indicative of engagement in one's profession but these were not included in the definition.

Consistent with other engagement definitions, professional engagement is conceptualized in these studies as a combination of beliefs and behaviors. Aronson and colleagues used the definition of engagement proposed by Schaufeli et al. (2002) as a foundation and then modified the definition to reflect the locus being on the pharmacy profession. The definitions proposed by

Miklich et al. and McLemore et al. were not aligned with any prior definitions of engagement. There were no instruments for measuring professional engagement identified in the literature.

In summary, review of the conceptual definitions and measurement of professional engagement in the U.S. healthcare worker literature demonstrates a very limited body of knowledge in this area. While the proposed definitions of professional engagement address positive beliefs and behaviors similar to other forms of engagement; the lack of agreement on a definition, the lack of instruments for measurement, and the fact that currently only two of the numerous healthcare professions are represented in this literature base provides extensive opportunity for future research.

Engagement in healthcare change. Studies were grouped under engagement in healthcare change if the locus of engagement in the study was one's engagement in initiatives that are intended to improve the quality, access, or cost of healthcare. Four (10%) of the 39 reviewed studies were classified as engagement in healthcare change studies with two of the studies focused on improving health disparities (Alexander, Lin, Sayla, & Wynia, 2008; Vanderbilt et al., 2007) and the other two focused on intra-organizational quality improvement changes (Caverzagie, Bernabeo, Reddy, & Holmboe, 2009; Kreindler et al., 2014). Physicians were the only healthcare worker group represented in these studies.

Overall, there was general agreement on the operationalization of engagement among the studies with a healthcare change locus. Alexander et al. (2008) provided the most comprehensive definition, stating that engagement in healthcare change is a multistage process that includes:

> (1) Awareness of the issue, (2) Reflection on the issue and one's potential role in addressing it, (3) Empowerment, or the realization that one has the capacity to make a difference, and finally (4) Action undertaken to address the issue. (p. 775)

These authors proposed an Awareness, Reflection/Empowerment, Action model of engagement in healthcare change and developed a questionnaire to measure an individual's readiness to engage in change activities. Although the study and questionnaire were focused specifically on physicians' engagement in healthcare disparities, the conceptual model and structure of the questionnaire could easily be adapted to other healthcare workers or areas of healthcare change.

The other three studies used qualitative methods to explore factors associated with the decision to participate in change initiatives. Given the structure provided by Alexander et al. (2008), the lack of representation from other healthcare professions, and the continued need for healthcare reform; there is considerable opportunity for future research into healthcare workers' engagement in healthcare change.

Factors associated with engagement. A total of 130 unique factors reported to be associated with engagement were identified in the 39 reviewed studies. Appendix A provides a complete list of factors along with: (1) an operational definition derived from the definitions or descriptions of the factors in the reviewed studies, (2) an indication of the number of studies in which each factor has been evaluated. (3) the average MMAT score for the relevant studies, (4) the mode of assessment used to identify or measure each factor in the reviewed studies, and (5) the locus of engagement in which each factor has been studied along with an indication of the direction of association (i.e. negative, positive, or no association).

Fewer than half of the identified factors (n = 61, 47%) were assessed by more than one study and 60% (n = 78) were only studied in the context of a work locus of engagement. Combined with the generally moderate MMAT average scores (46% - 57%) for the most frequently studied factors (included in ≥ 5 studies), the findings from this review indicate a lack of depth and quality of evidence related to the factors associated with engagement in the U.S.

healthcare worker population. The following sections provide a synthesis of the studies related to the most frequently studied factors.

Age and gender. Age and gender were identified as two of the three most studied factors associated with engagement in U.S. healthcare worker populations. Both factors have predominately been study in the context of a work locus of engagement with gender also represented in one study with a healthcare change locus. Eight of the nine studies (Byrne, Albert, Manning, & Desir, 2017; Havens, Warshawsky, & Vasey, 2013; Owens, Baker, Sumpter, & Cameron, 2016; Palmer, Griffin, Reed, & Fitzpatrick, 2010; Rivera, Fitzpatrick, & Boyle, 2011; Simpson, 2009b; Warshawsky, Havens, & Knafl, 2012; Yang, Sliter, Cheung, Sinclair, & Mohr, 2017) investigating age primarily through cross sectional survey studies identified a positive correlation with engagement. However, the study by Byrne et al. (2016) found mixed results for age across different samples that included both healthcare workers and non- healthcare workers, with some samples showing a positive correlation and others showing no correlation.

The inverse was true for gender with seven of eight cross sectional survey studies (Agarwal & Karpouzian, 2016; Byrne et al., 2017; Byrne et al., 2016; Owens et al., 2016; Rivera et al., 2011; Wonder, 2013) finding no correlation and only one study (Alexander et al., 2008) with a healthcare change locus identifying a positive correlation for being female. The average MMAT scores for the studies investigating age and gender were each 56%, indicating a mix of high and low quality studies.

Culture of regard and support. Seven studies addressed the relation between U.S. healthcare workers' engagement and organizational cultures characterized by terms such as respectful or supportive. Five of the studies (Brunetto et al., 2013; Byrne et al., 2016; Collini, Guidroz, & Perez, 2015; Kuykendall, Marshburn, Poston, & Mears, 2014; Owens et al., 2016)

conducted cross sectional surveys and one study (Yang et al., 2017) used a weekly diary questionnaire to quantitatively investigate a culture of regard and support in the context of a work locus of engagement. The qualitative study by Mackoff and Triolo (2008b) also explored this factor from the context of a leadership locus of engagement. Five of the six survey studies identified a positive correlation between work engagement and a culture of regard and support while the other study (Yang et al., 2017) demonstrated a negative correlation. Results from the qualitative study also revealed a theme suggesting a positive association between engagement and a culture of regard and support for nurse managers. The average MMAT score for all seven studies was 57% indicating a mix of higher and lower quality studies.

Years in setting/tenure. Six studies investigated the relation between engagement and length of time working in a particular setting or for a healthcare organization. Five studies (Havens et al., 2013; Owens et al., 2016; Palmer et al., 2010; Rivera et al., 2011; Warshawsky et al., 2012) used cross-sectional surveys while one study (Yang et al., 2017) conducted longitudinal surveys to assess for correlations. Three of the studies found no correlation (Rivera et al., 2011; Warshawsky et al., 2012; Yang et al., 2017), one found a positive correlation (Palmer et al., 2010), and one found a negative correlation (Havens et al., 2013). The study by Owens et al. (2016) found mixed results among two groups of healthcare organization employees with one sample showing a positive correlation and the other no correlation. The average MMAT score for the five studies was 56% indicating a mix of higher and lower quality studies.

Work shift. Six studies investigated the influence of the work shift (e.g., day shift or night shift) on nurses' level of work engagement. Five of the studies (Kuykendall et al., 2014; Mason et al., 2014; Rivera et al., 2011; Simpson, 2009b; Wonder, 2013) used cross-sectional survey designs while one study (Wonder, York, Jackson, & Sluys, 2017) used a comparative

correlational study design with two time-points. Only one of the five studies (Rivera et al., 2011) identified a positive correlation between working the day shift and work engagement while the rest found no correlation. The average MMAT score for these five studies was 54% indicating a mix of higher and lower quality studies.

Education level/degree. Six studies investigated the relation between nurses' level of education or degree on work engagement. Five studies (Lawrence, 2011; Palmer et al., 2010; Rivera et al., 2011; Warshawsky et al., 2012; Wonder, 2013) used cross-sectional surveys while one study (Wonder et al., 2017) used a comparative correlational study design with two time-points. There was no correlation found in any of the studies. The average MMAT score was 46% indicating less than half of the quality criteria were met.

Perception of autonomy. Five studies investigated U.S. healthcare workers' sense of freedom and independence at work and how this influenced engagement. Four of the studies (Fragoso et al., 2016; Kuykendall et al., 2014; Rivera et al., 2011; Simpson, 2009b) investigated work engagement using a cross-sectional survey of nurses, with the study also including emergency medical technicians and paramedics. Yang et al. (2017) was the only study to use a longitudinal survey design. Each study used a different instrument to measure perception of autonomy with four of the studies finding a positive relation with engagement and one study (Yang et al., 2017) finding no correlation. The average MMAT score for the four studies showing a positive relation was 50% of the quality criteria met, as was the score for the one study showing no relation.

Passion. Five studies investigated how U.S. healthcare workers' sense of excitement or passion toward a leadership, work, or professional locus influenced engagement. The two studies (Kuykendall et al., 2014; Rivera et al., 2011) that focused on work engagement conducted cross-

sectional surveys and used the Passion for Nursing Index of the Nursing Engagement Survey to evaluate passion. Both studies identified a positive correlation between work engagement and passion. The average MMAT score for the two studies was 37.5% indicating less than half of the quality criteria were met.

Two of the five studies (Aronson et al., 2012; Miklich et al., 2016) focused on professional engagement. Both of these studies used a Delphi technique to derive a set of beliefs and behaviors associated with professional engagement in the pharmacy profession. Both studies identified beliefs and behaviors associated with a sense of passion for the pharmacy profession as important characteristics of professional engagement. The average MMAT score these two studies was 62.5% with one study only meeting 25% of the quality criteria and the other meeting 100%.

The fifth study (Mackoff & Triolo, 2008a) used a structured interview protocol to explore nurse managers' perceptions of leadership engagement. Themes consistent with a sense of passion for leadership were identified as being an important aspect of an engaged nurse manager. This study met 50% of the MMAT quality criteria.

Years in practice. Five studies investigated the relation between total years in practice and engagement. Four studies (Palmer et al., 2010; Rivera et al., 2011; Simpson, 2009b; Warshawsky et al., 2012; Wonder et al., 2017) used cross-sectional surveys while one study (Wonder et al., 2017) used a comparative correlational study design with two time-points. A positive correlation was identified between years in practice and engagement in two studies (Palmer et al., 2010; Rivera et al., 2011) while no correlation was found in the remaining 3 studies. The average MMAT score was 55% indicating just over half of the quality criteria were met.

In summary, the factors most frequently studied for their relation with engagement in the U.S. healthcare worker population are: (1) age, (2) gender, (3) organizational cultures of regard and support, (4) years worked in a particular setting or tenure at an organization, (5) work shift, (6) level of education or degree earned, (7) perceptions of autonomy at work, (8) passion, and (9) total number of years in practice. Nurses are by far the most represented population in these studies and all but three studies focus on a work locus of engagement. Two studies investigated professional engagement using a Delphi technique to identify a set of beliefs and behaviors that represent professional engagement in the pharmacy profession while one study used in-depth interviews to explore leadership engagement among nurse managers. The majority of studies used a cross-sectional survey design with an average MMAT score for each factor ranging from 37.5% to 62.5%, indicating a generally moderate to low number of quality criteria being met by the included studies.

The findings from this review indicate that age, a culture of regard and support, perception of job autonomy, and passion are generally found to be positively correlated with work engagement and are hypothesized to have a positive association with leadership and professional engagement. Gender, work shift and education level do not generally appear to be correlated with work engagement. However, there is minimal evidence to suggest that working the day shift may be positively correlated with work engagement in some situations, and that being female may be positively associated with engagement in healthcare change. There is also mixed evidence for the association between work engagement and the number of years worked in a setting or tenure with an organization.

Antecedents and outcomes of engagement. The final analysis in this review looked at the 29 quantitative studies to determine if the study designs warranted claims of the associated

factors as antecedents or outcomes of engagement. The majority of these studies (n = 25, 86%) used a cross-sectional survey design, limiting the ability to draw conclusions beyond the presence or absence of correlations between engagement and factors. Although potentially useful for generating hypotheses, cross-sectional study designs are not able to demonstrate causality and can be heavily influenced by selection bias (Pandis, 2014). Only four studies included at least two time points for assessments and two of the four studies had major limitations that hinder the ability to draw any useful conclusions. A useful synthesis of the results was not possible due to the limited number of studies, differences in focus between studies, and low quality of evidence. Instead, a brief description of each study with comments on the relevance and implications for future research is provided.

The first study, by Anderson et al. (2009), compared the level of engagement for three cohorts of new-hire nurses before and after participating in a nursing residency program. Engagement was measured using a study-specific engagement questionnaire. However, minimal detail was provided regarding the contents of the questionnaire and no psychometric properties were reported. The authors did report a significant improvement on the engagement questionnaire post residency but no statistical values were given. The lack of information regarding the questionnaire and statistical outcomes limits the ability to draw any conclusions from this study.

The second study, by Tullar et al. (2016), used an interrupted time series study design to investigate the effect of an employee engagement program on retention rates. A total of 184 participants from one hospital with job titles of nurse assistants, patient care assistants, patient care technicians, or unit secretary completed the program which was used as a proxy measure of engagement. Employee retention records for these job categories were obtained for the period

beginning one year prior to the start of the program and ending one year after the completion of the program. After adjusting for PRN (*pro re nata,* working on an as needed basis) job status, receiving paid-time-off payouts, overtime eligibility, and increased age; the employees who participated in the engagement program had a significantly lower termination risk compared to the non-participating employees (0.37 times the risk of nonparticipants, 95% CI [0.17, 0.57]). Although the lack of measurement of engagement limits the ability to compare this study with other engagement studies, the findings suggest that an intensive program designed to improve employee engagement may result in improved retention rates. Further research with accepted measures of engagement and replication of findings with other populations is needed before useful conclusions can be determined.

In the third study, Wonder et al. (2017) compared nurses' level of engagement as measured by the 17-item Utrecht Work Engagement Scale during a period when the hospital of interest held a Magnet® designation and again two years after losing this designation. The Magnet® designation is awarded through the American Nurses Credentialing Center and recognizes hospitals that have organizational structures that support nurse engagement. The authors found a decrease in mean total work engagement score from time-point one ($M = 4.6$, $SD = 0.6$) to time-point two ($M = 4.2$, $SD = 0.7$) indicating less engagement after losing the Magnet® designation. A major limitation recognized in the study was a statistically significant difference ($p < .0001$) in the population of respondents at the second time-point compared to the first, likely as a result of staff turnover. Due to this limitation, a direct cause and effect relation between Magnet® status and engagement cannot be determined.

For the final study, Yang et al. (2017) investigated the influence of providing social support to others, a culture of regard and support, and perception of job autonomy on work

engagement as measured by the nine-item version of the Utrecht Work Engagement Scale. In this study, 142 nurses completed baseline and weekly electronic questionnaires asking about their experiences over the prior week. Results from this study indicate that providing support to others may have a positive effect on work engagement when supervisor support is considered low, or a negative effect when supervisor support is considered high. In addition, work engagement was not influenced by perceived job autonomy in this study, which is in contrast to prior studies. A strength of this study was the repeated measures collected on a weekly basis. However, it is unclear how quickly support experiences and job autonomy act on work engagement which may have contributed to the nonsignificant findings. This study raises some interesting questions related to possible interactions between various factors and the resulting effect on engagement. Future research is needed to better clarify these relations.

Discussion

The primary aims of this scoping review were to contextualize the last decade of engagement literature in relation to U.S. healthcare workers and identify associated antecedents and outcomes. A relatively small number of studies that addressed U.S. healthcare workers were identified when considered against the large body of extant engagement literature. One potential reason is that much of the engagement literature is based on the perspective of engagement as an antidote to burnout, which is considered a medical condition eligible for disability payments in several European countries but has historically received less attention in the U.S. (Schaufeli & De Witte, 2017a). Although relatively few in number, there has been a considerable increase in U.S. healthcare worker engagement studies since the review conducted by Simpson (2009a) a decade ago. Growing concern for U.S. healthcare workforce shortage and burnout, particularly in the nursing and medical professions, may be a contributing factor in this increase in studies

(Bodenheimer & Sinsky, 2014; Cox, Willis, & Coustasse, 2014). However, much of this literature is of low quality with non-experimental study designs, limiting the ability to draw causal conclusions regarding antecedents and outcomes. This review adds to the current body of knowledge by contextualizing the literature in terms of locus of engagement and suggesting a framework for future research.

