Exploring the Relationship Between Work Engagement and Psychological Contract Fulfillment in Health Care Organization-Employed Physicians

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Exploring the Relationship between Work Engagement and Psychological Contract Fulfilment in Health Care Organization Employed Physicians

By

Oyebanjo O. Olowe

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Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (PhD) in Health Sciences
Seton Hall University
2021
Doctoral Candidate, Oyebanjo Olowe, has successfully defended and made required modifications to the text of the doctoral dissertation for the Ph.D. during the Spring Semester 2021

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ABSTRACT

While physician employment by healthcare organizations (HCO) in the United States continues to rise and private practice ownership continues to decline, many physicians are disengaged and leaving their organization as their job expectations are not fulfilled. Concurrently, some are changing practice patterns that may lead to decreased access to care despite the forecasted shortage of 84,900 fewer physicians and the aging US population's project growth by 2033. Prior work on physician work engagement has been practitioner-based, never using the widely accepted validated Utrecht work engagement scale. Also, there has been little work on psychological contract fulfillment (PCF) in US physicians, hence the need for scholarly work. A survey was undertaken to explore the relationship between work engagement and psychological contract fulfillment in health care organization-employed physicians. The study was conducted on a random sample of 1,100 U.S. licensed HCO-employed physicians providing direct patient care for at least six months with representation from the four regions of the U.S., 42 specialties/subspecialties, seven practice settings, work hours, gender, marital status, and work experience. Primary data was collected via an online survey using two instruments: the Utrecht Work Engagement Scale (UWES-9) to assess physicians' relative work engagement levels and a psychological contract survey to measure the psychological contract's fulfillment.

The results showed strong evidence for a significant positive association and a significant positive predictive effect of PCF on work engagement and each of its dimensions: vigor, dedication, and absorption. Physicians' work hours were found to have a significant effect on dedication and absorption levels dimensions of work engagement. Furthermore, years of work experience were found to have significant predictive effects on the absorption dimension. Thus, it is inferred that PCF perception is positively associated with work engagement in HCO-
employed physicians and that PCF has a significant positive predictive effect on work engagement and each of its dimensions. This study's results can inform HRM practices in the retention of physicians. Furthermore, the study contributes empirical data lacking in the work engagement literature.

**Keywords:** Physician employment, work engagement, psychological contract fulfillment, hospital-physician relationship, Utrecht Work Engagement Scale (UWES-9), physician engagement, job demands, job resources, psychological contract breach, health care organization
DEDICATION

This work is dedicated first to
   God,
   my loving family,
   Pamela
   Yewande and Ayobami.
ACKNOWLEDGMENTS

The completion of a doctoral program is not possible without the committed support and guidance of God, family, and faculty. First and foremost, I thank God for giving me the might to complete this journey. The easy part is starting, but the hard part is finishing, but I did, and I give God the glory. I now acknowledge my wife, partner, and best friend, Pam. You are my cheerleader. Your words of encouragement have been unequalled throughout; thank you. I also recognize my two exceptional daughters, Yewande and Ayobami. You both inspire me to be a better father. As a father, husband, and pastor, I have treasured your unrivaled support in pursuing this degree. Thank you, and I love you all.

I now acknowledge my dissertation committee members, outstanding professionals, distinguished researchers, known for their strong commitment to student success.

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Dr. Battaglia, thank you for being a reader on my committee. Your insight into my study and your suggestions have shown me new ways that my research can take form. I value your perspective.
Dr. Cahill (retired chair), thank you for the early years of guidance as my advisor. Thank you for helping me make sense of my thoughts and translating them into a study worthy of research. More importantly, thank you for handing me off to Dr. Zipp-she did what you said she would; she brought me to the finish.

My educational journey at Seton Hall began as a master’s student in the Healthcare Administration program. I very much appreciated the guidance of Dr. Anne Hewitt for equipping me with the skills of a healthcare administrator. I culminate my studies with this dissertation.
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CHAPTER 1-INTRODUCTION

Every year, America’s physicians conduct over 1.2 billion patient visits, treating illnesses ranging from minor to life-threatening (The Physician’s Foundation, 2012). According to the Boston University School of Public Health, physicians receive or direct 87% of all personal healthcare spending (Sager & Socolar, 2005). Merritt Hawkins’ 2019 Survey of Physician Inpatient/Outpatient revenue disclosed that physicians generate, on average, $1.56 million in revenue annually for their affiliated hospitals. According to the American Medical Association (2018), physicians generate a per capita economic output of $3.1 trillion, up from $2.2 trillion in 2012. Accordingly, physicians are key players in healthcare and health care economics and catalysts of healthcare delivery in the United States (U.S).

Historically, U.S physicians have operated as independent owners or partners of their practices, typically running small businesses. As independent practitioners, physicians obtain medical staff membership and privileges (e.g., admitting) at 1+ hospitals. In a quasi-market exchange, hospitals grant physicians privileges to utilize its facility as the “doctor’s workshop,” coming and going as they please, ordering tests, and directing nurses and hospital personnel. In return, physicians agree to carry out delegated medical staff responsibilities like committee participation, follow medical staff rules/regulations/bylaws, and perform required functions like credentialing, peer review, and taking call duties (Pauly & Redisch, 1973). In recent years, however, the independent practice model has been increasingly supplanted by the employment model where health care organizations (HCOs) like hospitals, hospital-owned medical groups, physician-owned medical groups, HMO/PPOs, and other similar organizations employ physicians. According to the literature, nearly 50% of physicians identify as a hospital, hospital-owned medical group, or physician-owned medical group employee, while 31% identified as
owners of their practice or partners (The Physician’s Foundation, 2018)

A corollary to the physician employment trend is the proliferation of group practice mergers and the formation of increasingly large group practices that are virtually indistinguishable from large hospital systems (The Physician’s Foundation, 2018). Physicians are coming together to form larger groups for the same reasons they seek employment in an organization: financial security, the complexity of managing a practice (The Physician’s Foundation, 2018), compliance, physician’s quality of life, IT expertise, and the ability to compete for large population health management contracts (The Physician’s Foundation, 2018).

Younger physicians also opt for direct hospital employment to avoid the administrative burden and financial uncertainty of solo practice. Merritt Hawkins (2019) reported that only 1% of physicians in their final year of training indicated they would prefer a solo practice model. Currently, there is a decline in physician ownership of the private practice and a rise in HCO employment of physicians in the US.

A significant factor driving the current employment trend is the emerging delivery models characterized by global payments and the management of large population groups built around the principle of physician-hospital alignment and cooperation. With the increased emphasis on quality and the patient experience, these models, and systems of delivery, increasingly physician dependent have led hospitals, health systems, and other HCOs to focus on strategies that involve increased alignment and vertical integration among physicians, specifically, the employment of physicians. Besides physicians’ need to integrate with an HCO, HCO’s also have strategic, and service needs to employ physicians, including securing physicians for their services, staff outpatient facilities, and access referral networks. The
acquisition of physicians and their practices further strengthens the organization’s competitive position in a service line and geographic region (American Hospital Association, 2010).

In an employment model, the health system or HCO subsumes physicians and group practices as subordinate components and then directly negotiates contracts with third-party payers (Ciliberto & Dranove, 2006). As employees of the organization, physicians are involved in all risk arrangements undertaken by their employer. Furthermore, the relationship usually includes that almost all the physician’s time is spent performing services on behalf of HCO (HCPro, 2013). Essentially, physicians are ‘owned’ by and work exclusively for the HCO. At the outset of employment, the HCO typically guarantees compensation usually no longer than three years. The compensation framework typically is a productivity payment method with additional financial incentives for achieving quality or cost control (HCPro, 2013). Although employment increases job security potential, physicians have far less flexibility under this model (HCPro, 2013).

Given the healthcare landscape changes, health systems and hospital leaders acknowledge the importance of physician well-being, specific to work engagement, since almost 80% of today’s physicians are currently experiencing feelings of professional burnout (The Physician’s Foundation, 2016; 2018). Burnout is an antipode to work engagement (Bakker, 2011; Christian, Garza & Slaughter, 2011), which is a positive-related state of mind characterized by vigor, dedication, and absorption. To date, 80% of physicians are practicing at full capacity or are overextended. Additionally, more than 50% exhibit low morale, which is noteworthy because morale and work engagement are positively correlated (The Physician’s Foundation, 2018). Not surprising, 52% of physicians reported that having a sense of engagement was a decisive factor in them accepting a practice opportunity, and 44% reported
that feelings of disengagement prompted them to leave their HCO employment (The Physician’s Foundation, 2018). Clearly, physician engagement is a concerning issue amongst today’s physician’s workforce.

**Background of the problem**

The Advisory Board Company (ABC), a healthcare consulting firm that utilizes a combination of research and technology to improve HCO performance, noted in its 2014 medical staff engagement benchmark report that 60% of HCO-employed physicians were not engaged. One interesting discovery in ABC’s report was physicians’ perception of the psychological contract’s fulfillment. They noted that physicians reported a discrepancy between promised inducements by the organization and the actual delivery of those inducements meaningful to their engagement. In essence, there was a perceived gap between promises and the actual delivery of those promises (The Advisory Board Company, 2014, p. 9; Cejka Search, 2013).

A decade before ABC’s study, the Gallup organization published two studies on physician engagement (see The Advisory Board Company, 2014, p. 9). Gallup reported that hospitals are generally unsuccessful in engaging their employed physicians, with 30% of physicians reporting that they were not engaged. In the same study, only 11% of physicians reported confidence in their hospital's trustworthiness and ability to keep their promises, 14% perceived fair treatment, 25% were proud to work at the hospital, but only 7% were passionate about their workplace. In 2016, Jackson Healthcare sought to replicate Gallup’s 2002 and 2005 study. Their objective was to explore the comparison between “how engaged physicians are” and “how engaged their HCO employers perceived them to be.” Not surprising, the results were similar, reporting that their employed physicians were disengaged in large numbers and that
there had not yet been a positive change in engagement in the past decade (Jacksons Healthcare, 2016). Most alarming was that hospital executives perceived their physicians to be more engaged than they were and that while doctors are proud to align themselves with the hospital for which they work, they do not trust their hospital executives (Jackson Healthcare, 2016).

Generally, hospitals and physicians’ interests have not always aligned, and the relationship between them can be very contentious. Despite the widespread integration of hospitals and physician practices, friction between physicians and their HCO still exists. In a 2018 survey of 9,000 physicians, when asked the question, “On the whole, how would you describe the current state of relations between you and your organization?”, over 4,100 physicians reported that the relationship was somewhat or mostly negative (The Physician’s Foundation, 2018). Clearly, relationship concerns between HCOs and their employed physicians continue to exist in healthcare.

**Problem Statement**

With physicians increasingly becoming employees of healthcare organizations, many are experiencing burnout (The Physician’s Foundation, 2016), an antipode to work engagement. Given that feeling engaged is a principal driver of work satisfaction and that physician's work engagement has been reported as low, healthcare is faced with a major issue as physicians play a major role in the provision of quality care (Whitlock & Stark, 2014). Furthermore, the apparent disconnect between physicians’ and their executives’ perceptions of physicians’ engagement and promised inducements and actual delivery on those promises (The Advisory Board Company, 2014, P. 9; Cejka Search, 2013), which are the key tenets of the psychological contract discussed in the literature, raises further concerns for the healthcare system.
The psychological contract has gained interest as a construct relevant for understanding and managing contemporary employment relationships. According to the psychological contract, individual beliefs are shaped by the organization regarding terms of an exchanged agreement between individuals and their organizations. In general, it is employees’ subjective interpretations and evaluations of their employment deal (Rousseau, 1995).

Psychological contracts emerge when individuals believe that their organization has promised them certain inducements in return for their contributions (Turnley and Feldman, 2000). There is the belief that both verbal and nonverbal promises are present in the physician contract, enacting a set of reciprocal obligations (Rousseau, 1989) and that organizational members will reciprocate beneficially (detrimental) treatment they receive with positive (negative) behavior and attitudes (Blau, 1964). Rousseau (1995) indicated that employees who perceive their employer fulfilling its obligations are more likely to become more engaged and are less likely to leave the organization. There is little doubt that understanding the relationship between psychological contract fulfillment and work engagement holds the promise of enabling organizations to create, manage, and maintain an engaged workforce, especially as the need for physicians grows (Conway and Briner 2005).

The Association of American Medical Colleges (AAMC) has reported that the U.S. is experiencing a physician shortage and will face a deficit of up to 84,900 too few doctors by 2033 (2020). The number of full-time equivalent physicians will grow by just over 1% per year as retirements are only marginally offset by new entries. Concurrently, an aging population and a variety of societal factors continue to increase the demand for physician services as older individuals see a physician three times the rate of their younger counterparts (Centers for Disease Control and Prevention/CDC). In the next decade, the U.S. population will grow by 10.4%, from
about 327 million to 361 million, and more than 70% of U.S. adults have at least one unhealthy behavior (America’s Health Rankings, United Health Foundation).

Consistent with the global aging data, the physician workforce is aging as well, with 1 in 4 doctors older than 65 years of age. Growing concerns about physician burnout, documented in the literature, suggest physicians will be more likely to accelerate than delay retirement—also, 17% of physicians who are not in the retirement age plan to retire early. In 1 to 3 years, 48% plan to cut back on clinical hours, take a non-clinical job or pursue “concierge” medicine (The Physician’s Foundation, 2016; 2018). The decrease in physicians engaging in clinical work will undoubtedly decrease access to care. Although HCO employed physicians work more hours than independent doctors, they treat 11.9% fewer patients, further reducing healthcare access. Clearly, the nation is reaching a juncture where physicians need to be highly engaged and committed to their profession because the number of patients they see, the number of hours they work, and in general, how they practice, will increasingly influence the access to care and the quality-of-care Americans receive. While the US population continues to age and the aging physician population contemplates retirement, we turn our attention to the 44% of physicians leaving their HCOs due to disengagement as their job expectations were not fulfilled (The Physician’s Foundation, 2016).

While the concept of work engagement stems from its positive relationship with several organizational outcomes, including profitability and productivity (Bakker, Schaufeli, Leiter & Tarris, 2008; Schaufeli & Bakker, 2004), decreased turnover intentions, higher job satisfaction, and organizational citizenship behaviors its relevance in addressing the identified issue surrounding physician engagement is clear (Harter, Schmidt, Hayes, 2002). When workers in general exhibit higher work engagement levels, they perform better at work because they often
experience positive emotions, including happiness, joy, and enthusiasm (Salanova & Schaufeli, 2007). Accordingly, exploring the relationship between work engagement and psychological contract fulfillment in health care organization-employed physicians is warranted. For this study, work engagement or being engaged adheres to Schaufeli, Salanova, González-Romá, and Bakker’s (2002) definition as “a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption” (p. 74).

The Gap in the Literature

While there have been attempts to measure physician work engagement (see VITAL WorkLife, Inc. and Cejka Search, 2013), nearly all the research on physician work engagement in the US is practitioner-based (Robinson et al., 2004). Nevertheless, US physicians’ relative work engagement levels using the validated Utrecht work engagement scale are unknown. Accordingly, widely accepted validated instruments to measure work engagement, such as the Utrecht work engagement scale, are needed to assess physicians’ work engagement since it is the most theoretically and empirically developed engagement construct in the literature (Rich et al., 2010).

The Physician’s Foundation’s 2016 and 2018 findings showed that employed physicians were leaving their organization because of disengagement. VITAL WorkLife, Inc., and Cejka Search reported considerable gaps between physicians’ need to feel engaged and what they were experiencing in their current practices (2013). According to the Job demands and resources model, it is unknown if physicians have enough job resources to buffer the effects of job demands. Demerouti, Bakker, Nachreiner, & Schaufeli (2001) posited that the lack of job resources is associated with disengagement. However, it is unknown if that were the case with the disengaged physicians. Measuring physician perception of their psychological contract
fulfillment (PCF) is a valuable way to discover if, indeed, there is a discrepancy. The state of the psychological contract, which was not addressed in both studies (see VITAL WorkLife, Inc., and Cejka Search, 2013), will provide insight into the gap between physicians’ perception of fulfillment and employer obligations.

Furthermore, The Advisory Board Company (2014) indicated that HCOs leaders realize their need to listen to their employed physicians, involve them in decision-making, recognize their desire for autonomy, and integrate them into decision-making (Spaulding, Gamm, and Menser, 2014). It is unknown whether health leaders have acted on these findings. However, physicians report that the goals and priorities of HCOs leaders do not reflect their goals and priorities (The Advisory Board Company, 2014). These findings are not surprising. Historically, the interests of hospitals and physicians have not always aligned. Despite the report, it is unknown whether physicians are work-engaged. Measuring HCO-employed physician's relative work engagement levels using the Utrecht work engagement scale is needed to evaluate the HCO-physician relationship.

In the sole psychological contract fulfillment study conducted on US physicians, Hartwell (2010) investigated the relationship between physician’s working hours and five organizational outcomes. The study showed that physicians placed a higher value on fulfilling their psychological contract than on working reduced hours. Work engagement was not a variable in this study, however. While a Finnish study of 178 Public Sector employees in the social and health services showed a positive relationship between psychological contract fulfillment and work engagement, work engagement played a mediating role between psychological contract fulfillment and mental health (Parzefall and Hakanen, 2010, p. 5). These findings are, however, specific to this national and organizational setting. They may not be generalized to United States
physicians. Physicians are professionals, and a professional’s psychological contract is more complicated than initially believed (Trybou, Gemmel, Pauwels, Henninck, & Clays, 2014). Thus, the impact of PCF on work engagement in U.S. physicians is still unknown.

Overall, there is a dearth of scholarly research on work engagement literature in the US. The relative levels of work engagement, particularly in US physicians, are unknown. There is an urgent need for quantitative research studies to establish normative ranges for the UWES-9 for HCO-employed physicians in the US. Needed is a breakdown by medical specialty and employment setting (hospital, group practice, academic) personal demographic information (age, gender, number of hours worked, experience). Similarly, research is needed in the literature of psychological contracts in physicians as well.

Physicians are a unique population group. Recent efforts to reform the financing and delivery of health care have challenging long-standing assumptions about the role of the professional and the organization in delivering health care. Consequently, physicians may be more sensitive to professional and administrative breaches of their contracts than professionals working in industries that are not the target of significant reform efforts (e.g., engineering, sales). Therefore, other professionals may not notice professional and administrative breaches as readily or respond to them as aggressively. Moreover, physicians' and healthcare organizations’ relationships are complex and multi-faceted, with transactional and relational components. A dominant theme in much of the literature on employed professionals is that professional employees resist administrative controls and do not operate well as employees. The strong connection between psychological contracts developed by the employee and the employer’s perceived exchange relationship adds to a robust theoretical framework for explaining the employee-employer relationship's negative and positive aspects and the associated attitudes.
The impact of PCF on work engagement in HCO-employed physicians in the US is unknown. According to this primary investigator, this is the first study to explore the impact of psychological contract fulfillment on work engagement in physicians employed by healthcare organizations (HCOs) in the United States. This research’s findings will provide essential insights into the relationship between a physician and their HCO.

**Purpose of the Study**

The purpose is threefold. First, to better understand the levels of work engagement in US HCO-employed physicians using the Utrecht Work Engagement Scale (UWES-9), a three-dimensional construct that included vigor, dedication, and absorption. The Utrecht Work Engagement Scale (UWES-9) is the most theoretically, and empirically developed engagement construct in the literature (Rich et al., 2010). Second, to access physicians’ perception of PCF in HCO-employed physicians in the US. The third purpose of this study is to determine if a relationship exists between physicians’ perceptions of PCF and self-rated work engagement and to what extent.

Saks (2006) showed that work-engaged employees have high-quality relationships with their employers, encouraging them to show higher positive attitudes and behaviors towards their organization and goals. The positive behaviors manifest as increased job satisfaction and physicians’ retention, high quality of care, improved patient safety, improved efficiency, and improved health care costs. However, little has been done to understand work engagement in HCO-employed physicians in the US, which leads us to this study. Next are the variables, research questions, and hypotheses.
Variables

This study's sole dependent variable is work engagement measured in three dimensions: vigor, dedication, and absorption. Likewise, the sole independent variable is psychological contract fulfillment. There are four control variables: gender, age, years of experience, and marital status. Finally, there are three sociodemographic variables: work hours, practice setting, and medical specialization.

Assumptions

This study rests on the following assumptions.

1. HCO-employed physicians in the US possess self-awareness regarding their engagement or lack of engagement at work and can and will articulate that awareness through the Utrecht Work Engagement Scale (UWES-9) ©.

2. Physicians possess self-awareness regarding levels of fulfillment of their psychological contract with their employing organization and can articulate that awareness through the PCF Survey.

3. HCO environments in which physicians work are considered high-demand work environments due to the nature of the medical practice environment.

4. Work engagement is a phenomenon that can be measured by the Utrecht Work Engagement Scale (UWES-9) ©

The Significance of the Study

The relatively high degree of responsibility physicians holds frequently rises to the level of life or death, making the potential consequences of physician disengagement arguably higher than disengagement experienced by most other types of workers.
**Practitioner significance.** Understanding how psychological contracts shape work engagement will provide insights into managing potential threats to the delicate physician-hospital relationship. Administrators can develop ways to help prevent, detect, and mitigate psychological contract breach once discovered to prevent adverse workplace outcomes. Ensuring psychological contract fulfillment increases workplace satisfaction (Rayton & Yalabik, 2014), and psychological contract fulfillment and workplace satisfaction not only cut turnover rates but may also save organizations money (Rayton & Yalabik, 2014). Employers who meet their employees’ needs tend to retain satisfied employees, increase organizational effectiveness, and increase an employer’s ability to hire more efficient employees (Bender et al., 2013).

**Societal Significance.** A primary public policy and healthcare concern is the prospect of physicians modifying their practice styles in ways that reduce patient access or the chance that physicians will abandon patient care roles or leave medicine altogether (The Physician’s Foundation, 2018; 2016). There is already a diminishing supply of physicians, coupled with an increasing demand for their services. The aging population, the complexity of patient care, the increasing number of newly insured, and the impending retirement of baby-boomer physicians compound the increased levels of physician dissatisfaction and shortage (Whitlock & Stark, 2014). This investigation can develop effective strategies to engage physicians and help hospitals and health systems retain and attract top talent.

**Academic Significance.** Lastly, there is a surprising dearth of scholarly research addressing the process of work engagement in physicians. Most of the research on work engagement originates from the practitioner and consultancy literature, many of which do not employ validated instruments. There is also a lack of research on the nature of the relationship between psychological contracts and work engagement (Rayton & Yalabik, 2014, p. 2384). The
lack of studies is particularly true in the physician population. This study will make empirical contributions to the work engagement and psychological contract literature in the US. Particularly to the ongoing scholarly conversation on the drivers and consequence of work engagement and the interplay between work engagement and psychological contracts at a time when hospital employment of physicians is on the rise and physician engagement is low.

