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The Organizational Commitment of Sonographers in the Mid-Atlantic Region of the United States

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

By

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Abstract

THE ORGANIZATIONAL COMMITMENT OF SONOGRAPHERS IN THE MID-ATLANTIC REGION OF THE UNITED STATES

By Yonella Demars, Ph.D., MSRS, RDMS (AB, OB/Gyn, PS), RVT

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2021.

Dissertation Chair: Jeffrey S. Legg PhD.

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Sonographers are skilled medical professionals who operate specialized equipment that utilizes sound waves to create images of the body. Radiologist and physicians depend on sonographers to summarize their findings by creating a preliminary report that is sent, along with images, to them for diagnosis and treatment purposes.

Organizational commitment is described by John Meyer and Natalie Allen, through their organizational commitment three component model, as a mindset reflecting a desire, a need, or obligation to maintain membership in an organization. Specifically, affective organizational commitment is the desire an employee demonstrates that allows them to remain with their employer because of an emotional attachment, a sense of fitting in, or them identifying with the organization's goals and values. Employees demonstrating a higher score in affective commitment are happy with their work-life experience, typically demonstrating a good attendance record, better job performance, and display organizational citizenship behavior crucial to their organization's success. Contrarily, employees with higher continuance commitment scores are driven more by the costs associated with leaving. Those who demonstrate more of a sense of obligation to an organization influenced by experiences both prior to and upon entry into an organization will demonstrate higher scores in normative commitment. Subsequently, employees with higher scores in continuance and normative commitment tend to possess behaviors different than those with high emotional attachment.

Although the three components of commitment presumably increase the likelihood that employees will remain with their employing organization, employees'

motive for remaining, reflecting behaviors, and productivity levels will differ based on which component is possessed in higher amounts by the employee. The purpose of this study was to identify three organizational commitment components of sonographers in the Mid-Atlantic region of the United States by documenting and revealing the following: scores on each of the commitment components, the relationship between each commitment component and certain sociodemographic variables and the effect perceived organizational support has on the organizational commitment components of sonographers.

Using a multiple component survey (Affective Commitment Survey, Continuance Commitment Survey, Normative Commitment Survey, and the Survey of Perceived Organizational Support collectively), this quantitative, cross-sectional design measured the organizational commitment scores of 110 sonographers and determined the impact of sociodemographic variables and perceived organizational support using means, standard deviations, stepwise and mixed hierarchical multiple regression analyses. The results of these analyses showed sonographers in the study's sample having a continuance commitment, affective commitment, and normative commitment score of 4.62, 4.30, and 3.46 respectively. Results also showed living in Pennsylvania, years at current organization, being a registered cardiac sonographer, and being single were significant variables that contributed to the variance of organizational commitment scores of sonographers. After accounting for the variance in each commitment component influenced by the sociodemographic variables, the results showed the support a sonographer perceived to receive from their employer explained over 50% of the total variance in their affective and normative commitment score. The results of this study did not show perceived organizational support as influencing a sonographer's continuance commitment score.

In conclusion, by documenting the scores of each organizational commitment component and identifying variables that contribute to a sonographer's organizational commitment it provides a complete picture of the connection employees have with their employing organization. These results also could possibly answer questions about a sonographer's performance, work behavior, and attendance record.

Vita

Yonella Demars was born February 22, 1982, in Santo Domingo, Dominican Republic. Graduated as a magnet student from Jenkins High School in Savannah, Georgia, she later obtained a Bachelor of Science in Radiologic Sciences with a concentration in Diagnostic Medical Sonography from Armstrong Atlantic State University in Savannah, Georgia. Between 2009 - 2017 she was a staff sonographer at the University of Virginia Medical Center where she mentored and trained fellow sonographers and sonography students. She was also involved in implementing changes to various practice processes, creating continuing medical education lectures, and overseeing the ultrasound department's night shift rotation. In the fall of 2010, she began graduate studies at Midwestern State University in Wichita Falls, Texas. Demars received her Master of Science in Radiologic Science with a concentration in Health Administration in December 2012. In 2013 Demars was presented with the opportunity to participate as a contributing author of a Sonography textbook. Her authorship later encouraged her to create her business called SONONOTES, which she self-published a Pediatric Sonography Study Guide, mock exams, and plans to provide resources for sonography educators. Demars has been interviewed by a well-known sonography related website, had abstracts accepted to both local and international conferences

where she was a guest lecturer and serves on several professional committees to include the American Registry for Diagnostic Medical Sonography item writing team. Currently, Demars is the founding program director of the only CAAHEP accredited bachelors Diagnostic Medical Sonography program in the Commonwealth located within the College of Health Professions at Virginia Commonwealth University.

Chapter 1: Introduction

This chapter provides a brief overview of sonography and the sonography profession, the rationale for the study, the study's purpose, the research questions answered, and the analytical approach used.

Sonography in the United States

Sonography utilizes sound waves to create images of the body for medical diagnosis and treatment by radiologists and other physicians. The skilled medical professionals performing the examination to provide images for diagnoses are known as **sonographers** or **diagnostic medical sonographers**. Sonographers are patient care facilitators who assess their patients, detect ultrasound abnormalities, interpret their images to create effective preliminary reports, and utilize critical thinking skills. Although sonographers perform ultrasound examinations only under the order of a referring health care provider, they typically work independently.

Due to the independent nature of their work, sonographers perform a multitude of tasks beyond scanning. They must adapt to various work conditions and environments, handle heavy workloads, and deal with the emotional reactions of patients, all while focusing on the quality of the images produced and the patient care provided. Although primarily employed in hospitals, sonographers may be employed in physician offices, freestanding imaging centers, mobile imaging companies, and medical and diagnostic laboratories (Bureau of Labor Statistics, 2018a). All sonographers perform their jobs

using ultrasound equipment usually in dimly lit examination rooms or at a patient's bedside (portable). Physical demands may include the ability to stand for extended periods of time, the strength to physically reposition patients, and distort their own body and extremities to access areas of the patient requiring imaging. Sonographers may also be responsible for establishing a sterile field and properly handling patient's bodily fluids and specimens during ultrasound procedures.

Sonography History and Sonographer Overview

The true conception of sonography occurred in 1880 with the discovery of piezoelectricity by French physicists Pierre and Jacques Curie (Baker, 2005). Acting as both a transmitter and a receiver of sound, piezoelectric crystals converted electrical energy into mechanical energy. Along with vacuum tube amplifiers, quartz crystals are used with early ultrasonic transducers as being the first ultrasonic device (Baker, 2005). This device formed the basis of sonar detection later used during World War II.

Sonography, also termed "ultrasonography" or "ultrasound," is a diagnostic imaging technique using high frequency (greater than 20Hz) mechanical and longitudinal sound waves to create real-time images. Sonography evaluates internal structures within the body to include abdominal organs, organ transplants, fetus *in utero*, male and female reproductive organs, musculoskeletal anatomy (e.g., tendons, ligaments, and muscles), and vascular structures (e.g., heart, veins, and arteries). Advantages of sonography include its mobility, lack of side effects, lower expenses as compared to other imaging examinations (e.g., magnetic resonance imaging [MRI] or computed tomography [CT]) and creation of images without using ionizing radiation

(Adler & Carlton, 2016). Ionizing radiation is a type of radiation that is capable of removing an electron from an atom and causing tissue damage and injuries to humans.

Diagnostic medical sonographers are unique and essential health care professionals. Historically, sonographers were known as “ultrasound technical specialists” (Baker, 2005). But, almost two decades ago, sonographers were given a significant place among other health professions via recognition by the United States government in the 2002-2003 edition of the *Occupational Outlook Handbook* (McLaughlin, 2002). This independent occupational classification allowed for diagnostic medical sonography to be recognized “by the federal government as a separate profession, independent of radiologic technology” (McLaughlin, 2002, p. 112). Gaining the title of “diagnostic medical sonographer” as opposed to “ultrasound technician,” “ultrasound technical specialist,” or “tech” is a statement to sonographers’ professional identity and demonstrates an elevated role in imaging sciences (Baker, 2005).

The Society of Diagnostic Medical Sonography (SDMS, 2013) states that a sonographer’s scope of practice is to provide patient care services and act as a delegated agent of a physician based upon education preparation and clinical competence using ultrasound. Sonographers employ independent, professional, ethical judgment, and critical thinking to perform sonographic procedures (SDMS, 2013). The SDMS (2013) noted that some standards sonographers should reflect in their behavior and performance include:

1. Patient information assessment and evaluation
2. Patient education and communication

3. Analysis, determination, and implementation of protocol for sonographic examinations
4. Evaluation of the results to include documentation of findings
5. Patient safety

Sonographers send their images along with a written preliminary report to a radiologist or physician for interpretation and formation of a medical diagnosis.

Physicians, nurse practitioners, and other clinicians rely on sonographers' quality diagnostic ultrasound examinations to determine the next step in their patient's care plan.

Sonographer education. At present, sonography training in the United States can be obtained on the job or in diagnostic medical sonography (DMS) programs housed in post-secondary institutions. Students experience both didactic and laboratory learning and clinical education at hospital-based programs, community colleges and universities offering a certificate, associate degree, or bachelor's degrees. Students successfully graduating from a DMS program are eligible for national certification. Although the American Registry of Radiologic Technologists (ARRT) offers a sonography certification, the most widely recognized and accepted credential is from the American Registry for Diagnostic Medical Sonography (ARDMS). To become a nationally recognized registered sonographer through the ARDMS, applicants must successfully pass a Sonography Principles and Instrumentation (SPI) physics exam and one additional exam from a list of specialty examinations: abdomen, breast,

adult/pediatric/fetal echocardiography, obstetrics and gynecology, pediatric, musculoskeletal, and vascular technology (Get Certified, 2019).

Sonography Utilization in the United States

The 2015 National Ambulatory Medical Care Survey indicates that 49,104 ultrasound exams (excluding echocardiograms) were provided at physician practices in 2015 (Rui & Okeyode, 2015). The volume has increased from the 28,012 exams reported in 2014 (Rui, Hing, & Okeyode, 2014). It should be noted that an additional 11,604 echocardiograms were provided at physician practices in 2015 (Rui & Okeyode, 2015). Echocardiograms are specialized ultrasound procedures that are reported separately from other ultrasound procedures. In the last six years, ultrasound exams and echocardiograms are utilized more in the ambulatory setting than any other imaging service provided (Rui & Okeyode, 2015). Although Juliusson, Thorvaldsdottir, Kristjansson, and Hannesson (2019) reported gradual increases in ultrasound usage, the Healthcare Cost and Utilization Project (HCUP) sponsored by the Agency for Healthcare Research and Quality (AHRQ) does not align with their numbers. The AHRQ reports the hospital inpatient procedures related to ultrasound shows a decreased trend. In 1993, over 1.7 million discharge records had an ultrasound procedure code attached. However, by 2014, only 1.1 million discharge records showed ultrasound related activities (U.S. Department of Health & Human Services, 2019).

The Need for the Study and the Research Problem

The term organizational commitment refers to the mindset reflecting a desire, a need, or obligation to maintain membership in an organization (Meyer & Allen, 1987).

Some employees remain with an organization because of an emotional attachment to the organization. Employees with this emotional attachment typically demonstrate a good attendance record, better job performance, and display organizational citizenship behavior crucial to their organization's success (Meyer & Allen, 1997). Emotionally attached employees also accept circumstances as they are (loyalty) and are also more vocal when suggesting improvements (Meyer & Allen, 1997). Contrarily, employees with commitment to the organization driven more by the costs associated with leaving or by their feeling of obligation tend to possess behaviors different than those with high emotional attachment. An employee's work environment should be considered as influencing a sonographer's commitment to the organization, job satisfaction, and their perception of the employer (Meyer & Allen, 1997).