Multi-loci engagement. Similar to prior reviews (Bailey et al., 2017; Simpson, 2009a), results from this review indicated that the definition of work engagement proposed by Schaufeli et al. (2002) was the most frequent operationalization of engagement in the U.S. healthcare worker population. However, there was still considerable variability on operationalization within the reviewed studies. Building on the recommendations from Bailey et al. (2017), four distinct categories of engagement studies were identified based on the locus of engagement: work, leadership, profession, and healthcare change. The concept of locus of engagement has received very little attention in the literature. A search of the databases used in this review, as well as Google Scholar, identified only one publication related to locus of engagement; a project report from the Kingston University Chartered Institute of Personnel and Development (CIPD) in London, U.K. (Gourlay et al., 2011). This report provides an overview of the engagement literature and suggests that engagement may be tied to one or more specific objects of focus (e.g., job tasks, organization, managers, profession, family, etc.) as opposed to a general state of the individual. In other words, an individual may be engaged in some parts of his or her work and personal life without being engaged in others.

The CIPD report also presents findings from a study conducted by researchers from the CIPD which is the only identified empirical evidence explicitly related to locus of engagement. In this study, researchers conducted cross-sectional surveys and in-depth interviews with

employees from three companies in the U.K. that are part of the Kingston Employee Engagement Consortium. The study looked at employees' level of engagement with a variety of loci and the relation to performance. Findings from this study indicate that employees are more engaged in aspects of their job that are tangible and experienced frequently (e.g., job tasks, immediate colleagues, and direct managers) as opposed to those that are more abstract and less frequently experienced (e.g. values of an organization or individuals outside the organization). In addition, each locus of engagement had a positive relation to job performance but there were differences in the strength of this relation depending on the locus of engagement. Although all of the organizations were in the U.K. and none were in the healthcare sector, findings from this report support the idea of locus of engagement as a possible important topic for study in U.S. healthcare worker populations.

Additional questions rising from this preliminary work on locus of engagement include the extent that one can experience multi-loci engagement and under what circumstances do multiple loci of engagement enhance or detract from one another? For example, healthcare workers in teaching hospitals may have multiple work roles including clinical care, teaching, and administrative duties. Can these healthcare workers be equally engaged in two or more work roles? In addition, can healthcare workers be equally engaged in one or more work role and also engaged in loci outside of their work such as a hobby or secondary career? If so, under what conditions does multi-loci engagement enhance or impair healthcare workers' performance, persistence and achievement? Understanding these aspects of engagement may assist healthcare workers and organizational leaders better design work environments and cultures to achieve optimal outcomes for patients and employees.

Several types of research are needed to investigate these questions. First, high quality qualitative research is needed to identify the loci of engagement that appear meaningful to U.S. healthcare workers. Once identified, agreement on operational definitions for various loci of engagement is needed as well as development of reliable instruments to identify or measure engagement in this context. The Awareness Reflection/Empowerment Action model and related questionnaire for engagement in healthcare change proposed by Alexander et al. (2008), and the definitions of professional engagement and characteristic behaviors proposed by Aronson et al. (2012) and Miklich et al. (2016), provide a good example of the type of work needed. High quality experimental studies are also needed to better understand the nature and direction of relations between the loci of engagement and proposed antecedents and outcomes.

Influence of locus of engagement on antecedents and outcomes. The findings from this review indicate that relatively little is known about the factors that promote engagement among U.S. healthcare workers or what outcomes are achieved as a result of engagement. The prior section on antecedents and outcomes provided a detailed description of the findings from this review. In addition to the general need for more research in this area, future studies should investigate potential antecedents and outcomes in the context of locus of engagement. While some antecedents and outcomes may have a general effect across all loci of engagement, others may be more context-dependent. For example, this review found no relation between U.S. healthcare workers' gender or race when examined in a work locus of engagement while a positive relation was found for being female or of a minority status when examined in a healthcare change locus of engagement. Of the 130 factors identified in this review, 22 (17%) were investigated in the context of more than one locus of engagement and only five factors (4%) were studied in more than two loci. Evidence of a locus-dependent influence among factors

associated with engagement, or identifying which factors have a general versus locus-dependent influence, would improve the understanding of engagement as a general characteristic as proposed by Schaufeli (2002) or a context-dependent factor as proposed by Kahn (1990). Improving this understanding would provide healthcare organization leaders with important information for designing and measuring the impact of initiatives aimed toward enhancing employee engagement.

Autonomous motivation as an antecedent of engagement. Another interesting finding from this review is that although engagement is generally considered to be a motivational state (Byrne et al., 2017), motivational theory was not used as a theoretical framework by any of the reviewed studies. One theory that appears relevant to the study of engagement in U.S. healthcare workers is Self-Determination Theory (Ryan & Deci, 2000). According to Self-Determination Theory, individuals have three basic psychological needs (autonomy, competency, and relatedness) that influence normal behaviors. Autonomy relates to one's ability to exercise choice or agency in the events of their life (i.e., self-determination), competency relates to one's confidence or perceived ability to perform or succeed in a particular activity, and relatedness addresses one's need to feel connected to important others or to a particular community. Another influence on behavior is the extent to which an individual feels they have the ability to choose to participate in the behavior (*autonomous regulation*) or feels compelled to participate (*controlled regulation*) by some external factor such as reward, punishment, guilt, or shame. In Self-Determination Theory, an individual's motivation to perform a particular behavior exists on a continuum ranging from amotivation (a complete lack of desire or intent) to intrinsic motivation (a desire to perform based on personal interest and enjoyment). In between are multiple levels of extrinsic motivation (a desire to perform in order to receive a reward or avoid punishment) that

progressively move from more controlled to more autonomously regulated forms of extrinsic motivation (see Ryan & Deci 2000 for description of levels). According to Self-Determination Theory, behaviors that help fulfill an unmet basic psychological need and are more autonomously regulated are more likely to be performed. In addition, greater persistence, performance, and achievement are experienced when behaviors are more autonomously motivated (Koestner, Otis, Powers, Pelletier, & Gagnon, 2008; Stone, Deci, & Ryan, 2009). Prior studies have supported the use of Self-Determination Theory as a motivational theory in both the work and healthcare professions education contexts (Deci, Olafsen, & Ryan, 2017; Gagne & Deci, 2005; Kusurkar & Croiset, 2015; Orsini, Binnie, & Wilson, 2016).

Many of the factors investigated for their relation to engagement in this review can be considered from the perspective of Self-Determination Theory. For example, the factor identified as perception of job autonomy clearly matches with the psychological need for autonomy and would represent a work environment that is supportive of autonomous motivation. Four out of the five studies that included this factor in a work locus of engagement context identified a positive correlation. Other examples of factors that could be viewed from a Self-Determination Theory perspective include professional growth and development and psychological availability/confidence (need for competence), culture of regard and support and inter and intra-professional relationships (need for relatedness) just to name a few. Another factor, performance-driven reward/recognition, was positively correlated with work engagement despite appearing to be an example of controlled motivation. This finding is in line with prior research that shows performance-driven rewards do not have a negative impact on intrinsic motivation because the reward is viewed as positive performance feedback which supports a feeling of competence (Cameron & Pierce, 1994).

Regardless of which operationalization of engagement is used, descriptions of engaged employees are consistent with more autonomously regulated forms of motivation. Prior studies have used the Multidimensional Work Motivation Scale (Gange et al., 2015) and modified versions of the Academic Motivation Scale (Sobral, 2004; Sockalingam et al., 2016) to measure relative degrees for autonomous and controlled motivation in the organizational and educational settings respectively. Investigating the influence of healthcare workers' autonomous versus controlled forms of motivation may be a useful approach to understanding motivation as an antecedent to engagement. In addition, understanding how healthcare professions educational programs influence the degree and nature of learners' motivations may be important to fostering a more engaged healthcare workforce.

Goal orientation as an antecedent of engagement. The nature of an individual's personal and professional goals is also known to influence academic and work role behaviors (Che-Ha, Mavondo, & Mohd-Said, 2014; Huang, 2012). In particular, individuals display higher levels of performance, persistence and achievement when they view their current activity as being instrumental to achieving mastery oriented goals (Che-Ha et al., 2014; Fryer, Ginns, & Walker, 2014; Lee, McInerney, Liem, & Ortiga, 2010; Marques-Quinteiro & Curral, 2012; Simons, Dewitte, & Lens, 2004). Although prior studies have demonstrated a positive relation between mastery goal orientation and work engagement, these studies did not include a U.S. healthcare worker population (Adriaenssens, De Gucht, & Maes, 2015a; Poortvliet, Anseel, & Theuwis, 2015).

Several of the factors associated with engagement identified in this review may be influenced by healthcare workers' goal orientations. For example, a positive relation was found between being mission-driven and both leadership engagement and professional engagement.

Other examples of factors that may be influenced by goal orientation include work meaningfulness, performance-driven reward/recognition, culture of meaning, and communicating mission and vision. These factors were found to have a positive relation with multiple loci of engagement, supporting the potential broad importance of goal orientation to U.S. healthcare workers' engagement.

One potential application for the influence of goal orientation on engagement would be in the recruitment and hiring of healthcare workers with greater likelihood of engagement. Another application may be for healthcare organization leaders and policy makers to evaluate U.S. healthcare workers' perceptions of new or existing policies, processes, or programs from a goal orientation perspective. For example, are goals associated with certain quality improvement programs perceived by healthcare workers to be more mastery or performance oriented and are they more controlled or autonomously regulated? A third application for goal orientation is in the context of healthcare professions education. Prior studies have demonstrated the role of healthcare professions students' goal orientation on educational outcomes (Hoffman, Hudak-Rosander, Datta, Morris, & Kelz, 2014; Johnson & Beehr, 2014; Simons et al., 2004). However, no research was identified investigating a link between healthcare professions students' goal orientations and subsequent engagement once in the workforce.

Valid goal orientation assessment instruments are needed to evaluate the use of goal orientation in the context of engagement. Prior research has measured learning goal orientation in the healthcare professions education context using the Modified Archer's Health Professions Motivation Survey (Perrot, Deloney, Hastings, Savell, & Savidge, 2001) and in the work setting using the Goal Orientation Questionnaire developed by Button, Matheiu, and Zajac (1996). Future studies should look at the concurrent validity of these instruments or identify additional

instruments that can be used to evaluate how students' learning goal orientation transfers into the professional work environment.

A focus on professional engagement in the physical therapy profession. One particular area of interest for future research is related to professional engagement and how healthcare professions education influences future professional engagement. Specifically, how does advancement along the physical therapist education continuum influence professional engagement and what can be done to optimize this influence? This interest stems from the belief that the physical therapy profession is positioned to take a leading role in meeting current and future societal healthcare needs, and that the physical therapy education system needs to make considerable strides in preparing high performing, high achieving, and persistent physical therapists that are able to excel in this role.

In support of this belief, over half of the U.S. health burden is accounted for by morbidity and chronic disability with 4 of the current top 10 health problems causing the most disability (low back pain, neck pain, other musculoskeletal, and falls) being conditions directly addressed by physical therapists. Many other conditions on the list such osteoarthritis, opioid use disorders, stroke, and diabetes are also impacted by the services physical therapists provide (Institute of Health Metrics and Evaluation, 2018; Mokdad et al., 2018). One example that well-represents the role of physical therapists in alleviating societal disability is in regards to low back and neck pain. Low back and neck pain are identified as the leading cause of disability in the U.S. and account for over $86 billion in healthcare expenditure (Davis, Onega, Weeks, & Lurie, 2012; Institute of Health Metrics and Evaluation, 2018). In addition, medical management of back and neck pain account for a large portion of the opioid prescriptions in the U.S. and contribute to the more than 46 deaths per day, and over 200,000 deaths since 1999 (Centers for Disease Control

and Prevention, 2017; Kaye et al., 2017). Physical therapists are a safe and effective option for treating low back and neck pain, and can play a leading role in reducing the need for opioid medications (Blanpied et al., 2017; Delitto et al., 2012; Wenger et al., 2018).

Although physical therapists' knowledge related to managing musculoskeletal conditions is generally greater than most physicians, differences in knowledge regarding the most current evidence-based practices exist and these differences appear to be related to the level of physical therapists' postprofessional education (Childs et al., 2005; Ladeira, Cheng, & da Silva, 2017). Furthermore, the relatively low percentage (around 40%) of physical therapists holding membership in the profession's only professional association makes efforts to advance the profession through association led initiatives such as adoption of standards and political advocacy a challenge (American Physical Therapy Association, 2018; Bureau of Labor Statistics, 2018). An understanding of what drives physical therapists to become professionally engaged may assist the physical therapy profession to better meet societal healthcare needs.

Development of professionally engaged lifelong learners. As healthcare professionals, physical therapists are expected to embrace the concepts of professional development and lifelong learning (American Physical Therapy Association, 2007). Physical therapist professional and postprofessional education programs also have a responsibility to develop these characteristics in physical therapist learners (American Board of Physical Therapy Residency and Fellowship Education, 2017; American Physical Therapy Association, 2004). A recent meta-analysis of studies investigating orientation toward lifelong learning in health professions students, residents, and practitioners identified that orientation toward lifelong learning increased as individuals progressed along the education continuum (Babenko, Koppula, Daniels, Nadon, & Daniels, 2017). However, other studies have shown a decrease in academic motivation and self-

directed learning during medical, dental, and pharmacy professional education; especially in the first year (Del-Ben et al., 2013; Hastings, West, & Hee Hong, 2005; Premkumar et al., 2013). Physical therapists were represented in only one of the studies reviewed for the meta-analysis and use of a single cohort sample of final year students prevented the ability to compare orientation toward lifelong learning across years in the program (Novak, Palladino, Ange, & Richardson, 2014).

Research with practicing physicians has also suggested a link between orientation toward lifelong learning, career satisfaction, and participation in activities consistent with professional engagement such as research, professional service, and teaching (Hojat et al., 2010). Although limited, the study conducted by O'Loughlin, Dal Bello-Haas, and Milidonis (2005) provides evidence of this relation in the physical therapy profession as well. These researchers showed that development of a professional development plan during physical therapy professional education enhanced students' awareness of the range of lifelong learning opportunities including professional engagement activities such as participation in professional conferences, service, teaching, and research. In addition, qualitative data from this study showed evidence of between-student differences in the type of motivations associated with lifelong learning. For example, some students demonstrated more autonomous motivation by expressing that the point system used for the professional development plan assignment was not useful because 'the whole thing about the professional development plan is what you are getting from it…not what you are putting into it; I look at personal and professional growth.' (p. 47) In contrast, other students were motivated by the point system stating it 'was effective…It kept me going over things… I would recheck… to make sure I (had points) in the different areas.'(p. 47)

Gaps in the current knowledge. Overall, the influence of the physical therapy education continuum on orientation toward lifelong learning and professional engagement is unclear. Jones, Bellah, and Godges (2008) found that physical therapy residency graduates participated in professional activities such as obtaining a specialty certification, serving as a clinical instructor, and providing education at a significantly ($p < .01$) greater rate that non-residency graduate peers. Although encouraging, postprofessional residency education is currently voluntary in the physical therapy profession with less than 12% of graduating physical therapists choosing to apply for a residency position (American Board of Physical Therapy Residency and Fellowship Education, 2016; Commission on Accreditation in Physical Therapy Education, 2017b). Considering the amount of time, effort, and expense associated with residency education, it is possible that the decision to pursue a residency is representative of students who display higher levels of orientation toward lifelong learning and are more likely to participate in professional engagement activities. Even so, this does not mean that residents are a homogenous group in terms of motivations for pursuing residency education. Recent evidence indicates within group differences in students' motivations for pursuing residency education with some being more motivated to provide better patient care, some to prepare for specialty practice, and others to take a fast track to developing expertise (Osborne, Janson, Black, & Jensen, In review). This study only included students who had been accepted into a residency program and therefore does not provide insight into differences between the 12% who do pursue residency and the 88% who do not.