Operational Definitions

The following are definitions for the primary vocabulary in the present study:

**Physician Employment.** An Integrated Salary Model (ISM) where physicians provide medical services on behalf of the employing HCO and are paid for those services (Na-Eun & Cho, 2015). An IRS W-2 employment agreement solidifies the relationship, and a contract outlines the terms (HCPro, 2013).

**Health Care Organization (HCO).** A is a center that provides health services such as diagnosing diseases, surgical operations & treatment, and patients' recovery. Also, research and teaching assignments may be performed (Khosrow-Pour, 2017).

**Work Engagement.** Work engagement is a positive work-related state of mind characterized by vigor, dedication, and absorption. Vigor refers to high levels of energy and mental resilience while working, the willingness to invest in one’s work, and persistence even in the face of difficulties. Dedication refers to being actively involved in one’s work and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption refers to being fully concentrated and happily engrossed in one’s work, whereby time passes quickly, and one has difficulty detaching oneself from work (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002, p.74).
**Psychological Contract.** “The individual beliefs shaped by the organization regarding terms of an exchanged agreement between individuals and their organizations” (Rousseau, 1995, p.9). For example, if a physician receives exceptional feedback from a job evaluation, the physician will expect a raise or promotion from the HCO employer. The psychological contract is also operationally defined as depicted by ratings from Hartwell’s (2010) psychological survey.

**Psychological Contract Fulfillment (PCF).** Psychological contract fulfillment refers to an employee’s perception that an employer has maintained their obligations to the employee (Lub et al., 2016). For example, if a physician has worked for an HCO for ten years, they might expect to lead a department. If the HCO elevates the physician to the leadership position, then the physician’s psychological contract is fulfilled. Correspondingly, higher scores from Hartwell’s (2010) psychological contract survey indicate higher psychological contract fulfillment levels.

**Psychological Contract Breach (PCB).** Psychological contract breach refers to an employee’s perception that their organization is not meeting their organizational needs (Rayton & Yalabik, 2014). For example, a physician experiences a psychological contract breach when physicians are not provided EMR training to their satisfaction to do their jobs properly. Low scores from Bal et al.’s (2010) psychological contract survey correspond with high psychological contract breach levels.

**Job Demands and Resources Model (J-DR).** Job demands are those physical, psychological, social, and organizational features of the job that requires continuous physical and psychological effort or ability. They are associated with physical and psychological costs. For physicians employed by HCOs, job demands might include working with emotionally demanding patients and their family members, long hours on their feet with no breaks for food or
even use of a bathroom, and the constant pressure to see too many patients within the allotted time provided by the organization. Job resources refer to “those physical, psychological, social, or organizational aspects of the job that may:

1. Reduce job demands and the associated physiological and psychological costs.
2. Are functional in achieving work goals.

Adequate job resources foster a motivational process that boosts employees’ willingness to invest their efforts and competencies into their work tasks, thus enhancing the likelihood that organizational goals will be successfully achieved (Tuckey, Michelle & Dollard, Maureen, 2012).
Theoretical Framework

Job Demands and Resources Model (JD-R)

The present study set out to investigate the impact of perceived psychological contract fulfillment on work engagement in HCO-employed physicians employing the assumptions of the motivational properties in the JDR model. This study’s theoretical framework exists in the relationships described in the job demands-resources (JD-R) model of work engagement (Bakker, 2011; Bakker & Demerouti, 2007, 2008; Demerouti et al., 2001). Demerouti and her colleagues first introduced the JD-R model in 2001. The first study on work engagement employing the Utrecht Work Engagement Scale (UWES) was published (Schaufeli, Salanova, González-Romá, & Bakker, 2002) a year later. To date, studies on work engagement have used the JD-R model as the theoretical framework more often than any other theory or model. The Job demands and resources model (JD-R) model (Figure 1) specifies how one of the two specific sets of working conditions found in every organizational context: job demands, and job resources, can generate work engagement (Demerouti, Bakker, de Jonge, Janssen, & Schaufeli, 2001).

Job demands are those physical, psychological, social, and organizational features of the job that require continuous physical and psychological effort or ability and are associated with physical and psychological costs — such as work pressures, hostile work environments, and psychologically challenging interactions with clients. For physicians employed by HCOs, job demands might include working with emotionally demanding patients and their family members, long hours on their feet with no breaks for food or even use of a bathroom, and the constant pressure to see too many patients in the time provided by the organization. In this context, high demands occur as physicians deliver patient care services in their employing HCOs.
Job resources refer to “those physical, psychological, social, or organizational aspects of the job that may (a) reduce job demands and the associated physiological and psychological costs, (b) are functional in achieving work goals, and (c) stimulate personal growth, learning, and development” (Demerouti et al., 2001, p. 501). Adequate job resources foster a motivational process that boosts employees’ willingness to invest their efforts and competencies into their work tasks, thus enhancing the likelihood that organizational goals will be successfully achieved (Tuckey, Bakker, & Dollard, 2012).

Job resources present on the following levels: Organization (e.g., salary, career opportunities, job security); Interpersonal and social relations (e.g., supervisor and co-worker support); Organization of work (e.g., role clarity, participation in decision-making); and Task (e.g., performance feedback skill variety, autonomy) (Bakker, Demerouti, & Verbeke, 2004). Job resources for physicians would be autonomy in clinical decision-making and leadership that respects their opinions (The Physician’s Foundation, 2016;2018, Stark & Whitlock, 2014). Physicians indicated that their organizations did not provide the promised resources pertinent to their engagement—the perceived discrepancy between what was promised and delivered indubitably impacted their work engagement level. Though job demands are not negative per se, they may turn into stress factors that reduce engagement. In general, job demands and resources negatively correlate because high job demands may prevent job resources’ mobilization (Bakker & Demerouti, 2007). Therefore, job resources provide elements that support work engagement in high-demand work environments like HCOs.
Figure 1

Theoretical Framework – The Job Demands-Resources (JD-R) Model of Work Engagement

Note. Theoretical framework – The job demands-resources (JD-R) model of work engagement. From “Applying the Job Demands-Resources model: A ‘how to’ guide to measuring and tackling work engagement and burnout” by Wilmar B. Schaufeli, 2017. Organizational Dynamics 46, p.120—132. Copyright © 2017 by Elsevier Publishing Limited all rights reserved and reprinted with permission.

Jobs that combine high demands with high resources are so-called active jobs (Karasek, 1979) that challenge employees to learn new things on the job and motivate them to use new behaviors. Physicians are self-learners and have active jobs. High job demands without job resources to buffer effects of job stress on physicians negatively impact the energetic component of work engagement (vigor), leading to exhaustion. By decreasing job demands, employee exhaustion decreases, representing a movement along the work engagement’s energetic component range, from exhaustion toward vigor (Demerouti et al., 2001). For example, shorter
shift rotations and reasonable patient volumes that fit within reasonable time slots will correspond with a more energetic, less exhausted physician. According to Demerouti et al., exhaustion includes physical exhaustion and general feelings of emptiness—being overburdened from work. Distancing oneself from work reduces identity or involvement with work, moving down the dedication component scale of work engagement (2001). However, an energetic physician may not necessarily feel connected with their employing HCO. In essence, while the lack of job resources may lead to exhaustion, it may not automatically lead to physicians distancing themselves from their work to the extent whereby the dedication (identification) component of work engagement is impacted. However, because this framework assumes relatively high job demands, the lack of job resources can lead to distancing oneself from one’s work, which translates to low levels of dedication. When there is a shortage of needed resources in the HCO environment, physicians disconnect from the organization’s goals and are less willing to perform extra-role behaviors, for example, voluntary participation in quality improvement efforts. Alternately, increasing job resources increases employee engagement by increasing the employees’ dedication at work, a reversal of the distancing of the self from work (Demerouti et al., 2001).

Parzefall and Hakanen (2013) integrated the psychological contract approach into the JD-R model. They found that perceived psychological contract perceptions can have significant implications on employee attitudes and behaviors, which predict both individual and organizational performance (Robinson, 1996). In this current study, performance outcomes were not the focus; however, work engagement was the outcome of interest. Parzefall and Hakanen (2010, p. 5) conceptualize psychological contract fulfillment as a form of ‘economic and socio-emotional resources that the employee expects the employer to provide.’ Physicians work under
high-demand conditions that require matching resources to deliver patient care, which will enhance physicians’ dedication to work. In other words, perceived psychological contract fulfillment is likely to foster a sense of care and support among physicians, influencing their perceptions of the quality, or in Guest’s terms’ (2004), the employment relationship and helping employees in their work. The appraisal of an employee’s psychological contract provides an assessment of their employment relationship. According to Weiss and Cropanzano (1996), this assessment reflects an environment that favors the regular emergence of specific affective states.

**Figure 2**

*Conceptual Framework*

*Note.* Conceptual framework explaining the relationship between psychological contract fulfillment and work engagement in HCO-Employed physicians in the United States. Adapted from “Applying the Job Demands-Resources model: A ‘how to’ guide to measuring and tackling
High perception of the psychological contract fulfillment influences the quality of the physician-HCO relationship, encouraging more than a mere obligation to reciprocate. In the HCO environment where high demands are intrinsic to the practice of medicine, job resources buffer the harmful effects of various job demands on engagement, keeping job demands placed on physicians to a level that supports their high level of energy. Under these conditions, vigor, the energetic component of work engagement, and dedication, the identification component of work engagement, are supported. In turn, physicians become physically energized, psychologically renewed. The ideal HCO environment provides a transformational leadership environment that keeps its promises to its physicians. Perception of fulfilled promises shows that physicians are heard, respected, and supported as valuable clinical team leaders. Their workdays fully engage them as they are engrossed in serving their patients well. Here, physicians demonstrate high levels of all three work engagement components—vigor, dedication, and absorption.

**Research Questions**

Based on this study’s purpose and theoretical framework, there are eight research and six hypotheses. The questions are as follows.

**Research questions one and two are descriptive and do not have accompanying hypotheses.**

RQ1. What are physicians’ perceptions of their psychological contract fulfillment as HCO employees in the US?
RQ2. What are physicians’ self-rated levels of vigor, dedication, absorption as HCO employees in the US?

**Research questions three to five address the association between the variables with their corresponding hypothesis.**

RQ3. Is there a relationship between physicians’ perception of psychological contract fulfillment and self-rated vigor levels as HCO employees in the US?

H3a: There is a relationship between physicians’ perception of psychological contract fulfillment and self-rated vigor levels as HCO employees in the US.

H3o: There is no relationship between physicians’ perception of psychological contract fulfillment and self-rated vigor levels as HCO employees in the US.

RQ4. Is there a relationship between physicians’ perception of psychological contract fulfillment and self-rated levels of dedication as HCO employees in the US?

H4a: There is a relationship between physicians’ perception of psychological contract fulfillment and self-rated levels of dedication as HCO employees in the US.

H4o: There is no relationship between physicians’ perception of psychological contract fulfillment and self-rated levels of dedication as HCO employees in the US.

RQ5. Is there a relationship between physicians’ perception of psychological contract fulfillment and self-rated absorption levels as HCO employees in the US?

H5a: There is a relationship between physicians’ perception of psychological contract fulfillment and self-rated absorption levels as HCO employees in the US.
H5o: There is no relationship between physicians’ perception of psychological contract fulfillment and self-rated absorption levels as HCO employees in the US.

Research questions six to eight address whether the independent variable psychological contract fulfillment has a statistically significant predictive effect on the dependent variable, work engagement and its dimensions: vigor, dedication, and absorption, while controlling the effects of age, years of experience, gender, marital status, work hours, practice setting and medical specialization?

RQ6: To what extent do physicians’ perception of psychological contract fulfillment predict self-rated vigor levels as HCO employees in the US controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization?

H6a: Physicians’ perception of psychological contract fulfillment significantly predicts self-rated vigor levels as HCO employees in the U.S controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization.

H6o: Physicians’ perception of psychological contract fulfillment does not predict self-rated levels of vigor as HCO employees in the U.S controlling for age, years in practice, gender, marital status, work hours, practice setting, and medical specialization.

RQ7: To what extent do physicians’ perception of psychological contract fulfillment predict self-rated levels of dedication as employees of healthcare organizations in the U.S., controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization?
H7a: Physicians’ perception of psychological contract fulfillment significantly predicts self-rated levels of dedication as HCO employees in the U.S, controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization.

H7o: Physicians’ perception of psychological contract fulfillment significantly predicts self-rated levels of dedication as HCO employees in the U.S, controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization.

RQ8: To what extent do Physicians’ perception of psychological contract fulfillment predict self-rated absorption levels as employees of HCOs in the U.S controlling age, years of experience, gender, marital status, work hours, practice setting, and medical specialization?

H8a: Physicians’ perception of psychological contract fulfillment significantly predicts self-rated absorption levels as HCO employees in the U.S controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization.

H8o: Physicians’ perception of psychological contract fulfillment significantly predicts self-rated absorption levels as HCO employees in the U.S controlling for age, years of experience, gender, marital status, work hours, practice setting, and medical specialization.

The methodology for this study was a quantitative, correlational, cross-sectional web-based survey design that addressed eight research questions and twelve hypotheses regarding HCO-Employed physician's psychological contract fulfillment on self-rated levels of work
engagement and its dimensions: vigor, dedication, and absorption. Spearman’s rho analysis was applied to determine the correlation between the variables. Additionally, inferential statistics were utilized, which included ordinal logistic regression and the generalized linear model in determining the predictive effects of the independent variables on the dependent variable. There is evidence in the literature that conceptualizes psychological contract fulfillment as a cognitive assessment of how well the employer (HCO) has fulfilled its promises to the employee (physician) and is an assessment that may have attitudinal and affective consequences that this dissertation treated as a resource. For that reason, this PI posited that perceived psychological contract fulfillment would positively lead to higher levels of work engagement in physicians employed by HCOs in the United States.
CHAPTER 2-REVIEW OF RELEVANT LITERATURE

This chapter presents a literature review related to the following areas: work engagement, employee engagement, work engagement as the antipode of burnout, the concept of psychological contracts, its measurements and formation, and research gaps.

Engagement

Engagement is an emerging construct with origins in professional practice rather than academia (Macey & Schneider, 2008). A surplus of differing definitions, interpretations, operationalizations, and measurement tools surrounding the concept has created a situation where no single definition of engagement is authoritative (Attridge, 2009; Simpson, 2009). However, most definitions agree that engagement indicates how much of an employee’s personal energy is invested in their work (Jones & Harter, 2005). Furthermore, most scholars and practitioners agree that engagement has behavioral, emotional, and cognitive components (Attridge, 2009; Kahn, 1990) and that engagement benefits both employees and employers (Macey & Schneider, 2008).

Employee Engagement and Work Engagement

Both practitioners and scholars have explored the engagement construct extensively. Practitioners overwhelmingly refer to the construct as employee engagement, a term introduced by the Gallup Organization in the 1990s (Buckingham & Coffman, 1999). An overwhelming amount of popular research originated from practitioners who have shared their findings and suggestions in business and consulting in the literature, little of which is peer-reviewed. Scholarly research came later (Attridge, 2009). Early research focused on understanding the process of engagement (Kahn, 1990; Saks, 2006) using several different construct
operationalizations. However, studies are now using the work engagement construct (Bakker & Leiter, 2010) to explore the process of engagement and its antecedents and consequences. Because there appears to be a misperception between employee engagement and work engagement, we define the terms before proceeding with the literature review. In this dissertation, *employee engagement* refers to the practitioner construct, where *work engagement* refers to the predominant scholarly construct. Both constructs are discussed next.

**Employee Engagement**

Employee engagement is the term preferred by practitioners. It is “the emotional and intellectual commitment of an individual or group to build and sustain strong business performance” (Hewitt Associates LLC. 2005). Practitioners focus their efforts on providing ways for clients to engage in organizational interventions that increase engagement, more so that some organizations have created their engagement models with definitions specific to their unique environmental needs. Practitioners also see employee engagement as a parsimonious way to measure several affective constructs without much effort and bundle the results in a way useful for their clients to enhance their employees’ work experience (Harter & Schmidt, 2002). Practitioner definitions focus primarily on the antecedents, or drivers, of engagement as they attempt to assist their clients in creating a more engaged workforce. They (practitioners) also focus on company-wide engagement outcomes, such as increased employee retention and productivity (Macey & Schneider, 2008). Gallup’s extensive research provided a data set that included nearly 200,000 people in 8,000 business units. The findings show that employee engagement correlates with important business outcomes like profitability, productivity, and customer satisfaction. Furthermore, safety and employee retention increased in companies with higher overall engagement levels (Harter et al., 2002). The fact is that the exact definition of
engagement varies from company to company, with many human resource consultancies promoting their proprietary definitions and correlating surveys.

**Work Engagement**

The work engagement construct is defined by most scholars in the literature as “a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002, p. 74). As the most studied engagement model in the scholarly literature, work engagement has been described as the opposite of burnout (Christian, Garza, & Slaughter, 2011). Burnout is a prolonged response to physical, cognitive, and emotional job stress characterized by exhaustion, cynicism, and inefficacy (Maslach, Schaufeli, & Leiter, 2001). Instead, work engagement occurs on the opposite end of the spectrum and is a persistent positive state characterized by vigor, dedication, and absorption (Schaufeli, Salanova, González-romá, & Bakker, 2002). Work engagement refers to the employee’s relationship with their work, whereas employee engagement is the employee's relationship with the organization (Schaufeli, 2006).

The inclusion of the relationship with the organization blurs the distinction between work engagement and other traditional concepts such as organizational commitment and extra-role behavior. As with many other psychological terms, work engagement is easy to recognize in practice yet challenging to define. Macey and Schneider (2008: 3) stated that the confusion about the meaning of engagement “…can be attributed to the ‘bottom-up’ manner in which the engagement notion has quickly evolved within the practitioner community.” The bottom-up method highly employed in business is at odds with the top-down academic approach that requires a clear and unambiguous definition of the term. It also hampers the understanding of work engagement for practical purposes, particularly in physician engagement. Physician
engagement is a broadly used term that includes different work attitudes and behaviors like the practical use of hospital services (Spaulding, Gamm & Menser, 2014), implementation of best practices, accountability, physician performance measurement, physician leadership development, enhanced communication, values, alignment (Scott, Thériault & McGuire, 2012). It also pertains to involvement in strategy, decision-making, and care direction (Spaulding et al., 2014).

Nevertheless, the concept of work engagement is prevalent today, partly due to the wealth of information in the literature regarding its importance in organizational performance. However, there is little empirical evidence to back up these claims since most of these findings come from the practitioner literature and consulting firms (Robinson et al., 2004). While some engagement definitions frequently sound like other better known and established constructs (Robinson et al., 2004), work engagement is a motivational concept (Saks, 2006). Unlike relatively passive attitudes such as job satisfaction and organizational commitment, engagement is related to an active personal presence (Kahn 1990). According to Bakker (2009), engaged employees have high arousal, and activation in their work pushes them into action.

**Personal Engagement at Work**

Scholarly literature on engagement followed two primary research approaches. The first began with Kahn’s (1990) grounded theory research with camp counselors and an architectural firm’s employees. Kahn, while referring to the degree to which people bring, or fail to bring, their personal selves into their work role, defined personal engagement as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, or emotionally during role performances” (p. 694). Kahn identified three psychological conditions associated with personal engagement in the work role:
meaningfulness, safety, and availability of one’s resources to bring to the work role.

A second academic approach discussed in the literature views work engagement as the opposite of burnout’s psychological construct (Maslach & Leiter, 1997; Schaufeli et al., 2002). While Schaufeli et al. (2002) agreed with Maslach and Leiter (1997) that engagement is conceptually the positive antipode of burnout, they disagreed about the components of engagement and how it should be measured. Maslach and Leiter described three burnout components: exhaustion, cynicism, and ineffectiveness (or low efficacy). However, Schaufeli et al. (2002) defined engagement as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (p. 74), which is the definition often used in subsequent academic research on engagement. This dissertation adopted this definition of work engagement as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (p. 74). Furthermore, this definition stands independent of any organizational outcomes.

**Physician Engagement Studies**

The term *physician engagement* is used to describe a variety of different concepts in the literature. Specifically, in the health care practitioner literature in the U.S, physician engagement frequently refers to the extent to which physicians support the goals and objectives established by the health care organization they are affiliated with by employment or privilege. The Advisory Board Company (2014) considered physician engagement a term reserved for employed physicians and alignment, a term used for independent physicians. Press Ganey described physician engagement as measuring “physician’s appraisal of their work environment, emotional experiences, and attachment to the workplace” and referred to physician alignment as “the extent to which a physician feels a strong partnership or connection with the organization’s
leadership” (Press Ganey, 2016, para. 5). They make no distinction between employed or independent physicians.

Furthermore, Shortell (2001) defined alignment between physicians and the HCOs as the degree to which physicians and hospitals share the same mission, vision, goals, objectives, and strategies and work toward their accomplishment. Thus, as it relates to engagement, the definition changes and is dependent on organizational objectives. In any case, VITAL WorkLife Inc. and Cejka Search (2013) noted that the transferability of existing research on employee engagement to physicians might not be appropriate, making a case for empirical assessment of work engagement in physicians. The next section will address the two research domains of physician engagement: scholarly-based studies and practitioner-based studies.

**Physician Engagement: Scholarly-Based Studies**

Engagement, an individual-level construct, has been found to have positive consequences for both employees and organizations (Saks, 2006). Research has shown that engaged workers perform better than non-engaged workers because engaged workers experience positive emotions like happiness, enthusiasm, and better health (Schaufeli & Bakker, 2004). Not surprising, few studies were found in the literature addressing physician work engagement as defined by Schaufeli et al. (2002). These studies were collated and grouped as individual characteristics, work environment, and work outcomes.

**Work Engagement and Individual Characteristics**

Individual characteristic is age, experience, personal strengths, work-family conflict, marital status, and the presence or absence of children.
**Age, Experience, and Personal Strengths**

A study of 123 German surgeons, Mache, Vitzthum, Klapp, and Danzer (2014) discovered meaningful relationships between personal and organizational resources and work engagement. Notably, they found that physicians' medical experience was significantly and positively associated with their work engagement levels. The researchers also found a correlation between work engagement and age. They found that although younger physicians in the age group “26–35” reported the highest engagement scores compared with their older colleagues, years of experience were also significantly and positively associated with engagement, such that the more experience a physician had, the higher their engagement. Findings also showed that highly engaged physicians exhibit personal strengths in resilience, optimism, and self-efficacy (Mache, Bernburg, Vitzthum, et al., 2015). These strengths are considered personal resources in the J-DR model that a physician draws from in difficult times. A significant negative association, however, was identified between pessimism and engagement whereby the more pessimistic a physician was, the lower their work engagement (Mache S, Vitzthum K, Klapp BF, et al., 2014).