Previous research has demonstrated that organizational commitment is associated with **antecedents** (i.e., a thing or event existing before another) such as work experiences/conditions, leadership behaviors, and organizational support (Akroyd, Legg, Jackowski, & Adams, 2009; Allen & Meyer, 1990; Buchanan, 1974; Eisenberger, Fasolo, & Davis-LaMastro, 1990; Hrebiniak & Alutto, 1972; Painter & Akroyd, 1998; Steers, 1977). Studies have found notable outcomes associated with organizational commitment such as: turnover, work quality, job satisfaction, absenteeism, and burnout (Akroyd, Jackowski, & Legg, 2007; Akroyd et al., 2009; Allen & Meyer, 1990; Chang et al., 2017; Daugherty, 2002; Jackson et al., 1987; Jung & Kim, 2012; Kang, 2012; Mowday, Steers, & Porter, 1979; Painter & Akroyd, 1998; Porter et al., 1974; Rizzo,

House, & Lirtzman, 1970; Steers, 1977). These antecedents and outcomes can affect the well-being of sonographers and the success of their employing organizations.

Identifying the organizational commitment of employees is necessary for an organization to understand the sustainability of their workforce. It also provides an opportunity to fully evaluate and understand employees' behaviors, performance, attendance patterns, and interpersonal views toward the organization. This information also helps organizations implement or continue processes providing advantage over their competitors, higher patient satisfaction scores, and dedicated employees.

In searching the literature, no studies that included the organizational commitment of sonographers were found. Among the medical professions, organizational commitment studies were conducted in fields such as nursing, occupational therapy, radiation therapy, and radiography. However, it cannot be assumed that the findings from other health care professions or those conducted within the radiologic sciences/technology of radiography, radiation therapy and nuclear medicine are equivalent and generalizable to sonographers. This could be due to sonography being an imaging specialty requiring communication of a sonographer's findings, either orally or written to a radiologist or interpreting physician.

Purpose of the Study

This study contributes to the current literature on organizational commitment and serves as the foundation for future behavioral research among sonographers in the U.S. Particularly, this study will identify three organizational commitment components of sonographers in the Mid-Atlantic region of the United States by documenting and

revealing the following: scores on three organizational commitment components, the relationship between each commitment component and certain sociodemographic variables and the effect perceived organizational support has on the organizational commitment components of sonographers after controlling for the effect from sociodemographic variables.

Research Questions

This study addresses the following three research questions:

RQ1: What is the affective organizational commitment, continuance organizational commitment, and normative organizational commitment among a sample of registered sonographers in the Mid-Atlantic region of the United States?

RQ2: Is there a relationship between affective, continuance, and normative commitment and the following sociodemographic characteristics: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting?

RQ3: Is affective, normative, and continuance organizational commitment affected by perceived organizational support after controlling for sociodemographic variables?

Data and Analytical Approach

This quantitative study uses a cross-sectional research design to measure the three organizational commitment components of sonographers, identify any relationship between each commitment component and certain sociodemographic variables, and identify the effect of a sonographer's perceived organizational support on the

commitment components they possess. Data were collected from a sample of registered sonographers residing in the Mid-Atlantic region of the United States: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia, using systematic sampling to select sonographers from the ARDMS database. This database, managed by Infocus Marketing, Inc., includes registered diagnostic medical sonographers (RDMS), registered diagnostic cardiac sonographers (RDCS), and registered vascular technologists (RVT). The study sample was mailed a research packet, consisting of a consent letter, surveys, an ink pen, and a postage paid return envelope. A second survey packet was sent to all non-respondents 8 weeks after the initial mailing due to a low response rate.

The Affective Commitment Scale, Continuance Commitment Scale, and Normative Commitment Scale were used to measure organizational commitment, and organizational support was measured with the Survey of Perceived Organizational Support. Data from the surveys was entered in the latest version of the IBM Statistical Package for the Social Science (SPSS version 27) software. Descriptive statistics, multiple regression using stepwise approach, and hierarchical multiple regression were used to evaluate the research questions posed.

Chapter Summary and Organization of Dissertation Proposal

Chapter 1 gave a brief overview about the sonography profession and the roles, responsibilities, and education of a sonographer. It also highlighted in-patient sonography utilization statistics and the importance of identifying and considering antecedents that influence the organizational commitment of employees.

Underrepresented in previous studies of organizational commitment, sonographer's organizational commitment has not been studied. Chapter 1 also describes the need to conduct a study evaluating sonographers and organizational commitment that will fill the present gap. Indicating the study's purpose and research questions helps to affirm the statistical analyses being used supports both. Chapter 2, titled Literature Review, discusses the historical definitions of organizational commitment, the conceptual framework guiding this study, organizational commitment instruments used in the past, studies on organizational commitment, and the literature on organizational commitment and perceived organizational support. Chapter 2 also illustrates the lack of research on organizational commitment in the sonography profession, thus aiding in the need for the current study. Chapter 3, titled Methodology, discusses the research problem and design and lists the research questions and hypotheses, the sample and sampling method, the data collection procedures, the analysis of the study's instruments, study variables, and statistical analysis to be performed to include data entry, scoring, and evaluation. Lastly, references and appendices conclude the dissertation.

Chapter 2: Literature Review

This chapter summarizes the literature concerning the various conceptual definitions of organizational commitment, introduces the conceptual model guiding this research study, discusses instruments used to measure organizational commitment, summarizes studies conducted on organizational commitment, and introduces the relationship between organizational commitment and perceived organizational support.

Historical Development of Organizational Commitment

The Hawthorne studies are considered the first organizational research studies that focused on productivity and attitude in an assembly room environment (Mannevu, 2018). Conducted from 1924 to 1933, the work environment consisted of young women selected to work in a relay assembly room. From a human resources perspective, Hawthorne studies focused on the adaptivity of workers with the goal of characterizing workers as either problematic or adaptive team players who showed cooperation (Mannevu, 2018). Later, studies on job satisfaction and job performance relationships emerged. Then, researchers began to look at attitudinal concepts like organizational commitment.

In the past, the construct of organizational commitment has been identified as two separate entities: behavioral commitment and attitudinal commitment. Mowday, Porter, and Steers (1982) distinguished the two, stating that behavioral commitment focuses on “the process by which individuals become locked into a certain organization

and how they dealt with this problem” (p. 26) and attitudinal commitment “is the process by which people come to think about their relationship with the organization” (p. 26).

Attitudinal commitment, referenced hereafter as organizational commitment or commitment, focuses on the *mindset* that reflects a desire, a need, and an obligation to maintain membership in an organization (Meyer & Allen, 1987). Organizational commitment has been the topic of numerous studies across a variety of disciplines, particularly among behavioral scientists and individuals managing employees. Consequently, there have been numerous definitions of organizational commitment based on the researcher’s discipline.

Kanter (1968) stated that organizational commitment is “the willingness of social actors to give their energy and loyalty to social systems” (p. 499), meaning employees do not mind working for and supporting their employer. Brown (1969) noted that commitment “includes something of the notion of membership” (p. 347). Others describe commitment as a linkage or relationship between an employee and employer. Hall, Schneider, and Nygren (1970) described that commitment as “the process by which the goals of the organization and those of the individual become increasingly integrated or congruent” (p. 276).

Additionally, Porter et al. (1974) conceptualized organizational commitment in three ways: a strong belief or accepting organizational beliefs and values to be congruent with one’s own, the willingness to put forth energy and effort into the organization, and the desire to maintain a relationship or linkage with the organization (p. 604). Similarly, Sheldon (1971) stated that “commitment is an attitude toward the

organization which links and attaches the identity of the person to the organization” (p. 143). Hrebiniak and Alutto (1972) identified organizational commitment as “a structural phenomenon which occurs as a result of individual-organizational transactions” (p. 556). Porter et al. (1974) stated that organizational commitment is also “the relative strength of an individual’s identification with and involvement in a particular organization” (p. 604) which is very similar to Sheldon’s (1971) definition. As the conceptualization of organizational commitment evolved, the most referenced and widely accepted conceptualization of organizational commitment is that of Meyer and Allen, which describes organizational commitment as having three separate components: affective commitment, normative commitment, and continuance commitment.

Organizational commitment has been investigated extensively over the past five decades. Porter and Smith (1970) presented an initial paradigm directly stating that an employee was either committed or not committed. Using a two-dimensional model, Porter and Smith created an instrument called the Organizational Commitment Questionnaire that measured psychometric properties encompassing attitudinal commitment. Mowday et al. (1982) elaborated on this two-dimensional model in 1970 (as cited in Mowday et al., 1979, p. 1).

According to Mowday et al. (1982), organizational commitment should be considered more globally, which shows attachment to the employing organization not just to the individual job or specific assigned tasks. This view is supported by Porter et al.’s (1974) who emphasized that a greater amount of time will be required for an employee to determine their organizational commitment. This time requirement was not

supported in Meyer and Allen's 1987 study. They noted that, despite the stability seen in the organizational commitment questionnaire scores, there was evidence of a significant decline overall in commitment during the first 9 months of employment (Meyer & Allen, 1987). Mowday et al. (1979) also determined that organizational commitment is different and more stable than job satisfaction, acknowledging job satisfaction is formed quickly at a specific moment in time as being based on immediate reactions to specific aspects of an employee's work environment (i.e., pay, supervision, etc.).

Mowday et al.'s two-dimensional model was later expanded by Meyer and Allen into a three-dimensional model of commitment. Meyer and Allen proposed that commitment overall was comprised of three components, thus allowing for the differences among the components to be acknowledged (Allen & Meyer, 1990). These components are discussed in their conceptual framework of organizational commitment.

Organizational Commitment Conceptual Framework

Allen and Meyer (1984, 1990, 1991, 1996, 1998) and Meyer et al. (2002) have conducted numerous studies on organizational commitment. Their paradigmatic three-component model focuses on three psychological commitment components possessed by employees based on their connection with their employing organization. Collectively, three components make up the complete picture of commitment to an organization.

In 1990, Allen and Meyer described three distinguishable components of attitudinal commitment. The authors focused on demonstrating a psychological linkage existing between employees and their organizations. Allen and Meyer also developed and validated measures for each while demonstrating how the components linked to

variables from previous research as antecedents to organizational commitment (Mowday et al., 1979; Steers, 1977).

Organizational commitment: Three component model. Affective commitment describes employees' emotional attachment to their organization and to the work conducted. Employees identify with the organization's goals and values and possess a sense of fitting in. Employees demonstrating strong affective commitment remain with the organization because they desire to be there (Allen & Meyer, 1996). Studies have shown that the work experiences encountered are a major influence on an employees' commitment to the organization. Employees who are happy with their work-life experience will possess a higher score of affective commitment (Meyer, Irving, & Allen, 1998; Santos, Chambel, & Castanheira, 2016; Steers, 1977). Similarly, this commitment component also shows that employees have affection for their job.

Continuance commitment refers to the connection developed after all costs of leaving an organization has been evaluated. These costs may include the loss of seniority, job title, pay, and friendships (Allen & Meyer, 1996; Meyer & Allen, 1997). Other factors are time-based such as age and tenure (Allen & Meyer, 1996; Meyer & Allen, 1997). Continuance commitment aligns with Becker's side bet theory and what is known in the literature as calculative commitment. Employees identifying with this commitment component will remain with an organization because they feel the need to after calculating the costs of leaving (Allen & Meyer, 1996).