Both within and between group differences in mastery versus performance goal orientation and autonomous versus controlled motivation have been seen in medical, nursing, and pharmacy students; with decisions to pursue further education being positively influenced by

more autonomously motivated, mastery-oriented learning goals (Fryer, 2015; Hegarty, 2011; Perrot et al., 2001; Sockalingam et al., 2016; Volkening, Ostermann, Link, & Hubner, 2010). However, the nature of physical therapist learners' learning goal orientation and motivation for continued learning is currently unknown as is the influence of the physical therapy education process on these characteristics. Investigating how physical therapist learners' learning goal orientation and the nature of their motivation for continued learning develop over the physical therapy education continuum may help to understand what drives physical therapists' orientation toward lifelong learning and future professional engagement. In addition, understanding how various learning goal orientations and motivations for continued learning influence orientation toward lifelong learning and future professional engagement may assist physical therapy educators in developing strategies to optimize these characteristics in future physical therapist learners.

Purpose of the current study. The purpose of this study is to investigate the direct effects of physical therapist learners' current level of education on motivations for continued learning, learning goal orientations, orientation toward lifelong learning, and future professional engagement. Additional indirect effects of motivations for continued learning and learning goal orientation on the relations between current level of education, orientation toward lifelong learning and future professional engagement will also be assessed. The null hypotheses to be tested for each of these relations are as follows:

$H_{0\text{-}1}$: Physical therapist learners' current level of education is not related to motivations for continued learning.

$H_{0\text{-}2}$: Physical therapist learners' current level of education is not related to learning goal orientation.

$H_{0\text{-}3}$: Physical therapist learners' current level of education is not related to orientation toward lifelong learning.

$H_{0\text{-}4}$: Physical therapist learners' current level of education is not related to future professional engagement.

$H_{0\text{-}5}$: Motivations for continued learning is not related to orientation toward lifelong learning.

$H_{0\text{-}6}$: Motivations for continued learning is not related to future professional engagement.

$H_{0\text{-}7}$: Learning goal orientation is not related to orientation toward lifelong learning.

$H_{0\text{-}8}$: Learning goal orientation is not related to future professional engagement.

In addition to the above hypotheses, this study evaluates the performance of three instruments that were modified for use in the physical therapy education context. These instruments will be further discussed in the description of the methodology in Chapter Three. Results from this study will be used to design future research that provides stronger causal evidence for the factors that promote development of professionally engaged lifelong learners.

Chapter 3: Methods

Chapter Overview

This study used a correlational, cross-sectional survey design and recruited physical therapists learners from all regions of the United States. The anonymous survey was distributed via email and included questions related to the following constructs or variables: (1) personal characteristics, (2) educational program characteristics, (3) current level of education, (4) motivation for continued learning, (5) learning goal orientation, (6) orientation toward lifelong learning, and (7) likelihood of future professional engagement behaviors. Data were collected via a link to online software designed for survey research purposes (Qualtrics, Provo, UT). Further details about the participants, measures, procedures, and planned analyses are presented in this chapter.

Participants

A stratified purposive sample of physical therapist learners enrolled in either professional (Doctor of Physical Therapy) or postprofessional (residency or fellowship) programs was recruited for participation via emails sent by a faculty member from each respective program. Use of stratified purposive sampling was desirable for this study due to the inability to randomly recruit from the entire population of physical therapy learners and the goal of identifying a sample with proportional representation from the specified subgroups (Vogt, 2007). Target enrollment for this study was 250 useable surveys with representation from both the professional and postprofessional education levels. This enrollment target was based on a sample required for the statistical techniques of interest (i.e., confirmatory factor analysis and structural equation

modeling) that require these larger sample sizes. A total of 461 submissions were received, of which 210 were removed due to non-responsiveness for a majority of one or more of the included scales. The remaining 251 submissions were included in the analysis which met the target enrollment for the study. A response rate was not calculated due to the anonymous nature of the survey and incomplete data on the number of potential participants provided by programs.

Measures

The instruments used to measure motivations for continued learning, learning goal orientation, and orientation toward lifelong learning were modifications of existing instruments which are described in more detail subsequently. Modifications included wording revisions to better align with the study population and converting the original Likert-type scales to a 0-100 VAS in order to improve consistency in scoring. Prior research has demonstrated strong correlations ($r = .90\text{-}.94$, $p<.001$) between a VAS and Likert-type scale for single items (Hasson & Arnetz, 2005). Validity and reliability of the modified scales were evaluated by performing factor analysis and calculating coefficient H which is a more appropriate measure of internal consistency for multidimensional scales (Swisher, Beckstead, & Bebeau, 2004; Widhiarso, 2014). Results of these analyses are reported for each instrument in the following sections.

Personal characteristics. Participants were asked to provide basic demographic information including age, gender, and race/ethnicity. Demographic information was used to describe the sample population but was not included in the primary analysis.

Participants were generally less than 30 years old (71%), female (67%), and Caucasian (86%), which is consistent with aggregate demographics data for the entire population of student physical therapists (Table 3.1) (Commission on Accreditation in Physical Therapy Education, 2017b).

Educational program characteristics. Participants from professional level programs were asked to indicate the State in which their program is located. Professional program geographic region was determined based on the distribution of States by geographic region used by the Commission on Accreditation in Physical Therapy Education (2017b). Participants in the residency and fellowship programs were asked to indicate the type of program they were enrolled in based on the existing program types at the time of the study according to the American Board of Physical Therapy Residency and Fellowship Education (2018). Program characteristics were used to describe the sample population but were not included in the primary analysis.

Representation from six of the nine geographic regions for the professional education programs was achieved with the largest representation coming from the South Atlantic (n = 60, 40%) and West North Central (n = 33, 22%) regions (Table 3.2). Residency level participants represented eight of the 11 residency program types while fellowship participants represented only two of the nine fellowship program types. Two findings stand out in the residency responses. First, there were a relatively small number of responses from the most numerous type of residency program (orthopaedics) while there were a relatively large number of responses from faculty residents who represent only one program. Second, geriatric residents represent the largest proportion of resident participants despite having far fewer programs than orthopaedics or neurology. The reasons for these results are unclear, but may represent differences in the characteristics of the leaders and/or residents involved in different program types. For example, leaders of the less numerous geriatric residencies may have been more motivated to ensure their program type was represented and therefore taken a more active role in encouraging their residents to participate. The large proportion of orthopaedic manual physical therapy fellowship

responses is not surprising as these programs greatly outnumber any other fellowship program type.

Table 3.1.

Personal Characteristics

Characteristic	n	Percent	Cumulative Percent
Age (n = 251)			
20-25 years	105	41.8%	41.8%
26-30 years	75	29.9%	71.7%
>30 years	28	11.2%	82.9%
Missing	43	17.1%	100.0%
Gender (n = 251)			
Female	168	66.9%	66.9%
Male	82	32.7%	99.6%
Other	1	0.4%	100.0%
Missing	0	0.0%	100.0%
Race/Ethnicity (n = 251)			
Caucasian	216	86.1%	86.1%
Asian	16	6.4%	92.4%
Hispanic/Latino	4	1.6%	94.0%
African American	2	0.8%	94.8%
American Indian/Alaska Native	1	0.4%	95.2%
Other	1	0.4%	95.6%
Hawaiian Native	0	0.0%	95.6%
Two or More Races	10	4.0%	99.6%
Missing	1	0.4%	100.0%

Table 3.2.

Educational Program Characteristics

Characteristic	n	Percent	Cumulative Percent
Professional Program Geographic Region (n = 149)			
South Atlantic	60	40.3%	40.3%
West North Central	33	22.1%	62.4%
New England	20	13.4%	75.8%

East North Central	15	10.1%	85.9%
Mountain	10	6.7%	92.6%
West South Central	6	4.0%	96.6%
Middle Atlantic	0	0.0%	96.6%
East South Central	0	0.0%	96.6%
Pacific	0	0.0%	96.6%
Missing	5	3.4%	100.0%
Residency Type (n = 57)			
Geriatrics	16	28.1%	28.1%
Neurology	11	19.3%	47.4%
Faculty	10	17.5%	64.9%
Acute Care	2	3.5%	68.4%
Pediatrics	7	12.3%	80.7%
Sports	5	8.8%	89.5%
Orthopaedics	4	7.0%	96.5%
Wound Management	1	1.8%	98.2%
Cardiovascular & Pulmonary	0	0.0%	98.2%
Clinical Electrophysiology	0	0.0%	98.2%
Women's Health	0	0.0%	98.2%
missing	1	1.8%	100.0%
Fellowship Type (n = 43)			
Orthopaedic Manual Physical Therapy	39	90.7%	90.7%
Spine	2	4.7%	95.3%
Critical Care	0	0.0%	95.3%
Hand Therapy	0	0.0%	95.3%
Higher Education Leadership	0	0.0%	95.3%
Movement Science	0	0.0%	95.3%
Neonatology	0	0.0%	95.3%
Sports Division 1	0	0.0%	95.3%
Upper Extremity Athlete	0	0.0%	95.3%
Missing	2	4.7%	100.0%

Current level of education. Participants were asked to indicate if they were currently enrolled in a Doctor of Physical Therapy, residency, or fellowship level program. Participants indicating enrollment in a Doctor of Physical Therapy program were also asked to provide their current year or semester of enrollment. A 5-point ordinal scale representing first year

professional, second year professional, third year professional, residency, or fellowship was used for the analysis.

A relatively even distribution of participants across education levels was achieved with a range between 43 (17%) and 57 (23%) participants at each level (Table 3.3).

Table 3.3.

Current Level of Education

Level of Education	n	Percent	Cumulative Percent
First Year Professional	46	18.3%	18.3%
Second Year Professional	46	18.3%	36.7%
Third Year Professional	57	22.7%	59.4%
Residency	57	22.7%	82.1%
Fellowship	43	17.1%	99.2%
Missing	2	0.8%	100.0%

Motivation for postprofessional continued learning. The nature of respondent's motivation for continued learning (i.e., autonomous or controlled motivation) was assessed using items from a version of the Academic Motivation Scale (Vallerand et al., 1992) previously modified for use in a population of psychiatry residents (Sockalingam et al., 2016). Items associated with either autonomous or controlled motivation were further modified so that the statements were related to the physical therapy profession and addressed motivations for continued learning after completion of the participants' current educational program as opposed to motivations for participating in their current program. The phrase, "After graduation from my current program I want to pursue continued learning activities…" was used as the stem for all items.

Autonomous motivations for continued learning. Participants' degree of identification with autonomous motivation for continued learning was measured using a 0-100 VAS where 0

represented *not at all like me* and 100 represented *exactly like me*. A total of 16 statements were included in the autonomous motivation for continued learning scale. An example item is, "…because I experience pleasure and satisfaction while learning new things". Factor loadings for all 16 items ranged between .36 and .79 on a single factor with an Eigenvalue of 7.35 which explained 46% of the variance (Table 3.4). Latent scale internal consistency was supported by a high coefficient H value of .94. Hancock and Mueller (2001) suggest H values greater than .70 are acceptable in measurement models.

Table 3.4.

Autonomous Motivation (AM) Scale Performance

	Scale Items	Factor Loading
AM1	...because I experience pleasure and satisfaction while learning new things	.79
AM2	...for the pleasure I experience when I discover new things about physical therapy that I have never seen before	.76
AM3	...for the pleasure I experience in broadening my knowledge about topics that interest me	.79
AM4	...because continued learning activities would allow me to continue to learn about many things that interest me	.78
AM5	...for the pleasure I experience when achieving higher levels of knowledge	.75
AM6	...for the pleasure I experience while I am surpassing myself in one of my personal accomplishments	.63
AM7	...for the satisfaction I feel when I am in the process of accomplishing difficult learning activities	.69
AM8	...because continued learning allows me to experience a personal satisfaction in my quest for excellence in my professional development	.76
AM9	...for the intense feelings I experience when I am sharing ideas with others	.57
AM10	...for the pleasure I experience when I read physical therapy related books and papers	.65
AM11	...for the pleasure that I experience when I feel completely absorbed by what certain physical therapy researchers/educators have written	.66
AM12	...for the "high" feeling that I experience while learning about various interesting subjects	.64
AM13	...because continued learning will help me be better prepared as a physical therapist	.69

AM14	...because eventually it will enable me to obtain a job in a setting that I like	.36
AM15	...because continued learning will help me make a better choice regarding my career path	.50
AM16	...because I believe that the additional time spent in continued learning activities will improve my competence as a physical therapist	.68

Controlled motivations for continued learning. Participants' degree of identification with controlled motivation for continued learning was measured using a 0-100 VAS where 0 represented *not at all like me* and 100 represented *exactly like me*. A total of eight statements were included in the controlled motivation for continued learning scale. An example item is, "…because with only my current level of education I would not find a higher-paying position later". Factor loadings for all eight items ranged between .57 and .83 on a single factor with an Eigenvalue of 4.12 which explained 52% of the variance (Table 3.5). Scale internal consistency was supported by a high coefficient H value of .90.

Table 3.5.

Controlled Motivation (CM) Scale Performance

	Scale Items	**Factor Loading**
CM1	...to prove to myself that I am capable of completing higher levels of learning	.57
CM2	...because of the fact that if I learn more I will feel important	.73
CM3	...to show myself that I am an intelligent person	.70
CM4	...because I want to show myself that I can succeed at continued learning activities	.71
CM5	...because with only my current level of training I would not find a higher-paying position later	.63
CM6	...in order to obtain a more prestigious position later on	.75
CM7	...because I want to have "the good life" later on	.78
CM8	...in order to have a better salary later on	.83

The autonomous motivation for continued learning and controlled motivation for continued learning factors were used as both endogenous and exogenous variables for analysis in this study, representing the influence of the physical therapist education process on motivation

for continued learning and the subsequent influence of this motivation on orientation toward lifelong learning and future professional engagement.

Learning goal orientation. Participants' learning goal orientation was assessed using items from the mastery and performance goal orientation subscales of the Modified Archer Health Professions Motivation Survey (Perrot, Deloney, Hastings, Savell, & Savidge, 2001). Item phrasing was slightly modified for clarity and to account for differences in participants' current level of education. For example, the original survey's prompt "Think back over this academic year. In general, when did you feel most successful?" was changed to "Thinking about your experience as a student/learner; in general how successful do you feel when…" Also, the word *tutorial* from the original questionnaire was replaced with the word *lab* in the version used for this study in order to use language more consistent with physical therapist education.

Mastery learning goal orientation. Participants' mastery learning goal orientation was measured using a series of 0-100 VAS. Anchors on the 0 pole of the scale included statements such as "not at all successful" or "do not agree at all", and anchors on the 100 pole included "very successful" or "strongly agree". A total of 15 statements were included in the mastery learning goal orientation scale. An example items is, "I am always thinking of ways to improve how I do things." Factor loadings for all 15 items ranged between -.11 and .78 on a single factor with an Eigenvalue of 5.44 which explained 36% of the variance (Table 3.6). Scale internal consistency was supported by a high coefficient H value of .91.

Table 3.6.

Mastery Learning Goal (MG) Orientation Scale Performance

	Scale Items	Factor Loading
MG1	...a lecture or lab makes you think about things.	.53
MG2	...you learn something interesting.	.70
MG3	...something you learn makes you want to find out more.	.72

MG4	...learn something new?	.78
MG5	...read something interesting?	.70
MG6	...work hard?	.73
MG7	...work on a challenging task or assignment?	.54
MG8	...see improvement in your work?	.73
MG9	The more challenging the task, the harder I work.	.48
MG10	I am always thinking of ways to improve how I do things.	.70
MG11	I feel very upset when I commit some sort of error.	.25
MG12	I like to compete against myself.	.46
MG13	The opinions that important people have of me cause me little concern.	-.11
MG14	...I understand something for the first time.	.54
MG15	...I am involved totally in something that I am doing.	.66

Performance learning goal orientation. Participants' performance learning goal orientation was measured using the same series of 0-100 VAS as used in the mastery learning goal orientation scale. A total of 15 statements were included in the performance learning goal orientation. An example item is, "…you get a higher grade than other students". Factor loadings for all 15 items ranged between .27 and .84 on a single factor with an Eigenvalue of 6.19 which explained 41% of the variance (Table 3.7). Scale internal consistency was supported by a high coefficient H value of .93.