Mazzetti, Biolcati, Guglielmi, Vallesi, and Schaufeli (2016) surveyed 269 physicians from various medical departments from nine hospitals in northern Italy, investigating the role of affectivity on work engagement and workaholism. Positive affectivity and work engagement were found to be positively related. Furthermore, negative affectivity and workaholism also showed a positive association. They posited that individual affectivity might influence physicians’ perceptions of job demands and job control in healthcare organizations’ demanding work environments.
Work-family Conflicts, Marital Status, and the Presence or Absence of Children and Gender

Work-Family conflict is a form of role conflict that occurs when the role pressures from work and family domains are incompatible or place too many demands at one time on a person, making it difficult or impossible to fulfill all roles satisfactorily (Greenhaus & Beutell, 1985). These competing demands of the workplace and family can result in overload and increase stress (Greenhaus & Beutell, 1985). Mache, Vitzthum, Groneberg (2015) reported that higher work-family conflict was associated with lower levels of work engagement in a sample of 564 physician specialists. The researchers also found that single physicians scored higher on work engagement than married physicians. Furthermore, male physicians with children rated their work engagement significantly higher than female physicians (Mache Bernburg Groneberg et al., 2016). Family life is essential. Work-family conflict speaks to the work-life balance.

Schaufeli and Bakker (2004) reported that men (N = 5,450) scored significantly higher than women (N=4066) on dedication and absorption factors of engagement but found no gender differences in the vigor dimension. Patrick and Mukherjee’s research on the relationship between job role and the demographic makeup and engagement in physicians and nurses across 20 hospitals in India also found a significant difference in work engagement levels between genders among physicians on the vigor dimension. In general, the findings showed that males had slightly higher work engagement levels than their female counterparts. Both studies concur with Mache, Vitzthum, Wanke, et al. (2014), who also found that male psychiatrists scored significantly higher on vigor than female MDs. Thus, from this work, it might be inferred that male doctors showed higher energy levels and strong identification towards their work than their female colleagues (2018). Conversely, Prins et al. (2009) showed in their study (N=2115) that female residents exhibited higher engagement levels and committed fewer medical errors than
their male counterparts. Thus, demonstrating the controversy and lack of clarity that exists in the literature specific to work engagement and factors that might impact it.

Although there may be little that hospital leadership can do to change individual characteristics such as physicians' age, sex, marital status, or the number of children they have, individual characteristics can help identify vulnerable physicians. For example, for young doctors who are aiming for a balance between work and family, an opportunity exists for healthcare leaders to develop models to address these lifestyle needs. We now consider work engagement and work environment next.

**Work Engagement and Work Environment**

*Task Combination, Professional Fulfillment, and Job Resources*

In 2013, Van Den Berg, Bakker, and Ten Cate (2013) researched 300 physicians who worked at an academic medical center to understand the effect of task combination on work engagement in physicians who held multiples roles such as teaching, research, and patients care. Their findings showed that task combinations (i.e., teaching, research, and patient care) were negatively associated with work engagement. Specifically, respondents with only teaching responsibilities demonstrated higher work engagement than respondents who combined teaching and research, teaching, and patient care, or all three. Lindgren, Baathe, and Dellve (2013), using a qualitative study (n=25) to understand how physicians view their engagement in practice, discovered that physician engagement's central motivational drive is the persistent striving for professional fulfillment. According to the findings of Gorter, Jacobs, and Allard (2012), making patients happy was positively and significantly associated with work engagement. Further supporting this observation is the finding from a national survey which identified that 78 out of 100 physicians indicated that their primary source of professional satisfaction is derived from
the patient relationship (The Physician’s Foundation, 2018).

Job resources were also associated with engagement. Two studies: Mache, Vitzthum, Klapp, et al. (2014) and Mache, Vitzthum, Wanke, et al. (2014) showed that influence at work, possibilities for development, the degree of freedom at work, a sense of community, feedback, quality of leadership, and social support all of which are considered job resources had a significant positive association with work engagement.

The identification of protective factors, such as the work environment, enables leadership to know how to intervene. What can be modified, however, is the work environment. These factors enable leadership to know how to intervene. For example, hospital leadership can modify schedules, divide labor, determine whether all physicians participate in research or education, improve support, grant more autonomy, provide timely and constructive feedback, or create professional development opportunities.

**Work Engagement and Work Outcomes**

Based on the literature review, findings suggest that although promising, there is very little evidence linking engagement with hospital physicians’ work outcomes. The outcomes identified in this section include job satisfaction, quality of life, and medical error.

**Job Satisfaction, Quality of Life, Work Ability, and Quality of Care**

In a survey study (n=1882) conducted at one academic medical center in Massachusetts assessing work engagement and burnout, and career satisfaction, Rao et al. (2020) found that work-engaged physicians reported higher career satisfaction levels. He also concluded that these physicians were more likely to stay in their current role, regardless of their burnout level. They concluded that promoting engagement may be as important as mitigating burnout. Rao et
al.’s (2020) study is one of a handful of studies in the U.S that employed the UWES scale to measure work engagement in physicians. However, this was a single-center study at an academic medical center, and physicians were considered engaged if they scored high on two of the three subscales (Rao et al., 2020). Furthermore, the researchers found that physicians who reported high engagement levels that did not exhibit burnout were twice as satisfied with their careers than those with low burnout and engagement levels. Moreover, physicians with low levels of burnout and low engagement levels did better than those who experienced burnout and thus concluded that engaged physicians have higher career satisfaction.

Surprisingly, while burnout and engagement often function divergently, Linzer et al. noted that this was not the case in their study (Linzer et al., 2016). One-quarter of the respondents in this study did not sort into either of the expected categories of high burnout-low engagement category or the low burnout-high engagement category. Furthermore, not being burnt out for the somewhat neutral respondents did not automatically translate into high engagement levels, and being engaged did not necessarily protect them from burnout. Also, Mache, Vitzthum, Groneberg (2015) found an association between engagement and job satisfaction in their research of 123 clinicians specializing in Surgery. They found a positive correlation between work engagement and surgeons’ quality of life, with work engagement mediating the relationship between organizational factors and job satisfaction.

Work-engaged physicians report that they experience a better work experience and commit fewer medical errors. In a Netherland study on work engagement and burnout, Prins et al. (2010) surveyed over 2000 residents on three constructs: burnout, work engagement, and self-assessed patient care practices. The study revealed that men reported more medical errors in action/judgment than women who were more engaged than men. While residents with burnout
reported significantly more errors, highly engaged residents, on the other hand, reported fewer errors. In this study, engagement protected employees and positively affected patient care and quality.

An investigation conducted looking at the link between physician work engagement, patient care experience, and job resources in an academic setting, Scheepers, Lases, Arah, Heineman, and Lombarts (2017) reported that higher physician work engagement did not necessarily translate into better patient care experience. This study comprised 4,573 patients and 185 physicians. The findings suggest that work-engaged physicians, as perceived by patients, might not necessarily be associated with better performance. The researchers indicated that the findings were unexpected since previous research by Prins et al. (2009) has already demonstrated that work engagement facilitated high performance. More research is needed. However, the finding in this study showed that physicians’ work engagement was not higher than average. From the physicians’ perspective, autonomy and learning opportunities could safeguard their work engagement.

**Physician Engagement: Practitioner-Based Studies**

Spaulding, Gamm, and Menser (2014) defined physician engagement in a qualitative study of 38 health care administrators in one large multihospital system in the U.S as “physician participation in the appropriate and effective use of hospital services. As such, it may encompass an array of hospital-physician arrangements extending from strategies for improving physician referrals to the acquisition of physician practices” (p. 66). Their findings showed in ranking order “success factors in more fully engaging physicians” (p. 66) as relationships and communication, providing positive experiences to physicians, integration, and accountability and quality. The leaders concluded that they need to listen to their physicians, involve them in
decision making, recognize their desire to retain autonomy, integrate them in governance and administration, involve them in multidisciplinary teams to implement and spearhead quality initiatives. Spaulding et al. (2014) further noted the need for additional research from the perspective of physicians.

Using their 2014 engagement benchmark index to assess HCO-employed physicians' engagement, the Advisory Board Company found that 31.9% to 43.2% of employed physicians reported they were engaged. These engaged physicians indicated that they would recommend their organizations to friends and family as a place to receive care. However, less than 50% indicated that the organization's actions did not reflect their (physicians) goals and priorities. Furthermore, these physicians indicated that the organization was not open and responsive to their input (The Advisory Board Company, 2014, p. 9). These findings are not surprising. Historically, hospitals and physicians' interests have not always aligned (The Physician’s Foundation, 2018). The misaligned incentives, goals, and objectives make collaboration difficult. They have often created tension between the dyad, which may contribute to why most physicians are dispassionate when implementing their organization’s compliance programs, even when vital to its success (Burns & Muller, 2008). Despite the widespread integration of hospitals and physician practices, friction between the two parties remains prevalent. Hospital administrators feel that their physicians should naturally feel more engaged. They perceive disengaged physicians as difficult and often frustrated by behaviors that range from passivity to selective noncompliance to active resistance (Whitlock & Stark, 2014).

The third major study conducted in this category is by VITAL WorkLife, Inc. and Cejka Search, healthcare consulting companies, in September of 2013, surveying 1666 physicians. To better understand the meaning of engagement to physicians, fifteen elements of engagement that
physicians felt were most relevant to them and in the power of the HCO to provide were measured. The respondents felt engaged with their work, but less than half felt engaged with their organizations. In their study, physicians identified all 15 as necessary; they ranked “respect for my competency and skills” as the top element. A three-way tie was reported for the second-place element, including “feeling that my opinions and ideas are valued,” “good relationships with my physician colleagues,” and “good work/life balance” (p. 20). The survey also found significant gaps between what physicians perceive as essential for their engagement and what they perceive they were experiencing in practice.

Furthermore, a companion survey administered to administrators around these same engagement elements reported gaps between physicians' perception of delivery of promises and administrators' perception of organizational obligations. In most cases, administrators over-projected the degree to which they perceive they delivered inducements compared to what physicians felt they were currently experiencing. Another notable finding was that 43.5% indicated that feelings of disengagement prompted them to leave a practice, and over half (51.9%) specified that the potential of developing a sense of engagement was a deciding factor in their accepting a practice opportunity. The researchers did not directly define engagement, remarking it “is often used as a blanket term, lacking the specificity needed to take appropriate and effective actions to engage physicians more fully” (Best & Schutte, 2013, p. 2).

Shanafelt and Noseworthy called for leading HCOs to join them in their commitment to work engagement research. Such efforts should help fill the enormous gap in the literature related to physician work engagement and related physician-focused constructs, leading ultimately to improvements in the overall U.S. health care delivery system. This work is part of that effort.
Next, we consider the psychological contract. The psychological contract concept is a framework applied to understand and manage employment relations (Conway & Briner, 2002, p. 287), which the physician-HCO relationship is. This dissertation examined psychological contracts as a psychological variable that may influence work engagement levels in physicians employed by HCOs.

Psychological Contract-What is it?

This chapter reviews the primary research surrounding psychological contract development, psychological contract breach and fulfillment, and organizational outcomes and attitudes.

The psychology contract has gained considerable prominence in academic and practitioner settings over the last three decades because of its application in contemporary employment relationships (Rousseau, 2001; Shore and Coyle-Shapiro, 2003; Turnley & Feldman, 1998). This is particularly true in employment relationships that arise from economic and organizational circumstances like hospital mergers, downsizing, increased reliance on temporary workers, and demographic diversity (Arnold, 1996; Sparrow, 1996; Herriot & Kidd, 1997). As employers, HCOs consider effective management of their physicians a critical organizational issue, particularly those under the employment model. As the complex relationship between an individual and an organization develops, the psychological contract accounts for areas of the relationship that a formal contract cannot (Rousseau, 1990, 1995).

Despite a substantial body of research on the psychological contract, there is no universal definition (Anderson and Schalk, 1998; Cullinane and Dundon, 2006). The most extensive review of the origins and early development of the psychological contract construct is that of
Roehling (1997), who notes that both Argyris (1960) and Levinson et al. (1962) received credit for introducing the term. We consider the historical development of the psychological contract next.

**History and Definitions of the Psychological Contract**

The understanding of the historical evolution of the psychological contract is very crucial as it not only shapes the current literature but also influences future research directions. Roehling (1997) contended that Rousseau’s (1989) influential article reconceptualized the psychological contract and marked the “transition from early developments to recent developments in the psychological contract literature” (p. 213). Based on Roehling’s classification, more recently, Conway and Briner (2005, 2009) divided the psychological contract research into two broad phases: the Pre-Rousseau period and the Rousseau period

**Pre-Rousseau Period**

Argyris (1960, p. 97) used the term 'psychological work contract’ to describe the implicit understanding that emerged due to a leadership style that Argyris referred to as ‘passive’ or ‘understanding’ between employees and their foreman. Argyris noticed that supervisors adopting this leadership style positively influenced employee behavior by maintaining an informal employee culture. Levinson, Price, Munden, Mandl, and Solley (1962) derived the psychological contract concept by looking at the intangible aspects of contractual relationships where employees spoke of their work expectations. The researchers viewed psychological contracts as ‘a series of mutual expectations of which the parties to the relationship may, not themselves be [but] dimly aware but which nonetheless govern their relationship to each other’ (p. 21). According to Schein, individual employees forge their expectations from their inner needs, what they have learned from others, traditions and norms which may be operating, their past experiences, and "a host of other sources" (Schein, 1980, p. 24). While studying organization
socialization, Kotter defined the psychological contract as ‘an implicit contract between an individual and his organization which specifies what each expects to give and receive from each other in their relationship’ (p. 92). This was in 1973. Kotter refers to matches and mismatches of expectations, which he claims make up the psychological contract and emphasizes the importance of minimizing these mismatches to retain workers.

In the pre-Rousseau period, most authors defined a psychological contract as an exchange between two parties. However, the definitions were often inconsistent, especially over the parties involved in the psychological contract. For instance, March and Simon (1958) and Kotter (1973) conceptualized the psychological contract as an exchange relationship between employees and their organization. On the other hand, Argyris (1960) proposed that the psychological contract developed based on interactions between foremen and employees. Finally, Schein (1980) suggested that the psychological contract forms between an employee, managers, and other parties. Schein (1980) argued that the “notion of a psychological contract implies there is a set of unwritten expectations operating at all times between every employee of an organization and the various managers and others in that organization” (p. 22). He reinforced the importance of the employer's perspective, along with the employee's view.

Coyle-Shapiro and Parzefall (2008) noted, however, that the “initial phase in the development of the psychological contract is full is marked by disagreements between the early contributors” (p. 19). The work forming this period has also been described as ambiguous (Conway & Briner, 2009).

The Rousseau Period

Denise M. Rousseau receives credit for having the most significant influence on psychological contract research and being instrumental in its resurgence (Cullinane & Dundon,
The Rousseau period starts with Rousseau’s (1989) seminal work, which drew a conceptual distinction between transactional and relational contracts. Relational contracts are less formal, possess a broader scope, and are subjectively understood by the parties involved, while transactional contracts are very specific, narrow with time limits. Nearly all research in the area published after 1989 refers to Rousseau’s work. According to Conway and Briner (2005), the paper marked a fundamental shift in understanding the meaning, functioning, and how to investigate the psychological contract. Rousseau (1995) defines a psychological contract as individual beliefs shaped by the organization regarding an exchanged agreement between individuals and their organization. Rousseau’s definition focused on the individual employee beliefs and not the organization, though it acknowledged the existence of reciprocity. The definition also emphasized the perceived agreement, not the actual agreement between the involved parties in the psychological contract. This thesis adopts this definition for this dissertation.

**Differences between Rousseau’s Conceptualization of PC & Previous Research**

There are three areas in which Rousseau's viewpoint differs from the previous research. First, much of the early work on PC focused on the expectations that employees had about their obligations to the organization and the organization’s obligations to them. The perspective aforesaid is in contrast with Rousseau’s perspective, which is a focus on the promissory aspects of the contract. What do employees feel that their organization has promised them, and what promises from them are implicit in this arrangement? The second difference is that earlier studies emphasized the two-way nature of the contract more strongly, whereas, for Rousseau, the emphasis is on individual idiosyncratic perceptions that exist ‘in the eye of the beholder’ (Rousseau, 1989: 123). As Conway and Briner note, ‘Rousseau believes that it is primarily an
individual’s perceptions of observable behavior that constitute psychological contracts’ (Conway & Briner, 2005: 14). Finally, there is a significant shift in emphasis that revolves around the fulfillment of the psychological contract. Early studies tended to focus on equity between the inputs of the organization and those of the employee. Rousseau was responsible for shifting focus from comparative inputs to consideration of the ‘violation’ of psychological contracts and the consequent outcomes.

As the complex relationship between an individual and an organization develops, the psychological contract accounts for areas of the relationship that a formal contract cannot (Rousseau, 1990, 1995). The psychological contract also allows individuals to know what they should give in terms of effort and what they should expect in return. (Rousseau, 1990). The study of psychological contracts forms a useful avenue for improving the understanding of job attitudes and work behaviors (see Zhao, Wayne, Glibkowski, & Bravo, 2007, for a meta-analysis).

**Psychological Contract Fulfillment: Rationale**

The inclusion of psychological contract fulfillment in this work is very relevant owing to the following reasons. First, researchers have increasingly proposed fulfillment as the fundamental measure for judging the psychological contract's performance (Lee, Liu, Rousseau, Hui & Chen, 2011). Psychological contract fulfillment measures the extent to which one party to the contract (employee) deems the other (employer) has met its obligations. From an employee perspective, it takes two forms: perceived employer fulfillment and perceived employee fulfillment. In the case of perceived employer fulfillment, the employee assesses the extent to which the employer fulfills its obligations to them. Second, perceived employee fulfillment emphasizes the employee’s perception of fulfilling their obligations to the employer. This
dissertation focuses on perceived employer fulfillment rather than perceived employee fulfillment, as perceived employer fulfillment is the most critical aspect of the psychological contract explaining employee outcomes (Robinson & Rousseau, 1994). According to Rousseau and Parks (1993), psychological contract fulfillment is subject to an individual’s interpretation.

**Psychological Contracts and Organizational Attitudes**

The strong connection between the employee's psychological contract and the employer's perceived exchange relationship adds to a robust theoretical framework for explaining the employee-employer relationship's negative and positive aspects. The next section looks at the literature on organizational commitment and three physicians' studies, two in the US, one in Belgium, on psychological contract fulfillment and breach.

**Psychological Contract and Organizational Commitment**

Organizational commitment describes the strength of an individual’s identification with and attachment to an organization (Meyer & Allen, 1984), and literature suggests that organizational commitment correlates with psychological contracts. Rousseau (1995) noted commitment as an essential part of relational obligations when employees perceived a psychological contract breach or fulfillment. An individual who values relationships in the organization is more likely to be committed to organizational goals and values toward their organization (Trybou, Gemmel, Desmidt & Annemas, 2017; Bunderson, 2001).

**Psychological Contract Research in Physicians**

There has been almost very little empirical research related to the psychological contract in US physicians. There are two US studies and a European study relevant to this study.
The first study was a longitudinal study undertaken by Bunderson (2001), who investigated the effects of perceived psychological contract breach on organizational commitment in physicians, nurses, physician assistants, and nurse practitioners (N=283) in an integrated health system. Bunderson discovered that physicians' psychological contract with the HCO shaped both their professional and administrative work ideologies. Physicians' dual roles: a member of the HCO, and a licensed professional as a Medical doctor, involves both professional and administrative roles and perceived role obligations. It suggests that because of important differences between these two ideologies, a physician's response to perceptions that their organization is not fulfilling its role obligations will depend on whether the breach of organizational obligations is perceived as professional or administrative. In his study, Bunderson (2001) discovered that perceived breaches of administrative role obligations are most strongly associated with dissatisfaction, thoughts of quitting, and turnover.

On the other hand, perceived breaches of professional role obligations strongly associate with lower organizational commitment and job performance. Specifically, while the perceived administrative breach was positively associated with turnover intentions and turnover, a perceived professional breach was unrelated to these variables. This pattern is consistent with the argument that when a physician perceives that the employing HCO fails to fulfill its administrative role obligations, the employee rationally responds and terminates the employment relationship given the transactional nature of the administrative role. On the flip side, a perceived professional breach was negatively associated with organizational commitment, productivity, and patient satisfaction. These results are consistent with the argument that professional role obligations rest on a relational rather than transactional
exchange. These physicians did not leave their organizations; they just disengaged. According to Kahn (1990), disengagement is “the uncoupling of selves from work roles; in disengagement, people withdraw and defend themselves physically, cognitively, or emotionally during role performances” (p. 694). Bunderson’s findings have important implications for the way we think about professionals, professional employment, and psychological contracts.

The second US study on psychological contract fulfillment in the physician population examined the effect of psychological contract fulfillment on reduced worked hours in female physicians (N=98). In this study, psychological contract fulfillment was a mediator between work hours and work-related outcomes. Hartwell’s (2010) study showed that when physicians have high psychological contract fulfillment, the organization will reap the benefits of good work-related outcomes regardless of the number of hours the employee works. The author found this true for reduced-hour physicians who appear to be more responsive than their full-time counterparts to psychological contract fulfillment regarding their career satisfaction and turnover intention. The findings also suggest that physicians with high psychological contract fulfillment perceive that they receive a lot more support from their supervisors and are much more likely to feel fulfilled in their career development than physicians with low psychological contract fulfillment. These findings agree with Parfall and Hakanen (2010), who depicts psychological contract fulfillment as a resource. Resources buffer the effects of high job demands that physicians face every day. This study used the evaluation-oriented approach to assess the psychological contract.

The third study on psychological contracts and physicians was conducted across six hospitals in Belgium. In a hospital-physician alignment study, Trybou, Gemmel, Desmidt, and
Annemans (2017) surveyed 130 physicians and found that hospitals' fulfillment of administrative and professional obligations to physicians stimulated physician motivation to contribute to the hospital's mission. Furthermore, the researchers considered the mediating role of the physicians’ emotional attachment to the hospital and the moderation effect of the exchange with the Chief medical officer. Physicians who perceived the psychological contract's fulfillment increased their commitment to the organization’s mission statement & were less likely to quit. The leader-member exchange between physicians and the chief medical officer moderated the relationship between the fulfillment of administrative obligations and affective commitment positively. Employees that perceived their employer fulfilling its obligations were more likely to become more committed to the organization’s values and goals and less likely to leave the organization (Rousseau, 1995). When MDs perceive a high PCF level, they are increasingly motivated to contribute to the hospital's mission statement.

The next section looks at psychological contract research in workplace outcomes.