A third component of Allen and Meyer's three component model of commitment is **normative commitment**. Discussion of the Normative Commitment Scale (NCS)

surfaced in Meyer and Allen's 1990 article titled "The Measurement and Antecedents of Affective, Continuance, and Normative commitment to the Organization." Normative commitment is based on a sense of obligation to the organization and is influenced by experiences both prior to and upon entry into an organization (Allen & Meyer, 1990). Normative commitment prevails even when an employee is unhappy in their organization or has the desire to pursue other opportunities because of the employee's sense of obligation to the organization.

Although the three components of commitment presumably increase the likelihood that employees will remain with the employing organization, employees' motive for remaining, reflecting behaviors, and productivity levels will differ based on which component is possessed in higher amounts by the employee. A diagram of Allen and Meyer's conceptual model of organizational commitment is illustrated in Figure 1.

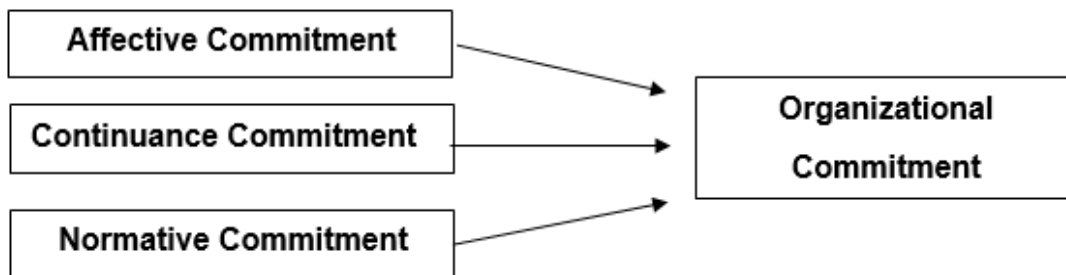


Figure 1. Allen and Meyers' three component model of organizational commitment.

Historical Organizational Commitment Instruments

The literature reveals that various instruments have been used to measure organizational commitment. However, many of these studies failed to report the instrument's reliability and validity and/or reported a low correlation coefficient (r). For example, Grusky's (1966) study on career mobility and organizational commitment

reported a correlation coefficient of 0.15. Their study used a four-item scale that consisted of seniority, identification with the company, attitudes toward company administrators, and general satisfaction with the company.

Revising 1969 Ritzer and Trice's scale in an attempt to measure Becker's side-bet theory on commitment, Hrebiniak and Alutto (1972) asked 318 schoolteachers and 395 registered nurses if they would leave their organizations under 12 conditions like an increase in pay, freedom to be personally creative, enhanced status, ability to work with people who are friendlier, etc. In this study, a Spearman-Brown reliability estimate for the 4-item scale was reported at 0.79, but no other reliability or validity data was reported (Ritzer & Trice, 1969). Others like Gouldner (1960); Hall, Schneider, and Nygren (1970), and Buchanan (1974) also failed to report the reliability or validity data for the measures used in their studies.

Despite the aforementioned scales lacking a robust evaluation, Mowday et al.'s (1979) Organizational Commitment Questionnaire (OCQ) was the most prevalent organizational commitment scale used in research until the development of Allen and Meyer's three commitment scales (ACS, NCS, CCS). Mowday et al.'s (1979) instrument incorporated components of their organizational commitment definition that organizational commitment is "the relative strength of an individual's identification with and involvement in a particular organization" (p. 604). Similarly, all of Allen and Meyer's 1990 scales complement their three-component model and their definition that organizational commitment is a mindset that reflects a desire, a need, and an obligation to maintain membership in an organization (Meyer & Allen, 1987).

Organizational Commitment Studies

Many correlational studies have been conducted confirming variables/antecedents (causes) as well as subsequent behaviors (outcomes) associated with organizational commitment. Steers (1977) demonstrated three major antecedents of organizational commitment: personal characteristics, job- or role-related characteristics, and work experiences. These three categories were later confirmed by Mowday et al. (1982) as antecedents of affective commitment.

Personal characteristics are those defining the employee: age, education, opportunity for achievement, role tension, and central life interest (Steers, 1977). These were assessed via the use of the Manifest Needs Questionnaire (MNQ). **Job characteristics** are those factors that would influence the commitment of employees to their employers. These variables consisted of job challenge, opportunities for social interaction, and the amount of feedback that is provided on the job by the employer. These were assessed using the Hackman and Lawler 1971 scale (Steers, 1977). The last antecedent group was **work experience**, which was assessed via the instrument developed by Buchanan in 1974. Work experience was considered the major antecedent influencing the psychological attachment that an employee will have with his or her employer. Steers' (1977) hypothesized preliminary model suggested how the antecedents are influences on commitment and how commitment leads to certain behavioral outcomes. He assessed participants' commitment using the Organizational Commitment Questionnaire (OCQ) developed by Porter et al. (1974). Some of the

variables for each antecedent are listed in Table 1 and Steers preliminary model is seen in Figure 2 (Steers, 1977).

Steers' study consisted of two sample groups. One sample consisted of technical and nontechnical employees from a major Midwestern hospital who had an average age of 35, an average tenure of 8 years, and educational backgrounds ranging from high school diplomas through Master's degrees (Steers, 1977). The second sample consisted of research scientists and engineers who held various technical and administrative positions at a major independent research laboratory. The scientist and engineers had an average age of 38, an average tenure of 10 years, and educational backgrounds ranging from bachelor's through doctoral degrees (Steers, 1977).

Table 1

Proposed Antecedents of Organizational Commitment

Personal Characteristics	Job Characteristics	Work Experiences
Age	Job challenge	Group attitude toward the organization
Opportunities for achievement	Opportunities for social interactions	Organizational dependency and trust
Education	Amount of feedback provided on the job	Perceptions of personal investment and personal importance to an organization
Role tension		
Central life interest		Rewards or the realization of expectations

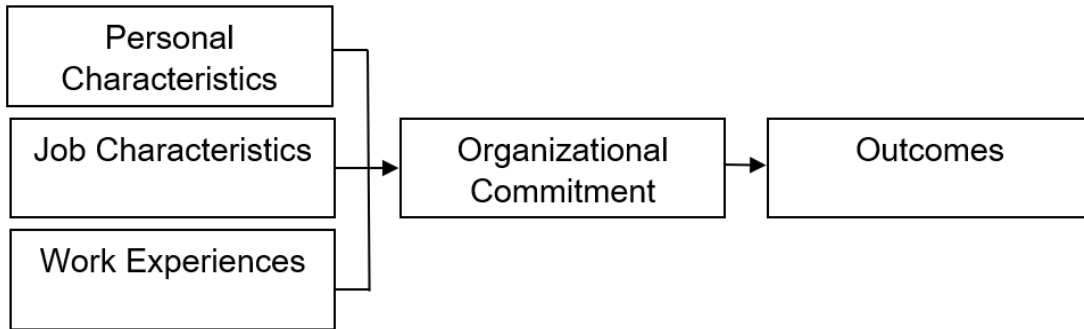


Figure 2. Steers' preliminary model of antecedents to commitment subsequent outcomes.

Steers used stepwise multiple regression analyses using the variables from each antecedent category as independent variables; commitment was the dependent variable. The regression showed that a substantial portion of the variance was attributable to the independent variables. In assessing the strength of each antecedent's influence on organizational commitment, he confirmed that all three sets of antecedents were significantly related to commitment. Work experience was most closely related to organizational commitment. Experiences found to influence commitment include the employee's sense of working for a dependable and trustworthy employer, the overall attitude that employees have for their employing organization, an employee's personal investment, their sense of importance within the organization, and their rewards for being an employee at the organization (Steers, 1977).

Becker (1960) noted one contradiction in previous studies. Becker (1960) demonstrated individuals established commitment because of personal investments or side bets (like Meyer and Allen's continuance commitment) more so than solely work experiences. Becker's side bets are considered anything of value to the employee that

is unrelated to their job but for which the employee has associated with their job. For instance, one may feel that changing jobs too often establishes their trustworthiness and dependability as side bets. If an opportunity presents for a better position just a month after starting a job, the individual may be reluctant to leave their current position for fear of loss of reputation of trustworthiness and dependability. Becker felt that people became committed to organizations or what he refers to as “lines of activity” based on the side bets that were created during linkages with the lines of activity. Becker (1960) also stated that these side bets are “often a consequence of the person’s participation in social organizations” (p. 32).

In 1984, Meyer and Allen developed a study to test the Ritzer and Trice Scale (R-TS), Hrebiniak & Alutto Scale (H-AS) and the interpretation of studies using Becker’s 1960 side-bet theory as a foundation. The R-TS consists of 15 items that measured continuance commitment. This instrument, however, was noted by its creators as having issues in assessing its reliability and validity (Ritzer & Trice, 1969). The H-AS scale is a six-item work related trust scale that has correlated trust with organizational commitment (Cook & Wall, 1980). Meyer and Allen were particularly interested in the strength of the relationship between scores on the R-TS and H-AS and age and tenure (length/time) in an organization because they were considered correlations to side bets. They placed emphasis on age, stating that “rather than indicating that older employees become increasingly locked in or continuance committed, the correlations may reflect an increase in affective commitment with increasing age and experience” (Meyer & Allen, 1984, p. 373).

Meyer and Allen (1984) emphasized that while the R-TS and H-AS were intended to measure continuance commitment, they could have been measuring affective commitment instead. The uncertainty of which commitment was been measured led Meyer and Allen to develop the Continuance Commitment Scale (CCS) and the Affective Commitment Scale (ACS) for their 1984 study.

The ACS was developed to “assess the commitment characterized by positive feelings of identification with, attachment to, and involvement in the work organization” (Meyer & Allen, 1984, p. 375). The CCS was developed to “assess the extent to which employees feel committed to their organization by virtue of the costs that they feel are associated with leaving” (Meyer & Allen, 1984, p. 375). Meyer and Allen (1984) discovered that the Ritzer and Trice Scale (R-TS) and Hrebiniak & Alutto Scale (H-AS) measured different commitment constructs. R-TS and H-AS measured affective commitment primarily rather than continuance commitment. They also found that age and tenure were significantly correlated with the organizational commitment questionnaire and the affective commitment scale. Utilizing age and tenure as variables in any commitment study also aligns with Porter et al.’s (1974) and Steers’ (1977) suggestion that employees who are older and have been employed longer will have a stronger affective commitment to the organization for which they are employed.

Because work experiences of respondents were not included in previous research, Meyer et al. (1998) added the influence of work values and work experiences on organizational commitment in a study of university graduates who had accepted full-time employment with various companies. They particularly assessed how important

specific work characteristics/experiences were to participants 1 month prior to them starting their job with their employers. They documented change via questionnaires mailed to participants 1, 6, and 12 months after they started their jobs. The characteristics and experiences consisted of the items listed in Table 2 (Meyer et al., 1998).