The mastery learning goal orientation and performance learning goal orientation scores were used as both endogenous and exogenous variables for analysis in this study, representing the influence of the physical therapist education process on learning goal orientation and the subsequent influence of learning goal orientation on orientation toward lifelong learning and future professional engagement.

Table 3.7.

Performance Learning Goal (PG) Orientation Scale

	Scale Items	**Factor Loading**
PG1	...you show people you are good at something.	.47
PG2	...you get a higher grade than other students.	.76

PG3	...you show people that you are smart.	.78
PG4	...you are the only one who can answer the lecturer's question.	.67
PG5	...do better than others in the class?	.84
PG6	...get one of the highest grades?	.80
PG7	If someone is evaluating me I tend to expect the worst.	.27
PG8	I like to be the best person in my group.	.65
PG9	I am usually worried about what impression I make.	.52
PG10	Good grades are important to me.	.62
PG11	I get anxious when I do not know how well I am doing.	.49
PG12	I am often afraid that I look ridiculous or make a fool of myself.	.46
PG13	...I accomplish something that others in my class could not do.	.75
PG14	...I receive recognition or prestige.	.65
PG15	...my status in the group is enhanced.	.65

Orientation toward lifelong learning. Participants' orientation toward lifelong learning was assessed using a version of the Jefferson Scale of Physician Lifelong Learning (Hojat et al., 2003) that was modified for use across a variety of health professions student populations (Novak et al., 2014). The Jefferson Scale of Lifelong Learning-Health Professions Student Version includes 14 items asking participants to indicate their level of agreement with statements using a 0-100 VAS ranging from *strongly disagree* to *strongly agree.* An example item is "I routinely search electronic resources to find out about new developments in healthcare/medicine". Factor loadings for all 14 items ranged between .30 and .78 on a single factor with an Eigenvalue of 5.96 which explained 43% of the variance (Table 3.8). Scale internal consistency was supported by a high coefficient H value of .92.

Table 3.8.

Orientation toward Lifelong Learning (LLL) Scale Performance

	Scale Items	**Factor Loading**
LLL1	Searching for the answer to a question is, in and by itself, rewarding	.48
LLL2	Lifelong learning is a professional responsibility of all healthcare providers	.55
LLL3	I enjoy reading articles in which issues of healthcare/medicine are discussed	.71
LLL4	I routinely attend student study groups	.30

LLL5	I read healthcare/medical literature in journals, websites or textbooks at least once every week	.75
LLL6	I routinely search electronic resources to find out about new developments in healthcare/medicine	.78
LLL7	I believe that I would fall behind if I stopped learning about new developments in healthcare/medicine	.66
LLL8	One of the important goals of health professions' education is to develop students'/learners' lifelong learning skills	.62
LLL9	Rapid changes in health science/medicine require constant updating of knowledge and development of new professional skills	.63
LLL10	I always make time for learning on my own, even when I have a busy class schedule and other obligations	.70
LLL11	I recognize my need to constantly acquire new professional knowledge	.74
LLL12	I routinely attend optional sessions, such as professional meetings, guest lectures, or clinics where I can volunteer to improve my knowledge and clinical skills	.69
LLL13	I take every opportunity to gain new knowledge/skills that are important to my discipline	.76
LLL14	My preferred approach in finding an answer to a question is to consult a credible resource such as a textbook or electronic resource	.60

The overall orientation toward lifelong learning score represented by all 14 items was used as a endogenous variable for analysis in this study representing the influence of the physical therapists' level of education, motivation for continue learning, and learning goal orientations on orientation toward lifelong learning.

Likelihood of future professional engagement. Participants were asked to indicate their perceived likelihood of pursuing a list of nine behaviors thought to indicate professional engagement in the physical therapy profession such as membership in the professional association, conference attendance, and serving as a clinical instructor or mentor. The behaviors were based on a concurrent study by Osborne and Hartley (in press) that aimed to define professional engagement in the physical therapy profession and identify key indicator behaviors. Participants indicated perceived likelihood of future participation in each behavior on a 0-100

VAS where 0 represented *not at all likely* and 100 represented *completely likely*. Factor loadings for all nine items ranged between .53 and .74 on a single factor with an Eigenvalue of 4.06 which explained 45% of the variance (Table 3.9). Scale internal consistency was supported by a high coefficient H value of .89.

Table 3.9.

Future Professional Engagement (FPE) Scale Performance

	Scale Items	Factor Loading
FPE1	Join or remain a member of the APTA	.53
FPE2	Regularly attend professional meetings such as conferences, board meetings, or House of Delegates	.68
FPE3	Take on a leadership role that serves to advance or promote the physical therapy profession	.71
FPE4	Participate in activities where you are an advocate for patients, public health, or the physical therapy profession	.70
FPE5	Develop strong professional relationships with professionals other than physical therapists	.69
FPE6	Regularly read the professional literature to stay up-to-date with current practice	.71
FPE7	Seek out and adopt new innovations into your practice	.74
FPE8	Monitor and evaluate patient outcomes to ensure safety, effectiveness, and appropriateness of physical therapy interventions	.65
FPE9	Openly discuss and address ethical dilemmas you face as a physical therapist and healthcare provider	.61

Note. APTA = American Physical Therapy Association

The overall future professional engagement score represented by all nine items was used as an endogenous variable for analysis in this study representing the influence current level of education, motivation for continue learning, and learning goal orientation on the perceived likelihood of future professional engagement.

Procedures

Recruitment emails were distributed to a pre-determined list of programs developed to maximize diversity in the sample (e.g., size, geographic location, specialty area). For example,

the University of North Florida was selected to represent a medium size, public, teaching university in the South Atlantic region while Boston University was selected to represent a large, private, research university in the New England region. A faculty member from each program was contacted prior to the start of the study and asked to confirm their willingness and ability to distribute a recruitment email to learners in their program. After confirmation was received, a recruitment email was sent to the faculty member for distribution to potential participants (i.e. learners within the respective programs). The email included information about the study and a link to the online survey. A one-time reminder email was also sent to the faculty member for distribution to learners two weeks after the initial recruitment email. Potential participants were asked to complete the survey within two weeks of receiving the initial and follow up emails, however; submissions were accepted until the target enrollment was complete. Recruitment emails were initially distributed to only a portion of the programs on the list and the principal investigator monitored the number of submissions received. Additional recruitment emails were distributed to programs on the list until the target enrollment was achieved. The study protocol was reviewed and determined exempt by the University of North Florida IRB.

Overview of Analyses

Structural equation modeling was planned as the primary analysis to evaluate the a proposed theoretical model where current level of education influences motivations for continued learning, learning goal orientation, orientation toward lifelong learning, and future professional engagement; and motivations for continued learning and learning goal orientations also influence orientation toward lifelong learning and future professional engagement (Figure 3.1). However, model misspecification due to a high degree of multicollinearity prevented successful completion of the planned structural equation modeling. Conceptual overlap between

types of motivations (autonomous and controlled) and learning goal orientations (mastery and performance), as well as convergence in the outcomes associated with goal orientations, are likely behind this high degree of shared variance (Pintrich, 2000). For example, individuals scoring higher on autonomous motivation items are also likely to score highly on items associated with mastery goal orientation, and both mastery and performance learning goals may contribute to positive outcomes such as orientation toward lifelong learning, and future professional engagement.

Figure 3.1. Theoretical Model for Predictors of Orientation toward Lifelong Learning and Future Professional Engagement

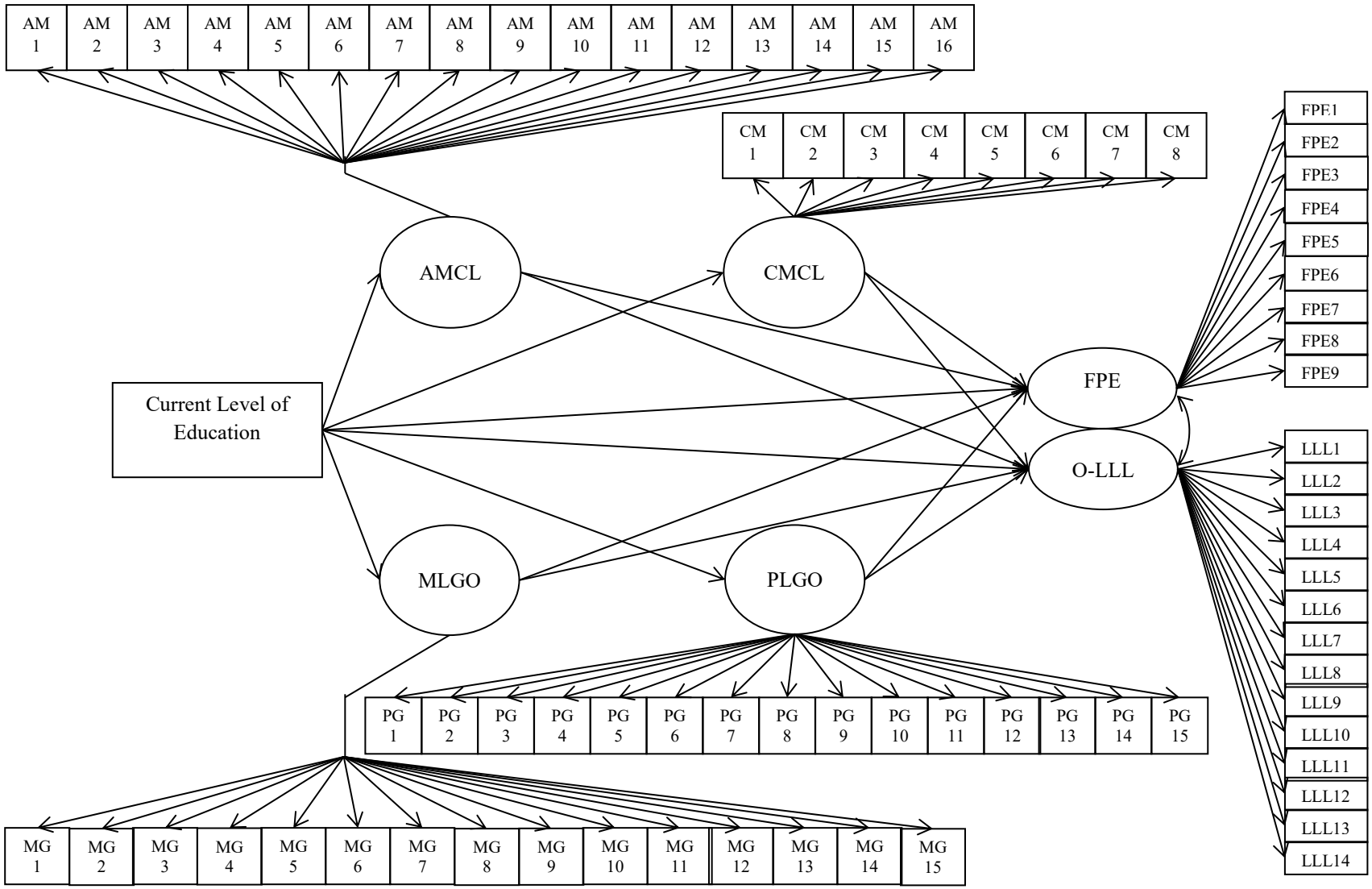
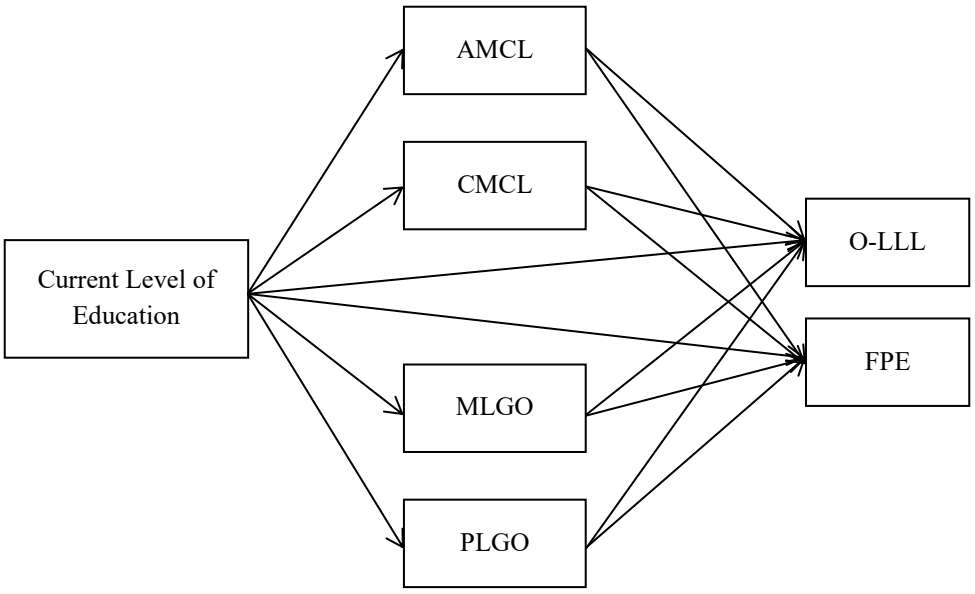


Figure 3.1. Proposed theoretical model showing both the measurement and structural models for predictors of orientation toward lifelong learning and future professional engagement. AMCL = autonomous motivation for continued learning; AM = autonomous motivation; CMCL = controlled motivation for continued learning; CM = controlled motivation; MLGO = mastery learning goal orientation; MG = mastery goal; PLGO = performance learning goal orientation; PG = performance goal; O-LLL = orientation toward lifelong learning; LLL = lifelong learning; FPE = future professional engagement.

To address the multicollinearity issues, participants' factor scores were calculated for each scale and analyzed as observed variables representing the degree of correlation between the construct represented in the scale and the participants' responses. Evidence supporting construct validity for each scale was previously presented in the description of the scales. The revised path model is graphically represented in Figure 3.2. Indirect and total effects were evaluated for all relations between current level of education, orientation toward lifelong learning, and future professional engagement that demonstrated mediation by motivations for continued learning or learning goal orientation. The direct, indirect, and total effects for the proposed model are presented in Chapter Four.

Figure 3.2. Revised Path Model for Predictors of Orientation toward Lifelong Learning and Future Professional Engagement.



Chapter 4: Results

The results of this study demonstrate the direct, indirect, and total effects of physical therapist learners' current level of education, motivations for continued learning, and learning goal orientations on orientation toward lifelong learning, and future professional engagement. As described in Chapter Three, issues with a high degree of multicollinearity in the original measurement model resulted in the use of path analysis instead of the planned structural equation modeling to evaluate the revised model (Figure 3.2). This chapter provides the results of the preliminary data analysis as well as the final path analysis.

Preliminary Data Analysis

Data for the 251 included cases were initially examined to ensure appropriateness for path analysis. Results supporting the validity and reliability of the various scales used to create factor scores were presented in Chapter 3. Normality was assessed using Mardia's normalized multivariate kurtosis, obtaining a value of 10.01. Although this value is outside of the suggested range of -3.0 to 3.0, larger values are acceptable with large sample sizes such as the one in this study (Bentler, 2006). Raw data from the cases with the largest contributions to normalized multivariate kurtosis were reviewed and found to be non-problematic.

Review of the standardized residual matrix (Table 4.1) identified a value below 2.0 for all variables indicating good fit between each variable and the data, and no serious deficiencies in residual variance or covariance (Raykov & Marcoulides, 2006). The distribution of standardized residuals was slightly asymmetric with the majority (53.6%) having a value between -0.1 and

0.1, an additional 42.9% having a value between 0.1 and 0.3, and one additional residual with a value of 0.6.

Table 4.1.