**Psychological Contracts and Workplace Outcomes**

Changes in employee-employer relationships are associated with diverse adverse workplace outcomes. These are costs from employee turnover, temporary replacement costs, recruitment and selection costs, and costs related to productivity, affecting its bottom line. Research on psychological contracts indicates a breach of contract accompanies a reduction in organizational commitment, organizational citizenship behavior (OCB), job performance, and job satisfaction (Bunderson, 2001; Conway & Briner, 2002; Coyle-Shapiro, 2002). Additionally, a breach is associated with intentions to leave the organization and actual turnover. Ultimately, it is essential to understand how psychological contracts affect workplace outcomes to arbitrate and manage these outcomes and expediently reduce unnecessary costs.
The following section examines organizational citizenship behaviors as significant consequences of psychological contract breach.

**Psychological Contract and Organizational Citizenship Behaviors (OCB)**

OCB has been defined as contextual performance because the behaviors are discretionary and not included in an employee’s formal job description (Organ, 1988). Because the job does not explicitly require such behaviors, there are no formal sanctions for not engaging in them. As such, OCB can be considered a behavioral gauge of workers’ reactions to their employment relationship. Employees are less likely to engage in OCB when they perceive a negative relationship with their employer.

Researching 134 supervisor-subordinate dyads, Turnley, Bolino, Lester, and Bloodgood (2003) examined the relationships between psychological contract fulfillment and three types of employee behavior: in-role performance, organizational citizenship behavior directed at the organization, and organizational citizenship behavior directed at individuals within the organization. The study showed that psychological contract fulfillment is positively related to the performance of all three types of employee behavior. Similarly, the results indicate that psychological contract fulfillment is more strongly related to citizenship behavior directed at the organization than to citizenship behavior directed at one’s colleagues. The research also investigated if employees’ attributions regarding reasons for PC breach impacted work performance. They found that employees were likely to reduce their effort when they perceived that their organization intentionally failed to fulfill PC. In essence, the literature shows that psychological contract breach leads to a decline in Organizational citizenship behaviors (OCB) while psychological contract fulfillment leads to an increase in OCB. Psychological contracts
arise when individuals infer promises that give rise to beliefs in the presence of mutual
obligations, typically between employee and employer (Rousseau, 1989).

Moreover, a breach occurs when an employee perceives that their organization has failed
to fulfill one or more obligations comprising the contract. The literature has shown that PCB led
to low levels of OCB. On the other hand, PCF was strongly positively related to OCB directed
more at the organization than at the individuals within the organization. Employees who
perceived PCB were reported likely to seek employment outside their current organization with
intentions to leave. However, employees with high PCF were more attached to the organization
and intended to continue the job (Robinson & Morrison, 2000).

Concerning organizational attitudes, higher perception of PCF led to increased
organizational commitment showing employee commitment to organizational values and goals,
and less likely to leave the organization (Rousseau, 1995), while PCB resulted in lower job
satisfaction and negative attitudes and behavioral intentions (Zhao et al., 2007). The previous
section compiled current literature about workplace outcomes and their relationship to
psychological contracts. The next section discusses psychological contracts and work
engagement.

The Psychological Contract and Work Engagement

Research has shown that employee perceptions of psychological fulfillment led to
motivational outcomes that include work engagement (see Agarwal, 2014). The dynamic is
consistent with the principle of reciprocity explained with social exchange theory. According to
Blau (1964), social exchanges are voluntary actions accompanied by the expectation that such
treatment will be reciprocated at some future point. When employees see that the organization has
provided essential resources, they will respond in kind with effort and loyalty (Kurtessis et al.,
2015), in this case, the psychological and motivation state of engagement. The next section speaks to the relationship between psychological contracts and work engagement and its effects on turnover intention, job satisfaction, and mental health. There is, however, no literature on work engagement and psychological contracts on physicians in the US or anywhere else to the best of this PI’s knowledge. This study is the first.

Bal, Cooman, & Mol (2013) investigated the interrelations between the psychological contract, work engagement, and turnover intention in 240 employees and found that psychological contract fulfillment was related to higher work engagement, positive attitudes towards the job, and lower turnover intentions, but only for employees with low tenure. Furthermore, psychological contract overtime was higher for those with high tenure, but the relations between turnover intention and the psychological contract were stronger for those with low organizational tenure. Tenure plays a role in the dynamics between PC and work outcomes.

**Psychological Contract, Work Engagement, and Job Satisfaction**

Rayton & Yalabik (2014) examined the connection between psychological contract breach (PCB) and work engagement while incorporating job satisfaction as a mediator variable into the exchange relationship. The population studied by Rayton and Yalabik (2014) were workers in the banking sector in the United Kingdom. The researchers showed that PCB reflected employees’ feelings of resource loss, and these feelings impacted work engagement through their impact on job satisfaction. The next study views psychological contract fulfillment as a resource.
Psychological Contract, Work Engagement, and Mental Health

Parzefall and Hakanen (2010, p. 5) conceptualized PCF as a form of ‘economic and socio-emotional resources’ that the employee expects the employer to provide. While examining the motivational and health-enhancing properties of Finnish employees in the field of social and health services, the researchers demonstrated that perceived PCF leads to an improvement in mental health.’. As a mediating variable, work engagement is positively associated with commitment and mental health.

Summary

Nearly 50 % of physicians are employees of HCOs, and most are not engaged in their work (The Physician’s Foundation, 2018). Engagement is the antipode to burnout, and three-quarters of physicians are continually experiencing feelings of burnout (The Physician’s Foundation, 2018). Also, greater than half of the physicians exhibit low morale, and 17 % plan to retire early, 48 % plan to reduce work, take a non-clinical job or pursue “concierge” medicine and 44% leave their employing organization because of disengagement (Whitlock & Stark, 2014). The fact is by 2033, there will be a shortage of 84,900 physicians (AAMC, 2019).

The relationship between physicians and their organizations has frequently been an exchange relationship, yet; the physician-hospital relationship is still tense. Friction between the two parties remains prevalent since only 6 % of physicians see the current state of relations between physicians and hospitals as mostly positive and cooperative, and 46 % see the relationship as negative (The Physician’s Foundation, 2018). A significant number of physicians state that the actions of their HCOs do not reflect their goals and priorities (The Advisory Board Company, 2014). These misaligned incentives, goals, and objectives between physicians and their HCO make collaboration difficult and often create tension. Furthermore, there are sizable
gaps between the delivery of inducements physicians perceived are essential to feeling engaged and what they are experiencing in their current practices (Vital WorkLife, Inc. and Cejka Search, 2013). HCOs leaders, however, recognize the need to listen to physicians, involve them in decision-making, recognize physicians’ desire to retain autonomy, and integrate them in decision making (Spaulding, Gamm, and Menser, 2014).

There is also a shortage of scholarly research on work engagement in the physician population, evident from the extensive literature review, particularly in the US. A significant portion of the physician engagement studies took place in Europe. The scholarly work already undertaken in work engagement areas indicated very little evidence linking engagement with hospital physicians' work outcomes. The only outcomes identified in the literature include job satisfaction, ability to work, and medical error rates.

Also, there has been very little work on psychological contracts in physicians. Physicians are professionals, and as professionals, they operate in a pluralistic ideology work environment. Consequently, they respond differently to administrative and professional breach or fulfillment of organizational obligations or promises. In other words, these responses depend on whether it affects them administratively as an employee of the organization or professionally as a physician (Bunderson, 2001; Trybou, Gemmel, Desmidt, and Annemas, 2017). Psychological contract fulfillment leads to positive organizational commitment and in-role and extra-role behaviors. It is also a form of economic and socio-emotional resource that employees expect their organization to provide (Parzefall and Hakanen, 2010, p. 5). Thus, physicians' perception of their psychological contract fulfillment is much more critical than working reduce hours because they are not experiencing burnout but experiencing career satisfaction and encouraged to continue practicing medicine (Hartwell (2010).
CHAPTER 3-METHODOLOGY

Introduction

This chapter explains the methodology selected for this research. The sections include research design, population, and sample selection, including the quantitative sample size subsection, instrumentation, validity, reliability, data collection and management, and data analysis.

Research Design

The purpose of this study was to assess the impact of HCO-Employed physician's psychological contract fulfillment on self-rated levels of total work engagement and its dimensions: vigor, dedication, and absorption. A quantitative, correlational, cross-sectional web-based survey research design was employed for this study to address eight research questions and twelve hypotheses regarding HCO-Employed physician's psychological contract fulfillment on self-rated levels of total work engagement and its dimensions: vigor, dedication, and absorption. The study was cross-sectional because it involves the collection of data at one point in time. A correlational design was used to explore if a relationship existed between HCO-Employed physician's psychological contract fulfillment on self-rated levels of total work engagement and its dimensions: vigor, dedication, and absorption. The research used continuous and categorical variables, assessing the relationship between these variables, and no manipulation of variables was needed, which supported a correlational design (Creswell, 2014). Ordinal logistic regression was also employed to assess the predictive relationships of the independent variables on the dependent variable.
Population and Sample Selection

The population of interest was HCO-employed physicians in the United States. The sample in this study was obtained from three sources. First, a purchased email contact information of a randomized sample of licensed physicians (n=15,000) from a medical email list vendor (see physician_list.com). Second, from two LinkedIn groups: “The American Osteopathic Association” (9,260 members) and “The Hospitalists Network” (5,520 members). Third, from a physician audience recruited by Centiment, an online data collection provider (see Centiment.com).

Study participants met the following inclusion criteria: (a) licensed physician, MD or DO practicing in the US (b) employed in the same work setting for at least six months and sees patients (c) have access to an internet-capable device with internet access to take the online survey (d) English speaking and (e) 21 years or older. Physicians whose roles were strictly teaching or research in academic medicine and those who functioned exclusively in administrative roles, such as serving as a Chief Medical Officer or those who were not engaged in-patient care directly at the time, were excluded from the study.

Measures of Variables

In addition to the demographic questions, the dependent variable was measured using the Utrecht Work Engagement Scale (UWES)© to assess participants’ level of work engagement and its dimensions: vigor, dedication, and absorption. Furthermore, the independent variable, psychological contract fulfillment, was measured using a psychological contract fulfillment measure created by Hartwell (2010).

Work Engagement Scale: Utrecht Work Engagement Scale (UWES-9). The purpose of the 9-item UWES© was to assess work engagement and its three dimensions: vigor,
dedication, and absorption. As presented to those completing it, the questionnaire was entitled “Work and Well-being Survey (UWES)”, so named by its developers to avoid bias that the term work engagement might suggest if it included in the questionnaire title. Work Engagement is operationalized using (UWES-9), as published in Schaufeli et al. (2006), covering all 3-sub scales. This conceptualization of engagement is the most theoretically and empirically developed engagement construct in the literature. Work engagement was measured using the seven-item Likert scale (1, strongly disagree; 7, strongly agree). This instrument is a three-factor scale-Vigor, Dedication, and Absorption.

Vigor subscale. Vigor is a behavioral-energetic component of work engagement. It refers to having high energy and mental resilience on the job, being inclined to exert effort in one’s work, and having the tenacity to persevere when work is difficult (Schaufeli et al., 2002). Three scales assess vigor. A sample question for the vigor subscale is “At my work, I feel bursting with energy.” Dedication subscale. Dedication is an emotional component of work engagement, related to having a strong psychological identification with work or a job. It is characterized by having a high level of involvement at work, a sense of work-related significance, pride, enthusiasm, inspiration, and challenge (Schaufeli et al., 2002). A sample question is, “I find the work that I do full of meaning and purpose” Absorption subscale. Absorption is a cognitive component of work engagement. It entails full concentration and deep engrossment in one’s work such that time moves quickly and detaching oneself from work is difficult (Schaufeli et al., 2002). Three items assess Absorption. A sample question is, “When I am working, I forget everything else around me.” measure absorption.

Validity. The UWES Preliminary Manual (Schaufeli & Bakker, 2004b) did not report the instrument's face validity. Nevertheless, factorial validity has been confirmed through
psychometric analyses. The instrument includes three highly correlated scales. A psychometric evaluation of studies conducted with a multi-national database led the instrument developers to conclude, “Work engagement, as assessed by the UWES, may be considered a one-dimensional as well as a three-dimensional construct” (p. 17, p. 30). Different occupational groups had significant but “relatively small” differences in mean engagement scores in the Dutch version studies. No studies of U.S. employees were included in the analyses. Physicians had the lowest mean scores of all occupations, but the low scores may have more to do with the class of physicians taking the survey. According to the researchers, these physicians were known to have career problems shown by the low scores that are not representative of physicians in general.

**Reliability.** In the UWES Preliminary Manual, Schaufeli and Bakker (2004b) summarized the three scales' internal consistency as “good.” All values of Cronbach’s α exceed the critical value of .70 (p. 7). They noted that the values of Cronbach’s α usually ranged between .80 to .90 for the scales across numerous studies they cited. The stability (test-retest) coefficients they provided for vigor, dedication, and absorption were .30, .36, and .46, indicating relatively moderate stability across time.

**Scoring.** The UWES Preliminary Manual provided directions for scoring the instrument (Schaufeli & Bakker, 2004b) by adding the total scores on each of three subscales and dividing each total subscale score by 3. A total score was also obtained by totaling all the response scores and dividing by the total number of items, which was 9 in the version used in this study. Each subscale score and the total score ranged between 0 and 6. Scores for each subscale and the total score range from zero to 6, with zero meaning the employee never experiences work engagement or one of the subscale dimensions. A score of 6 means the employee experiences work engagement or one of its subscale dimensions always or every day.
There are currently no normative ranges available for the UWES© specific to physicians in the US. Nevertheless, normative ranges for the Dutch language UWES 9-item version for several occupations are provided in Schaufeli and Bakker (2004b) as follows: Vigor: Mean = 3.99, SD = 1.08, SE = .01 Dedication: Mean = 3.912, SD = 1.31, SE = .01 Absorption: Mean = 3.56, SD = 1.10, SE = .01 Total score: Mean = 3.82, SD = 1.10, SE = .01 A total UWES score of 4.67 or higher was considered high or very high, while a score of 3.06 or less was considered low or very low by Schaufeli and Bakker (2004). The same ranges will be adopted in this study while recognizing the limitations of doing so for HCO-employed physicians employed in the U.S.

**Psychological Contract Fulfilment Scale.** The psychological contract fulfillment scale is a 14-Based on Rousseau’s (1990) & Robinson and Morrison’s (1995) measures, a scale ranging from (1) “not at all” to (4) “extremely” sample questions “How much of a reward to you is having authority needed to get the job done?” “How much of a concern to you is not being able to do your job because of red tape? “To what extent has this practice met your expectations?” The scale measured the Dimensions: benefits, pay, advancement opportunities, work itself, resource support, good employment relationship, unmet expectations, support with personal problems, volunteering to do non-required tasks on the job, supports high-quality health care, sufficient power and responsibility, and comparison between preferences and actuality (Hartwell, 2010). This scale was selected because it assesses the state of the psychological contract from the employees’ perspective. The measure proposed by Hartwell reflects the extent to which management fulfills its promises related to the context of pay, promotion opportunities, and job requirements, employees' level of trust in the organization, and the perceived fairness of management.
So far, this operationalization is the most comprehensive for examining psychological contract fulfillment in HCO-employed physicians for this thesis.

**Criterion Validity.** The criterion validity of the PCF Scale was tested in two ways. First, the measure was correlated with expected outcomes like psychological distress and distress due to the divergence between the respondent's professional activities and the current work arrangement. The findings showed psychological contract fulfillment to significantly negatively correlated with psychological distress \( (r=-.30, p<.01) \) and distress due to the difference between professional activities the respondent would like to do and the respondent’s current work arrangement \( (r=-.48, p<001) \). The negative empirical association between psychological contract fulfillment and these expected outcomes would suggest that the Psychological Contract Fulfillment Scale has validity concerning these criteria (Hartwell, 2010)

Second, the criterion validity was tested by running a factor analysis (principal components with oblique rotation) to determine if items from the PCF Scale loaded on the same factors as items of an established measure of the same construct (DeVellis,1991). Four factors were identified: 1) supervisor relations obligations, 2) service quality obligations, 3) job structure obligations, and 4) career development obligations.

**Construct Validity.** Two methods were used to assess the construct validity of the PCF scale. A single-item measure of PCF from the dataset, “I feel like my workplace has met my psychological contract for working reduced hours,” was correlated with the new Psychological Contract Fulfillment Scale for reduced-hour physicians only \( (r=.37, /p<.05) \). The PCF scale was correlated with the item “How satisfied are you with the extent to which this practice has met your expectations?” Satisfaction and psychological contract fulfillment are theoretically related constructs and were found to be correlated \( (r=.52, p<.001) \) (Hartwell, 2010)
**Cronbach’s alpha.** The internal consistency reliability (Cronbach’s alpha) of the PCF scale is .77, which is well above the .70 standard recommended by Nunnally (1967) and Van de Ven and Ferry (1980). DeVellis (1991, p. 85) describes different alpha levels and uses the word “respectable” to describe an alpha between .70 and .80.

**A Priori G*Power Analysis**

Figures 3 and 4 show the prospective power analysis for the necessary sample size for the Spearman Rho nonparametric correlation analysis and ordinal logistical regression proposed for this study using the G*Power calculator. The input included the default medium effect size ($f^2=.15$) and minimum power (.80) for regression analysis and effect size ($f^2=.3$) and minimum power (.80) for spearman rho. The .80 power level indicates a 20% chance of type II error (not rejecting a true null hypothesis; missing a real effect). The G*Power output indicated a minimum of 167 participants were necessary to detect significant effects. See figures 3 and 4.
Figure 3

A Priori G*Power Analysis for Spearman Rho

Note. A Priori G*Power analysis to determine sample size given an effect size of .03 appropriate for Spearman Rho, an alpha level set at .05, power of .80, one sample of HCO-employed physicians, one independent variable (psychological contract fulfillment), and one dependent variable (work engagement), the expected and anticipated sample size is 82 participants for the survey instruments.
A Priori G*Power Analysis for Ordinal Logistic Regression

Note. A Priori G*Power analysis to determine sample size given an effect size of .15 appropriate for ordinal logistic regression, an alpha level set at .05, power of .80, one sample of HCO-employed physicians, four tested predictors with a total number of five predictors, and one dependent variable (work engagement), the expected and anticipated sample size is 85 participants for the survey instruments.

Data Collection

The PI used a multistep approach to secure study participants. The multistep approach was used to ensure enough respondents, given that physician response rates are reported as low in the literature, mainly using an email list. Also, because the survey was deployed during a pandemic, the PI wanted to ensure that it reached a wide population of physicians.
After IRB approval by Seton Hall University, the solicitation letter embedded with a survey link was sent out concurrently to recruit the study sample as follows:

a. All physicians on a randomized generated email list (n=15,000) purchased from Physicians_lists.com, a medical email list vendor (See www.physicians_lists.com), via Hotsol, a bulk email service provider (See www.hotsol.net).

b. Physicians via Centiment, an online data collection provider (see www.centiment.com)

c. Two closed LinkedIn groups: The American Osteopathic Association (9,260 members) and The Hospitalists Network (5,520 members) via a posting on their forums so that anyone interested could take the survey. Upon request from site administrators, the PI was granted entry into both groups and permitted to conduct the survey.

Also, the PI utilized snowball sampling. Snowball sampling is asking individuals to refer participants to the study (Crouse & Lowe, 2018). To obtain participants through this method, the PI added the following statement at the end of the solicitation letter "Please feel free to ask other physicians that you know that in your judgment meets the study criteria to participate in the survey. You can forward the link at the bottom of the page to them even if you choose not to take the survey."

The solicitation letter informed participants about the research, instructed them on the study parameters, and then asked them to complete the survey if they would like to. Individuals had to self-identify as a physician working for an HCO currently employed in the same work
setting for at least six months to participate in the study. Clicking the embedded survey link was considered as consent. The activated link led to the SurveyMonkey® site, where a 34-item survey was hosted. The questionnaire comprised ten demographic questions, followed by the PCF survey (14 questions) and the work engagement survey (9 questions) that took between 5-8 minutes to complete. There was one attention span question in the survey. Within two weeks of opening the survey, the PI had obtained responses that exceeded the study's required sample size of 167. The survey was kept open for five additional weeks. No monetary incentives were provided to the recipients. In total, 1,170 survey responses were obtained, 70 of which were incomplete, with greater than 10% of the questions not answered. Thus, those 70 survey responses were excluded from all the responses. The final count was 1,100 completed surveys. While only 167 surveys were required for the study, the PI used all completed surveys to increase statistical power.

**Data Management**

The survey data was retrieved from SurveyMonkey's secure server and stored on a USB drive by the PI. Participants' identities, such as name, address, or other personally identifying information, were not collected as part of the study. The only information collected was demographic data, and nothing in that information identified respondents. Because participants' responses were anonymous, there is no way to contact or link their responses to them. If participants forwarded the survey link to others, no identifying information was collected from them as well. The data collected from the survey will be kept confidential to protect its integrity. The USB drive will be stored on a locked desk in the office of the principal investigator. The principal investigator, Oyebanjo Olowe, has access to all the data, which will be kept for three years after study completion. After three years, the research data will be destroyed by opening
the USB on a password-protected laptop. The files will be selected and deleted. The recycled bin will then be emptied by the PI.

**Statistical Analysis**

Statistical Package for the Social Sciences (SPSS, 2017) version 26.0 was used for data analysis. The PI used descriptive statistics to answer questions 1 and 2, presenting them in tabular and graphical forms to report frequencies and percentages. Central tendency on the data was calculated and screened for normality, outliers, and significant skewness.

Questions 3, 4, and 5, and their corresponding hypothesis, were analyzed using the Spearman Rho rank correlation to evaluate the monotonic relationship between the dependent and independent variables given the data is based on ranked values rather than the raw data. The Spearman rank-order correlation coefficient is a nonparametric measure of the strength and direction of association that exists between two variables measured on at least an ordinal scale. Spearman Rho was applied to analyze the relationship between PCF and vigor, dedication, and absorption and measure the association's strength and direction.