Table 2

Items Defining the Value and Experience Measures

Comfort and Security	Competence and Growth	Status and Independence
Permits a regular routine in time and place of work	Requires meeting and speaking with many other people	Permits advancement of high administrative responsibility
Provides job security	Is intellectually stimulating	Provides the opportunity to earn a high income
Has clear-cut rules and procedures to follow	Requires originality and creativeness	Requires supervising others
Provides ample leisure time off the job	Makes a social contribution by the work you do	Permits working independently
Provides comfortable working conditions	Satisfies your cultural and aesthetic interests	Is respected by other people
	Encourages continued and development of knowledge and skills	Requires working on problems of central importance to the organization
	Permits you to develop	

Comfort and Security	Competence and Growth	Status and Independence
	your own methods of doing the work	Gives you the responsibility of taking risks
	Provides a feeling of accomplishment	
	Provides change and variety in duties and activities	

Note. Adapted from “Examination of the combined effects of work values and early work experiences on organizational commitment” by John P. Meyer, P. Gregory Irving, and Natalie J. Allen, 1998, *Journal of Organizational Behavior*, 19, p. 229-52, Copyright 1998 by John Wiley & Sons, Ltd.

Meyer et al.’s (1998) research utilized multiple regression analyses to test the main and interaction effects of person (moderator) and situation variables in the prediction of commitment measured 1 year after the graduates began with their employers. Based on person-job fit literature, which states that work values shape how people view experiences, the work values in this study were treated as moderators. Meyer et al.’s (1998) methodological process was based on discoveries from theoretical arguments and empirical findings that showed work experiences to have a stronger impact on affective commitment among employees who placed greater value on those experiences.

Meyer et al.’s. (1998) study concerned the effects of work values and work experiences on normative, continuance, and affective commitment and confirmed that

competence and growth-related experiences are rated most important among their participants. To assess values prior to entry and the post-entry work experiences, the researchers in this study used *Manhardt's Work Value Inventory* and the *Organizational Commitment Questionnaire*, respectively. Their statistical analysis consisted of a hierarchical regression analysis with affective commitment as the outcome; the results showed variables associated with work experiences accounting for the variance in affective commitment. The researchers expected work values and work experience to not account for much variance in continuance commitment and this was indeed the case in their research. Their research also showed that the effect of work values and work experience on normative commitment was weaker overall than for affective commitment. The only variance that was significant related to normative commitment and appeared in the 6- to 12-month time lag. Overall, the results of Meyer et al.'s (1998) study supported the hypothesis "that affective commitment would be stronger among those who had positive early work experiences" (Meyer et al., 1998, p. 41).

In aligning with the concept that organizational commitment develops over time, several longitudinal studies have been conducted focusing on organizational commitment as it relates to behaviors, antecedents, and attitudes within various work environments (Abdelmoteleb, 2018; Galais & Moser, 2009; Garland, Lambert, Hogan, Kim, & Kelley, 2014; Schalk, 2011).

Although, the most recent definition of commitment seen in Meyer and Allen's 1997 work collectively expresses the definition more broadly by stating "affective, continuance, and normative commitment are psychological states that characterize the

person's relationship with the entity in question and have implications for the decision to remain involved with it" (p. 93). The statement and views of this study is based on Meyer and Allen's earlier conceptualization of the definition of commitment because it appears to be more elaborate. Their initial definition states that commitment is a mindset that reflects a desire, a need, and an obligation to maintain membership in an organization (Meyer & Allen, 1987).

Organizational Commitment Studies in Health Care

Although organizational commitment is an important topic in various professions, little research has been conducted to examine radiologic technologists' commitment to their employing organization. As noted previously, commitment is seen and evaluated in the context of a particular organization and/or work environment. It is important to narrow search topics to specific disciplines such as "organizational commitment and sonographer," "organizational commitment and radiographers," "organizational commitment and radiation therapists," "organizational commitment and occupational therapists," "organizational commitment and nurses," "organizational commitment and nuclear medicine technologist," etc. to obtain information related to that discipline. Three separate searches were conducted to locate articles related to the topic of this study. Initially, a Virginia Commonwealth University library search from 1974 to 2021 was conducted resulting in no journal articles related to organizational commitment of sonographers or nuclear medicine technologists. The same search was also conducted via PubMed and CINAHL.

Organizational commitment of allied health professionals and nurses. Two articles were found related to occupational therapists and organizational commitment. The first, conducted in 1998 by Painter and Akroyd, focused on the significance of work rewards (i.e., intrinsic and extrinsic) as predictors of organizational commitment in an ambulatory care and hospital setting. Specifically, the extrinsic rewards included working conditions, salary, and supervision; the intrinsic rewards were task autonomy and task involvement, all of which were the independent variables of the study (Painter & Akroyd, 1998). Their sample consisted of 237 occupational therapists who were members of the American Occupational Therapy Association (AOTA) working in South Carolina, North Carolina, and Virginia. Instruments used included a demographic questionnaire, Mowday et al.'s 1979 Organizational Commitment Questionnaire and a modified scale of Mottaz' 1981 extrinsic/intrinsic rewards questionnaire. Forced multiple regression was used and confirmed that 52% of the variance was accounted for by the independent variables in the ambulatory care setting and 41% in the hospital setting. Several of their findings aligned with Steers' (1977) concepts. General working conditions, task involvement, task autonomy, and supervision positively affected organizational commitment among occupational therapists.

Seruya and Hinojosa (2010) took a different approach to examine the professional and organizational commitment among 157 occupational therapists. Previous research has used correlational methodology designs; Seruya and Hinojosa's study used a quasi-experimental, non-equivalent group design incorporating a snowballing recruitment technique. Although this sampling technique has the advantage

of recruiting large numbers of participants, it is not random and requires researchers to consciously ignore their knowledge of their sample and the generalizability to a specific population (Creswell, 2002). This study also used the Organizational Commitment Questionnaire. According to Seruya and Hinojosa (2010), occupational therapists working in a medical setting had a significantly higher level of organizational commitment than did their counterparts employed in a school-based setting. Their finding aligned with the social identity theory which was the foundation of their study. Social identity theory states that self categorization or “taking on an identity helps us to understand who we are in relation to others” (Seruya & Hinojosa, 2010, p. 131). The researchers further stated that occupational therapists who worked in the medical setting were around other professionals in which they can be easily identified. Therapists who worked in school-based settings often worked with few to no other occupational therapists.

As expected, the nursing profession had examined organizational commitment extensively. Literature review was restricted to those published in the 21st century that could add merit to this research study.

McNeese-Smith and Nazarey (2001) performed a qualitative study consisting of semi-structured interviews of 30 staff nurses from a large Los Angeles county university hospital. Nine themes emerged that were identified as contributors of creating organizational commitment, and nine other themes, such as lack of appreciation, lack of job security, etc., were identified as factors that caused a decrease of organizational commitment. These themes are shown in Table 3 (McNeese-Smith & Nazarey, 2001).

Overall, these themes can easily be aligned with the antecedents of organizational commitment that Steers formulated in 1977.

Table 3

Themes That Create OC/Lack of OC for Nurses

Creating Organizational Commitment	Dismantling of Organizational Commitment
Personal factors	Conflict with personal needs
Opportunities for learning and continued education	Lack of learning
Job satisfaction	Lack of appreciation/fairness
Plan to retire from organization	No category identified
Monetary benefits	Inadequate monetary benefits
Patient care	Patient care
Coworkers	Poor relationship with coworkers
Cultural factors	Career development stage
Job security	Lack of job security

Conflicting information was found by Wu and Norman (2006) in their research on final year degree student nurses in China ($n = 71$). The researchers' aim was to explore the relationships between job satisfaction and organizational commitment, role ambiguity and conflict, and demographic variables associated with retention of nurses within the Chinese healthcare workforce. This quantitative research study employed a cross-sectional correlational design and used the Job Satisfaction Scale, Organizational Commitment Scale, and Role Conflict and Ambiguity Scale. Wu and Norman (2006)

found that student nurses were highly committed to the Chinese health care service, and 92% of the participants reported a willingness to put more effort into promoting the health of Chinese people. Correlations between job satisfaction, organizational commitment, role conflict, and ambiguity were found. The positive correlation between these variables indicated that student nurses who are more satisfied with nursing as a job were also more committed to the health care service.

Although the results indicate that this study's participants did not experience high levels of role conflict and role ambiguity, the findings may not be equivocal to studies conducted in the U.S. or studies that used employees at organizations (Wu & Norman, 2006). It may also be important to compare the environment Chinese students are in as it relates to clinical sites and organizations within their educational career paths.

Organizational commitment of radiologic technologists. Two articles were found related to radiographers and organizational commitment. Makanjee, Hartzler, and Uys (2006) examined the extent to which perceived organizational support (POS) influenced the commitment of 119 radiographers from the Tshwane metropolitan region of Gauteng, South Africa. Makanjee et al.'s descriptive correlation design utilized 17 items from Meyer and Allen's organizational commitment scale and other scales to gather and interpret their findings. The results showed a moderate level of affective and continuance commitment among their participants while normative commitment was considered low (Makanjee et al., 2006).

Akroyd et al. (2007) conducted a study focused on the predictive ability of organizational leadership, work role, and demographics variables on the organizational

commitment of ARRT registered radiographers ($N = 456$) in the U.S. Among other scales, Meyer and Allen's organizational commitment scale was also used. The results showed that organizational support, role clarity, transformational leadership behaviors by supervisors, and educational levels exhibited significant and positive coefficients ($p < 0.05$) (Akroyd et al., 2007). The model demonstrated that 50% and 40% of the observed variance of affective and normative commitment, respectively, were accounted for by the linear combination of the independent variables. The researchers noted that although the regression model was significant, continuance commitment accounted for only 7% of the variance. It should be assumed that other variables not included in the model might provide better prediction in future research. They also found that participants with certificates or associate degrees had higher levels of continuance commitment than those participants with bachelor's or Master's degrees (Akroyd et al., 2007).

Akroyd et al. (2009) examined the predictive ability of organizational support, role ambiguity, role conflict, and managerial leadership on the organizational commitment of 176 ARRT registered radiation therapists. The study included covariates such as the number of years certified as a therapist, educational level, and call requirement. The cross-sectional predictive research design utilized questionnaires to measure organizational variables, organizational support, role ambiguity and role conflict. The statistical analysis consisted of multiple regression analysis to determine how much variance in each dependent variable (three components of commitment) accounted for the variance in the independent variables. Like Akroyd and colleagues' 2007 study of

radiographers, the results indicate that increased organizational support and high levels of supervisory transformational leadership behaviors were associated with higher levels of affective and normative commitment (52% and 40% of the variance, respectively). When analyzing continuance commitment, the model found that only 17% of the variance was accounted for by the independent variables. Thus, other factors not included in the model may provide a better prediction in future research (Akroyd et al., 2009).

Organizational Commitment and Perceived Organizational Support

Several studies related organizational commitment with perceived organizational support (POS) via a social exchange theory approach. A meta-analysis conducted by Meyer, Stanley, Herscovitch, and Topolnytsky (2002) identified strong correlations between normative organizational commitment and perceived organizational support in studies conducted outside North America. Their findings also showed that perceived organizational support had the strongest positive correlation with affective commitment. Meyer and colleagues' findings are consistent with those of Eisenberger, Huntington, Hutchinson, and Sowa (1986) and Shore and Tetrick (1991). Eisenberger et al. argued that organizations must possess a supportive work environment just to have affectively committed employees. Shore and Tetrick's longitudinal study focusing on employee attitudes confirmed a strong correlation between organizational commitment and perceived organizational support based the social exchange theory. Their confirmatory factor analysis also supported the notion that the Survey of Perceived Organizational

Support (SPOS) is empirically distinct from affective commitment measured by the Affective Commitment Scale.