Standardized Residual Matrix

	CLE	MLGO	PLGO	AMCL	CMCL	FPE	O-LLL
CLE	-0.00						
MLGO	0.00	-0.00					
PLGO	0.00	0.33	-0.00				
AMCL	0.00	0.60	0.17	-0.00			
CMCL	-0.00	0.19	0.36	0.38	0.00		
FPE	0.00	0.26	0.10	0.09	0.24	0.07	
O-LLL	0.00	0.29	0.15	0.09	0.21	0.32	0.08

Note. CLE = current level of education; MLGO = mastery learning goal orientation; PGLO = performance learning goal orientation; AMCL = autonomous motivation for continued learning; CMCL = controlled motivation for continued learning; FPE = future professional engagement; O-LLL = orientation toward lifelong learning

Overall model fit was assessed using root mean square error of approximation (RMSEA) due to the relatively low impact of a large sample size on this goodness of fit index. Model fit (RMSEA = .43, 90% CI [0.39, 0.47]) exceeded the recommended value of .05, indicating the data was not a good fit to the proposed model (Raykov & Marcoulides, 2006). The R-squared values for the associated standardized solutions ranged between .01 and .50 indicating a large degree of variance and covariance in the endogenous variables left unexplained by the model which likely contributed to the poor fit. Despite the overall poor model fit, a number of significant ($p < .05$) path coefficients were identified (Figure 4.1) that may be useful in informing future research. The direct and indirect interactions between each variable in the model are presented in Figure 4.1 and discussed in subsequent sections.

Figure 4.1. Significant Standardized Path Coefficients for the Structural Model

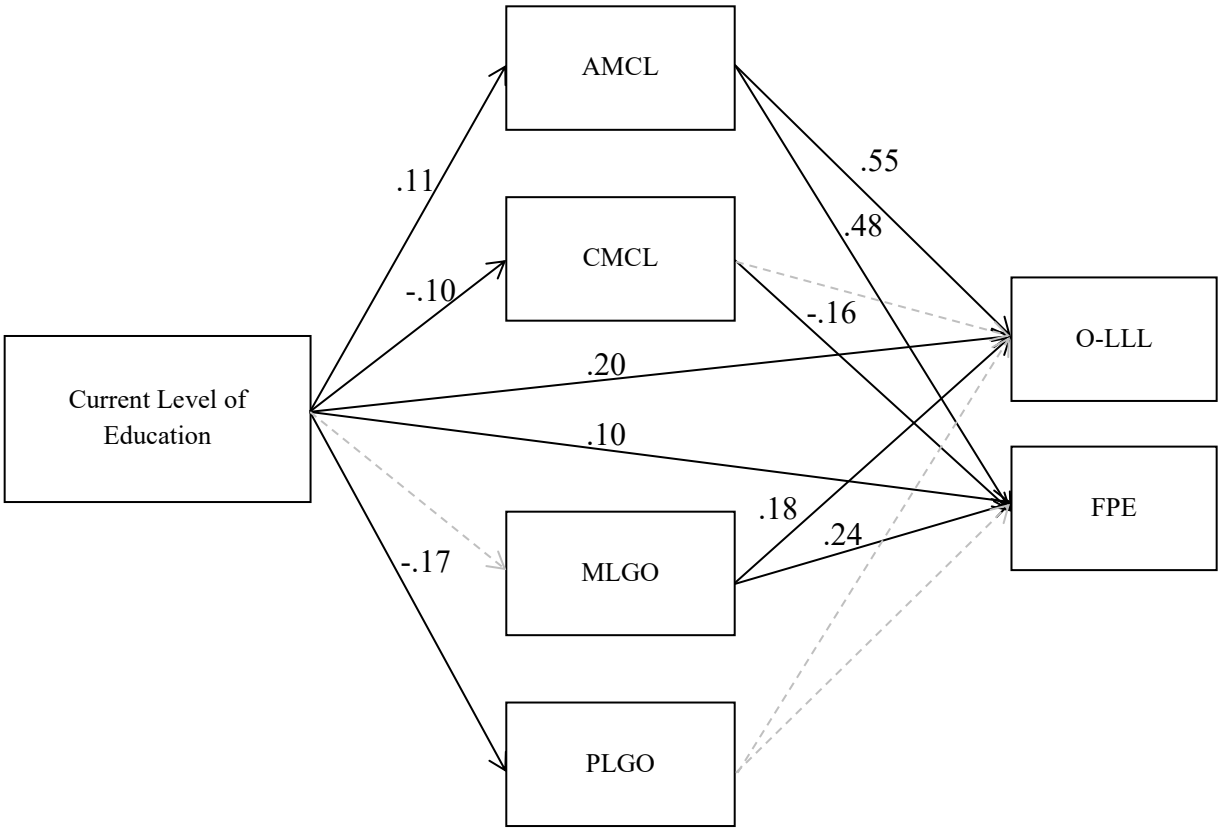


Figure 4.1. AMCL = autonomous motivation for continued learning; CMCL = controlled motivation for continued learning; MLGO = mastery learning goal orientation; PLGO = performance learning goal orientation; O-LLL = orientation toward lifelong learning; FPE = future professional engagement.
Only significant path coefficients are shown ($p < .05$).

Direct Effects

Influence of level of education on motivations for continued learning. Physical therapist learners' current level of education had a small but significant direct effect on autonomous motivation for continued learning ($\beta = .11$, $p < .05$) and controlled motivation for continued learning ($\beta = -.10$, $p < .05$) such that higher levels of education were associated with

greater autonomous motivation for continued learning and lower controlled motivation for continued learning (Figure 4.1). Based on these findings, the null hypothesis for a relation between current level of education and motivations for continued learning ($H_{0\text{-}1}$) was rejected. Results from this study support a relation between the progression through the physical therapist education process and a transition away from less desirable motivations for continued learning such as meeting licensure requirements and toward more desirable motivations such as finding interest and value in the learning process.

Influence of level of education on learning goal orientation. Physical therapist learners' current level of education had a small but significant direct effect on performance learning goal orientation ($\beta = -.17$, $p < .05$) such that higher levels of education were associated with less performance learning goal orientation (Figure 4.1). Current level of education did not have a significant direct effect on mastery learning goal orientation ($\beta = .05$, $p > .05$). Based on these findings, the null hypothesis for a relation between current level of education and learning goal orientation ($H_{0\text{-}2}$) was partially rejected. Results from this study support that progression through the physical therapist education process is associated with a reduction in the less desirable performance learning goal orientation such as showing others you are better than your peers. However, the results do not demonstrate an association between higher levels of education and a change in the more desirable mastery learning goal orientation such as seeking ways to improve how you perform on a particular skill.

Influence of level of education on orientation toward lifelong learning. Physical therapist learners' current level of education had a small but significant direct effect on orientation toward lifelong learning ($\beta = .20$, $p < .05$) such that higher levels of education were associated with greater orientation toward lifelong learning (Figure 4.1). Based on this finding,

the null hypothesis for a relation between current level of education and orientation toward lifelong learning (H_{0-3}) was rejected. The results from this study support that progression through the physical therapists' education process is associated with an increased orientation toward lifelong learning such as recognizing the ongoing need to gain new professional knowledge.

Influence of level of education on future professional engagement. Physical therapist learners' current level of education had a small but significant direct effect on future professional engagement ($\beta = .10$, $p < .05$) such that higher levels of education were associated with greater likelihood of future professional engagement (Figure 4.1). Based on this finding, the null hypothesis for a relation between current level of education and future professional engagement (H_{0-4}) was rejected. The results from this study support that as physical therapist learners progress through the education process they develop a greater perceived likelihood of future participation in behaviors that are indicative of a professionally engaged physical therapist such as maintaining membership in a professional organization.

Influence of motivations for continued learning on orientation toward lifelong learning. Physical therapist learners' autonomous motivation for continued learning had a moderate and significant direct effect on orientation toward lifelong learning ($\beta = .55$, $p < .05$) such that learners with higher levels of autonomous motivation for continued learning had greater orientation toward lifelong learning (Figure 4.1). Learners' controlled motivation for continued learning did not have a significant direct effect on orientation toward lifelong learning ($\beta = .01$, $p > .05$). Based on these findings, the null hypothesis for a relation between motivations for continued learning and orientation toward lifelong learning (H_{0-5}) was rejected. The results from this study support that motivation for continued learning is related to orientation toward lifelong learning and that autonomous motivation for continued learning such as personal

satisfaction are a more desirable form of motivation for continued learning in terms of developing physical therapist learners' orientation toward lifelong learning.

Influence of learning goal orientation on orientation toward lifelong learning. Physical therapist learners' mastery learning goal orientation had a small but significant direct effect on orientation toward lifelong learning ($\beta = .18$, $p < .05$) such that learners with higher levels of mastery learning goal orientation had greater orientation toward lifelong learning (Figure 4.1). Learners' performance learning goal orientation did not have a significant direct effect on orientation toward lifelong learning ($\beta = .09$, $p > .05$). Based on these findings, the null hypothesis for a relation between learning goal orientation and orientation toward lifelong learning ($H_{0\text{-}6}$) was rejected. The results from this study support that learning goal orientation is related to orientation toward lifelong learning and that mastery learning goal orientation is a more desirable form of learning goal orientation in terms of developing physical therapist learners' orientation toward lifelong learning.

Influence of motivations for continued learning on future professional engagement. Physical therapist learners' autonomous motivation for continued learning and controlled motivation for continued learning had a moderate and significant ($\beta = .48$, $p < .05$) and a small but significant ($\beta = -.16$, $p < .05$) direct effect on future professional engagement respectively (Figure 4.1). Based on these findings, the null hypothesis for a relation between motivations for continued learning and future professional engagement ($H_{0\text{-}7}$) was rejected. The results from this study support that greater autonomous motivation for continued learning such as the pleasure and satisfaction of learning new things is associated with an increased likelihood of future professional engagement while greater controlled motivation for continued learning such as a

desire for a better salary is associated with decreased likelihood of future professional engagement.

Influence of learning goal orientation on future professional engagement. Physical therapist learners' mastery learning goal orientation had a small to moderate ($\beta = .24$, $p < .05$) direct effect on future professional engagement while performance learning goal orientation did not have a significant direct effect ($\beta = .03$, $p > .05$) on future professional engagement. Based on these findings the null hypothesis for a relation between learning goal orientation and future professional engagement ($H_{0\text{-}8}$) was rejected. The results of this study support that learning goal orientation is related to future professional engagement and that a mastery learning goal orientation is a more desirable form of learning goal orientation in terms of influencing future professional engagement.

Indirect and Total Effects

Indirect effects represent the relation between two variables that is explained by a third mediating variable, and the total effect represents the combination of direct and indirect effects between two variables (Raykov & Marcoulides, 2006). Indirect effects were determined by calculating the product of the significant path coefficients leading to and away from the mediating variable. Total effects were calculated by summing the significant direct and indirect effects. Motivations for continued learning (autonomous and controlled) were the only variables found to have indirect effects on the relations between current level of education and orientation toward lifelong learning or future professional engagement.

Current level of education and motivations for continued learning on orientation toward lifelong learning. Physical therapist learners' motivations for continued learning had a small indirect effect on the relation between current level of education and orientation toward

lifelong learning. The direct effect of current level of education of .20, combined with the indirect effect of autonomous motivation for continued learning of .06 resulted in a small to moderate total effect of .26 on orientation toward lifelong learning. In other words, learners who are further along in their education have a greater orientation toward lifelong learning and this effect is increased to a small degree by having a higher level of autonomous motivation for continued learning.

Current level of education and motivations for continued learning on future professional engagement. Physical therapist learners' motivations for continued learning also had a small indirect effect on the relation between current level of education and future professional engagement. The direct effect of current level of education of .10, combined with the indirect effects of autonomous motivation for continued learning of .05 and controlled motivation for continued learning of .06, resulted in a small to moderate total effect of .21 on the likelihood of future professional engagement. In other words, learners who are further along in their education have a greater likelihood of future professional engagement and this effect is increased to a small degree by the relative increase in autonomous motivation for continued learning and decrease in controlled motivation for continued learning learners' experience during the education process.

Summary

The results from this analysis indicate that as physical therapist learners advance along the education continuum their motivations for continued learning become more autonomous and less controlled, they become more oriented toward lifelong learning, and they express a greater likelihood of participating in behaviors associated with engagement in the physical therapy profession. The effects of current level of education on orientation toward lifelong learning and

future professional engagement were marginally influenced by learner's type of motivation for continued learning with autonomous motivation for continued learning further increasing the positive effects on both orientation toward lifelong learning and future professional engagement. In contrast, learners' level of controlled motivation for continued learning had no effect on orientation toward lifelong learning and slightly diminished the positive effect higher education levels on future professional engagement. Learner's orientation toward lifelong learning and future professional engagement were also positively influenced by their level of mastery learning goal orientation but this relation was not influenced by current level of education. Conversely, more advanced learners demonstrated a decrease in performance learning goal orientation but this did not influence orientation toward lifelong learning and future professional engagement.

Overall, the model was able to account for 39% of the variance in orientation toward lifelong learning scores and 50% of the variance in future professional engagement scores. These findings represent a non-trivial but incomplete explanation of how physical therapist learners' develop into professionally engaged lifelong learners. The following discussion will provide some practical implications and limitations of the current findings, suggest future areas of research, and suggest revision to the current model based on relevant theoretical and empirical literature.

Chapter 5: Discussion

The findings from this study support the assertion that physical therapist learners develop greater orientation toward lifelong learning and perceived likelihood of future professional engagement as they advance along the physical therapy education continuum, and that this effect is increased by learners' autonomous motivation for continued learning. However, knowledge of all of the factors influencing orientation toward lifelong learning and future professional engagement is still incomplete, as is the understanding of how to best identify and modify these factors to optimize physical therapist education outcomes. The health professions literature provides a number of evidence-based recommendations for developing learners' autonomous motivations that may be transferable to physical therapy education (Baker & Goodboy, 2019; Jeno et al., 2017; Orsini et al., 2016; Orsini, Evans, & Jerez, 2015). In addition, recent work published since the onset of this study provides a useful model for informing future research on optimizing physical therapist education outcomes (Jensen, Mostrom, Hack, Nordstrom, & Gwyer, 2019). This chapter will address the limitations of the current study and discuss implications for practice in the context of key recommendations from the autonomy-supportive teaching literature. Suggested areas of future research that are aligned with the recently published work on educating physical therapists will also be discussed.

Limitations

There are several limitations with the results of this study that should be considered along with the assumptions and delimitations discussed in Chapter One. First, the inability to determine a specific response rate limits the generalizability of the findings. Program contacts were asked to provide the number of learners that would receive an invitation to participate. However, this information was not received from all programs and verification of actual distribution was not possible. Due to this limitation, a selection bias whereby learners with greater levels of autonomous motivation were systematically more likely to complete the survey is possible. Future studies may focus on a smaller number of programs and include methods that foster more robust and verifiable participation.

A second limitation is the disproportional representation of respondents by region, residency type, and fellowship type. From a regional perspective, over 60% of the respondents were from two of the nine regions and three regions had no representation. The same pattern was true for residency and fellowship type where only a few of the various program types represented the majority of respondents and some program types had zero respondents. Even so, the overall sample size was sufficient for the statistical analyses and the results suggest that the proposed relations may exist within the population. Future studies are needed to confirm these relations and better explore the nature of these relations across the entire physical therapist learner population.

Additional limitations are the large degree of multicollinearity and issues with model misspecification which make the proposed model insufficient for understanding what influences physical therapy learners' orientation toward lifelong learning and future professional engagement. However, the current model explained 50% and 39% of orientation toward lifelong learning and future professional engagement respectively. Thus, autonomous motivation and

mastery goal orientation are likely important factors to consider when building an understanding for what influences physical therapist learners' orientation toward lifelong learning and future professional engagement. Similarities between these constructs in terms of influence on intrinsic motivation may account for the high degree of multicollinearity seen in the measurement model (Fryer et al., 2014; Vansteenkiste, Lens, & Deci, 2006). In addition, several factors related to lifelong learning (e.g., feeling of personal growth and learning culture) that were identified in the systematic literature review for this study demonstrated positive correlations with various forms of engagement. This may indicate that orientation toward lifelong learning functions more as an antecedent of professional engagement than as a separate but related outcome. Further research is needed to understand these complex relations between motivation, learning, and engagement in the context of physical therapist education.