Ordinal logistic regression was used to analyze questions 6, 7, and 8 and corresponding hypotheses to predict the ordinal dependent variable, adjusting for the control variables. Where assumptions were violated, the generalized linear model was used. Logistic regression describes the relationship between a set of independent variables and a categorical dependent variable. There are two main objectives for using ordinal logistic regression in this study. First, to determine whether the independent variable PCF has a statistically significant effect on the dependent variable, work engagement: vigor, dedication, and absorption, while controlling for the effects of age, gender, marital status, weekly working hours, years of work experience, practice setting, and respondent practice type. Second, to determine how well the ordinal logistic
regression model predicts the dependent variable work engagement: vigor, dedication, and absorption.
CHAPTER 4-RESULTS

The purpose of this study was to assess the impact of physicians' perception of their psychological contract fulfillment on self-rated work engagement levels as employees of HCOs in the US. The researcher constructed the following eight research questions to assess the gap in the literature:

The PI answered the eight research questions using the quantitative research approach and a correlational research design. The quantitative approach allowed the researcher to gather numerical data quickly via a cross-sectional online survey. The results were analyzed using descriptive statistics and Spearman rho to determine the correlational between variables. An assessment of predictive relationships was tested using ordinal logistic regression models. The ordinal logistic regression analyses were utilized to address three research questions (RQ6, RQ7, and RQ8). In this chapter, the researcher describes the descriptive statistics of the data. The participants' characteristics and the mean, median, and mode of the variables are thoroughly examined to provide a comprehensive interpretation of the collected data. The researcher also recounts the data analysis procedures, testing the assumptions, and describes the results of the analyses per each research question. The data analysis procedures were upheld according to Chapter 3. Likewise, the assumptions were supported by the data.

Descriptive Findings

Questions 1 and 2 were answered using descriptive statistics. Table 1 presents a summary of the demographic profile of the respondents. The average age of respondents (doctors) was 51.33 (SD = 12.70). Figure 5 shows the age distribution of respondents. Of note is that 30% of respondents are older than 60 years old. This concurs with the most recent research of the federation of state medical board 2018 report (FSMB, 2018)
More than 85% of the respondents worked in their organization for more than two years, with only 5.3% of the respondents practicing in their organization for less than one year. Most of the sample were (n = 668, 60.7%) comprised of male doctors. More than 80% of the respondents were married, while greater than 50% of the respondents had been practicing medicine for 20 years or more. Less than 10% of the respondents had work experience of fewer than five years.

Figure 6 shows that hospital, hospital/health system-owned medical group, and physician-owned medical group practice presented as the most popular (74.9%) setting for physicians practice environment.
Figure 6

*Bar Graph Illustrating Respondents Practice Setting*

Roughly 40% of physicians were practicing in the North East, while an almost equal percentage (20%) were practicing in the country's Midwest, South, and West regions (See figure 7).
The respondents indicated a wide range (42) of specialties/subspecialties in medicine

(See figure 8)
Figure 8

Bar Graph Representation of Respondents According to Specialty

Please specify your area of specialty practice, if any

42 specialties/subspecialties
Table 1

Demographic Profile of the Respondents

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practicing in the organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months – 1 year</td>
<td>58</td>
<td>5.3</td>
</tr>
<tr>
<td>1 – 2 years</td>
<td>87</td>
<td>7.9</td>
</tr>
<tr>
<td>&gt; 2 years</td>
<td>955</td>
<td>86.8</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>668</td>
<td>60.7</td>
</tr>
<tr>
<td>Female</td>
<td>432</td>
<td>39.3</td>
</tr>
<tr>
<td>Marital status</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>899</td>
<td>81.7</td>
</tr>
<tr>
<td>Single</td>
<td>201</td>
<td>18.3</td>
</tr>
<tr>
<td>Practice medicine (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 5</td>
<td>104</td>
<td>9.5</td>
</tr>
<tr>
<td>6 – 10</td>
<td>178</td>
<td>16.2</td>
</tr>
<tr>
<td>11 – 20</td>
<td>250</td>
<td>22.7</td>
</tr>
<tr>
<td>21 – 30</td>
<td>292</td>
<td>26.5</td>
</tr>
<tr>
<td>31 or more</td>
<td>376</td>
<td>25.1</td>
</tr>
<tr>
<td>Practice setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>389</td>
<td>35.4</td>
</tr>
<tr>
<td>Health system / Medical group</td>
<td>435</td>
<td>39.5</td>
</tr>
<tr>
<td>Physician-owned medical group</td>
<td>160</td>
<td>14.5</td>
</tr>
<tr>
<td>practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government facilities</td>
<td>37</td>
<td>3.4</td>
</tr>
<tr>
<td>HMO / PPO organization</td>
<td>22</td>
<td>2.0</td>
</tr>
<tr>
<td>Academic medical center</td>
<td>33</td>
<td>3.0</td>
</tr>
<tr>
<td>Federally qualified health center</td>
<td>7</td>
<td>.60</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>1.5</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>455</td>
<td>41.4</td>
</tr>
<tr>
<td>Midwest</td>
<td>222</td>
<td>20.2</td>
</tr>
<tr>
<td>South</td>
<td>218</td>
<td>19.8</td>
</tr>
<tr>
<td>West</td>
<td>205</td>
<td>18.6</td>
</tr>
<tr>
<td>Working optimal hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>381</td>
<td>34.6</td>
</tr>
<tr>
<td>Yes</td>
<td>719</td>
<td>65.4</td>
</tr>
<tr>
<td>Medical specialty</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-------------</td>
<td>---</td>
</tr>
<tr>
<td>Allergy and Immunology</td>
<td>5</td>
<td>.5</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>118</td>
<td>10.7</td>
</tr>
<tr>
<td>Cardiology</td>
<td>33</td>
<td>3.0</td>
</tr>
<tr>
<td>Cardiothoracic Surgery</td>
<td>9</td>
<td>.8</td>
</tr>
<tr>
<td>Clinical Informatics</td>
<td>1</td>
<td>.1</td>
</tr>
<tr>
<td>Colon and Rectal Surgery</td>
<td>4</td>
<td>.4</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>29</td>
<td>2.6</td>
</tr>
<tr>
<td>Dermatology</td>
<td>35</td>
<td>3.2</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>75</td>
<td>6.8</td>
</tr>
<tr>
<td>Endocrinology, Diabetes, and Metabolism</td>
<td>11</td>
<td>1.0</td>
</tr>
<tr>
<td>Family Medicine</td>
<td>75</td>
<td>6.8</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>18</td>
<td>1.6</td>
</tr>
<tr>
<td>General Internal Medicine</td>
<td>76</td>
<td>6.9</td>
</tr>
<tr>
<td>General Surgery</td>
<td>47</td>
<td>4.3</td>
</tr>
<tr>
<td>Geriatric Medicine</td>
<td>6</td>
<td>.5</td>
</tr>
<tr>
<td>Hematology-Oncology</td>
<td>15</td>
<td>1.4</td>
</tr>
<tr>
<td>Hospice and Palliative Care</td>
<td>8</td>
<td>.7</td>
</tr>
<tr>
<td>Hospital Medicine</td>
<td>34</td>
<td>3.1</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>12</td>
<td>1.1</td>
</tr>
<tr>
<td>Medical Genetics and Genomics</td>
<td>3</td>
<td>.3</td>
</tr>
<tr>
<td>Medical Oncology</td>
<td>20</td>
<td>1.8</td>
</tr>
<tr>
<td>Nephrology</td>
<td>5</td>
<td>.5</td>
</tr>
<tr>
<td>Neurological Surgery</td>
<td>10</td>
<td>.9</td>
</tr>
<tr>
<td>Neurology</td>
<td>31</td>
<td>2.8</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>1</td>
<td>.1</td>
</tr>
<tr>
<td>Obstetrics and Gynecology</td>
<td>35</td>
<td>3.2</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>16</td>
<td>1.5</td>
</tr>
<tr>
<td>Orthopedic Surgery</td>
<td>49</td>
<td>4.5</td>
</tr>
<tr>
<td>Otolaryngology-Head and Neck Surgery</td>
<td>8</td>
<td>.7</td>
</tr>
<tr>
<td>Pathology</td>
<td>22</td>
<td>2.0</td>
</tr>
</tbody>
</table>
The psychological contract fulfillment (PCF) score of doctors as HCO employees was measured as the aggregated score of a four-item scale ranging from 1 (not at all) to 4 (extremely likely). The PCF score ranged from 1.2 to 3.8, with a mean of 2.665 and a standard deviation of 0.365. The median PCF score was 2.643. Results of the one-sample t-test with a hypothesized mean of 3.0 indicated that the mean is significantly less than 3.0 ($t (1099) = 29.025, p < .001$). Therefore, the average PCF score is close to the “somewhat” response. Figure 9 is a histogram of the distribution of PCF score. The histogram indicates symmetric distribution of the PCF score, which shows that the assumption of normality is satisfied.
Table 2 shows a similar PCF score of physicians' practice setting. Furthermore, PCF scores by physicians' specialties are also identical.

**Table 2**

**PCF Score of Physicians by Practice Setting**

<table>
<thead>
<tr>
<th>Practice Setting</th>
<th>Hospital Health System-Owned Medical Group</th>
<th>Physician-Owned Medical Group</th>
<th>Government Facilities</th>
<th>HMO/PPO</th>
<th>Academic Medical Center</th>
<th>FQHC</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>389</td>
<td>435</td>
<td>160</td>
<td>37</td>
<td>22</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>PCF score (Mean)</td>
<td>2.69</td>
<td>2.64</td>
<td>2.65</td>
<td>2.66</td>
<td>2.61</td>
<td>2.74</td>
<td>2.96</td>
</tr>
</tbody>
</table>
### Table 3

*PCF Score of Physicians by Specialty*

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Primary Care</th>
<th>Surgical Hospital Medicine</th>
<th>Medicine</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>251</td>
<td>140</td>
<td>34</td>
<td>627</td>
</tr>
<tr>
<td>PCF score (Mean)</td>
<td>2.70</td>
<td>2.61</td>
<td>2.62</td>
<td>2.66</td>
</tr>
</tbody>
</table>

Figures 10, 11, and 12 presents the results of the physician’s self-rated perceived level of vigor, dedication, absorption dimensions of work engagement constructs. The median level for vigor and dedication was “average,” while the median level for absorption was “high.” For the overall work engagement, the median response level was “average” (see figure 13). Therefore, on average, there was an average vigor, dedication levels, and high absorption level, with the overall work engagement being average.

**Figure 10**

*Histogram of the Distribution of Vigor Subscore*
Figure 11

*Histogram of the Distribution of Dedication Subscore*

![Histogram of Dedication Subscore](image1)

Figure 12

*Histogram of the Absorption Subscore*

![Histogram of Absorption Subscore](image2)
Figures 14, 15, and 16 show respondents' answers to one question each from each work engagement construct. Measuring vigor: “At my work, I feel bursting with energy,” 44% of respondents indicated that they have high levels of energy performing their job while 20% answered ‘rarely’ In the dedication dimension of work engagement, for the question “My job inspires me,’ 65% of respondents indicated that they are inspired by what they did as a physician, while 10% were not. Finally, a question from the absorption construct, “I am proud of the work that I do,” 91% indicated that they take pride in what they do as physicians, while 1% do not.
Figure 14

Respondents' Collective Response on a Vigor Dimension Question

Figure 15

Respondents’ Collective Response on a Dedication Dimension Question
Furthermore, when vigor, dedication, and absorption scores were measured by practice setting, all scored were similar and average across all locations. See table 4. When work engagement and its dimensions were measured by medical specialty as grouped into the following categories: primary care, surgical, hospital medicine, medicine, and other, the hospitalists, although scored average in engagement scores across all dimensions, scored lower consistently in all off the constructs compared to other specialties (See table 5). Table 6 shows that work engagement and dimensions: vigor, dedication, and absorption scores increased with age group, starting 46-55. Furthermore, in the same dimensions, mean scores increased with years of experience beginning from 11-20 years group (See table 7). Tables 7 and 8 show that mean work engagement scores were lower in female physicians and higher in married physicians.
### Table 4

**Work Engagement Score of Physicians by Practice Setting (N=1100)**

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Hospital</th>
<th>Health System-Owned Medical Group</th>
<th>Physician-Owned Medical Group</th>
<th>Government Facilities</th>
<th>HMO/PPO</th>
<th>Academic Medical Center</th>
<th>FQHC</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>389</td>
<td>435</td>
<td>160</td>
<td>37</td>
<td>22</td>
<td>33</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Vigor</td>
<td>3.79</td>
<td>3.68</td>
<td>3.57</td>
<td>4.02</td>
<td>3.85</td>
<td>3.93</td>
<td>4.43</td>
<td>3.67</td>
</tr>
<tr>
<td>Dedication</td>
<td>3.99</td>
<td>3.85</td>
<td>3.81</td>
<td>4.15</td>
<td>4.18</td>
<td>4.09</td>
<td>4.24</td>
<td>4.08</td>
</tr>
<tr>
<td>Absorption</td>
<td>4.33</td>
<td>4.21</td>
<td>4.18</td>
<td>4.17</td>
<td>4.61</td>
<td>4.45</td>
<td>4.57</td>
<td>4.21</td>
</tr>
<tr>
<td>Total Work Engagement</td>
<td>4.03</td>
<td>3.92</td>
<td>3.86</td>
<td>4.11</td>
<td>4.21</td>
<td>4.15</td>
<td>4.41</td>
<td>3.99</td>
</tr>
</tbody>
</table>

### Table 5

**Work Engagement Score of Physicians by Specialty (N=1100)**

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Primary Care</th>
<th>Surgical</th>
<th>Hospital Medicine</th>
<th>Medicine</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>251</td>
<td>140</td>
<td>34</td>
<td>627</td>
<td>38</td>
</tr>
<tr>
<td>Vigor</td>
<td>3.77</td>
<td>3.83</td>
<td>3.41</td>
<td>3.71</td>
<td>3.61</td>
</tr>
<tr>
<td>Dedication</td>
<td>3.87</td>
<td>4.16</td>
<td>3.41</td>
<td>3.91</td>
<td>3.97</td>
</tr>
<tr>
<td>Absorption</td>
<td>4.23</td>
<td>4.37</td>
<td>4.09</td>
<td>4.26</td>
<td>4.22</td>
</tr>
<tr>
<td>Total Work Engagement</td>
<td>3.96</td>
<td>4.12</td>
<td>3.64</td>
<td>3.96</td>
<td>3.93</td>
</tr>
</tbody>
</table>
### Table 6

*Work Engagement Score of Physicians by Age Group (N=1100)*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>Work Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 or under</td>
<td>3.7135</td>
<td>3.7188</td>
<td>4.1667</td>
<td>3.8663</td>
</tr>
<tr>
<td>36-45</td>
<td>3.6146</td>
<td>3.7558</td>
<td>4.2049</td>
<td>3.8584</td>
</tr>
<tr>
<td>46-55</td>
<td>3.6695</td>
<td>3.8218</td>
<td>4.1667</td>
<td>3.9195</td>
</tr>
<tr>
<td>56-65</td>
<td>3.7834</td>
<td>4.0561</td>
<td>4.2862</td>
<td>4.0419</td>
</tr>
<tr>
<td>66-75</td>
<td>3.9457</td>
<td>4.3049</td>
<td>4.4186</td>
<td>4.2231</td>
</tr>
<tr>
<td>76 or over</td>
<td>3.9615</td>
<td>4.2821</td>
<td>4.3974</td>
<td>4.2137</td>
</tr>
</tbody>
</table>

### Table 7

*Work Engagement Score of Physicians by Years of Experience (N=1100)*

<table>
<thead>
<tr>
<th>Experience</th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>Work Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>3.6891</td>
<td>3.7596</td>
<td>4.2821</td>
<td>3.9103</td>
</tr>
<tr>
<td>6-10</td>
<td>3.5955</td>
<td>3.6910</td>
<td>4.1311</td>
<td>3.8059</td>
</tr>
<tr>
<td>11-20</td>
<td>3.6480</td>
<td>3.8053</td>
<td>4.2693</td>
<td>3.9076</td>
</tr>
<tr>
<td>21-30</td>
<td>3.7135</td>
<td>3.9532</td>
<td>4.2534</td>
<td>3.9734</td>
</tr>
<tr>
<td>31+</td>
<td>3.9251</td>
<td>4.2101</td>
<td>4.3539</td>
<td>4.1630</td>
</tr>
</tbody>
</table>

### Table 8

*Work Engagement Score by Gender (N=1100)*

<table>
<thead>
<tr>
<th>Vigor score</th>
<th>Gender</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>3.642</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.787</td>
</tr>
<tr>
<td>Score Type</td>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Dedication score</td>
<td>Female</td>
<td>3.803</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.001</td>
</tr>
<tr>
<td>Absorption score</td>
<td>Female</td>
<td>4.245</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.278</td>
</tr>
<tr>
<td>Total Work Engagement</td>
<td>Female</td>
<td>3.897</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.022</td>
</tr>
</tbody>
</table>

**Table 9**

*Work Engagement Score by Marital Status (N=1100)*

<table>
<thead>
<tr>
<th>Score Type</th>
<th>Marital Status</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigor score</td>
<td>Married</td>
<td>3.761</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>3.592</td>
</tr>
<tr>
<td>Dedication score</td>
<td>Married</td>
<td>3.954</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>3.786</td>
</tr>
<tr>
<td>Absorption score</td>
<td>Married</td>
<td>4.268</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>4.252</td>
</tr>
<tr>
<td>Total Work Engagement</td>
<td>Married</td>
<td>3.994</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>3.877</td>
</tr>
</tbody>
</table>

Reliability of work engagement and psychological contract fulfillment (PCF) scales were assessed using Cronbach’s alpha. The Cronbach’s alpha measure for the PCF scale was 0.667. The alpha value was less than the recommended cut-off of 0.70 by Nunnally (1967); however, no improvement in the alpha value was possible with the exclusion of any of the items in the PCF scale. According to Hinton et al.’s (2004) guide for appropriate alpha cut-off point, an alpha of 0.677 shows moderate reliability.
Correlations of the Variables

Questions 3, 4, and 5, and their corresponding hypothesis, were analyzed using the Spearman Rho rank correlation. Figure 17 is a scatter plot between the vigor level and PCF scores. The scatter plot shows some positive trend of association between vigor level and PCF scores. Spearman’s correlation coefficient was used to assess the significance of the association between the vigor level and PCF score. Results of the Spearman’s correlation indicates that there is a significant positive correlation between vigor level and PCF ($r = 0.439$, $n = 1100$, $p < .001$). Therefore, hypothesis H3o is rejected, and hypothesis H3a is supported.

Figure 17

Scatter Plot of Vigor Level and Psychological Contract Fulfillment Scores

Figure 18 is a scatter plot of dedication level and PCF score showing a possible positive association. Spearman’s correlation coefficient was used to assess the significance of the association between dedication level and PCF score. Results of the Spearman’s correlation showed that there is a significant positive correlation between dedication level and PCF ($r =$...
.458, n = 1100, p < .001). Therefore, hypothesis H4o is rejected, and hypothesis H4a is supported.

**Figure 18**

*Scatter plot of dedication level and psychological contract fulfilment*

**Figure 19**

*Scatter Plot of Absorption Level and Psychological Contract Fulfilment*
Figure 19 is a scatter plot of Absorption level and PCF scores, showing a positive correlation. Spearman’s correlation coefficient was used to assess the significance of the association between Absorption level and PCF score. Results of the Spearman’s correlation indicates that there is a significant positive correlation between Absorption level and PCF (r = .300, n = 1100, p < .001). Therefore, hypothesis H5o is rejected, and hypothesis H5a is supported. The correlation matrix (Table 10) shows that hypothesis H3a, 4a, and 5a is supported.

Table 10

*Spearman Rho’s Correlations of Study Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>Work Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCF</td>
<td>r</td>
<td>.439**</td>
<td>.458**</td>
<td>.300**</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Vigor</td>
<td>r</td>
<td>--</td>
<td>.822**</td>
<td>.570**</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Dedication</td>
<td>r</td>
<td>--</td>
<td>.624**</td>
<td>.936**</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Absorption</td>
<td>r</td>
<td>--</td>
<td></td>
<td>.792**</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Engagement</td>
<td>r</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. **-Correlation is significant at the .001 level (2-tailed)
The following questions are items from the psychological contract survey. When asked the question, “to what extent has your organization met your expectations?” 55.8% indicate considerable to extremely while 44.2 answered not at all (5.9%) and somewhat (35.7%). See figure 20. In the married category, more female physicians (48%) indicated that their expectations were ‘not at all (4.9%) and somewhat (43.1%) met compared to the male (43%). Furthermore, more single female physicians (54%) compared to single male (48%) reported that their expectations were ‘not at all (10.3%) and somewhat (43.9%) met. See table 12. For the rest of the questions, see Appendix G for more details.

Figure 20

A bar chart representation of collective response to a question about met expectations
When asked the question, “*how much of a concern to you is the income on this job?*” 80% of respondents indicated that they were concerned. 52% of the 80 were very concerned. Only 20% of respondents were happy with their income. Furthermore, when asked, “*how much of a concern to you is job security?*” 68% were concerned, and of the 68%, 50% were very concerned. Concerning respondent’s interaction with a supervisor or an official of the HCO with decision authority over the respondent, when asked the question, “*how much of a reward to you is your supervisor’s respect for your ability?*” 72% indicated it was a benefit. Again, when asked, “*how much of a reward to you is having your supervisor pay attention to what you say?*” 70% indicated that it was rewarding and when asked “*how much of a reward to you is your supervisor’s concern about the welfare of those under them?*” 60% said it was beneficial to them. In the area of authority or autonomy or decision making, when asked the question, “*how much of a reward to you is having the authority needed to get the job done?*” 82% replied extremely beneficial. Also, when asked, “*how much of a concern to you is having to do things against your better judgment?*” 80% of respondents replied concerned, of which 39% said extremely concerned. Finally, when asked the question, “*how much of a concern to you is not
“being able to do your job because of red tape?” 90% replied red tape is a concern (See Appendix G).

**Ordinal Logistic Regression and Generalized Linear Model (GELM)**

Ordinal logistic regression was used to analyze questions 6, 7, and 8 and their corresponding hypotheses. The effect of psychological contract fulfillment (PCF) on work engagement was tested using ordinal logistic regression adjusting for age, gender, marital status, weekly working hours, years of work experience, practice setting, and respondent practice type, classified into primary care, surgical, medicine, hospitalist, and other categories. The ordinal logistic regression model assumes that the dependent variable is ordinal, and the independent variables are continuous or categorical. The dependent variable (work engagement level) is an ordinal variable ranging from very low, low, average, high, and very high categories. Furthermore, PCF score is treated as an interval scale variable; age and weekly hours are continuous variables while gender, marital status, years of work experience, practice setting, and practice type are categorical control variables. Therefore, the assumption of ordinal logistic regression in terms of measurement level of variables is satisfied.

The ordinal logistic regression also assumes proportionality of odds assumption. This assumption was tested using a full likelihood ratio test comparing the fitted location model to a model with varying location parameters. The full likelihood ratio test results indicate that the assumption of proportionality of odds was not satisfied ($\chi^2 = 93.557, p < .001$). Therefore, an alternative model of generalized linear model based on ordered logit link for the response variable was used to test the effect of PCF on work engagement level. The generalized linear model (GELM), while retaining all the ordered logistic regression elements, gives unbiased, consistent, and efficient estimates of model effects relaxing the proportionality of odds.
assumption. The significance of effects included in GELM was tested using the Wald Chi-square test.