Like organizational commitment, perceived organizational support is attitudinal. Perceived organizational support is an employee's perception about the extent to which the organization for whom they work values their contribution and cares about their well-being (Eisenberger et al., 1986). Eisenberger et al. (1986) found that employees form global beliefs about their organization's commitment to them. They also noted that perceived organizational support can be increased or influenced by various leadership behaviors and the receipt of praise and approval. Similarly, Mowday et al. (1982) also noted that the satisfaction of needs by way of praise and approval is a determinant of affective commitment.

Shore and Tetrick (1991) discussed how employees expect for their needs to be fulfilled by the organization for which they work—unfilled needs lead to lowered organizational commitment. Eisenberger et al. (1990) studied 422 hourly employees and 109 managerial employees to examine the relationship of perceived support with expressed affective attachment. Items from both the OCQ and the ACS were used to assess commitment, and the Survey of Perceived Organizational Support was used to assess perception of support. Employees with high perceived support expressed greater affective attachment to the organization; perceived support was also noted as being positively related to material and social rewards (Eisenberger et al., 1990).

Chapter Summary

The literature reveals little consensus in the definition of commitment to an organization, referred to as organizational commitment. Researchers Allen and Meyer's (1996) three component model has shown organizational commitment to be a multidimensional construct derived from an effort to identify themes and commonalities that were seen in existing definitions of commitment (Meyer & Allen, 1997). Their model consisted of attitudinal commitment, normative commitment, and continuance commitment, all of which are collectively possessed in varying degrees in one employee. The three-component model and the three distinct scales have shown to be a valid substitution to Porter and Smith's 1970 commitment model and the elaborated version conducted by Mowday et al. in 1982. Several studies have shown antecedents that are associated with increases in each of the components of organizational commitment. Studies have shown age, education, work experiences, organizational tenure, and an employee's perception of support from their employee to account for the variance seen in the components of organizational commitment. Identifying the organizational commitment of sonographers and documenting and revealing the relationship between each component and various sociodemographic characteristics is an important part of this study's purpose and research questions. Additionally, reporting the effect of perceived organizational support on organizational commitment among sonographers aligns with the purpose and research questions of this study as well.

Chapter 3 discusses the methodology used to yield important and reliable evidence that aligns with the study's purpose and research questions.

Chapter 3: Methodology

This chapter describes the research problem and design; lists the research questions and hypotheses; and provides the sample and sampling method, data collection methods and procedures, the analysis of the study's instruments, the study variables, and the statistical analyses performed.

This purpose of this study was to examine the organizational commitment of sonographers, the relationship of sociodemographic characteristics on organizational commitment and the effect of perceived organizational support on organizational commitment. Specifically, this research first determines the organizational commitment scores of sonographers in the Mid-Atlantic region of the U.S. and analyzed how these scores were impacted by the following: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, organizational tenure, employment status, sonographer position tenure, marital status, environment setting, and perceived organizational support. The Mid-Atlantic region included the following states: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.

Research Problem

Across various disciplines, many studies have been conducted based investigations on Meyer and Allen's multi-dimensional conceptualization of

organizational commitment. These studies' results are not generalizable to sonographers because sonographers have different responsibilities and scope of practice as imaging professionals. Sonographers are the only imaging professionals in the U.S. responsible for creating a preliminary report of their findings for every examination performed. They spend most of their time working independently with their patients, and they must be well-rounded in human anatomy to recognize sonographic anatomy. Although anatomy should be recognized based on location in the body, sonographic anatomy consists of different hues of grays, echotextures, and brightness that must also be considered. A sonographer's responsibilities and culture include detection of abnormalities and preliminary diagnosing as they are responsible for effectively communicating with the radiologist/physician via a preliminary report.

According to the Bureau of Labor Statistics (2018b), the national estimate for the sonography occupation is 71,130, which is a little over one-third of that for radiologic technologists (205,590) in the United States. If the sonography profession is expected to withstand the 24% growth (average growth for other occupations is 7%) projected by the Bureau of Labor Statistics, sonographers need to remain in the profession.

Constructing a study to determine the organizational commitment scores of sonographers and influencing sociodemographic characteristics was useful due to the discovery of a mere absence and underrepresentation of sonographers in past studies that focused on organizational commitment. It cannot be assumed that the findings from other health care professions or those conducted within the radiologic

sciences/technology of radiography and radiation therapy are equivalent and generalizable to sonographers.

Research Design

Using a multiple component survey, this quantitative, cross-sectional design measured the organizational commitment scores of sonographers and determined the impact of sociodemographic variables and perceived organizational support. This was a nonexperimental correlational research design because the researcher studied the effects of a potential *cause* that was not be manipulated and took the participants as they were (Creswell, 2002; Polit & Beck, 2017). This design is also referred to as an explanatory design.

Creswell (2002) stated that “explanatory” research design has the following characteristics also seen in this study:

1. Two or more variables are correlated
2. Data are collected at one point in time
3. Study participants are analyzed as a single group
4. At least two scores are obtained from each participant in the group
5. Correlational statistical test is reported in the data analysis
6. Interpretations and conclusions are made from the statistical test results

The goal of correlational/explanatory research is to predict scores and examine and explain the relationship between variables (Creswell, 2002; Polit & Beck, 2017). A **correlation** is a relationship or association between two variables; hence, the variation in one variable will be related to the variation in another variable. Correlation research

also seldom controls the independent variable; therefore, in this study, independent variables are referred to as *predictors*, and dependent variables are referred to as the *outcome* variable (Field, 2009). Survey research is flexible, can focus on a wide range of topics, and tends to be relatively superficial and not probe deep into human complexities (Polit & Beck, 2017). Surveys also emphasize what people do and allow for the collection of data in a number of ways. Self-administered postal surveys were used to achieve this study's goals.

Research Questions and Hypotheses

The following three research questions and corresponding hypotheses guided this study:

1. What is the affective organizational commitment, continuance organizational commitment, and normative organizational commitment among a sample of registered sonographers in the Mid-Atlantic region of the United States?

There was no hypothesis for this question since the goal is to calculate and describe the scores of each commitment per study participant.

2. Is there a relationship between affective, continuance, and normative commitment and the following sociodemographic characteristics: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting?

Hypothesis: The relationship between sociodemographic variables and commitment is greater than zero with 95% confidence.

Null hypothesis: The relationship between sociodemographic variables and commitment is zero with 95% confidence.

3. Is affective, normative, and continuance organizational commitment affected by perceived organizational support after controlling for sociodemographic variables?

Hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is greater than zero with 95% confidence.

Null hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is zero with 95% confidence.

Sample, Sampling Method, Inclusion/Exclusion Criteria and Sample Size

The sample (target population) of this study consisted of sonographers residing in the Mid-Atlantic region of the United States registered by the American Registry for Diagnostic Medical Sonography (ARDMS) as either a registered diagnostic medical sonographer (RDMS), a registered diagnostic cardiac sonographer (RDCS), or a registered vascular technologist (RVT). Probability sampling was used and involved selecting participants from a population who are representative of the population; it is considered the most rigorous form of sampling in quantitative research (Creswell, 2002; Polit & Beck, 2017). A sampling frame is the name of the list from which participants are chosen (Polit & Beck, 2017). In this case, probability sampling using systematic sampling was conducted by InFocus Marketing, Inc. to select 1,000 ARDMS registered sonographers residing in the U.S. Mid-Atlantic region for participation in the study. The systematic sampling strategy consisted of choosing every 3rd and 5th individual in the

sampling frame. InFocus Marketing, Inc. was the company that handled registrant personal information for the ARDMS. InFocus Marketing Inc. utilized Infocus proprietary software to systematically select 1,000 candidates from a pool of 1,548 (sampling frame) candidates were eligible as of June 2020. Creswell (2002) noted that systematic sampling is not as precise and rigorous as using simple random sampling. However, it is convenient and does not require random number generation. Additionally, systematic sampling yields essentially the same results as simple random sampling but is more efficient (Polit & Beck, 2017).

To enhance the construct validity and assure that the sample was a good exemplar of the population construct, the researcher used the following as inclusion criteria: ARDMS registered sonographer, residing in the Mid-Atlantic region of the U.S., and currently employed as a sonographer for at least one year with their current employer. Sonographers whose title is educator, lead, manager, supervisor, or application specialists were excluded from the study. The rationale for including sonographers with at least one year of experience is that, as the literature states, there are likely fluctuations in commitment within the first 9 months (Meyer & Allen, 1987). Similarly, it is important to identify the job title of study participants because the literature has shown that the commitment components of individuals in these positions is developed and impacted differently by sociodemographic variables.

No relationship between variables indicates that a null hypothesis is probably true (Polit & Beck, 2017). Rejecting a true null hypothesis or accepting a false null hypothesis are two types of errors. Rejecting a null hypothesis that is true is known as a

Type I error or a false positive conclusion (Polit & Beck, 2017). Conversely, accepting a null hypothesis when it should have been rejected is known as a Type II error or a false negative conclusion (Polit & Beck, 2017). Selecting a level of significance (α) controls the risk of committing a Type I error. Beta (β) is the probability of a Type II error occurring and its complement ($1 - \beta$) is the power of a statistical test in detecting a true relationship (Polit & Beck, 2017). Power analysis is used to reduce the risk of Type II errors and to achieve statistical conclusion validity of the study by calculating an *a priori* sample size (Polit & Beck, 2017).

Effect size is usually not known and is estimated based on the researcher's hypothesis about how strong the variable relationships are (Polit & Beck, 2017). Denoting small (0.02), medium (0.15), or large (0.35) for an effect size is more common among researchers (Polit & Beck, 2017). Particularly in nursing studies, small to medium effects have been used. *A priori* sample size estimates for this study were calculated by using the *a priori* sample size calculator for multiple regression taken from the Daniel Soper website. The parameter values used to determine the sample size (N) of 156 were as follows (Soper, 2020): α (probability level) = 0.05, desired power = 0.80, medium effect size = 0.15, and 20 predictors.

To account for the number of non-respondents or an expected low response rate for mailed surveys, an additional 20% was added to the initial calculated sample size resulting in a proposed sample size of $n = 187$. To ensure a study sample size of $n = 187$, the sample population will be $N = 1,000$, in anticipating a low return rate of 19%.

However, the researcher is hopeful to have a response rate greater than 65% to yield a small risk of bias (Polit & Beck, 2017).

Recruitment Methods and Procedure for Data Collection

After applying the criteria for eligible participants and employing systematic sampling of the accessible population, the researcher purchased a mailing list of ARDMS-registered sonographers (sampling frame) from InFocus Marketing, Inc. A letter of voluntary participation, printed in colored ink, (Appendix B), which included an explanation of the study along with a demographic sheet (Appendix C), Organizational Commitment Scale (Appendix D), and the Survey of Perceived Organizational Support (Appendix E) was mailed as one complete packet. Packets were mailed on the same day to eligible participants along with a postage-paid returned envelope addressed to the researcher. To preserve anonymity but help identify respondents and nonrespondents, each survey packet and return envelope used a coding system (e.g. OC1, OC2, OC3, etc.)

Although mail surveys are less costly, allow for a larger geographically diverse sample, offer the possibility of complete anonymity, and exclude interviewer bias, they tend to result in lower response rates and bias in favor of the sample population that is interested in the survey topic (Cummings, Savirz, & Konrad, 2001; Polit & Beck, 2017). Polit and Beck (2017) recommended sending a second copy of the survey because many non-respondents may have misplaced or discarded the original. Therefore, to encourage participation, a second survey packet coded with the participants' initial code was mailed to all non-respondents 8 weeks after the initial mailing. The waves of

respondents were documented and compared based on the respondents from the initial solicitation known as wave 1, and those respondents participating after the reminder survey was mailed (wave 2).