Finally, the use of path analysis as opposed to structural equation modeling limits the interpretation of the statistical analysis. Path analysis assumes there is no error in the measurement of observed variables (Raykov & Marcoulides, 2006). However, use of self-reported survey data is known to have error, especially when measuring psychological constructs such as motivation and goal orientation (Fink, 2003). While not optimal, the use of path analysis in this study still provides some support for the presence of the identified relations. Future studies using revised casual models and structural equation modeling are needed to more accurately investigate proposed relations.

Implications for Educational Practice

Self-Determination Theory has been identified in the health professions education literature as a useful theory for informing teaching strategies that foster autonomous motivation (Orsini et al., 2015; Ten Cate, Kusurkar, & Williams, 2011; Williams, Saizow, & Ryan, 1999).

Teaching strategies based on Self-Determination Theory create autonomy-supportive environments which increase learners autonomus motivations and are associated with desirable educational outcomes such as greater reflection, reduced burnout, improved academic performance, and orientation toward lifelong learning (Orsini et al., 2016; Sockalingam et al., 2016). Although referred to as autonomy-supportive, the teaching strategies and environments associated with Self-Determination Theory are designed to meet all three basic psychological needs – autonomy, competence, and relatedness (Reeve, 2016). The systematic review conducted for this study also demonstrated a link between factors associated with autonomy-supportive environments (e.g. culture of regard and support) and engagement.

Baker and Goodboy (2019) discussed how autonomy-supportive environments help learners internalize the value of extrinsic motivators, transitioning them to more intrinsic forms of motivation. As learners perceive a greater personal value in the content being taught, they become more interested and subsequently more autonomously motivated to continue learning about the topic. Baker and Goodboy offered three general recommendations for creating autonomy-supportive learning environments that provide a good framework for discussing teaching strategies in physical therapy education: provide meaningful rationale, frame in the context of self-development, and offer meaningful but structured choices. Further description and examples for each strategy is provided in the following sections.

Provide meaningful rationale. Not all content taught during physical therapy education is inherently interesting, and what is interesting to some some students may not be interesting to others. In these instances, instructors may motivate students by providing a rationale for why they should learn particular content. According to Self-Determination Theory, these rationale can be provided in a controlled (e.g., to pass the exam) or an autonomy-supportive (e.g., to make

better clinical decisions) manner. Although both controlled and autonomy-supportive strategies may result in motivation to study the assigned material, the use of autonomy-supportive teaching strategies is associated with increased engagement in learning, greater conceptual learning, and inceased long-term transfer of knowledge into practice (Cappetta & Paolino, 2015; Jang, Reeve, & Halusic, 2016; Jeno et al., 2017). Teaching methods such as problem-based learning, flipped classroom, and simulation are designed to make learning activites more meaningful by contextualizing and providing salience to learning activities. For example, asking physical therapy learners to investigate and solve actual patient cases either in the classroom or in a simulation lab may demonstrate the applicability of the content to learners' future professional roles. (Chung & Lee, 2018; Gewurtz, Coman, Shaminder, Jung, & Soloman, 2016; Sabus & Macauley, 2016). Use of these types of teaching methods may help develop a more autonomous motivation for learning content that is important, but not inherently interesting.

In the context of orientation toward lifelong learning and future professional engagement, some learners' may not be intrinsically motivated toward behaviors such as searching the literature to find answers to clinical questions or maintaining professional association membership. Using autonomy-supportive teaching techniques, physical therapist educators may frequently discuss a healthcare professional's responsibility for keeping up with a rapidly changing evidence base to ensure best care for patients, or how professional association membership can help professionals stay informed of emerging trends in healthcare. When providing rationale, it is important for the instructor to understand which rationale are actually meaningful to learners or work with learners to understand why a particular rationale is meaningful. Interactive and non-judgmental discussions that acknowledge learners' negative perceptions and use language such as "can, may, could" instead of "must, need, should" can be

an effective strategy to develop more autonomous motivation toward the topic (Kusurkar, Croiset, & Ten Cate, 2011). By providing meaningful rationale in an autonomy-supportive way, instructors help learners' recognize and internalize the value of orientation toward lifelong learning and future professional engagement, potentially leading to more autonomous motivations for future participation in these desirable aspects of professional practice.

Frame in the context of self-development. Baker and Goodboy also recommended that meaningful rationale be placed in the context of self-development (e.g., to become more skilled) as opposed to self-image (e.g. to perform better than others). This recommendation is consistent with goal orientation literature and findings from the current study which demonstrate a positive effect from a more mastery as opposed to performance goal orientation (Fryer et al., 2014; Lee et al., 2010; Lens, 2001). From an Self-Determination Theory perspective, a self-referenced desire for challenge and improvement on prior performance is a more autonomous form of motivation whereas the desire to perform better than others is a more controlled form of motivation. It is also important to recognize that although self-referenced, implicit goals such as avoiding the feeling of guilt or shame act as controlled motivations (Ryan & Deci, 2000).

In the context of orientation toward lifelong learning and future professional engagement, some learners' may not see the link between certain lifelong learning or professional engagement behaviors and self-development, or may not see a particular value in these behaviors. For example, a learner may view attending continuing education seminars or professional conferences as simply a way to meet requirements for licensure renewal (i.e. a controlled motivation). In this scenario, the learner may view attending any course or conference as sufficent regardless of the content or quality. Using autonomy-supportive teaching techniques, physical therapist educators may help learners recognize the difference in high and low qualty

learning or engagement opportunities, accept the personal responsibility for professional development, and identify the optimal level of challenge for their current development needs (Kusurkar et al., 2011). Instructors can avoid fostering feelings of guilt or shame in discussions with learners by using statements such as “by participating in this activity you can develop your skills in…” as opposed to “a really good physical therapist would…’

Offer meaningful but structured choices. Allowing learners to have agency in their learning process promotes autonomous motivation when choices are relevant, not excessive in number or overly complex, and aligned with learners’ values (Katz & Assor, 2007). Baker and Goodboy (2019) recommend that instructors establish the objectives to be met and the boundries of choices available, and then allowing learners’ to determine in what order and how those objectives are addressed. For example, the learning objectives for a course in orthopaedics may include demonstrating knowledge and skills related to the diagnosis and treatment of common musculoskeletal conditions. The instructor may have a set list of examination techniques and treatment principles that need to be covered in the course, but could then structure the course so that students’ interests guide the order in which these topics are addressed. In addition, the instructor may offer a selection of equal but different assignments (e.g., written, live demonstration, video) that learners can choose from to demonstrate mastery of the required content. This may form a positive relationship between instructors and learners which enhances the learning experience (Keng, Ng, Chia, & Ryan, 2016). From a Self-Determination Theory perspective, the psychological needs for autonomy and competence are met when learners’ are provided the opportunity to influence the learning process and experience success with learning. The need for relatedness is met by the increased aliance formed with the instructor (Reeve, 2016).

In the context of orientation toward lifelong learning and future professional engagement, there are many continued learning and professional engagement options available after formal physical therapy education is complete. Novice physical therapists may be overwhelmed by the number of options while at the same time unaware of many options that may align with their interests and values. An important role of physical therapist educators may be to help learners develop self-assessment skills for determining learning needs and professional interests, identify well-matched learning and engagement opportunities, and foster active participation while in the formal education setting where structured guidance can be provided (Kusurkar et al., 2011). For example, a learner in a clinical setting may be overwhelmed by the number of situations where they feel under-prepared for providing care to their patients. The instructor may help the learner formulate and priortize clinical questions, that if answered, will have the greatest impact on their practice. The instructor may then help the learner identify methods of answering the clinical questions and select the methods that provide the best answer considering the learners' particular circumstances. Similiarly, an instructor may help a learner who wants to learn more about a relatively uncommon case recognize the value in contributing to the professional body of knowledge by developing a case report or providing a presentation dessiminating what they learned.

Areas of Future Research

The current study placed lifelong learning and professional engagement as outcomes of physical therapist education. While useful for the purposes of this study, it is important to recognize that the purpose of educating professionals extends beyond individual learners and is focused toward meeting broader societal needs (Colby & Sullivan, 2008). Similar to the literature on work engagement, professional engagement may play a more central role as both an

antecedent of factors experienced during professional education and, by virtue of its presence an antecedent of broader outcomes.

Jensen and colleagues (2019) identified the need for an *arc of professional development* that bridges professional formation with the profession's fulfillment of its societal purpose. Colby and Sullivan (2008) discuss how the demands of professional practice such as productivity and market forces can drain enthusiasm, resulting in disillusionment and settling for mediocrity. Expanding on the arc metaphor, professional engagement may serve as a keystone which keeps the arc from collapsing and protects professionals from getting swept away or drowning in the stream of practice demands. This protective function is consistent with other literature demonstrating the role of work engagement in preventing burnout (Bailey et al., 2017; Schaufeli & De Witte, 2017b). This metaphor also suggests a research framework where professional engagement serves as a mediating variable between professional formation and fulfillment of societal purpose and practice demands serve as moderators (Figure 5.1).

A clear definition and method of measuring professional engagement is essential to furthering research in this area. In addition, the important antecedents and outcomes of professional engagement need to be identified and effective educational interventions need to be developed to positively influence these factors.

Figure 5.1. Professional Engagement Research Framework

Figure 5.1. Research framework showing professional engagement as the keystone (mediator) of the arc of professional development that bridges professional formation (antecedents) to fulfillment of societal purpose (outcomes) over the demands of professional practice (moderators).

Defining professional engagement. As a starting point, a separate Delphi study was conducted to develop a consensus definition of professional engagement in physical therapy (Osborne & Hartley, in press). This study involved 30 physical therapists recognized for their contributions to the profession who reached consensus on the following definition: "Professional engagement in physical therapy is a fulfilling and enthusiastic dedication to making a positive impact on the health of individuals and society through behaviors that advance the profession of physical therapy," (p. 7). This definition suggests enthusiasm and dedication as characteristics important to the development of professional engagement, and identifies individual and societal health along with advancement of the profession as key outcome domains. The factors identified in this definition provide initial guidance on selecting specific antecedents and outcomes for further study.

Measurement of professional engagement. An important next step in understanding the antecedents and outcomes of professional engagement is to develop a valid and reliable measurement instrument. The current study provides some preliminary work toward developing an instrument based on the key indicator behaviors (Table 5.1) identified in the Delphi study on professional engagement in physical therapy (Osborne & Hartley, in press). The behaviors used to measure likelihood of future professional engagement in the current study were drawn from the list of potential behaviors used in the Delphi study prior to obtaining final results. Therefore, there is not a direct match between the behaviors used in the current study and the final list of key indicator behaviors from the Delphi study. The high degree of internal consistency identified for the future professional engagement instrument used in the current study does offer promise for developing an instrument based on these behaviors. Additional research is needed to determine the best methods of measuring these behaviors and confirming the factor structure of the instrument.

Table 5.1.

Key Indicators Behaviors of Professional Engagement in Physical Therapy

Indicator Behaviors
Advocates for patients, public health and well-being, and/or the physical therapy profession
Maintains membership in a physical therapy professional organization
Practices at the top of his or her license
Regularly attends professional meetings
Maintains professional currency by regularly reading physical therapy/health care literature
Monitors and evaluates patient outcomes to ensure safety, effectiveness, and appropriateness or physical therapy interventions
Develops strong interprofessional relationships

Antecedents of professional engagement. The definition of professional engagement identifies enthusiasm and dedication as important characteristics of a professionally engaged physical therapist. However, findings from the systematic literature review for this study indicate a considerably larger number of potentially relevant factors associated with engagement. Considering that study design limitations in the reviewed papers prevented identification of causal relations, much work is needed in this area. Future research should include longitudinal study designs in order to provide optimal evidence for causal relations.

The Model of Excellence in Physical Therapist Education recently published by Jensen and colleagues (2019) provides some useful ideas for potential antecedents of professional engagement. This model identifies three dimensions: *Culture of Excellence*, *Praxis of Learning*, and *Organizational Structure and Resources*. The Culture of Excellence domain contains four elements: shared beliefs and values, leadership and vision, drive for excellence with high expectations, and partnerships. Likewise, the Praxis of Learning domain consists of four elements: signature pedagogy, practice-based learning, creating adaptive learners, and professional formation. In the center of the model is a lens containing learner centeredness and patient centeredness that serves as a conduit for translating the Culture of Excellence into the Praxis of Learning. The foundation of the model is the Organizational Structure and Resources domain which represents the varying contexts in which physical therapist education occurs.

Considering that the model represents excellence in physical therapist education, each domain either provides or helps to identify potential antecedents of professional engagement. For example, a culture of shared beliefs and values as well as leadership and vision are positively associated with work engagement and may also contribute to professional engagement (Bailey et al., 2017). Similarly, practice-based and adaptive learning are consistent with autonomy-

supportive teaching recommendations and may have a positive influence on professional engagement (Baker & Goodboy, 2019; Cutrer et al., 2017; Kusurkar et al., 2011). Organization structures such type of administrative structure or didactic format are known to influence physical therapy residency outcomes and may also influence the development of professional engagement (Hartley, Roach, Harrington, & McNally, 2019).

Outcomes of professional engagement. The three outcomes domains identified in the consensus definition for professional engagement in physical therapy are patient outcomes, public health, and advancement of the profession. Each domain may be uniquely useful in determining more specific outcomes of interest. At the patient level, future research may investigate how clinicians' level of professional engagement influences patients' change in function, satisfaction, or healthcare expense. At the public health level, research may investigate how professionally engaged clinicians influence access to care, healthcare cost/utilization, or prevention. At the level of the profession, research may investigate how professional engagement influences advocacy efforts, advancing the body of knowledge, or participation in interprofessional teams. The influence of individual key professional engagement behaviors on outcomes is difficult to study and likely to have small independent effects. However, when considered in the context of a clinicians' professional engagement these effects may be more easily measured and interactions between behaviors may enhance the overall effect size. The lack of evidence for healthcare outcomes associated with engagement identified in the literature review makes this area of research both needed and open for exploration. Longitudinal study designs are also needed to determine causal relations between antecedents and outcomes.

Conclusion

Although limited, the preliminary work described in this dissertation provides a foundation for investigating the characteristics of a professionally engaged healthcare professionals and how the education process can positively influence these characteristics. Operational definitions and key behaviors representative of professional engagement in various healthcare professions can assist in distinguishing universal versus profession-specific aspects of professional engagement. Understanding the state versus trait nature of these attributes may assist educational leaders in developing selection criteria and curriculum that most effectively produced engaged healthcare professionals. The ability to identify and measure professional engagement among healthcare professionals may be useful in understanding how to design a healthcare system that most effectively meets its societal purpose. Findings from the present study support Self-Determination Theory as a useful theory for informing both research and educational practices aimed toward professional engagement. However, considerable work is needed toward developing this evidence base.