Table 12 presents the estimates of the model effects and tests for their significance using a generalized linear model based on ordered logit link function for the response variable, specifically testing the effect of PCF score on the overall work engagement level of physicians, adjusting for age, gender, marital status, weekly hours, practice setting, practice type and years of work experience. The overall model was statistically significant (LR $\chi^2 (20) = 183.772, p < .001$). Results of Wald’s Chi-square test indicate that age, gender, marital status, years of work experience, practice type, and practice setting did not have a significant effect on work engagement level ($p \geq .05$).

The effect of PCF on work engagement level was found to be statistically significant (Wald $\chi^2 (1) = 129.975, p < .001$). Specifically, the estimated logit coefficient for PCF was 1.959, and the associated odds ratio was OR = 7.09. This indicates that if the physician were to increase the PCF score by one point, his / her log-odds (odds ratio = 7.09) of being in a higher level of work engagement would increase by 1.889, adjusting for age, gender, marital status, work experience, practice setting, weekly hours, and practice type. Furthermore, this effect of PCF score adjusting for age, gender, marital status, weekly hours, practice setting, practice type, and work experience was statistically significant and positive ($b_1 = 1.959, OR = 7.09, 95\% CI$ for OR: 5.06 – 9.93, $\chi^2 (1) = 129.975, p < .001$). Therefore, it may be inferred that psychological contract fulfilment has a significant effect on overall work engagement.

Additionally, the effect of weekly hours on work engagement was found to be positive and statistically significant (Wald $\chi^2 (1) = 16.105, p < .001$). Specifically, the estimated logit coefficient for weekly hours was 0.017, and the associated odds ratio was OR = 1.02. This
indicates that an increase of one hour in weekly hours is associated with an increase of 2% in the physician's odds being in a higher work engagement level. Furthermore, this effect of weekly hours was statistically significant ($b = 0.017$, OR = 1.02, 95% CI for OR: $1.01 - 1.03$, $\chi^2 (1) = 16.105$, $p < .001$).

**Table 12**

*Generalized Linear Model Effect of PCF on Self-Rated Work Engagement*

<table>
<thead>
<tr>
<th>Threshold</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>Wald</th>
<th>P</th>
<th>95% CI of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Work engagement level = very low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Work engagement level = low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Work engagement level = average]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Work engagement level = high]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Gender= Female]</td>
<td>0.016</td>
<td>0.136</td>
<td>1.02</td>
<td>0.013</td>
<td>0.909</td>
<td>0.78 - 1.33</td>
</tr>
<tr>
<td>[Gender=Male]</td>
<td>0(^a)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>[Marital status = Married]</td>
<td>0.157</td>
<td>0.165</td>
<td>1.17</td>
<td>0.909</td>
<td>0.34</td>
<td>0.85 - 1.62</td>
</tr>
<tr>
<td>[Marital status = Single]</td>
<td>0(^a)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>[Years of experience = 1 - 5]</td>
<td>0.314</td>
<td>0.468</td>
<td>1.37</td>
<td>0.45</td>
<td>0.502</td>
<td>0.55 - 3.43</td>
</tr>
<tr>
<td>[Years of experience = 6 - 10]</td>
<td>-0.084</td>
<td>0.4</td>
<td>0.92</td>
<td>0.044</td>
<td>0.834</td>
<td>0.42 - 2.01</td>
</tr>
<tr>
<td>[Years of experience = 11 - 20]</td>
<td>0.398</td>
<td>0.313</td>
<td>1.49</td>
<td>1.615</td>
<td>0.204</td>
<td>0.81 - 2.75</td>
</tr>
<tr>
<td>[Years of experience = 21 - 30]</td>
<td>-0.18</td>
<td>0.213</td>
<td>0.84</td>
<td>0.709</td>
<td>0.4</td>
<td>0.55 - 1.27</td>
</tr>
<tr>
<td>[Years of experience = 31+]</td>
<td>0(^a)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Specialty = Primary Care</td>
<td>0.259</td>
<td>0.356</td>
<td>1.30</td>
<td>0.526</td>
<td>0.468</td>
<td>0.64</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Specialty = Surgical</td>
<td>0.416</td>
<td>0.378</td>
<td>1.52</td>
<td>1.21</td>
<td>0.271</td>
<td>0.72</td>
</tr>
<tr>
<td>Specialty = Hospitalist</td>
<td>0.228</td>
<td>0.487</td>
<td>1.26</td>
<td>0.219</td>
<td>0.64</td>
<td>0.48</td>
</tr>
<tr>
<td>Specialty = Medical</td>
<td>0.2</td>
<td>0.344</td>
<td>1.22</td>
<td>0.34</td>
<td>0.56</td>
<td>0.62</td>
</tr>
<tr>
<td>Specialty = Other</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Practice setting = Hospital</td>
<td>-0.415</td>
<td>0.5</td>
<td>0.66</td>
<td>0.689</td>
<td>0.407</td>
<td>0.25</td>
</tr>
<tr>
<td>Practice setting = Health system / medical group practice</td>
<td>-0.788</td>
<td>0.5</td>
<td>0.45</td>
<td>2.485</td>
<td>0.115</td>
<td>0.17</td>
</tr>
<tr>
<td>Practice setting = Physician owned medicine group practice</td>
<td>-0.941</td>
<td>0.518</td>
<td>0.39</td>
<td>3.306</td>
<td>0.069</td>
<td>0.14</td>
</tr>
<tr>
<td>Practice setting = Government facilities</td>
<td>-0.789</td>
<td>0.595</td>
<td>0.45</td>
<td>1.76</td>
<td>0.185</td>
<td>0.14</td>
</tr>
<tr>
<td>Practice setting = HMO / PPO organization</td>
<td>0.258</td>
<td>0.648</td>
<td>1.29</td>
<td>0.159</td>
<td>0.69</td>
<td>0.36</td>
</tr>
<tr>
<td>Practice setting = Academic medical center</td>
<td>-0.185</td>
<td>0.596</td>
<td>0.83</td>
<td>0.096</td>
<td>0.757</td>
<td>0.26</td>
</tr>
<tr>
<td>Practice setting = Federally qualified medical center</td>
<td>-0.75</td>
<td>0.888</td>
<td>0.47</td>
<td>0.713</td>
<td>0.398</td>
<td>0.08</td>
</tr>
<tr>
<td>Practice setting = Others</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

*Note. SE = standard error, B = log odds coefficient, OR = odds ratio, <sup>a</sup>this parameter is set to zero as it is used as a reference category.*

**Threshold values indicate cut-off points of the latent logit link function, which are not part of the interpretation of the effect of the predictor variables in the model.**

The effect of psychological contract fulfillment (PCF) on work engagement's vigor level dimension was tested using ordinal logistic regression adjusting for age, gender, marital status, years of work experience, weekly hours, specialty, and practice setting. The ordinal logistic
regression model assumes that the dependent variable is ordinal, and the independent variables are continuous or categorical. The dependent variable (vigor level) is an ordinal variable ranging from very low, low, average, high, and very high categories. Furthermore, PCF score is treated as an interval scale variable; age and weekly hours are continuous variables while gender, marital status, years of work experience, practice setting, and practice type are categorical control variables. Therefore, the assumption of ordinal logistic regression in terms of measurement level of variables is satisfied.

The ordinal logistic regression also assumes proportionality of odds assumption. This assumption was tested using a full likelihood ratio test comparing the fitted location model to a model with varying location parameters. The full likelihood ratio test indicates that the assumption of proportionality of odds was satisfied ($\chi^2 (60) = 25.883, p = .999$). The ordinal logistic regression model assumes no severe multicollinearity, which is the problem of positively correlated independent variables. To assess the severity of multicollinearity, variance inflation factor (VIF) measure was used. To extract the VIF for each independent variable, the numerical score of work engagement was used as the dependent variable, and all the categorical variables (gender, marital status, years of work experience) were used in the model as dummy variables ($k-1$ dummy variables for a categorical variable with $k$ categories). For satisfactory evidence for no severe multicollinearity, the VIF for each variable in the model must be less than 10.0 (Haier et al. (2010)). The VIF value across all the predictors in the model ranged between 1.018 and 6.142, with a mean VIF of 3.361. This indicates that there is no severe multicollinearity adversely affecting the model effect estimates and their test.

Table 13 presents the estimates of the model effects and tests for their significance using ordinal logistic regression model, specifically testing the effect of PCF score on self-rated vigor.
level of physicians, adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting and practice type. Wald’s Chi-square test indicated that age, gender, marital status, years of work experience, weekly hours, practice setting, and practice type did not have a significant effect on work engagement score \((p \geq .05)\). The overall model was statistically significant \(\chi^2 \ (20) = 275.725, p < .001\). The Nagelkerke R squared value was 0.244, and McFadden R squared measure was 0.101. The estimated logit coefficient for PCF was 2.546, and the associated odds ratio was \(OR = 12.756\). This indicates that if the physician were to increase the PCF score by one point, his / her odds of being in a higher level of self-rated vigor would increase \(12.756\) times adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting and practice type. The effect of PCF score on self-rated vigor level adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting, and practice type was statistically significant and positive \((b1 = 2.546, OR = 12.756, 95\% \ CI \ for \ OR: \ 9.12 - 17.85, \ \chi^2 \ (1) = 220.19, p < .001)\). Therefore, hypothesis H6o is rejected, and hypothesis H6a is supported.

**Table 13**

**Ordinal Logistic Regression Model Effect of PCF on Self-Rated Vigor Level**

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Estimate</th>
<th>SE</th>
<th>OR</th>
<th>Wald</th>
<th>P</th>
<th>95% CI of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Vigor level = very low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Vigor level = low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Vigor level = average]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Vigor level = high]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.009</td>
<td>0.012</td>
<td>1.009</td>
<td>0.558</td>
<td>0.455</td>
<td>0.99 - 1.03</td>
</tr>
<tr>
<td>Weekly hours</td>
<td>0.008</td>
<td>0.004</td>
<td>1.008</td>
<td>3.571</td>
<td>0.059</td>
<td>1.00 - 1.02</td>
</tr>
<tr>
<td>PCF</td>
<td>2.546</td>
<td>0.172</td>
<td>12.756</td>
<td>220.19</td>
<td>&lt;.001</td>
<td>9.12 - 17.85</td>
</tr>
<tr>
<td>[Gender= Female]</td>
<td>-0.151</td>
<td>0.129</td>
<td>0.860</td>
<td>1.369</td>
<td>0.242</td>
<td>0.67 - 1.11</td>
</tr>
<tr>
<td></td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.155</td>
<td>1.168</td>
<td>2.877</td>
<td>0.09</td>
<td>0.96</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>[Marital status = Married]</td>
<td>0.264</td>
<td>0.155</td>
<td>1.168</td>
<td>2.877</td>
<td>0.09</td>
<td>0.96</td>
</tr>
<tr>
<td>[Marital status = Single]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>[Years of experience = 1 - 5]</td>
<td>0.154</td>
<td>0.445</td>
<td>1.166</td>
<td>0.12</td>
<td>0.73</td>
<td>0.49</td>
</tr>
<tr>
<td>[Years of experience = 6 - 10]</td>
<td>-0.167</td>
<td>0.38</td>
<td>0.846</td>
<td>0.193</td>
<td>0.66</td>
<td>0.40</td>
</tr>
<tr>
<td>[Years of experience = 11 - 20]</td>
<td>-0.056</td>
<td>0.299</td>
<td>0.946</td>
<td>0.035</td>
<td>0.852</td>
<td>0.53</td>
</tr>
<tr>
<td>[Years of experience = 21 - 30]</td>
<td>-0.347</td>
<td>0.204</td>
<td>0.707</td>
<td>2.908</td>
<td>0.088</td>
<td>0.47</td>
</tr>
<tr>
<td>[Years of experience = 31+]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>[Specialty = Primary Care]</td>
<td>0.264</td>
<td>0.336</td>
<td>1.302</td>
<td>0.618</td>
<td>0.432</td>
<td>0.67</td>
</tr>
<tr>
<td>[Specialty = Surgical]</td>
<td>0.564</td>
<td>0.357</td>
<td>1.758</td>
<td>2.489</td>
<td>0.115</td>
<td>0.87</td>
</tr>
<tr>
<td>[Specialty = Hospitalist]</td>
<td>-0.265</td>
<td>0.455</td>
<td>0.767</td>
<td>0.34</td>
<td>0.56</td>
<td>0.31</td>
</tr>
<tr>
<td>[Specialty = Medical]</td>
<td>0.282</td>
<td>0.323</td>
<td>1.326</td>
<td>0.76</td>
<td>0.383</td>
<td>0.70</td>
</tr>
<tr>
<td>[Specialty = Other]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>[Practice setting = Hospital]</td>
<td>0.616</td>
<td>0.49</td>
<td>1.852</td>
<td>1.58</td>
<td>0.209</td>
<td>0.71</td>
</tr>
<tr>
<td>[Practice setting = Health system / medical group practice]</td>
<td>0.518</td>
<td>0.488</td>
<td>1.679</td>
<td>1.125</td>
<td>0.289</td>
<td>0.64</td>
</tr>
<tr>
<td>[Practice setting = Physician owned medicine group practice]</td>
<td>0.352</td>
<td>0.504</td>
<td>1.422</td>
<td>0.488</td>
<td>0.485</td>
<td>0.53</td>
</tr>
<tr>
<td>[Practice setting = Government facilities]</td>
<td>1.088</td>
<td>0.575</td>
<td>2.968</td>
<td>3.58</td>
<td>0.058</td>
<td>0.96</td>
</tr>
<tr>
<td>[Practice setting = HMO / PPO organization]</td>
<td>0.503</td>
<td>0.64</td>
<td>1.654</td>
<td>0.617</td>
<td>0.432</td>
<td>0.47</td>
</tr>
<tr>
<td>Practice setting</td>
<td>0.84</td>
<td>0.586</td>
<td>2.316</td>
<td>2.056</td>
<td>0.152</td>
<td>0.73</td>
</tr>
<tr>
<td>----------------------------------</td>
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<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Practice setting = Federally</td>
<td>1.013</td>
<td>0.868</td>
<td>2.754</td>
<td>1.365</td>
<td>0.243</td>
<td>0.50</td>
</tr>
<tr>
<td>qualified medical center</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice setting = Others</td>
<td>0(^a)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

Note. SE = standard error, B = log odds coefficient, OR = odds ratio, \(a\)=this parameter is set to zero as it is used as a reference category.

**Threshold values indicate cut-off points of the latent logit link function, which are not part of the interpretation of the effect of the predictor variables in the model.

The effect of psychological contract fulfillment (PCF) on dedication level was tested using ordinal logistic regression adjusting for age, gender, years of work experience, weekly hours, practice setting, and practice type. The ordinal logistic regression model assumes that the dependent variable is ordinal and independent variables are continuous or categorical. The dependent variable (dedication level) is an ordinal variable ranging from very low, low, average, high, and very high categories. Furthermore, PCF score is treated as an interval scale variable; age and weekly hours are continuous variables while gender, years of work experience, practice setting, and practice type are categorical control variables. Therefore, the assumption of ordinal logistic regression in terms of measurement level of variables is satisfied. The ordinal logistic regression also assumes proportionality of odds assumption. This assumption was tested using a full likelihood ratio test comparing the fitted location model to a model with varying location parameters. Results of the full likelihood ratio test indicate that the assumption of proportionality of odds was not satisfied (\(\chi^2 (60) = 99.047, p < .001\)). Therefore, an alternative model of generalized linear model based on ordered logit link for the response variable was used to test the effect of PCF on self-rated dedication level.
Table 14 presents the estimates of model effects and tests for their significance using a generalized linear model based on ordered logistic link function, specifically testing the effect of PCF score on self-rated dedication level of physicians, adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting and practice type. The overall model was statistically significant (LR $\chi^2 (20) = 231.545, p < .001$). Age, gender, years of work experience, marital status, practice setting, and practice type did not have a significant effect on the dedication level dimension of work engagement score ($p \geq .05$). PCF showed a significant effect on the dedication level dimension of work engagement, the estimated logit coefficient for PCF was 2.235, and the associated odds ratio was OR = 9.346. This indicates that if the physician were to increase the PCF score by one point, his / her odds of being in a higher level of self-rated dedication would increase by 9.346 times, adjusting for age, gender, marital status, work experience, weekly hours, practice setting and practice type. Furthermore, this effect of PCF score on dedication level adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting, and practice type was statistically significant and positive ($b_1 = 2.235, OR = 9.346, Wald \chi^2 (1) = 164.892, p < .001$). Therefore, hypothesis H7o is rejected, and hypothesis H7a is supported.

Additionally, the effect of weekly hours on the dedication level dimension of the work engagement construct was found to be positive and statistically significant (Wald $\chi^2 (1) = 14.649, p < .001$). Specifically, the estimated logit coefficient for weekly hours was 0.016, and the associated odds ratio was OR = 1.016. This indicates that if the weekly hours of the respondent were to increase by one hour, his / her odds of being in a higher level of work engagement would increase by 1.6%, adjusting for age, gender, marital status, work experience, practice setting, weekly hours, and practice type. Furthermore, this effect of weekly hours on dedication level
dimension of work engagement was statistically significant and positive ($b = 0.016$, $OR = 1.016$, 95% CI for OR: $1.008 – 1.025$, $\chi^2 (1) = 14.649$, $p < .001$).

**Table 14**

*Generalized Linear Model Effect of PCF on Self-Rated Dedication Level*

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Estimate</th>
<th>SE</th>
<th>OR</th>
<th>Wald</th>
<th>P</th>
<th>95% CI of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Dedication level = very low]</td>
<td>**</td>
<td></td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Dedication level = low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Dedication level = average]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Dedication level = high]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Location**

<table>
<thead>
<tr>
<th>Age</th>
<th>0.024</th>
<th>0.012</th>
<th>1.024</th>
<th>3.988</th>
<th>0.050</th>
<th>0.999</th>
<th>1.049</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly hours</td>
<td>0.016</td>
<td>0.004</td>
<td>1.016</td>
<td>14.649</td>
<td>&lt;.001</td>
<td>1.008</td>
<td>1.025</td>
</tr>
<tr>
<td>PCF</td>
<td>2.235</td>
<td>0.174</td>
<td>9.346</td>
<td>164.892</td>
<td>&lt;.001</td>
<td>6.639</td>
<td>13.144</td>
</tr>
<tr>
<td>[Gender=Female]</td>
<td>-0.228</td>
<td>0.136</td>
<td>0.796</td>
<td>2.833</td>
<td>0.092</td>
<td>0.610</td>
<td>1.039</td>
</tr>
<tr>
<td>[Gender=Male]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Marital status = Married]</td>
<td>0.108</td>
<td>0.163</td>
<td>1.114</td>
<td>0.436</td>
<td>0.509</td>
<td>0.809</td>
<td>1.533</td>
</tr>
<tr>
<td>[Marital status = Single]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Years of experience = 1 - 5]</td>
<td>0.241</td>
<td>0.466</td>
<td>1.273</td>
<td>0.267</td>
<td>0.605</td>
<td>0.511</td>
<td>3.171</td>
</tr>
<tr>
<td>[Years of experience = 6 - 10]</td>
<td>-0.259</td>
<td>0.397</td>
<td>0.772</td>
<td>0.425</td>
<td>0.514</td>
<td>0.354</td>
<td>1.682</td>
</tr>
<tr>
<td>[Years of experience = 11 - 20]</td>
<td>0.042</td>
<td>0.312</td>
<td>1.043</td>
<td>0.018</td>
<td>0.892</td>
<td>0.566</td>
<td>1.923</td>
</tr>
<tr>
<td>[Years of experience = 21 - 30]</td>
<td>-0.242</td>
<td>0.212</td>
<td>0.785</td>
<td>1.304</td>
<td>0.253</td>
<td>0.518</td>
<td>1.190</td>
</tr>
<tr>
<td>[Years of experience = 31+]</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Specialty = Primary Care]</td>
<td>-0.107</td>
<td>0.351</td>
<td>0.899</td>
<td>0.092</td>
<td>0.761</td>
<td>0.451</td>
<td>1.790</td>
</tr>
</tbody>
</table>
The effect of psychological contract fulfillment (PCF) on absorption level was tested using ordinal logistic regression adjusting for age, gender, years of work experience, weekly hours, practice setting, and practice type. The ordinal logistic regression model assumes that the dependent variable is ordinal and independent variables are continuous or categorical. The
dependent variable (absorption level) is an ordinal variable ranging from very low, low, average, high, and very high categories. Furthermore, PCF score is treated as an interval scale variable; age and weekly hours are continuous variables while gender, marital status, years of work experience, practice setting, and practice type are categorical control variables. Therefore, the assumption of ordinal logistic regression in terms of measurement level of variables is satisfied. The ordinal logistic regression also assumes proportionality of odds assumption. This assumption was tested using a full likelihood ratio test comparing the fitted location model to a model with varying location parameters. Results of the full likelihood ratio test indicate that the assumption of proportionality of odds was not satisfied ($\chi^2 (60) = 133.671, p < .001$). Therefore, an alternative model of generalized linear model based on ordered logit link for the response variable was used to test the effect of PCF on absorption level.

Table 15 presents estimates of model effects and tests for their significance using a generalized linear model based on ordered logit link function for the response variable, specifically testing the effect of PCF score on self-rated absorption level of physicians, adjusting for age, gender, marital status, work experience, weekly hours, practice setting and practice type. Gender, marital status, practice setting, and practice type did not have a significant effect on self-rated absorption ($p \geq .05$). The overall constructed model was statistically significant ($LR \chi^2 (20) = 127.327, p < .001$). The PCF variable indicated a significant effect on the absorption level dimension of work engagement. The estimated logit coefficient for PCF was 1.419, and the associated odds ratio was OR = 4.133. This indicates that if the physician were to increase the PCF score by one point, his / her ordered odds of being in a higher level of self-rated absorption would increase 4.133 times, adjusting for age, gender, marital status, years of work experience, weekly hours, practice setting and practice type. Furthermore, this effect of PCF score on
absorption level was statistically significant and positive ($bI = 1.419$, OR = 4.133, Wald $\chi^2 (1) = 78.798$, $p < .001$). Therefore, hypothesis $H_{80}$ is rejected, and hypothesis $H_{8a}$ is supported.

Additionally, the effect of weekly hours on the absorption level dimension of the work engagement construct was found to be positive and statistically significant (Wald $\chi^2 (1) = 25.884$, $p < .001$). Specifically, the estimated logit coefficient for weekly hours was 0.021, and the associated odds ratio was OR = 1.021. This indicates that if the respondent's weekly hours were to increase by one hour, their odds of being in a higher level of work engagement would increase by 2.1%, adjusting for age, gender, marital status, work experience, practice setting, weekly hours, and practice type. Furthermore, this effect of weekly hours on absorption level dimension of work engagement was statistically significant and positive ($b = 0.021$, OR = 1.021, 95% CI for OR: 1.01 – 1.03, $\chi^2 (1) = 25.884$, $p < .001$).