Eight weeks after the initial mailing date, the researcher closed the study and no longer accepted participants. The number of participants relative to the number invited was reported as the response rate. Since the response rate for the study did not meet the desired sample size, the researcher will report the low response rate as a limitation for the study. Moreover, she decreased the number of predictors to maintain the study's power while lowering the required sample size. Sample bias, which was analyzed and reported, was present since all invited participants did not return their completed survey packet (Polit & Beck, 2017). The researcher stored participant data on a password-protected laptop and on a USB drive that was locked in the researcher's personal safe when not in use.

Instrumentation

Affective, Normative, and the Continuance Commitment Scales. The Affective Commitment Scale (ACS) and the Continuance Commitment Scale (CCS) were developed by Meyer and Allen in 1984. The ACS was developed to assess commitment characterized by positive feelings of identification with, attachment to, and involvement in the work organization (Meyer & Allen, 1984). It consists of eight items using a 7-point Likert scale response format of *strongly disagree* to *strongly agree* with items 4, 5, 6, and 8 reversely scored (Meyer & Allen, 1997). Median internal reliability for this measure is reported as 0.85 (Meyer & Allen, 1997).

The CCS assesses the extent to which employees feel committed to their organization after considering the costs associated with leaving (Meyer & Allen, 1984). It consists of nine items that using 7-point Likert scale response format of *strongly disagree* to *strongly agree* with items 1 and 4 reversely scored. (Meyer & Allen, 1984; Meyer & Allen, 1997). Median internal reliability for this measure is reported as 0.79 (Meyer & Allen, 1997). Meyer and Allen (1984) reported that this scale is also uncorrelated with the affective commitment scale (ACS, $r = 0.01$)

The Normative Commitment Scale was developed to assess commitment characterized based on a sense of obligation to the organization (Allen & Meyer, 1990). It consists of six items using a 7-point Likert scale response format of *strongly disagree* to *strongly agree* with item 1 reversely scored (Meyer & Allen, 1997). Median internal reliability for this measure is reported as 0.73 (Meyer & Allen, 1997). This instrument has been revised the most since its creation; the latest revised version will be used in this study. The computed mean of the three individual commitment scales will be reported individually as the commitment scores for the participants in this study. A high score is directly related to how much of the commitment component the participant possesses.

There have been very few reports on the temporal stability of these scales. Meyer and Allen (1997) stated that researchers reporting test-retest reliability estimates demonstrate commitment as being in flux during the early phases of employment. Later in employment the number begins to stabilize. Studies also indicate temporal stability to range from 0.38 to 0.94 depending on where people were in their work years (tenure). If

the organization tenure variable for this study is significant, it could confound this study and require a reduced model. For all three scales, factor analysis has determined that affective commitment, normative commitment, and continuance commitment are all distinguishable constructs and different from instruments that measure job satisfaction, career commitment, occupational commitment, and perceived organizational support (Meyer & Allen, 1997).

Survey of Perceived Organizational Support (SPOS). Previous literature indicates a correlation between the commitment construct and employees' perception of the support from their employer. The Survey of Perceived Organizational Support (SPOS) was developed by Eisenberger et al. in 1986 to align with the view that "perceived organizational support strengthens employees' effort-outcome expectancy and affective commitment to the organization, resulting in greater efforts to fulfill the organization's goals" (p. 501). Akroyd et al. (2007) noted that the SPOS is also grounded in the social exchange theory, which assumes "the level of relationship between the employer and the employee has an effect on the level of the employee's commitment to the organization" (p. 470).

Commitment statements are incorporated into the SPOS' 36-item scale. To control for agreement response bias, half of the statements are positively worded and the other half worded negatively (Eisenberger et al., 1986). This study will use the 16-item short form using a 7-point Likert scale to indicate the participants' extent of their agreement with the statements. The sum of the scores indicated the level of perceived

organizational support. The higher the score, the higher the level of perceived organizational support. Items 3, 5, 6, 9, 12, and 13 will be reversely scored.

Eisenberger et al. (1986) reported a Cronbach's alpha reliability coefficient of 0.97 for the SPOS with item total correlations ranging from 0.42 to 0.83 (mean 0.67, median 0.66). Their study findings showed that "employees develop global beliefs concerning the degree to which organizations values their contributions and care about their well-being" (Eisenberger et al., 1986, p. 503).

Study Variables

The study variables are presented differently depending on the research question to be answered. Research question number one focused on the three commitment components of sonographers. The goal of this research question was to identify how much (the score) of a commitment component the sonographer possesses. Statistical evidence is more descriptive. Research question number two determined the relationship between sociodemographic variables and each of the three components of organizational commitment. Sociodemographic variables were the predictor variables (IVs) and commitments were the outcome variables (DVs). Research question number three determined if each of the components of organizational commitment (DVs) were affected by perceived organizational support (IV) after controlling for sociodemographic characteristics (CVs). Perceived organizational support was the predictor variable, commitment was the outcome variable, and sociodemographic variables were the covariates. Table 4 illustrates the observed study variables, the instruments, and the type of data.

Table 4

Observed Study Variables

Variable	Instrument/Scale/Measurement	Data Type
Affective Organizational Commitment Employees stay in the organization because of their desire to be there.	The mean of the ACS ; 8-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous
Continuance Organizational Commitment Employees stay in the organization because they need to after evaluating all costs.	The mean of the CCS , 9-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous
Normative Organizational Commitment Employees stay in the organization because they are obligated to do so.	The mean of the NCS , 6-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous
Residential State	Delaware; District of Columbia; Maryland; Pennsylvania; Virginia; West Virginia	Nominal; Categorical
ARDMS Credentials	RDMS; RDCS; RVT (Respondents may have more than 1 certification)	Nominal; Categorical
Age	In years	Interval; Continuous

Variable	Instrument/Scale/Measurement	Data Type
Race/Ethnicity	American Indian or Alaska Native; Asian; White; Black or African American; Native Hawaiian or other Pacific Islander; Hispanic or Latino	Nominal; Categorical
Birth Gender	Female; Male	Nominal; Dichotomous
Sonography Education	Certificate; Associate; Bachelor's; Masters; Doctorate	Ordinal; Categorical
Highest degree obtained	Certificate; Associate; Bachelor's; Masters; Doctorate	Ordinal; Categorical
Years at current organization	In years	Interval; Continuous
Employment Status (all participants employed)	Full-time; Part-time	Nominal; Dichotomous
Years in current sonographer position	In years	Interval; Continuous
Marital Status	Single; Married; In a significant relationship; Divorced; Widowed	Nominal; Categorical
Hospital	Hospital; outpatient facility; doctor's office; other	Nominal; Categorical

Variable	Instrument/Scale/Measurement	Data Type
Organizational Support Perceived level of organizational support to an employee	SPOS: 16-item scale; 7-point Likert-type measure; 1 = strongly disagree, 7 = strongly agree Score range from 16-112 (higher scores indicate high levels of perceived support)	Interval; continuous

Statistical Analysis

This study focused on each of the three components of commitment as constructs, not just commitment as a whole, and conducted this study with that purpose in mind. Univariate descriptive statistics (frequency and descriptives) was used to summarize and synthesize the study's sample population using sociodemographic variables. Multiple regression using stepwise and hierarchical multiple regression was also conducted to analyze the data and answer the research questions. To control for the inflation of Type I error rate due to multiple statistical analysis being conducted on the same sample of data, a stratified alpha by using the Bonferroni-type adjustment was used (Tabachnick & Fidell, 2013). An overall (familywise error rate) alpha of 0.05 remained for the study, but more stringent alpha levels of 0.008 were used as test-specific critical values. This alpha was determined by dividing the total familywise error rate of the study by 6, which represents the number of statistical analysis test that was conducted on the sample data. An equation for this adjustment where α_i = adjusted alpha, α_{fw} = familywise error rate, and p = number of tests is seen below:

$$\alpha_i = \alpha_{fw} / p$$

The following statistical analysis was performed based on the research questions posed.

RQ1: What is the affective organizational commitment, continuance organizational commitment, and normative organizational commitment among a sample of registered sonographers in the Mid-Atlantic region of the United States?

Utilizing data from the ACS, NCS, and CCS, sample sizes, means and standard deviations were analyzed and reported for each of these scales. The means indicate the score of each commitment component for each study participant. The higher the number, the more of that commitment component the participant possesses. One of the creators of these scales advised not to assign “low, medium, or high” to the component results but simply state the mean results for each scale (J.P. Meyers, personal communication, May 27, 2019).

RQ2: Is there a relationship between affective, continuance, and normative commitment and the following sociodemographic characteristics: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting?

Hypothesis: The relationship between sociodemographic variables and commitment is greater than zero with 95% confidence.

Null hypothesis: The relationship between sociodemographic variables and commitment is zero with 95% confidence.

The statistical procedure for evaluating the combined relationship of multiple predictors (IVs) with a single outcome variable (DV) is multiple linear regression or ordinary least squares (OLS) regression. Correlation or the relationship between two variables are rarely perfect; therefore, multiple predictor variables are included to improve predictions of Y in the equation

$$Y' = B_1X_1 + B_2X_2 + \dots B_kX_k + A$$

where Y' is the predicted value on the outcome variable, B is the coefficients assigned to each of the predictors during regression, X represent the various predictors, and A is the y-intercept (Tabachnick & Fidell, 2013). OLS regression was conducted for each of the components of commitment to explain the variance from each predictor and the combined effect of all the predictors. This is a univariate technique because only one commitment will be analyzed at a time; hence, three multiple regressions provided evidence for this research question. Separate stepwise multiple regressions were used in which each variable was entered into the analysis based on empirical importance, the extent to which each variable has the highest relationship with commitment and can explain the variance in commitment. Categorical and ordinal variables were transferred into dummy variables.

The magnitude of the shared variance between the commitment score and the sociodemographic variables was documented with R squared. The F statistic and associated p value documented the generalizability of sample results to the reference population. Examination of beta weights, simple correlations, and partial correlations

were used to discuss the relative contributions to explained variance in the commitment score.

RQ3: Is affective, normative, and continuance organizational commitment affected by perceived organizational support after controlling for sociodemographic variables?

Hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is greater than zero with 95% confidence.

Null hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is zero with 95% confidence.

This research question used three separate mixed hierarchical regression analyses. The reduced models from RQ2 that showed to be the best model of predictors was entered first based on their beta weights. Organizational support (ORGSUP) was the predictor variable (IV); affective (AFFECT), continuance (CONTIN), and normative commitment (NORM) was the outcome variables (DVs); and sociodemographic variables (STATE, ARDMS, AGE, ETHNCTY, GENDER, SONOED, ED, TENUREO, EMPLOY, TENUREP, MARITAL, and ENVMT) were covariates (CVs) in this research question. To evaluate this question, three mixed hierarchical linear regression analyses were conducted. This method is considered mixed because the sociodemographic variables was entered first then support. Hierarchical linear regression analysis is usually used as a framework for model comparison rather than for a statistical method (Kim, 2016). By evaluating R square, one can determine whether newly added variables in the models show a significant improvement in the proportion of explained variance in the outcome variable (Kim, 2016).