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Appendix A | Factors Associated with Engagement

Factors Associated with Engagement by Quality of Evidence and Locus of Engagement

Factors	Definition	Number of Studies	Average MMAT Score	Mode of Assessment	Locus of Engagement			
					WE	LE	PE	EHC
Age	Total number of years since birth	9	56%	Self-Report	Ø / (+)			
Gender	Identifying as male or female	8	56%	Self-Report	Ø			(+) for female
Culture of Regard & Support	Cultures characterized by support and civility, offer esteem and recognition for the significance of one's contribution, empower individuals, and facilitate goal attainment	7	57%	Derived from qualitative analysis		(+)		
				Survey of Perceived Organizational Support	(+)			
				Recognition Index of the Nursing Engagement Survey	(+)			
				Four items from the HR 'Sweet 16'	(+)			
				Perceived Supervisor & Organizational Support Scale	(+)			
				Supervisor Social Support Scale	(+)			
				General Coworker Support Scale	(-)			

				General Supervisor Support Scale	(-)
Years in Setting/Tenure	Number of years practicing as licensed healthcare professional in a particular setting or at a particular workplace (e.g. acute care, emergency department)	6	56%	Self-Report	Ø / (+)
Work Shift	A designated period of time in which workers carryout their duties (e.g., day, or night)	6	54%	Self-Report	Ø / (+) (+) only for day shift
Education Level/ Degree	Highest level of professional education or academic degree earned (e.g. associates, bachelors, masters, doctoral)	6	46%	Self-Report	Ø
Perception of Job Autonomy	General attitude toward work-related independence, initiative, and freedom occurring in one's daily work activities	5	50%	Autonomy Subscale of the Index of Work Satisfaction.	(+)
				Autonomy and Input Index of the Nursing Engagement Survey	(+)
				Job Control-Decision Authority Measure	(+)

				Decision Authority Subscale of the Job Content Questionnaire	(+)		
				Work Method Autonomy Scale	Ø		
Passion	A feeling of excitement or ardor toward a particular target	5	50%	Derived from Qualitative Analysis		(+)	
				Passion for Nursing Index of the Nursing Engagement Survey	(+)		
				Derived from Delphi Technique			(+)
Years in Practice	Number of years as licensed healthcare professional	5	55%	Self-Report	Ø / (+)		
Organizational Commitment	The emotional attachment, identification with, and involvement one has with an organization	4	69%	Organizational Commitment Questionnaire (adapted 7-item version)	Ø		
				Organizational Commitment Scale	(+)		
				Affective Commitment Scale	(+)		

Inter-Professional Relationships	The quality of interactions one experiences with members of other professions	4	63%	Derived from Delphi Technique		(+)
				Relational Coordination Scale	(+)	
Professional Growth & Development	The process of lifelong learning where knowledge and skill needs are identified and met leading to a sense of confidence in one's professional abilities	4	56%	Derived from Delphi Technique		(+)
				Professional Growth Index of the Nursing Engagement Survey	(+)	
				Derived from Qualitative Analysis		(+)
Practice Environment	The various organizational, structural, attitudinal, and interpersonal aspects of a particular practice setting or location	4	50%	Halfer-Graf Job/Work Environment Nursing Satisfaction Survey	Ø	
				Work Environment Index of the Nursing Engagement Survey	(+)	
				Practice Environment Scale of the Nursing Work Index	(+)	
Employee Involvement in Decision-Making/Shared Governance	Practices supporting professionals' ability to influence or make decisions that directly	3	75%	Ethnographic Observation Methods	(+)	
				Decisional Involvement Scale	(+)	

	impact their practice			Index of Professional Nursing Governance	(+)
Structural Resources/Empowerment	The ability to get things done in an organization by having access to information, resources, opportunity, and support	3	67%	Job Resources Questionnaire	(+)
				Conditions of Work Effectiveness Questionnaire II	(+)
				Derived from Qualitative Analysis	(+)
Turnover Cognitions/Intention	The mental processes involved in deciding to stay or leave one's current job	3	67%	Turnover Cognitions Scale	(-)
				Three Self-Report Items	(-)
Burnout (Compassion Fatigue)	A progressive and cumulative process that is influenced by interaction with patients, personal resources, and exposure to stress, and leads to emotional and intellectual manifestations such as apathy, cynicism, boredom, irritability, or feeling overwhelmed	3	67%	Professional Quality of Life Scale	Ø / (-)
				Copenhagen Burnout Inventory	(-)
				Study-specific Burnout Scale	(-)
				Oldenburg Burnout Inventory	(-)

Generation	Age cohort based on year of birth: Veterans (1925-1945), Baby Boomers (1946-1964), Generation X (1965-1980), Generation Y (1981-2000)	3	63%	Self-Report	Ø	
Race	Identifying as Caucasian or as a minority	3	58%	Self-Report	Ø	(+) for being a minority
Hours Worked per Week	Number of hours employed performing target role per week	3	58%	Self-Report	Ø / (+)	
Intra-Professional Relationships	The quality of interactions one experiences with other members of their profession	3	50%	Derived from Delphi technique		(+)
				Relational Coordination Scale	(+)	
Leader-Member Exchange	The level of reciprocal satisfaction, trust, and understanding in a leader–follower relationship	3	50%	Manager Action Index of the Nursing Engagement Survey	(+)	
				Leader-Member Exchange Scale	Ø / (+)	

Reflection	The act of examining one's behaviors and experiences that promotes self-awareness and an integration of theoretical concepts into practice; enhancing self-esteem, empowerment, and level of future practice	3	42%	Derived from Qualitative Analysis		(+)	
				Reflection Subscale of the Reflection-Rumination Questionnaire	Ø		
				Awareness Reflection/Empowerment Action Questionnaire			(+)
Psychological Availability/Confidence	Positive belief in one's knowledge, skills, and ability to perform with excellence	2	100%	Psychological Availability Scale (7-item)	Ø / (+)		
				Psychological Availability Scale (5-item)	(+)		
				Derived from Delphi Technique		(+)	
Professional Association Membership	Having an active member status in an organization dedicated to advancing one's profession	2	88%	Derived from Delphi Technique		(+)	
Professional Meeting Participation	Attends and participates in professional meetings	2	88%	Derived from Delphi Technique		(+)	

Monitoring/Professional Currency	Staying informed about the status/progress of organizational initiatives or advances in one's profession	2	75%	Derived from Qualitative Analysis	(+)	(+)	
				Derived from Delphi Technique			(+)
Mission-Driven	Motivated and driven to action by a sense of meaningful mission and context	2	75%	Derived from Qualitative Analysis		(+)	
				Derived from Delphi Technique			(+)
Attunement	Empathy, compassion, regard for, and openness to the perspectives and contributions of others	2	75%	Derived from Qualitative Analysis		(+)	
				Derived from Delphi Technique			(+)
Affirmative Framework	Use of an optimistic explanatory style that generates positive expectations and models resilient behaviors	2	75%	Derived from Qualitative Analysis		(+)	
				Derived from Delphi Technique			(+)
Identification	The ability to associate with the views and characteristics of others without losing one's own identity	2	75%	Derived from Qualitative Analysis		(+)	Ø

Magnet Certification	Whether or not a hospital is certified by the American Nurses Credentialing Center for Excellence in Nursing	2	75%	Data from American Nurses Credentialing Center for Excellence in Nursing.	Ø / (+)
Psychological Safety	Work environments where providers are not afraid to speak up to improve work processes or call attention to a potentially dangerous situation	2	75%	Study-Specific Adaptation of related questionnaire. Organizational Psychological Safety Scale	Ø (+)
Performance-Driven Reward/ Recognition	Practices that link monetary or other forms of reward and recognition to employee success in achieving organization-supportive goals	2	75%	Ethnographic Observation Methods Recognition Index of the Nursing Engagement Survey	(+) (+)
Perception of Occupational Stress	An unpleasant emotional experience associated with elements of fear, dread, anxiety, irritation, annoyance, anger, sadness, grief, and depression	2	75%	Perceived Stress Scale Self-Reported Work Stress Questionnaire Subjective Stress Scale	(-) (-) Ø / (-)

Work Meaningfulness	A belief that one's work has a significant and positive purpose	2	75%	Psychological Meaningfulness Scale	Ø / (+)	
				Multidimensional Psychological Climate Scale	(+)	
				Work as Meaning Inventory	(+)	
				Items from Job Diagnostic Survey	(+)	
Culture of Meaning	A culture that creates clarity of mission, meaningfulness, and fosters alignment between organizations values and the values and contributions of the individuals in the organization	2	63%	Derived from Qualitative Analysis		(+)
				Agreement with single statement	(+)	
Patient Satisfaction	Patients overall rating of their experience receiving healthcare services	2	63%	Study-Specific Patient Satisfaction Scale	(+)	
				Derived from Qualitative Analysis	(+)	(+)

Facilitative Change Leadership	Leadership based on inclusion, collaboration, and empowerment in the development of change initiatives. Ensures structure that includes purposeful involvement from various stakeholders at all levels and intentionally avoids top-down communication	2	63%	Quality Improvement Leadership Subscale from the Quality in Action Survey	Ø	
				Empowerment Questionnaire	Ø	
				Derived from Qualitative Analysis		(+)
Turnover Rate	Percentage of employees that leave an organization during a specified time period	2	63%	Hospital Department Records	Ø / (-)	
Satisfaction with Salary and Benefits	General attitude toward the dollar remuneration and benefits received for work done	2	63%	Pay Subscale of the Index of Work Satisfaction	(+)	
				Salary and Benefits Index of the Nursing Engagement Survey	(+)	
Physical Strain/Distress	Physical exhaustion associated with working in high intensity/high stress environments	2	63%	Derived from Qualitative Analysis	(-)	
				Physical Strain Scale	Ø / (-)	

Overall Well-Being and Health	Perceived current level of fulfilment and satisfaction with life and health status	2	63%	Well-Being Scale	(+)	
				Single Self-Rating of Health Item	(+)	
Endorsement of Feelings of Depression	Identifies with statements or symptoms used in depression screening instruments	2	63%	2-Item Primary Care Evaluation of Mental Disorders	(-)	
				Center for Epidemiologic Studies Depression Scale	(-)	
Job Performance	The degree of interpersonal facilitation (helpfulness, consideration, cooperativeness) and job dedication (effort, initiative, persistence, self-discipline) one displays	2	63%	Contextual Performance Measure	(+)	
				Productivity metric from employer	(+)	
Being a Representative/ Role Model	The experience one has when representing their profession or serving in an exemplary role	2	63%	Derived from Delphi Technique		(+)

Professionalism	Being reliable, responsible, and accountable and acting with integrity, competence, compassion, and skill in the best interest of the patient/society	2	63%	Derived from Delphi Technique		(+)	
Altruism Toward Others	Acting for the good of others	2	63%	Derived from Delphi Technique		(+)	
Altruism Toward Profession	Acting for the good or advancement of one's profession	2	63%	Derived from Delphi Technique		(+)	
Self-Identification as a Minority	A view of self as part of a minority group (e.g., racial, religious, profession)	2	63%	Self-Report			(+)
Patient Focus/Patient-Centered Care	The extent to which patients are treated well and their needs are valued and considered a priority for the organization	2	50%	Patient Focus Subscale from the Quality in Action Survey	Ø		
				Study-Specific Scale for Patient-Centered Care	(+)		
				Derived from Qualitative Analysis	(+)	(+)	

Proactive Work Behaviors	Behaviors associated with initiating internal organizational change	2	50%	Proactive Work Behavior Scale	(+)	
				Awareness Reflection/Empowerment Action Questionnaire		(+)
Work Ability	Assessment of one's ability to continue working in his or her job, given characteristics of the job along with his or her resources	2	50%	3 Self-Report Items	Ø / (+)	
Perception of Patient Safety	Employees' assessment of the quality of care or services provided by their team	2	50%	3-items from The Hospital Survey on Patient Safety Culture	(+)	
				Full version of the Hospital Survey on Patient Safety Culture	(+)	
Satisfaction with Interaction	General attitude toward the opportunities presented for both formal and informal social and professional contact during working hours	2	50%	Interaction Subscale of the Index of Work Satisfaction	(+)	
				Derived from Qualitative Analysis	(+)	

Active Learning	The act of obtaining new knowledge or skills especially when it involves active participation in new experiences	2	38%	Derived from Delphi Technique			(+)
				Derived from Qualitative Analysis	(+)	(+)	
Organizational/ Professional Involvement	Actively contributing to the functioning and advancement of an organization or profession	2	38%	Derived from Delphi Technique			(+)
				Derived from Qualitative Analysis	(+)	(+)	
Feeling of Personal Growth	The perception of self-improvement that extends across multiple life domains	2	38%	Personal Growth Index of the Nursing Engagement Survey	(+)		
				Derived from Delphi Technique			(+)
Psychological Empowerment	The emotional investment needed for staff to be successful and is influenced by four dimensions of the work environment: meaning, competence, self-determination, and impact	2	38%	Psychological Empowerment Instrument	Ø / (+)		

Moral Distress	The negative feelings one experiences when their actions are not aligned with their moral sense	2	38%	Not in the Patient's Best Interest Subscale of the Moral Distress Scale	Ø / (-)
Intra-Professional Collaborations	The degree of teamwork and collaboration with colleagues within one's profession	2	38%	Non-nurse Staff Index of the Nursing Engagement Survey	(+)
Communicating Mission & Values	Activities associated with communicating the organization's scope and purpose to employees, and clarifying their role in supporting that purpose	1	100%	Ethnographic Observation Methods	(+)
Information Sharing	Practices in which current organizational performance and other information that could affect jobs is communicated to employees	1	100%	Ethnographic Observation Methods	(+)
Commitment to Supervisor	The emotional attachment, identification with, and involvement one has with a supervisor	1	100%	Supervisory Commitment Scale	(+)

Job Commitment	The emotional attachment, identification with, and involvement one has with a specific job	1	100%	Job Commitment Scale	(+)	
Walking Rounds with Feedback	A regular and ongoing process where leadership engages with front-line healthcare workers to identify and resolve safety issues, and feedback on the impact of changes is provided to the workers	1	100%	Two self-report items	(+)	
Collaborative Nature	Ability to work well with teams and cultivate strong professional relationships	1	100%	Derived from Delphi Technique		(+)
Effective Communicator	Ability to convey a message both orally and in writing	1	100%	Derived from Delphi Technique		(+)
Professional Identification	Proudly associating with one's profession and belief in its values	1	100%	Derived from Delphi Technique		(+)
Advocacy Toward Patients	Supporting, defending, or speaking for the interests of patients	1	100%	Derived from Delphi Technique		(+)

Advocacy Toward Profession	Supporting, defending, or speaking for the interests of one's profession	1	100%	Derived from Delphi Technique	(+)	
Scholarship	Contributes to the advancement of knowledge and supports research	1	100%	Derived from Delphi Technique	(+)	
Monitoring/Professional Practice	Staying aware of and evaluating patient progress to ensure safety, effectiveness, and appropriateness of interventions	1	100%	Derived from Delphi Technique	(+)	
Inter-group Dynamics	A continuum of strategies ranging from not promoting any relationship, through promoting increased degrees of inter-group closeness and finally to affirming a common identity subsuming all groups	1	100%	Derived from Qualitative Analysis		Ø
Extensive Interaction with Minority Populations	Spending a substantial amount of time interacting with individuals from minority populations	1	100%	Self-report		(+)

Hospital Size	Number of staffed beds in the hospital	1	75%	Data from American Hospital Association Annual Survey of Hospitals	Ø
Hospital Teaching Status	Ratio of medical and dental residents to number of hospital beds	1	75%	Data from American Hospital Association Annual Survey of Hospitals	Ø
Case Mix Index	A calculation indicating illness severity among hospital patient populations	1	75%	Data from Centers for Medicare and Medicaid Services	Ø
Organizational Life Cycle	Classification of hospitals based on change in admission rates over 2 consecutive years. The classifications are growers (≥5% increase), decliners (< 5% increase or a decrease), unstable (>5% increase or decrease in one year but not the other), and highly unstable (>5% increase or decrease in one year and then >5% in the other direction the second year)	1	75%	Data from American Hospital Association Annual Survey of Hospitals	(-) for being classified as a grower

Unit Size	Number of staffed beds on a particular hospital unit	1	75%	Data from American Hospital Association Annual Survey of Hospitals	Ø
Support Service Availability	The availability of any of support services such as respiratory therapy services and computerized order entry systems, information technology, etc.	1	75%	Support Services Checklist	Ø
Patient Acuity	Perception of patient-related demands including the type and variety of patients and the extent to which patient conditions change rapidly	1	75%	Patient Acuity Scale	Ø
Work Complexity	The extent to which work is characterized by frequent interruptions or unanticipated events	1	75%	Work Complexity Scale	(-)