The effect of age of the respondent on absorption level dimension of work engagement construct was found to be positive and statistically significant (Wald $\chi^2 (1) = 7.37$, $p = .007$). Specifically, the estimated logit coefficient for age was 0.031, and the associated odds ratio was OR = 1.031. This indicates that if the age of the respondent were to increase by one year, his / her odds of being in a higher level of work engagement would increase by 3.1%, adjusting for age, gender, marital status, work experience, practice setting, weekly hours and practice type. Furthermore, this effect of age on absorption level dimension of work engagement was statistically significant and positive ($b = 0.031$, OR = 1.031, 95% CI for OR: 1.01 – 1.06, $\chi^2 (1) = 7.37$, $p = .007$).

The effect of years of work experience on the absorption level dimension of the work engagement construct was found to be statistically significant. Specifically, the odds of being in a higher absorption level for those with 11 – 20 years of experience is 2.28 times higher than the
corresponding odds for those with experience of 31 or more years \((b = 0.824, \text{OR} = 2.280, 95\% \text{ CI for OR: } 1.28 – 4.07, \chi^2 (1) = 7.747, p = .005)\).

**Table 15**

*Generalized Linear Model Effect of PCF on Self-Rated Absorption Level*

<table>
<thead>
<tr>
<th>Threshold</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>Wald</th>
<th>P</th>
<th>95% CI of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Absorption level = very low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Absorption level = low]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Absorption level = average]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Absorption level = high]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>Wald</th>
<th>P</th>
<th>95% CI of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.031</td>
<td>0.011</td>
<td>1.031</td>
<td>7.37</td>
<td>0.007</td>
<td>1.01 – 1.06</td>
</tr>
<tr>
<td>Weekly hours</td>
<td>0.021</td>
<td>0.004</td>
<td>1.021</td>
<td>25.88</td>
<td>&lt;0.01</td>
<td>1.01 – 1.03</td>
</tr>
<tr>
<td>PCF</td>
<td>1.419</td>
<td>0.16</td>
<td>4.133</td>
<td>78.79</td>
<td>&lt;0.01</td>
<td>3.02 – 5.65</td>
</tr>
<tr>
<td>[Gender= Female]</td>
<td>0.003</td>
<td>0.128</td>
<td>1.003</td>
<td>0</td>
<td>0.983</td>
<td>0.78 – 1.29</td>
</tr>
<tr>
<td>[Gender= Male]</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>[Marital status = Married]</td>
<td>0.007</td>
<td>0.155</td>
<td>1.007</td>
<td>0.002</td>
<td>0.964</td>
<td>0.74 – 1.36</td>
</tr>
<tr>
<td>[Marital status = Single]</td>
<td>0^a</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>[Years of experience = 1 - 5]</td>
<td>0.766</td>
<td>0.44</td>
<td>2.151</td>
<td>3.025</td>
<td>0.082</td>
<td>0.91 – 5.10</td>
</tr>
<tr>
<td>[Years of experience = 6 - 10]</td>
<td>0.351</td>
<td>0.376</td>
<td>1.420</td>
<td>0.87</td>
<td>0.351</td>
<td>0.68 – 2.97</td>
</tr>
<tr>
<td>[Years of experience = 11 -20]</td>
<td>0.824</td>
<td>0.296</td>
<td>2.280</td>
<td>7.774</td>
<td>0.005</td>
<td>1.28 – 4.07</td>
</tr>
<tr>
<td>[Years of experience = 21 -30]</td>
<td>-0.01</td>
<td>0.201</td>
<td>0.990</td>
<td>0.003</td>
<td>0.959</td>
<td>0.67 – 1.47</td>
</tr>
<tr>
<td>[Years of experience = 31+]</td>
<td>0^a</td>
<td>.</td>
<td>.</td>
<td>.</td>
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<td>.</td>
</tr>
<tr>
<td>Specialty = Primary Care</td>
<td>0.093</td>
<td>0.334</td>
<td>1.097</td>
<td>0.077</td>
<td>0.781</td>
<td>0.57</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Specialty = Surgical</td>
<td>0.249</td>
<td>0.355</td>
<td>1.283</td>
<td>0.49</td>
<td>0.484</td>
<td>0.64</td>
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<tr>
<td>Specialty = Hospitalist</td>
<td>-0.073</td>
<td>0.458</td>
<td>0.930</td>
<td>0.026</td>
<td>0.873</td>
<td>0.38</td>
</tr>
<tr>
<td>Specialty = Medical</td>
<td>0.12</td>
<td>0.322</td>
<td>1.127</td>
<td>0.139</td>
<td>0.709</td>
<td>0.60</td>
</tr>
<tr>
<td>Specialty = Other</td>
<td>0a</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Practice setting = Hospital</td>
<td>-0.05</td>
<td>0.486</td>
<td>0.951</td>
<td>0.01</td>
<td>0.919</td>
<td>0.37</td>
</tr>
<tr>
<td>Practice setting = Health system / medical group practice</td>
<td>-0.093</td>
<td>0.485</td>
<td>0.911</td>
<td>0.037</td>
<td>0.847</td>
<td>0.35</td>
</tr>
<tr>
<td>Practice setting = Physician owned medicine group practice</td>
<td>-0.321</td>
<td>0.501</td>
<td>0.725</td>
<td>0.41</td>
<td>0.522</td>
<td>0.27</td>
</tr>
<tr>
<td>Practice setting = Government facilities</td>
<td>-0.073</td>
<td>0.57</td>
<td>0.930</td>
<td>0.017</td>
<td>0.898</td>
<td>0.30</td>
</tr>
<tr>
<td>Practice setting = HMO / PPO organization</td>
<td>0.258</td>
<td>0.632</td>
<td>1.294</td>
<td>0.167</td>
<td>0.683</td>
<td>0.38</td>
</tr>
<tr>
<td>Practice setting = Academic medical center</td>
<td>0.309</td>
<td>0.578</td>
<td>1.362</td>
<td>0.286</td>
<td>0.593</td>
<td>0.44</td>
</tr>
<tr>
<td>Practice setting = Federally qualified medical center</td>
<td>-0.054</td>
<td>0.864</td>
<td>0.947</td>
<td>0.004</td>
<td>0.95</td>
<td>0.17</td>
</tr>
<tr>
<td>Practice setting = Others</td>
<td>0a</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

Note. SE = standard error, B = log odds coefficient, OR = odds ratio, a= this parameter is set to zero as it is used as a reference category.

** Threshold values indicate cut-off points of the latent logit link function, which are not part of the interpretation of the effect of the predictor variables in the model.
Post Hoc G*Power Analysis

Figures 21 and 22 show the retrospective power analysis of the study using the obtained sample size of 1100 and effect size of 0.7 for spearman rho and 0.35 for ordinal logistic regression. The study's power was 1.000, which signified that we have the probability of correctly rejecting the null hypothesis (if false) 100% of the time. Thus, supporting that this was a high-powered study.

Figure 21

Post Hoc G*Power Analysis for Spearman Rho

Note. Post Hoc G*Power Analysis for Spearman Rho given an effect size of 0.7, an alpha level set at .05, a total sample size of 1100, the power=1.000.
Figure 22

*Post Hoc G* Power Analysis

![G*Power Analysis Graph](image)

**Note.** Post Hoc G*Power analysis with an effect size of 0.35, an alpha level set at .05, a total sample size of 1100, and the power=1.000.

**Table 16**

*Summary of Hypothesis Testing*

<table>
<thead>
<tr>
<th>Null Hypotheses</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H3o: There is no relationship between HCO-employed physicians’ perception of</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PCF and self-rated levels of vigor in the United States</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>H4o: There is no relationship between HCO-employed physicians' perception of</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PCF and self-rated levels of dedication in the United States</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>H5o: There is no relationship between HCO-employed physicians' perception of</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PCF and self-rated levels of absorption in the United States</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>H6o: HCO-employed physicians’ perception of PCF will not predict self-rated</strong></td>
<td></td>
</tr>
<tr>
<td><strong>levels of vigor, adjusting for age, weekly hour, gender, marital status, years</strong></td>
<td></td>
</tr>
<tr>
<td><strong>of experience, specialty, and practice setting.</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>H7o: HCO-employed physicians’ perception of PCF will not predict self-rated</strong></td>
<td></td>
</tr>
<tr>
<td><strong>levels of dedication, adjusting for age, weekly hour, gender, marital status,</strong></td>
<td></td>
</tr>
<tr>
<td><strong>years of experience, specialty, and practice setting.</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>H8o: HCO-employed physicians’ perception of PCF will not predict self-rated</strong></td>
<td></td>
</tr>
<tr>
<td><strong>absorption levels, adjusting for age, weekly hour, gender, marital status,</strong></td>
<td></td>
</tr>
<tr>
<td><strong>years of experience, specialty, and practice setting.</strong></td>
<td>X</td>
</tr>
</tbody>
</table>
CHAPTER 5-DISCUSSION

General Discussion

The chapter first reiterates and summarizes the study's objectives and then summarizes findings, interpretation, implications of findings, study limitations, and future research opportunities and recommendations.

The purpose of this study was threefold. First, to understand physicians' work engagement levels as health care organization (HCO) employees in the US using the Utrecht Work Engagement Scale (UWES-9), a three-dimensional construct that includes vigor, dedication, and absorption. Second, to assess physicians' perception of psychological contract fulfillment (PCF) as health care organization (HCO) employees in the US. Finally, this study's third purpose was to determine if a relationship exists between physicians' perceptions of psychological contract fulfillment (PCF) and self-rated work engagement and test the effect in HCO-employed physicians in the US.

Summary of Findings

Descriptive statistics were used to summarize the self-rated work engagement outcome. The median level for vigor and dedication was about an “average” score, while the median level for absorption was around a “high” score. For the overall work engagement, the median response level was around the “average” score. Therefore, it can be inferred that there was an average vigor level, an average dedication level, and a high absorption level of engagement. Furthermore, the overall work engagement was around the average score in physicians as health care organization (HCO) employees in the US.

Similarly, descriptive statistics were used to summarize the psychological contract fulfillment (PCF) outcome. The median level for psychological contract fulfillment (PCF) score
was close to the “somewhat,” indicating around “average score.” Thus, it can be inferred that US HCO-employed physicians’ psychological contract fulfillment level is around an average score. There was a significant positive correlation between the vigor dimension of work engagement and psychological contract fulfillment. Similarly, the results revealed a statistically significant positive correlation of psychological contract fulfillment with work engagement dimensions of dedication and absorption. When the correlation between psychological contract fulfillment and work engagement was tested, a significant positive correlation was found. In summary, significant positive associations of psychological contract fulfillment with work engagement and each of its dimensions of vigor, dedication, and absorption were found. The results support the three hypotheses (3, 4, and 5) pertaining to the association of psychological contract fulfillment with work engagement and its dimensions.

The study also hypothesized a significant predictive power of psychological contract fulfillment on vigor, dedication, and absorption dimensions of the work engagement construct, adjusting for age, work hours, gender, marital status, years of experience, medical specialty, and practice setting. Work hours were found to have a significant effect on the dedication and absorption dimensions of work engagement and total work engagement. Furthermore, age and years of experience were found to have a significant predictive effect on the absorption level dimension of the work engagement construct. The results of this study support the three hypotheses pertaining to a significant predictive effect of psychological contract fulfillment on vigor, dedication, and absorption level dimensions of work engagement construct. The results showed that psychological contract fulfillment is a significant positive predictor of employee engagement. Employees who expressed higher scores on the psychological contract fulfillment
scale had higher levels of employee engagement. That is, those with the strongest fulfillment tended to have the highest level of engagement.

The findings of this study are consistent with many studies about psychological contract fulfillment. Aggarwal (2014) found that employee perceptions of psychological fulfillment led to motivational outcomes that include work engagement. Parzefall & Hakanen (2010) reported that perceived psychological contract fulfillment functions as a form of job resources provided by the employer, which sets off positive motivational processes in employees leading to work engagement. As a mediating variable, work engagement was found to positively associate with organizational commitment. Caesens et al. (2016) and Kasekende (2017) showed that employees are motivated by resource availability and receiving rewards, increasing work engagement, and reducing turnover intention. Zhao, Wayne, Glibkowski, & Bravo, 2007 found that favorable psychological contract evaluations have been reported as the source of increased employee engagement and high motivation to contribute to organizational effectiveness.

Furthermore, the positive and significant association of psychological contract fulfillment on work engagement is consistent with the principle of reciprocity, which was expounded by Blau (1964). Here the author explains that social exchanges are voluntary actions accompanied by the expectation that such treatment will be reciprocated at some future point. Similarly, the findings are consistent with the concept that when employees observe that the organization has provided essential resources for efficient and effective delivery of services, they will put high effort and show loyalty, including work engagement components.

The findings of this study were also consistent with those found in Bal et al. (2013), where the researchers investigated the association of the psychological contract with work engagement and turnover intention and found that psychological contract fulfillment was
associated with higher work engagement, positive attitudes towards the job, and lower turnover intentions for employees.

Additional findings in our study showed that older physicians reported higher engagement mean scores than younger physicians. The finding is inconsistent with Mache, Vitzthum, Wanke, et al. (2014), who reported in their study that younger physicians, particularly those in the age group 26-35, scored the highest engagement scores compared with older physicians. While this was not a US study, caution is warranted in its interpretation. Nevertheless, Rao et al. (2020) found in their large study of one academic medical center that middle (11-20y)- late (>20y) career physicians scored higher in engagement than early career(<10yrs) physicians who at the same time experienced more burn out than the other two groups. Further research is needed in this area to clarify this finding. In any event, it is not necessarily a positive comment to note that almost 43% of younger doctors at the front end of their careers (<45 years old and) express negative feelings about their morale and the medical profession in general. These feelings are very important because moral has been reported to correlate with work engagement (Ivey, Blanc, & Mantler, 2015).

By contrast, in a national study, almost 80 % of all types of American workers indicate they are somewhat or very satisfied with their jobs (Pew Research Center. October 6, 2016). While almost 70% of younger physicians in one national survey indicate they will continue practicing as they currently are, 17.6% plan to cut back their hours and 6.4% indicate they will work part-time. These numbers are concerning in that even though they are still in the early stages of their careers, many younger physicians plan not to be practicing as full-time equivalents in the future, and this will impact healthcare provision (The Physician’s Foundation, 2018).
A possible explanation why older physicians have higher engagement scores is because they are nearing retirement and have established themselves and, therefore, satisfied with their jobs. On the other hand, lower scores could be attributed to mid-career physicians struggling to adapt to changes occurring in the healthcare system and attributed to new physicians entering the workforce who are still adjusting to life beyond medical school. Also, physician's experience was significantly and positively associated with their work engagement levels. This finding is consistent with the literature which supports that the more experience a physician has, the higher their engagement (Mache, Vitzthum, Wanke, et al., 2014; Mache, Bernburg, Vitzthum, et al., 2015) which may provide insight as to higher engagement scores seen in older physicians.

This study also confirmed findings in the practitioner literature on physician engagement. Physicians (75%) reported that it was important that supervisors value their opinions and ideas. This response is consistent with Vital WorkLife, Inc. and Cejka Search's (2013, pg. 20), where one of the top 4 of 15 engagement drivers was "value of opinions and ideas." The Advisory Board Company (2014) reported that one of the top three engagement drivers in their study was that physicians want their HCO to be "open & responsive to their input." Furthermore, the current findings support Spaulding, Gamm, and Messer (2014), where health administrators concluded that HCO administrators need to "listen to their physicians and involve them in decision making."

Another finding from this study that supports the practitioner literature is that greater than 70% of physicians (72%) want their supervisors to respect their competency and skills. Again, the statement agrees with one of Vital WorkLife, Inc. and Cejka Search’s (2013, pg. 20) top engagement drivers, "Respect for competency and skills." Jacksons Healthcare's 2016 engagement study showed a negative 30-point gap between the perception of respect that HCO
executives believed they accorded their employed physicians and the respect physicians
perceived they received from their executives, suggesting that being respected is important to
physicians.

Another finding in this study consistent with the practitioner literature is that 44% of
physicians answered that their expectations were 'somewhat' to 'not met by their HCOs when
asked. Vital WorkLife, Inc. and Cejka Search (2013, pg. 20) reported in their research of 1666
physicians that there were gaps between what physicians perceived they were promised by their
HCOs and what they received. The administrator's companion survey confirmed significant gaps
between promises administrators perceive they fulfilled and what physicians perceived they
received. Consequently, 44% are leaving their health care organizations due to disengagement
as their job expectations were not fulfilled.

Finally, 80% of physicians responding to another question indicated that they were
concerned about having to do things against their better judgment in their organization. This
finding requires will require more research as to the exact meaning of the answers. However, in
the survey of nearly 9,000 U.S. physicians across the country, 70% of physicians indicated that
one pain point that is the least satisfying aspect of their medical practice is "loss of clinical
autonomy." (The Physician’s Foundation, 2018). Physicians attend four years of undergraduate
college, then four years in medical school, and finally greater than 3 in residency and further
years in fellowship training to practice in their chosen specialty. After all the training, they often
find that their ability to make what they believe are the best decisions for their patients is
impeded or undermined by administrative requirements or third parties who are non-physicians.

Another interesting finding is that while the median level for vigor and dedication and
total work engagement was about the "average" score, the median response level for absorption
was around the "high" score. Interestingly, there were high absorption levels across all the
variables, even in specialties like hospital medicine, known to have low scores than other
specialties. These high absorption ratings probably speak to the core of who physicians are.
Absorption refers to being fully concentrated and happily engrossed in one's work, whereby time
passes quickly, and one has difficulty detaching oneself from work (Schaufeli, Salanova,

Physicians have stated repeatedly that a primary source of their professional satisfaction
is the unique nature of the physician-patient relationship, a position confirmed by nearly 80% of
physicians in the most recent national survey of 9,000 respondents (The Physician’s Foundation,
2018). In training, physicians submit to the grueling and expensive grind of medical education
primarily to play a positive role in other human beings' lives. Le Grand (2003) stated that one
could argue that most physicians are altruists. According to these physicians, patient
relationships far exceed other sources of professional satisfaction such as the "professional
stature of medicine," "intellectual stimulation," "professional relationships with colleagues," and
"income/compensation," the latter being cited by only 18.9% of physicians as one of their top
two sources of professional satisfaction (The Physician’s Foundation, 2018). This investigator
believes that when physicians interact with their patients, they are in deep absorption doing what
they were trained to do. High levels of absorption may be explained because physicians of all
types place the highest value on the physician-patient relationship since physicians experience
professional fulfillment when making patients healthy (Gorter, Jacobs & Allard 2012).

**Implications of Findings**

This study's objective was to assess the impact of physicians' perception of their
psychological contract fulfillment on self-rated work engagement levels as employees of HCO's
in the U.S. The results showed that PCF is positively and significantly associated with work engagement and each of the dimensions (vigor, dedication, and absorption) of the work engagement construct. Furthermore, PCF was found to have a significant positive predictive effect on work engagement and its dimensions.

This study's findings have implications at various healthcare system levels and for different stakeholders involved in planning, designing, and delivering health care services. There is sufficient evidence from the literature that employees' experience of PCF has a significant positive effect on their intention to leave and the likelihood of employee retention. This finding implies that the experience of PCF is associated with employee loyalty and employee retention. Furthermore, healthcare research clearly shows that PCF's effect is positive and desirable on employee loyalty and employee retention.

A study by Sheehan et al. (2019) to evaluate the effect of PCF experience on nurses' intention to leave the profession found that work engagement is a significant mediator between psychological contract fulfillment and intention to leave the nursing practice. The support for the significant positive effect of PCF was also reported by Bal, Cooman, & Mol (2013). The authors investigated the association of the psychological contract with work engagement and turnover intention. The results showed that psychological contract fulfillment was related to higher work engagement, positive attitudes towards the job, and lower turnover intentions, but only for employees with low tenure. Two studies (Perreira, Berta, Laporte, et al., 2019 and Mache, Vitzthum, Groneberg, 2015) found a significant association between engagement and job satisfaction. The researchers also noticed a positive correlation between work engagement and surgeons' quality of life, with work engagement mediating the relationship between
organizational factors and job satisfaction. Work engagement was positively significantly associated with workability as well.

The literature also includes attempts to assess the effect of breach of psychological contract fulfillment on work and organizational outcomes. A study by Rayton & Yalabik (2014) examined the association between psychological contract breach (PCB) and work engagement while incorporating job satisfaction as a mediator variable into the exchange relationship. The researchers showed that PCB reflected employees' feelings of resource loss. These feelings impacted work engagement through their impact on job satisfaction. As organizations and industries compete heavily for talent, they must understand how to increase employee loyalty to deliver work-related, business-related, and organization-related outcomes.

Practical implications involve the support of investment in programs and policies that create psychological contract fulfillment among physicians.

**Practitioner Implications.** Administrators should be aware that engaged physicians and those unlikely to leave the organization contribute to the organization at a much higher level and may feel urged, for instance, to put more effort into their work. Thus, they will have higher expectations from their employer (Coyle-Shapiro & Kessler, 2002). Employees with strong intentions to leave the organization, on the other will exert less effort and end up with lower expectations. Consequently, organizations may benefit more from their employees when they take a psychological contract perspective in maintaining the employment relationship.

However, managing psychological contracts is not easy for organizations. Through the psychological contract, upward as well as downward spirals are created. The subjectivity of employee and employer perceptions and the complexities of monitoring PCs are key challenges (Conway and Briner 2005). However, the impact of psychological contracts on work engagement
factors, such as employee loyalty, OCB, decreased turnover, and organizational citizenship behaviors noted in the literature support why health care organizations should address these issues. Administrators who desire work-engaged physicians in their HCOs require a sophisticated understanding of physicians' psychological contracts to close the gaps between their own and their physicians' beliefs. Regular monitoring of the psychological contract may eventually restore trust in the HCO-Physician relationship, which is essential to creating and sustaining physicians' PCF.

The study supports human resources workforce planning efforts in developing effective strategies that attract physicians, which may safeguard physician supply, particularly generation-specific hiring, training, and retention practices. HCOs need to consider generational values in hiring and retention decisions. Health systems acknowledge Gen X physicians as an important group of service suppliers replacing baby boomers (Pew, 2010). Generation X traits include attention to life-work balance, social concerns, informality in appearance and personal relationships, comfort with technology, and falling levels of trust. These characteristics need to be considered when forming organizational policies that will impact these physicians. Furthermore, the movement towards adapting employment policies to employee demands rather than the more traditional approach of expecting new employees to adjust to established workplace practices should be considered.