The magnitude of the shared variance between the commitment score and the sociodemographic variables was documented with R squared for both reduced and full models. The F statistic and associated p value documents the generalizability of sample results to the reference population for both reduced and full models. Examination of beta weights, simple correlations, and partial correlations was used to discuss the relative contributions to explained variance in the commitment score. In addition to R squares for each model, the R squared change describes the additional variance explained by organizational support in the full model.

Data entry, scoring, and evaluation. IBM Statistical Package for the Social Sciences (SPSS) version 27 was used for data entry/storage and analysis of responses to the demographic sheet, Commitment Scales, and the SPOS. The data was examined for errors to ensure consistency in data collection and procedures. Data from the NCS, ACS, CCS, and SPOS was scored using the same 7-point Likert scale numbering system and transformed for those items that were reversed scored. The coding system used to anonymize the survey packets and the two-digit month and day the packet data was inputted into SPSS and became the new identification number for the participant. For example, packet OC1 entered on August 22 became participant identification number OC10822.

All data in SPSS was reviewed to confirm accuracy of data entry and inspected (cleaned) for scores outside the accepted range. This was accomplished by sorting the cases in ascending order for each variable to make sure no value is out-of-range or misnumbered. The data was then assessed for missing data by utilizing the Univariate

Statistics Table, Separate Variance TTEST, and Missing Value Analysis. If a variable has a missing value, the Separate Variance t Tests table was assessed to determine if there was a relationship between values on the missing variable and other variables in the dataset (values that are missing on one variable could affect the integrity of the sample). A missing value analysis (MVA) was conducted to identify patterns of missing data and to replace them. The EM syntax was utilized to produce a table of correlations and a test to determine if the values were missing completely at random (MCAR). A statistically nonsignificant result greater than .05 on Little's MCAR inferred that the missing data is completely at random which allowed missing values to be substituted with the mean calculated from the available data.

Summary

This chapter summarized the methodological details supporting the study's purpose and provided a viable process to address the research questions posed. Comprehensive information was presented related to the research design, sample and sampling method, recruitment and data collection procedures, the statistical analysis plan, and variables and instrumentation. Three surveys (ACS, CCS, and NCS), which have been combined into one stand-alone survey, the Survey of Perceived Organization Support (SPOS), and a demographic sheet was used to collect data for this study. After data was collected, descriptive statistics were used to examine the study population. Means and standard deviations were used to report the commitment scores of each participant. Additionally, three ordinary least square analyses were conducted to represent each of the components of commitment (affective, normative, and

continuance) and to explain the variance from each predictor variable and the combined effect of all the predictor variables. This analysis answered RQ2. Then, three mixed hierarchical linear regression analyses were conducted to determine the effect of perceived organizational support on each component of commitment after controlling for sociodemographic variables. This analysis answered RQ3.

Chapter 4: Results

This chapter presents the results of the data analyses on the organizational commitment of sonographers in the Mid-Atlantic Region of the United States. Six main sections guide this chapter. The first section discusses the data collection process. Section two provide the characteristics of the study's sample; the data cleaning process is found in section three. The last three sections discuss the results for research question 1, 2, and 3, respectively. Collectively, these sections are essential in documenting the organizational commitment of sonographers, detailing which sociodemographic variables, if any, had a relationship with the various components of organizational commitment, and determining how a sonographer's perception of the support received from their employer affect their organizational commitment.

Data Collection

Upon IRB approval a total of 1,000 sonographers residing in Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia, were mailed survey packets requesting participation within 14 days of receipt of the survey. The first wave of surveys was mailed on September 3, 2020. Since the first packet was not received until September 21, 2020, 18 days after the initial survey was sent, wave one was extended. The author noticed an approximately 2-week difference in the date that was stamped on the survey envelope by the receiving post office location and the date that envelope arrived. It could be assumed that the delay in mailing could have been caused by the

presidential election and the COVID-19 pandemic that was currently going on. After several weeks of consistently receiving returned surveys, wave one was extended until one week had passed without the receipt of surveys. On October 31, 2020, after the receipt of no surveys for seven days wave one was officially closed. A total of 82 surveys were returned. On November 1, 2020, a second survey was mailed to all non-respondents. Any surveys received after November 1, 2020 were counted as the second wave. As expected, this wave was not as responsive as the first wave. One month later, only 27 additional surveys had been received. Due to altered hours of the mailing service that was used, ending of the sponsoring institution's academic semester, and approaching the holiday season, the researcher decided to close the second wave on November 18, 2020 after receiving 32 surveys. Since the ending of the second wave only two surveys have been received and were not included in the study. At the end of the collection period, 110 surveys were returned, resulting in a low response rate of 11%.

Sample

One hundred ten ARDMS registered sonographers participated in the study. Table 5 provides information on the sociodemographic characteristics of the study participants. Females made up 90% of participants. The average age of participants was 48.4 years. Almost all the participants were White (91.8%) while Blacks comprised 4.5% of the participants. Most respondents resided in Pennsylvania (44.5%) and Virginia (31.8%). Approximately 55% of participants had certificates in sonography, and 77.2% of participants had either an associate or bachelor's degree as the highest

degree obtained. Nearly 81% of the study participants were married or in a significant relationship. Almost 75% of the participants indicated holding RDMS credentials, 38.2% held RVT credentials, and a little over 20% held cardiac credentials. The majority (approximately 86%) were employed in a hospital or outpatient setting. Few participants (3.6%) indicated working in an environment other than a hospital, outpatient facility or doctor's office. Overall, 71.8% of the sample reported full-time employment. The average number of years participants in the study had been in their current sonographer position was 15.1 years. The average number of years participants in the study had worked for their current organization was 12.4 years.

Table 5

Sociodemographic Characteristics of Participants

Characteristics	N	Percent
State of Residence		
Delaware	7	6.4
District of Columbia	0	0
Maryland	15	13.6
Pennsylvania	49	44.5
Virginia	35	31.8
West Virginia	4	3.6
ARDMS Credentials (multiple response question)		
RDMS	82	74.5
RDCS	23	20.9
RVT	42	38.2
Gender		
Male	11	10.0
Female	99	90.0
Ethnicity/Race		
American Indian or Alaska Native	1	.9
Asian	1	.9

Characteristics	<i>N</i>	Percent
White	101	91.8
Black or African American	5	4.5
Native Hawaiian or Other Pacific Islander	0	0
Hispanic or Latino	2	1.8
Sonography Degree		
Certificate	61	55.5
Associate	37	33.6
Bachelors	12	10.9
Masters	0	0
Doctorate	0	0
Highest Degree Obtained		
Certificate	20	18.2
Associate	49	44.5
Bachelors	36	32.7
Masters	4	3.6
Doctorate	1	.9
Marital Status		
Single	11	10.0
Married	80	72.7
In a significant relationship	9	8.2
Divorced	9	8.2
Widow	1	.9
Employment Status		
Part-time	31	28.2
Full-time	79	71.8
Work Environment		
Hospital	50	45.5
Outpatient Facility	43	39.1
Doctor's Office	13	11.8
Other	4	3.6

Table 6

Sociodemographic Mean Characteristics of Participants

Characteristic	Mean
Years at Current Organization	12.4
Years in Current Sonography Position	15.1
Age	48.4

Data Cleaning

Data was entered into an Excel spreadsheet and analyzed using IBM SPSS Statistics (Version 27) predictive analytic software. The data was checked for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. The variables were examined separately. Four cases were found to be missing an entire survey and were omitted from the dataset. All variables were also assessed for distribution through frequency tables. Distributions found four respondents failed to answer question 2 on the support scale and the sonography education question. Other questions that were unanswered were only unanswered by one or two respondents. Those variables that had one to two unanswered items were: question 5 on the affective commitment scale, question 2 on the normative commitment scale, question 4 on the continuance commitment scale, questions 6, 10, and 12 on the perceived support scale, age, years in sonography position, employment status, and highest degree obtained. To assess the impact of missing values on the study variables with a continuous distribution, a missing value analysis was conducted. A MVA

indicated that no variable had more than 5% of missing values and the values that were missing were missing completely at random based on the Little's MCAR test: Chi-Square = 799.98, DF = 824, Sig = .719.

Missing values for following interval level variables were replaced with means from the entire sample: affective commitment question 5, continuance commitment question 18, normative commitment question 10, age, years in current sonographer position, and perceived support scale question 2, 6, 10, and 12. Similarly, missing values on ordinal variables, sonography education and highest degree obtained were replaced using the median. The sonography education variable missing values were replaced with the value of 1 (certificate) and the highest degree obtained variable missing values were replaced with the value of 2 (associate).

Reverse coding was conducted as instructed by authors Meyer and Allen (1997) and Eisenberger et al. (1986) (i.e., affective commitment questions 4, 5, 6, and 8; normative commitment question 9; continuance commitment questions 15 and 18 and organizational support questions 3, 5, 6, 9, 12, and 13). After reverse coding, the mean score of each respondent's answers was computed to establish the respondent's overall score of affective, continuance, and normative commitment. Similarly, the sums for the support scale were computed to establish the participants overall score for perceived organizational support. Commitment scores closer to 7 indicate respondents expressing more of that commitment component. Eisenberger et al. (1986) notes higher scores on perceived support equate to a high sense of support the respondent feel they receive from their organization.

Given the low response rate, the possible effect of attrition was considered. Respondents in wave 1 were compared to those in wave 2. The rationale was that if differences were noted between waves, it was likely that attrition would affect the relationships being investigated. After all variables were cleaned, a *t*-test comparing waves was used to determine if there was a mean difference in their overall affective, normative, and continuance commitment levels, and their level of perceived organizational support. Information provided from the *t*-test allows the researcher to use waves as a measure of attrition to eliminate the effect of attrition on the data.

Table 7 shows 79 participants in wave 1 and 31 participants in wave 2. A T-test for Equality in Means was conducted to test for differences in means, which showed a significant difference between wave 1 and wave 2. Overall affective commitment, overall normative commitment, overall continuance commitment and perceived organizational support was lower in wave 1 compared to wave 2. Since the results indicate a wave effect, wave was included as a CV in the study's analysis to represent the impact of sampling attrition.

Table 7

Wave Effects

	Wave number	N	Mean	Std. Deviation	t	Sig
Overall affective commitment	1	79	4.02	1.25		
	2	31	5.00	1.21	-3.70	.000
Overall normative commitment	1	79	3.18	1.45		

	Wave number	N	Mean	Std. Deviation	t	Sig
	2	31	4.18	1.51	-3.20	.002
Overall continuance commitment	1	79	4.61	0.96		
	2	31	4.64	0.98	-.14	.890
Overall perceived support	1	79	63.65	19.37		
	2	31	76.24	19.78	-3.05	.003

Frequency distributions were examined to clean categorical variables and to insure homogeneity of variance. To eliminate small frequencies, reduce the number of predictors, and to help the power of the study, several categories were collapsed. Under the state of residence variable, Delaware, D.C., and West Virginia were placed in a category called other. Under the ethnicity and race variable, Native, Asian, Black, and Hispanic were placed in a category called other. Under the marital status variable, single, significant other, divorce, and widow were placed in a category called other. The ordinal variable highest degree obtained was also recoded to include Master's and Doctorate together in a category called other. These transformations improved the homogeneity of variance in categorical variables and align with usual procedures when categories do not contain the number of cases equivocal to at least 10% of the category with the largest cases (Tabachnick & Fidell, 2013).