Overall Job Satisfaction	General attitude toward his or her job	1	75%	Index of Work Satisfaction (Subscales: Pay, professional status, interaction, task requirements, organizational policies, and autonomy)	(+)
Satisfaction with Organizational Policies	General attitude toward the limits imposed upon work activities by the organization's formal leadership	1	75%	Organizational Policies Subscale of the Index of Work Satisfaction	(+)
Satisfaction with Professional Status	General attitude toward the overall importance or significance felt about one's job—both in one's own view and in the view of others	1	75%	Professional Status Subscale of the Index of Work Satisfaction	(+)
Satisfaction with Task Requirements	General attitude toward the aspects of the job that need to be done and are a regular part of the job	1	75%	Task Requirements Subscale of the Index of Work Satisfaction	(+)
Job Search Behavior	Specific behaviors or acts that are likely to transform turnover intentions into outcomes	1	75%	10--item Job Search Behavior Index	(-)

Length of Work Shift	The overall duration of a designated period of time in which workers carryout their duties (e.g., 8 hours or 12 hours)	1	75%	Self-Report	Ø
Satisfaction with Teamwork	The extent to which one is satisfied with the teamwork attitudes and behaviors of their workgroup	1	75%	Organizational Culture Survey	(+)
Decisional Involvement - Dissonance	The difference between the desired degree of involvement in decision-making and the perceived actual involvement	1	75%	Decisional Involvement Scale	(-)
Climate of Diversity	The extent to which an employee perceives that the organization values diversity	1	75%	Two items from the HR 'Sweet 16'	(+)
Medical Resident Satisfaction	Medical residents' degree of satisfaction with various aspects of their residency program	1	75%	ACGME Satisfaction Scale.	(+)
Termination Risk	Risk of leaving an organization	1	75%	Hazard ratio calculated from HR records	(-)

Work-Family Balance Culture	The degree to which an organization supports employees' lives outside work	1	75%	Work-Family Culture Scale	(+)		
Modeling Change Leadership	Leadership based on a strong personal drive and vision for transformative change and dissatisfaction with the status quo. Provides clear expectations and coaching throughout the change process	1	75%	Derived from Qualitative Analysis		(+)	
Adaptive Change Leadership	Leadership based on monitoring progress and seeking out needs at the group and individual level, and then making modifications to address these needs as appropriate	1	75%	Derived from Qualitative Analysis		(+)	
Retention Rate	Percentage of employees that stay with an organization during a specified time period	1	75%	Derived from Qualitative Analysis			(+)

Benevolent Ethical Climate	Work environments that promote consideration for the concerns of others, such as patients, the work group, and the community before the concern for the individual self	1	50%	General Benevolent Scale (adapted)	Ø
Yeas Experience as a Manager	Number of years working in a managerial role	1	50%	Self-report	Ø
Number of FTE's Managed	The number of individuals reporting to a manager	1	50%	Self-Report	Ø
Inter-Professional Collaborations	The degree of teamwork and collaboration with colleagues from outside of one's profession	1	50%	Non-nurse Staff Index of the Nursing Engagement Survey	(+)
Percent of Time in Direct Patient Care	The proportion of overall time at work performing activities directly related to providing healthcare services to patients	1	50%	Self-Report	Ø

Work Group/Unit	A subgroup of employees within an organization that work closely together and share the same work responsibilities and commonly the same work space	1	50%	Self-Report	Ø
Compassion Satisfaction	A feeling of being enriched from offering help to people in need	1	50%	Professional Quality of Life Scale	(+)
Perception of Patient Safety Culture	Employees' assessment of the organization's overall attitudes and practices that impact the quality of care provided to patients	1	50%	The Hospital Survey on Patient Safety Culture	(+)
Perception of Work-Life Balance	The extent to which work and personal life interfere with or enhance one another	1	50%	Work-Life Balance Scale	(+)
Perception Skill Discretion	The level of skills and creativity required on the job and the flexibility permitted to the worker in deciding what skills to employ	1	50%	Decision Latitude Subscale of the Job Content Questionnaire	(+)

Work-Family Balance	The extent to which role pressures from work and family are compatible	1	50%	Work-Family Conflict Scale	Ø	
Attachment-Anxiety	A negative view of self as being unworthy of affection and is characterized by excessive attempts to achieve support and intimacy with a deep-seated fear of interpersonal rejection	1	50%	Experience of Relationships Scale	(-)	
Attachment-Avoidance	A negative view of others as being unreliable or untrustworthy and is characterized by avoidance of intimacy and suppression of emotions	1	50%	Experience of Relationships Scale	(-)	
Social Support Provision	Discretionary or obligatory helping behaviors at work that may or may not be part of employees' work task	1	50%	Social Support Provision Scale	Ø	
Generativity	Taking pleasure in helping younger generations	1	50%	Derived from Qualitative Analysis		(+)

Boundary clarity	The ability to maintain a sense of self even when feeling strong sense of association with others	1	50%	Derived from Qualitative Analysis	(+)
Self-Regulation	The ability to maintain an internal state of restraint, calm emotions, and suspend judgement	1	50%	Derived from Qualitative Analysis	(+)
Change Agility	Challenging the status quo, welcoming change, and consistently seeking improvement and learning	1	50%	Derived from Qualitative Analysis	(+)
Learning Culture	Cultures that create opportunities for educational mobility and continuous learning, encourage learning through risk taking and increased visibility, and provide transparency and accessibility to information and resources	1	50%	Derived from Qualitative Analysis	(+)

Culture of Generativity	A culture of caring for and contributing to the next generation	1	50%	Derived from Qualitative Analysis		(+)	
Culture of Excellence	A culture that communicates expectations of excellence and cultivates pride and personal investment in the organizations reputation, results and continued growth	1	50%	Derived from Qualitative Analysis		(+)	
Health Disparity Awareness	Knowledge about the existence and extent of health disparities	1	50%	Awareness Reflection/Empowerment Action Questionnaire			(+)
Self-Transcendence	Finding meaning through a focus on something outside of self	1	25%	Self-Transcendence Scale	(+)		
Work-Related Vulnerability	Being aware of human vulnerability through one's work	1	25%	Study-Specific Single Vulnerability Question	Ø		
Type of Setting	The specific practice setting where primarily employed (e.g. pediatric critical care, trauma emergency department)	1	25%	Self-Report	Ø		

Critical Reflective Practice	Personal and professional growth through metacognition during or after clinical practice situations	1	25%	Critical Reflective Practice Questionnaire	(+)	
Employment Status	Being employed part-time or full-time	1	25%	Self-Report	Ø	
Relational Energy	A heightened level of psychological resourcefulness generated from interpersonal interactions that enhances one's capacity to do work	1	25%	Relational Energy Scale	(+)	
Leader's Gender	Rather one's formal leader identifies as male or female	1	25%	Self-Report	Ø	
Leader's Race	Rather one's formal leader identifies as Caucasian or as a minority	1	25%	Self-Report	Ø	
Provider-Patient Relationships	The quality of interactions one has with the patients under their care	1	25%	Derived from Delphi Technique		(+)

Having an Engaged Role Model	The experience of having a relationship with someone who demonstrates a high degree of physical and mental excitement, immersion, and dedication toward a shared role	1	25%	Derived from Delphi Technique	(+)

Note. (+) = positive association, (-) = negative association, ∅ = no association, MMAT = Mixed Methods Assessment Tool which is scored based on the number of quality criteria met by a study, WE = work engagement, LE = leadership engagement, PE = professional engagement, EHC = engagement in healthcare change. Factors are listed by strength of evidence which is based on number of studies addressing factor and the average MMAT quality score of those studies.

Appendix B | Study Questionnaire Instruments

Table B.1.

Personal Characteristics

Characteristic	Categories
Age	Chronological age in years
Gender	Male Female Other
Race/Ethnicity	African American American Indian/Alaskan Native Asian Caucasian Hawaiian Native Hispanic/Latino Pacific Islander Other
Position on Education Continuum	1st year or within first 3 semesters 2nd year or within semesters 4-6 3rd year or semesters 7 or greater Residency Fellowship
Current GPA (DPT students only)	GPA on a 4.0 scale
Physical Therapy as First Career	Physical therapy as first career Prior career before entering physical therapy
Anticipated relationship strain Anticipated family strain Anticipated personal strain Anticipated financial strain	0-100 VAS (0 = Completely Disagree; 100 = Completely Agree)
Anticipated Student Debt	$0 to $49,999 $50,000 to $99,999 $100,000 to $199,999 > $200,000

Note. DPT = Doctor of Physical Therapy, GPA = grade point average

Table B.2.

Program Characteristics

Characteristic	Professional	Postprofessional
Enrollment Options	Full-time Only: Students must be enrolled in full-time Part-time option available: Students may enroll on a part-time basis	
Didactic Instruction	On-site: No online learning Hybrid: Mix between on-site and online/remote learning	
Program Grouping	Classified into CAPTE regions based on State in which the program is located	Classified into ABPTRFE program types
Cohort Size	Number of students in class	Number of residents or fellows-in-training in cohort
Institution Size	Number of students enrolled at university/college	Total number of residents and fellows-in-training enrolled in all programs at institution
Administration	Public: A State-run institution of higher learning Private: A privately run college or university Military: A federally-run institution affiliated with the military	Academic: Primary administration is a CAPTE accredited physical therapy education program Clinic-based: Primary administration is an organization that provides physical therapy clinical services Non-clinical & Non-academic: Primary administration is an organization that is not an academic or clinic-based organization
Tuition	N/A	No Tuition: Program charges tuition or fees Tuition: Program does not charge tuition or fees
Salary	N/A	Upper Salary: ≥ 70% of a full salary Lower Salary: ≤ 70% a full salary

Note. ABPTRFE = American Board of Physical Therapy Residency and Fellowship Education, CAPTE = Commission on Accreditation in Physical Therapy Education.

Table B.3.

Modified Academic Motivation Scale

Variable Code	Item	Scale
	After graduation from my current program I want to pursue continued learning activities…	0-100 VAS
CM5	...because with only my current level of training I would not find a higher-paying position later	0 = Not at all like me 100 = Exactly like me
AM1	...because I experience pleasure and satisfaction while learning new things	
AM13	...because continued learning will help me be better prepared as a physical therapist	
AM9	...for the intense feelings I experience when I am sharing ideas with others	
AM5	...for the pleasure I experience when achieving higher levels of knowledge	
CM1	...to prove to myself that I am capable of completing higher levels of learning	
CM6	...in order to obtain a more prestigious position later on	
AM2	...for the pleasure I experience when I discover new things about physical therapy that I have never seen before	
AM14	...because eventually it will enable me to obtain a job in a setting that I like	
AM10	...for the pleasure I experience when I read physical therapy related books and papers	
AM6	...for the pleasure I experience while I am surpassing myself in one of my personal accomplishments	
CM2	...because of the fact that if I learn more I will feel important	
CM7	...because I want to have "the good life" later on	
AM3	...for the pleasure I experience in broadening my knowledge about topics that interest me	
AM15	...because continued learning will help me make a better choice regarding my career path	
AM11	...for the pleasure that I experience when I feel completely absorbed by what certain physical therapy researchers/educators have written	
AM7	...for the satisfaction I feel when I am in the process of accomplishing difficult learning activities	
CM3	...to show myself that I am intelligent person	
CM8	...in order to have a better salary later on	

AM4	...because continued learning activities would allow me to continue to learn about many things that interest me
AM16	...because I believe that the additional time spent in continued learning activities will improve my competence as a physical therapist
AM12	...for the "high" feeling that I experience while learning about various interesting subjects
AM8	...because continued learning allows me to experience a personal satisfaction in my quest for excellence in my professional development
CM4	...because I want to show myself that I can succeed at continued learning activities

Note. AM = autonomous motivation; CM = controlled motivation; VAS = visual analog scale; Stem statement is in bold.

Table B.4.

Modified Archer Health Professions Motivation Survey - Mastery and Performance Goal Orientation Subscales

Variable Code	Item	Scale
	Thinking about your experience as a student/learner; in general, how successful do you feel when...	0-100 VAS
PG1	...you show people you are good at something	0 = Not at all successful
MG1	...a lecture or lab makes you think about things	100 = Very successful
PG2	...you get a higher grade than other students	
MG2	...you learn something interesting	
PG3	...you show people that you are smart	
MG3	...something you learn makes you want to find out more	
PG4	...you are the only one who can answer the lecturer's question	
	In general, how satisfied do you feel when you...	0-100 VAS
MG4	...learn something new	0 = Not at all satisfied
PG5	...do better than others in the class	100 = Very satisfied
MG5	...read something interesting	
MG6	...work hard	
MG7	...work on a challenging task or assignment	
MG8	...see improvement in your work	
PG6	...get one of the highest grades	
	In general, how much do you agree with these statements?	0-100 VAS
MG9	The more challenging the task, the harder I work	0 = Do not agree at all
PG7	If someone is evaluating me I tend to expect the worst	100 = Strongly agree
PG8	I like to be the best person in my group	

PG9	I am usually worried about what impression I make	
MG10	I am always thinking of ways to improve how I do things	
PG10	Good grades are important to me	
MG11	I feel very upset when I commit some sort of error	
MG12	I like to compete against myself	
MG13	The opinions that important people have of me cause me little concern	
PG11	I get anxious when I do not know how well I am doing	
PG12	I am often afraid that I look ridiculous or make a fool of myself	
	In general, how much do you agree with these statements? I feel satisfied or positive about myself when...	0-100 VAS
PG13	...I accomplish something that others in my class could not do	0 = Do not agree at all
MG14	...I understand something for the first time	100 = Strongly agree
MG15	...I am involved totally in something that I am doing	
PG14	...I receive recognition or prestige	
PG15	...my status in the group is enhanced	

Note. PG = performance goal; MG = mastery goal; VAS = visual analog scale; Stem statements are in bold.

Table B.5.

Jefferson Scale of Lifelong Learning - Health Professions Students Version

Variable Code	Item	Scale
	Please indicate the extent of your agreement with each of the following statements.	0-100 VAS
LLL1	Searching for the answer to a question is, in and by itself, rewarding	0 = Strongly disagree
LLL2	Lifelong learning is a professional responsibility of all healthcare providers	100 = Strongly agree
LLL3	I enjoy reading articles in which issues of healthcare/medicine are discussed	
LLL4	I routinely attend student study groups	
LLL5	I read healthcare/medical literature in journals, websites or textbooks at least once every week	
LLL6	I routinely search electronic resources to find out about new developments in healthcare/medicine	
LLL7	I believe that I would fall behind if I stopped learning about new developments in healthcare/medicine	
LLL8	One of the important goals of health professions' education is to develop students'/learners' lifelong learning skills	

LLL9	Rapid changes in health science/medicine require constant updating of knowledge and development of new professional skills
LLL10	I always make time for learning on my own, even when I have a busy class schedule and other obligations
LLL11	I recognize my need to constantly acquire new professional knowledge
LLL12	I routinely attend optional sessions, such as professional meetings, guest lectures, or clinics where I can volunteer to improve my knowledge and clinical skills
LLL13	I take every opportunity to gain new knowledge/skills that are important to my discipline
LLL14	My preferred approach in finding an answer to a question is to consult a credible resource such as a textbook or electronic resource

Note. LLL = lifelong learning; VAS = visual analog scale; Stem statement is in bold.

Table B.6.

Future Professional Engagement Scale

Variable Code	Item	Scale
	After completion of your current program, how likely are you to:	0-100 VAS
FPE1	Join or remain a member of the APTA	0 = Not at all likely
FPE2	Regularly attend professional meetings such as conferences, board meetings, or House of Delegates	100 = Completely likely
FPE3	Take on a leadership role that serves to advance or promote the physical therapy profession	
FPE4	Participate in activities where you are an advocate for patients, public health, or the physical therapy profession	
FPE5	Develop strong professional relationships with professionals other than physical therapists	
FPE6	Regularly read the professional literature to stay up-to-date with current practice	
FPE7	Seek out and adopt new innovations into your practice	
FPE8	Monitor and evaluate patient outcomes to ensure safety, effectiveness, and appropriateness of physical therapy interventions	
FPE9	Openly discuss and address ethical dilemmas you face as a physical therapist and healthcare provider	

Note. FPE = future professional engagement; VAS = visual analog scale; APTA = American Physical Therapy Association; Stem statement is in bold.