**Societal Implications.** Failure to consider work engagement among physicians has major financial consequences throughout the healthcare arena. High PCF experience energizes physicians and fosters physicians' feelings of self-worth and sense of significance at work setting off both motivational and health-enhancing processes, leading to a decrease in medical errors and associated medical cost improving quality of care. Medical errors are expected to cost the U.S.
trillion dollars annually. Almost half of the $2.9 trillion spent annually in healthcare expenditures could be saved by taking waste out of the system. Physicians play a vital role in every aspect of healthcare and guide processes and decisions made inside and outside the hospital walls, and so HCOs will need to engage physicians. Also, HCOs must find ways to create and sustain PCF among their physicians because of the impact on work engagement and its inverse relationship with turnover intention. Turnover can cost as much as $1 million per physician when all recruitment, start-up, and lost revenue costs are totaled. The average interview cost per vacancy was $31,090 (Buchbinder, Wilson, Melick, & Powe, 2001). High PCF experience in physicians may ease the two primary public policy concerns: the immediate physician shortage and the rising healthcare cost due to disengagement since physicians determine over 80% of the decisions that drive quality and cost.

**Educational Implications.** Lastly, this study contributes to health services research on HCO-employed physicians' psychological contracts and work engagement. Most of the research on work engagement originates from the practitioner and consultancy literature, many of which do not have validated instruments. There is a surprising absence of scholarly research addressing the process of work engagement in physicians. Also, there a shortage of academic research on the nature of the relationship between psychological contracts and work engagement (Rayton, Zeynep, & Yalabik, 2014, p. 2384), particularly true in the physician population in a period when hospital employment of physicians is on the rise, and physician engagement is low. This research answers repeated calls for more effective collaboration between academic researchers and practitioners. This study's large sample size provides empirical research on physicians' demographics, practice setting, and medical specialties to scholarly literature.
In summary, this study has shown that a physician's perception of psychological contract fulfillment is significantly positively associated with work engagement and its constructs: vigor, dedication, and absorption. Thus, it is implied that physicians' higher perceived PCF is associated with higher work engagement, which is expected to positively influence job satisfaction and reduce turnover and medical errors. Therefore, this study's findings show that planning and implementing policies that improve physicians' PCF experience will only help HCOs realize desirable work-related, job-related, and organization-related outcomes.

**Conclusions and Recommendations**

The purpose of this study was to assess the impact of physicians' perception of their psychological contract fulfillment on self-rated work engagement levels as employees of HCO’s in the US. The data was collected from a random sample of 1100 physicians with appropriate representation to physicians practicing in different regions, from different specialty areas, practice settings, genders, marital status, and work experience. The data were analyzed using correlation and regression analyses, explicitly using ordinal logistic regression and generalized linear models to test the significance of the association and predictive effect of psychological contract fulfillment on work engagement. The results showed strong evidence for a significant positive association and a significant positive predictive effect of PCF on work engagement and each of its dimensions (vigor, dedication, and absorption). Therefore, it can be inferred that psychological contract fulfillment is positively associated with work engagement, and it has a significant positive predictive effect on work engagement and each of its dimensions. To conclude, there is a significant positive impact of physicians' perception of their psychological contract fulfillment on self-rated work engagement levels as HCO employees in the US.
There is emerging evidence from research in health care of the positive effect of high perception of PCF on work engagement and, in turn, on employee loyalty and retention. It also appears logical that this will ultimately translate into improved positive quality of care for the patients. HCOs consider effective management of their physicians a critical organizational issue, particularly for those under the employment model. Psychological contract evaluation is needful in managing changes to the contemporary employment relationship. It is particularly true in employment relationships that arise from economic and organizational circumstances like hospital mergers, downsizing, increased reliance on locum tenens, and demographic diversity. Consequently, this PI speculates that investing in creating and sustaining PCF experience for physicians is likely to have positive returns in terms of physician loyalty, a lower likelihood of physicians leaving the organization or the profession, lower incidents of medical errors, and more work engaged physicians in the healthcare system.

Gottschalk (2013) recommended the following five points that organizations can consider while creating and building psychological contract fulfillment among employees. Though these points are provided in a generic framework, all the points are relevant and applicable to the healthcare sector. The points recommended to create and sustain PCF are -

- **Building trust** – Adequate levels of trust between healthcare executives and their employed physicians is an essential part of creating and sustaining PCF. Trust can be enhanced by creating work environments that emphasize behavioral consistency, integrity of action, and overall career development support. Psychological contract breach, along with its negative consequences, is likely to remain common in HCOs mergers, restructuring, and physician practices acquisition. The negative impact can be offset if managers learn how to navigate such changes to preserve physicians' sense of trust. HCO should vigorously establish and
maintain trusting relationships with their physicians beginning at recruitment which may inoculate them from the negative effects of potential contractual transgressions. During recruitment and onboarding, organizations make promises to their prospective physicians; promises physicians expect their organizations to uphold. Recruiters tend to present jobs in favorable terms, which increases the odds of psychological contract breach, as much of the expectations are unrealistically high. The result of a contract breach produces negative consequences since both the organization and the employee suffer from a breach in the long run (Zhao et al. 2007). In essence, the viability of the HCO-physician relationship is central to the health of the psychological contract.

- **Communication** - The psychological contract is perpetual and dynamic. It should be continually re-calibrated during the employment relationship. A key element to maintaining balance is an environment that allows an open discussion of the Physician–HCO relationship. The open channels of communication help understand the contract between the employee and the employer.

- **Practicing transparency** - Organizations must strive to become transparent at all levels from the inception of the employment relationship. Because the root of psychological contract formation lies in the recruitment process, human resources can broaden their practice to employ realistic job previews. A realistic job preview is a recruiting tool that provides a prospective employee with a realistic view of what the job involves (Wanus(1975). The preview ensures that newcomer physicians will have accurate expectations about their new positions. Having a preview decreases the odds of a psychological contract breach along the job continuum as trust is formed at the relationship’s onset.
• **Feedback and recognition** - Adequate feedback concerning performance is an essential component of work-life and clarifies many aspects of the employee-employer contract. One way to give feedback could be through regular performance appraisal (P.A.) discussions. Performance appraisal involves employers providing employees with feedback about their performance level (Rousseau & Greller, 1994), which assesses PCF. These meetings allow administrators to ask physicians how satisfied they are with the inducements provided by the HCOs, and specific contract contents can be discussed, and expectations can be expressed. Effective communication will include the reasons surrounding the breach if there is a breach, mainly where those reasons lie beyond the organization's control.

• **Aligning work with strengths** – Critical to a psychological contract's healthy status is consistently matching the individual physician's strength and competencies with assigned work tasks.

**Limitations**

Like any research study, research based on the analysis of a sample of data from a survey will be subject to several limitations. Firstly, this study was limited to a cross-sectional study of the US healthcare system. Results are not generalizable to other countries as participants were excluded if they were not from the United States. Additionally, results are not generalizable to the medical profession overall. More research is necessary to see if this study's results hold across physicians not presented within this study.

The study's conceptual framework includes only PCF and work engagement, statistically adjusting for the effects of age, gender, years of work experience, marital status, work hours, practice setting, and medical specialty. Human resource management literature discusses both
individual and situational antecedents of work engagement. For example, in addition to age, gender, and marital status, employees’ perceived core self-evaluation is a significant antecedent of work engagement. In their study, Judge et al. (1997) advocated a construct called core self-evaluations, associated with appraisals that persons make of themselves, the world, and others, significantly influencing their job satisfaction levels performance. The authors stated that different perceptions and behaviors could be affected by these self-evaluations.

However, many are unaware of the influence. Individuals with positive core self-evaluations gauge themselves positively in different situations seeing themselves capable, valuable, and in command of their own lives. The core self-evaluations construct is comprised of four traits: (1) self-esteem, or the degree to which one sees oneself as capable and valuable; (2) generalized self-efficacy, or the judgment about one’s ability to mobilize cognitive resources and adopt strategies to deal with specific situations; (3) locus of control, or one’s belief regarding one’s ability to exercise control over events one experiences; and (4) neuroticism, a personality trait that involves the tendency to experience negative feelings such as anxiety, fear, and depression. This study did not include the core self-evaluation construct as part of the collected data and analysis. Therefore, the possibility of the effect of PCF on work engagement getting mixed with the impact of core self-evaluation on work engagement cannot be ruled out.

Additionally, the limitations of this study are the same as with all self-reported survey studies. Dependence on participants' may have decreased the accuracy of the participant responses. Participants could have responded inaccurately to serve their motives or just responded based on the kind of day they were having. This survey was conducted during the coronavirus pandemic of 2020 on the physician population. Physicians were on the front line. Before completing the survey, a physician might have had a day when they felt burnout and
subsequently responded negatively to psychological contract breach and workplace dissatisfaction than if they completed the survey following when there was no pandemic. The survey was conducted in July through August when hospitalizations were down in some parts of the country while there was an uptick in other parts of the country. Therefore, the responses might not accurately depict the participants' typical experiences and may have been susceptible to bias. However, the strength of the self-reported survey allowed the researcher to obtain physicians' first-hand experiences efficiently.

This study design is cross-sectional. The experience of psychological contract fulfillment for a physician is dynamic. The changes in the work standards, management expectations, and resource availability could influence the PCF experience and affect work engagement. Therefore, a longitudinal analysis would provide a more comprehensive insight into the dynamic nature of PCF's effect, if any, on work engagement. Lastly, it is unknown whether HCO-employed physicians who may also hold part-time work with an agency or have other contracts participated in this study. This study's inclusion and exclusion criteria could not cover all alignment models given the complexity of the various integration strategies of physician contracting. While many physicians perceived alignment to be synonymous with employment, it is not. Employed physicians know they are employed as it is stated clearly on the proforma employment contract. Furthermore, it is unknown whether physicians in this sample had more than one license and worked in more than one location since 15.5% of US physicians have two active licenses, and 6.6% had three or more active licenses (Young et al., 2019).

**Future Research Opportunities**

This study provides a conceptual and methodological basis for additional research on the effect of psychological contract fulfillment on work engagement and in the context of broader
work and business outcomes. Further research can potentially determine if psychological contract fulfillment, adjusting for the effect of perceived core self-evaluation, significantly influences work engagement. Also, the effect of personality traits can be included in the model, particularly neuroticism and agreeableness.

This study defines the role of work engagement as an outcome variable. The conceptual framework scope could be expanded to include employee loyalty, employee retention, and other associated employee and organization-related outcomes. For example, additional research can evaluate PCF on physician’s retention mediated by self-rated work engagement. Given the psychological contract’s perpetual nature, there must be regular ongoing research on PCF’s role and effect. Additional research can include longitudinal analysis of the impact of psychological contract fulfillment on work engagement in physicians. This study can be replicated in other settings, in different health care systems, with participants with different demographic profiles. This replication of the current research would further test the robustness of the significance of the correlation and predictive effect of PCF on work engagement. While the interest in research on PCF and its effect on work and employment-related outcomes increases, more clarity must be sought and understood about what causes PCF in the workplace.

This study provides strong evidence that higher PCF perception is associated with higher work engagement levels. Future research could expand to integrate organization support and social exchange theories in the context of psychological contracts by examining the association of self-rated organizational support or human resource management practices on the psychological contract in the physician population. Lastly, it may be suggested to evaluate the effect of psychological contract breach and its impact on physician engagement and turnover intention.
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June 26, 2020

Oyebanjo Olowe

Re: Study ID# 2020-107

Dear Mr. Olowe,

At its June 24, 2020 meeting, the Research Ethics Committee of the Seton Hall University Institutional Review Board reviewed and approved your research proposal entitled “Exploring the Relationship between Psychological Contract Fulfillment and Work Engagement in Health Care Organization: Employed Physicians” as submitted. This memo serves as official notice of the aforementioned study’s approval. Enclosed for your records are the stamped original Consent Form and recruitment flyer. You can make copies of these forms for your use.

The Institutional Review Board approval of your research is valid for a one-year period from the date of this letter. During this time, any changes to the research protocol, informed consent form or study team must be reviewed and approved by the IRB prior to their implementation.

You will receive a communication from the Institutional Review Board at least 1 month prior to your expiration date requesting that you submit an Annual Progress Report to keep the study active, or a Final Review of Human Subjects Research form to close the study. In all future correspondence with the Institutional Review Board, please reference the ID# listed above.

Thank you for your cooperation.

Sincerely,

[Signature]
Mara C. Policky, PhD, OTR
Associate Professor
Co-Chair, Institutional Review Board

Office of the Institutional Review Board
Presidents Hall · 400 South Orange Avenue · South Orange, New Jersey 07079 · Tel 973.275.4654 · Fax 973.275.2978 · www.shu.edu
WHAT GREAT MINDS CAN DO
APPENDIX B-SOLICITATION LETTER

Dear Physician,

My name is Oyebanjo Olowo. I am a Ph.D. student at the School of Health and Medical Sciences at Seton Hall University. I am conducting this research study as part of my doctoral dissertation.

What is the purpose of this study?
You have been invited to participate in this study because you are a physician employed by a health care organization. The landscape of physician practice patterns has changed as more physicians are in the employment of health care organizations. The purpose of this study is to assess the impact of physicians' perception of fulfillment of employer promises on levels of engagement at work as an employee in a Health care Organization (HCO).

What is the study procedure?
You are being asked to complete a survey that consists of basic demographic questions, a Work and Well-Being survey (WES), and a psychological contract survey. You are being asked to participate because you are a licensed physician, MD, or DO, delivering patient care in the US in a health care organization that provides acute or non-acute patient care services as an employee of that organization for at least six months and you are English-speaking. If your role in your HCO is mainly administrative or academic teaching, rather than direct patient care, you are not eligible to participate in this study. If you meet the requirements, you may complete the survey by clicking on the link at the end of the document. This study will also be utilizing a recruitment technique called snow-ball sampling or chain referral. Even if you do not meet the study requirements, you can still help. The attached link below is not unique to you. You can forward the link to anyone you think might meet the criteria above. This allows the survey to reach a greater audience. Completing the survey will take about 5 minutes, but you can take as much time as you need. You can complete the survey by clicking on the link below.

Is participation Voluntary?
Your participation in this study is voluntary. You may decide not to participate at any time. If you do not participate, you would not be penalized in any way. By clicking on the link, you acknowledge that you are giving consent to participate in this study.

Is the survey anonymous?
Your identity, such as your name, address, or other personally-identifying information, would not be collected as part of the study. The only information collected will be demographic data, and nothing in that information will identify you. Also, your responses are anonymous. There will be no way to contact you or link your responses to you. If you forward the survey link to others, no identifying information will be collected from them. The research data may be published when the study is complete.
What will happen to study data?
The data collected from the survey will be kept confidential to protect its integrity. The data will be retrieved from survey monkey’s secure server and stored on a USB drive. The USB drive will be stored in a locked desk in the office of the principal investigator. The principal investigator, Oyebanjo Olowe, would have access to all the data which will be kept for three years. Then, the PI will delete the electronic data form the USB drive and then empty the recycle bin of the computer.

Risks to participating
There are no likely risks or discomfort anticipated by your participation in this study. As a potential research participant, you understand the privacy policies of social media, which are provided to you with this informed consent.

Facebook Privacy Link: https://www.facebook.com/policy.php
LinkedIn Privacy Link: https://www.linkedin.com/legal/privacy-policy
SurveyMonkey Privacy Link: https://www.surveymonkey.com/mp/legal/privacy-policy/

Benefits of participating
Also, there are no planned or anticipated direct benefits to you by participating. However, your participation may lead to the improvement of the practices surrounding formal and informal employment contract between the healthcare organizations and their physician employees.

Costs and payments
There will be no monetary compensation for participating in the research study.

Ways to participate in this study
The survey is available via Survey Monkey® electronic survey. When you complete your survey, please submit the survey by clicking on the “Submit” radio button. This action should automatically close your session. But to be certain, close your browser manually when finished. Please feel free to ask other physicians that you know that in your judgment meets the study criteria to participate in the survey. You can forward the link at the bottom of the page to them, even if you choose not to take the survey. Please note that although the web site is secure, as there is with anything online, there is a remote risk of hacking.

Can I request further information?
If you have an interest in learning more about this research study, please contact me through the office of Dr. Cahill, Chair in the Department of Interprofessional Health Sciences and Health Administration in the Seton Hall University School of Health and Medical Sciences at 973 – 275-2842, Terrence.Cahill@shu.edu. For questions about your rights as a study participant, or any concerns or complaints, please contact Dr. Michael LaFountaine, Director, Institutional Review Board in the office of IRB at Seton Hall University at 973-313-6314. You may send questions about the subject’s rights as human subjects in research by mail to irb@shu.edu.
APPENDIX C-COPYRIGHT LICENSE FOR JOB-DEMANDS AND RESOURCES MODEL USE

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Feb 19, 2021

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Licensed Content Author: Wilmar B. Schaufeli

Licensed Content Date: April–June 2017

Licensed Content Volume: 46

Licensed Content Issue: 2

Licensed Content Pages: 13
Title
Exploring the Relationship Between Work Engagement AND Psychological Contract Fulfillment in Health Care Organization-Employed Physicians

Institution name
Seton Hall University

Expected presentation date
Mar 2021

Portions
Figure 1 The Job Demands Resources Model
APPENDIX D-PARTICIPANT RECRUITMENT MAP

Total sample size needed = 167 (Grand total = 82-85)

Total Sample collected = 1100

minus 70 incomplete

1170 respondents

Send two reminders time interval 2 WEEKS

Obtain ≥167

YES

Send 200 emails weekly To LinkedIn & groups

Collect & analyze data with SPSS
APPENDIX E-DEMOGRAPHIC PROFILE QUESTIONNAIRE

1. Are you a MD or DO in the United States? □ Yes □ No

2. How long have you worked at your organization?
   □ Less than 6 months
   □ 6 months-1 year
   □ 1-3 years
   □ Greater than 3 years

3. What is your age? ________

4. What is your gender? □ M □ F

5. Please specify your area of specialty practice, if any ______________________

6. What is your current marital status?
   □ Married □ Single

7. How many hours do you work per week on average?______________________

8. How long have you been practicing medicine?
   □ Less than one year □ 1-5 years □ 6-10 years □ 11-20 years
   □ 21-30 years □ 31+ years

9. What is your practice setting?
   □ Hospital □ Hospital/Health System Medical Group Practice
   □ Physician-Owned Group Practice □ Government Facilities
   □ HMO/PPO Organization □ Other ______________________

10. In what region of the country do you practice?
    □ Northeast
    □ Midwest
    □ South
    □ West
    ______________________
APPENDIX F-WORK AND WELL-BEING SURVEY

Work & Well-being Survey (UWES) ©

The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

<table>
<thead>
<tr>
<th></th>
<th>Almost never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Never</td>
<td>A few times a year or less</td>
<td>Once a month or less</td>
<td>A few times a month</td>
<td>Once a week</td>
<td>A few times a week</td>
<td>Every day</td>
</tr>
</tbody>
</table>

1. ________ At my work, I feel bursting with energy
2. ________ At my job, I feel strong and vigorous
3. ________ I am enthusiastic about my job
4. ________ My job inspires me
5. ________ When I get up in the morning, I feel like going to work
6. ________ I feel happy when I am working intensely
7. ________ I am proud of the work that I do
8. ________ I am immersed in my work
9. ________ I get carried away when I’m working

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147
APPENDIX G-PCF SURVEY

Psychological Contract Fulfillment Survey (Hartwell, 2010)

1. Are you working the optimal number of hours? Y N

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Somewhat</th>
<th>Considerably</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. How much of a concern to you is the income on this job?
3. How much of a concern to you is job security?
4. How much of a reward to you is your supervisor's concern about the welfare of those under them?
5. How much of a reward to you is having the authority needed to get the job done?
6. How much of a reward to you is your supervisor paying attention to what you say?
7. How much of a concern to you is having to do things against your better judgment?
8. How much of a concern to you is not being able to do your job because of red tape?
9. To what extent has this practice met your expectations?
10. How much of a reward to you is your supervisor's respect for your abilities?
11. How much of a reward to you is challenging or stimulating work?
12. How much of a reward to you is having a variety of tasks?
13. How much of a reward to you is the opportunity to learn new things?
14. How much of a concern to you is your job's dullness, monotony, or lack of variety?
# APPENDIX H
## RESPONDENTS COLLECTIVE ANSWERS TO PCF ITEMS

### Q2. How much of a concern to you is income on this job?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Extremely</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>447</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>221</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q3. How much of a concern to you is job security?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Extremely</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>359</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>341</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>159</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q4. How much of a reward to you is your supervisor’s concern about the welfare of those under them?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Extremely</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>302</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>430</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>638</td>
</tr>
<tr>
<td></td>
<td>Extremely</td>
<td>225</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q5. How much of a reward to you is having the authority needed to get the job done?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<td>44</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>454</td>
</tr>
<tr>
<td></td>
<td>Extremely</td>
<td>455</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q6. How much of a concern to you is your supervisor paying attention to what you say?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<td>74</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>302</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>430</td>
</tr>
<tr>
<td></td>
<td>Extremely</td>
<td>327</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q7. How much of a concern to you is not being able to do your job because of red tape?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Extremely</td>
<td>362</td>
</tr>
<tr>
<td></td>
<td>Considerably</td>
<td>363</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q8. How much of a concern to you is your job’s dullness, monotony or lack of variety?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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<td>Somewhat</td>
<td>303</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>1100</td>
<td>100.0</td>
</tr>
</tbody>
</table>
APPENDIX I-DISSERTATION ORAL DEFENSE FORM

DOCTORAL CANDIDATE’S NAME: Oyebanjo Olowe

PROJECT TITLE: “Exploring the Relationship Between Work Engagement AND Psychological Contract Fulfillment in Health Care Organization-Employed Physicians”

ORAL DEFENSE DATE: March 8, 2021

I HAVE PARTICIPATED IN THE ABOVE-NAMED STUDENT’S ORAL DEFENSE OF HIS/HER DISSERTATION STUDY AND MY EVALUATION IS AS FOLLOWS:

DISSERT. COMMITTEE CHAIR: Genevieve Pinto Zipp
I evaluate the student’s presentation as follows: PASS X FAIL

COMMITTEE MEMBER SIGNATURE: [Signature]

DISSERT. COMMITTEE MEMBER: Ning Jackie Zhang
I evaluate the student’s presentation as follows: PASS V FAIL

COMMITTEE MEMBER SIGNATURE: [Signature]

DISSERT. COMMITTEE MEMBER: Fortunato Battaglia
I evaluate the student’s presentation as follows: PASS X FAIL

COMMITTEE MEMBER SIGNATURE: [Signature]

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Department of Interprofessional Health Sciences
and Health Administration
Interprofessional Health Sciences Campus (IHS)
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What great minds can do.