The data were also evaluated for univariate outliers using boxplots. The boxplots showed one case on overall continuance commitment variable, four cases on years at current organization variable, and four cases on years in current sonography position

variable to be univariate outliers. However, there was no case with excessive outliers, so these cases remained as part of the sample. Furthermore, there were no multivariate outliers found among the combinations of independent variables using Mahalanobis distance with $p < .001$.

To evaluate normality among the continuous variables the following items were evaluated: the numerical values of standardized skewness and kurtosis, p -values from the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality, Normal Q-Q Plots and histograms. With 99% confidence, there were no cases found to be above or below 3 standard deviations of the mean, so no transformations were conducted nor were there outlier cases that needed to be eliminated.

Lastly, a review of a Pearson’s correlation matrix of the study variables revealed an absence of multicollinearity.

Study Variables

Through the process of data cleaning, collapsing variables that affected homogeneity, and determining that there was a wave effect on the data, the following variables were used in the study.

Table 8

Transformed Study Variables

Variable	Instrument/Scale/Measurement	Data Type
Affective Organizational Commitment Employees stay in the organization because of their desire to be there.	The mean of the ACS ; 8-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous

Variable	Instrument/Scale/Measurement	Data Type
Continuance Organizational Commitment Employees stay in the organization because they need to after evaluating all costs.	The mean of the CCS, 9-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous
Normative Organizational Commitment Employees stay in the organization because they are obligated to do so.	The mean of the NCS, 6-item scale; 7-point Likert-type scale; 1 = strongly disagree, 7 = strongly agree	Interval; Continuous
Residential State	Maryland; Pennsylvania; Virginia; other state=1, else 0	Nominal; Categorical
ARDMS Credentials	RDMS=1 if RDMS, else 0 RDCS=1 if RDCS, else 0 RVT = 1 if RVT, else 0 (respondents may have more than 1 certification)	Nominal; Categorical
Age	In years	Interval; Continuous
Race/Ethnicity	White; other white=1, else 0	Nominal; Categorical
Birth Gender	Female = 1; else 0	Nominal; Dichotomous
Sonography Education	Certificate = 1; Associate = 2; Bachelor's = 3	Ordinal; Categorical
Highest degree obtained	Certificate = 1; Associate = 2; Bachelor's = 3; Masters & Doctorate = 4	Ordinal; Categorical

Variable	Instrument/Scale/Measurement	Data Type
Years at current organization	In years	Interval; Continuous
Employment Status (all participants employed)	Full-time = 1, else 0	Nominal; Dichotomous
Years in current sonographer position	In years	Interval; Continuous
Marital Status	Married; other married=1, else 0	Nominal; Categorical
Hospital	Hospital; outpatient facility; doctor's office; other environment = 1, else 0	Nominal; Categorical
Organizational Support Perceived level of organizational support to an employee	SPOS: 16-item scale; 7-point Likert-type measure; 1 = strongly disagree, 7 = strongly agree Score range from 16-112 (higher scores indicate high levels of perceived support)	Interval; continuous
Wave	Wave 1=1; else 0	Ordinal

Research Question 1 Results

What is the affective organizational commitment, continuance organizational commitment, and normative organizational commitment among a sample of registered sonographers in the Mid-Atlantic region of the United States?

The first research question was concerned with the overall levels of affective organization commitment, continuance organizational commitment, and normative commitment among registered sonographers in the Mid-Atlantic region of the United

States. Authors of the commitment scales state that the means scores of each corresponding scale should be used to determine the organizational commitment scores of participants. Table 9 shows the sample size, means, and standard deviations for each type of commitment among the study's participants. Out of a total possible score of 7, continuance commitment had the highest score with 4.62, followed by affective commitment with a score of 4.30, and 3.46 for normative commitment.

Table 9

Mean Scores of Affective, Normative, and Continuance Commitment of Registered Sonographers in the Mid-Atlantic region of the U.S.

Commitment	<i>N</i>	Mean	<i>SD</i>
Affective Commitment	110	4.30	1.31
Normative Commitment	110	3.46	1.53
Continuance Commitment	110	4.62	.96

Note. Values were rounded to the nearest hundredths.

These scores indicate that registered sonographers in the study's sample demonstrate more continuance commitment to their organization. Thus, they remain with their organization because they need to after evaluating the costs of leaving. The mean scores also show the study's sample population would agree that they are affectively committed to their organization, meaning they have an emotional attachment to the organization and a desire to be and remain with the organization. However, the mean scores also shows the sample being less likely to remain with the organization because of a sense of obligation to the organization.

Table 10 shows the Pearson correlation statistics of the three types of commitment among the participants, along with the weighted corrected correlation for the scales as reported in the meta-analysis by Meyer et. al. (2002). There is a positive relationship between affective and normative commitment, $r=.71$, $p < .001$. A negative relationship exists between affective and continuance, $r = -.06$, $p > .001$, as well as between continuance and normative commitment, $r = -.02$, $p > .001$. Comparing the study's coefficients to the coefficients reported by Meyer et al. (2002), the relationship between affective and normative commitment is similar. The direction of the relationship between affective and continuance as well as continuance and normative differs between this study and Meyer et al.'s (2002) meta-analysis. However, the magnitude of the relationships is close. The correlation coefficients also indicates that as a sonographer exhibit increased affective commitment, their normative commitment is also high. Conversely, sonographers with higher their affective commitment will have lower continuance commitment. The difference may be due to sonographer's negative perception of continuance commitment compared to other professional entities who participated in studies using the continuance commitment scale.

Table 10

Current Study vs Meta-Analysis of the Pearson Correlation for Affective, Continuance, and Normative Commitment

	Current Study			Norms		
	ACS	CCS	NCS	ACS	CCS	NCS
ACS	1.00	-.06	.71**	1.00	.05	.63
CCS		1.00	-.02		1.00	.18
NCS			1.00			1.00

Note. *ACS, Affective commitment scale, CCS, Continuance Commitment Scale, NCS, Normative Commitment Scale

** $p < .01$ (2-tailed); *values were rounded to the nearest hundredths

Research Question 2 Results

Is there a relationship between affective, continuance, and normative commitment and the following sociodemographic characteristics: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting?

Hypothesis: The relationship between sociodemographic variables and commitment is greater than zero with 95% confidence.

Null hypothesis: The relationship between sociodemographic variables and commitment is zero with 95% confidence.

Separate stepwise multiple regression analyses were performed between the three types of commitment as the dependent variable, sociodemographic variables as the independent variables, and wave as the covariate variable since a wave effect was found during the data cleaning process.

Affective commitment. Table 11 displays the correlation between the variables to determine which variables shared at least 9% variance (.3 x .3) (Tabachnick & Fidell, 2013). All 110 cases were included. Correlations at .3 or higher were included in the table. For the affective commitment analysis, only years at current organization and highest degree obtained showed correlations at .3 or higher. The correlation suggests some relationships among the predictors are significant based on the calculated p values. Years at current organization and wave correlated at .306, suggesting that respondents in the second wave had more years of service. The highest degree variable correlated with type of sonography education (.394) suggesting that more education was focused on sonography. The number of years participants were employed by their current organization correlated with overall affective commitment (.323), age (.346), and years in current sonographer position (.431).

Table 11

RQ2 Pearson Correlation Table for Affective Commitment

		Overall Affective Commitment	Sonography education	Wave	Age	Years at current sonographer position
	Years at current organization	.323***		.306* **	.346 ***	.431***
Pearson Correlation	Highest Degree		.394***			

***p < .001

Table 12 presents the results of the regression analysis. The model summary results identify model 3 as the best model for a N of 110. A multiple correlation coefficient value of 0.488 (R) implies the model has a moderate linear level of association between the predictors in the regression model and affective commitment. The R² for the best model was 23.8% and indicates living in Pennsylvania and years a sonographer had been at their current organization explains 23.8% of the variability in the sonographer's score on affective commitment to their organization.

The statistical significance of the overall model indicates living in Pennsylvania and years a sonographer has been at their current organization significantly predict their affective commitment, F(3,106)= 11.059, p < .000. Wave effect explains 11.2% of the variance, significant at p < .000. Living in Pennsylvania explains an additional 7.5% of

the variance and the model change is $p < .002$. Years at current organization explains 5.1% of the variance in the model and the model change is $p < .009$.

Examination of the standardized coefficients (β), seen in Table 12 shows that predicted affective commitment scores for sonographers in Pennsylvania are less than sonographers living in other states in the Mid-Atlantic region. Additionally, an increase in years sonographers worked at their current organization is associated with an increase in their affective commitment to the organization. Magnitude of relationships were consistent across models, ranging from .238 to -.274. There was little change from model to model in beta weights, suggesting that the contributions to explained variance in affective commitment was relatively independent of the predictors included in the model. Since the explained variance due to wave was greater than the explained variance of the IVs of interest and the fact that explained variance was less than 8% for either of the included IVs, it should be assumed that there is little to no practical value in the model and there are other factors that can be influencing the participants affective commitment.

Table 12

Stepwise Regression Model Summary for Affective Commitment and RQ2

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients
1	Wave	.112	.112	.000	.335
2	State of Residence PA	.187	.075	.002	Wave .326 State -.274

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients
3	Years at current organization	.238	.051	.009	Wave .254 State -.270 Years .238

Normative commitment. Table 13 displays the correlation between normative commitment and sociodemographic variables that showed correlations of .3 or higher. The correlations suggest some relationships among the predictors. The highest degree obtained variable correlated with type of sonography education (.394) suggesting that more education was focused on sonography. The number of years participants were employed at their current organization correlated with wave (.306) and age (.346) suggesting that participants in the second wave had more years of service and were older. Years in current sonographer position also correlated with both years at current organization (.431) and age (.439) suggesting that sonographers who joined the profession earlier in life when on the job training was more prevalent stayed with those organizations that provided their initial training.

Table 13

RQ2 Pearson Correlation Table for Normative Commitment

		Sonography education	Wave	Age	Years at current organization
Pearson Correlation	Highest Degree	.394***			
	Years at current organization		.306***	.346***	
	Years in current sonographer position			.439***	.431***

*** $p < .001$

Table 14 presents the results of the regression analysis. The model summary results identify model 2 as the best model. A multiple correlation coefficient value of 0.464 (R) implies this model has a moderate linear level of association between the predictors in the regression model and normative commitment. R^2 for the best model was 21.6%, indicates living in Pennsylvania explains 21.6% of the variability in the sonographer's score on normative commitment to their organization.

The statistical significance of the overall model indicates living in Pennsylvania significantly predicts their normative commitment, $F(2,107) = 14.709, p < .000$. Wave effect explains 8.7% of the variance, significant at $p < .002$. Living in Pennsylvania explains an additional 12.9% of the variance and the model change is $p < .000$.

Examination of the standardized coefficients (β) shows that predicted normative commitment scores for sonographers who live in Pennsylvania are less than sonographers who live in other states in the Mid-Atlantic region. Magnitude of relationships were consistent across models, ranging from .283 to .294. There was little change from model to model in beta weights suggesting that the contributions to explained variance in normative commitment was relatively independent of the predictors included in the model. Since R^2 change is 12.9% for the included IVs, it should be assumed there is little practical value in the model and there are other factors that can be influencing the participants normative commitment.

Table 14

Stepwise Regression Model Summary for Normative Commitment and RQ2

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	
1	Wave	.087	.087	.002	.294	
2	State of Residence PA	.216	.129	.000	Wave	.283
					State	-.359

Continuance commitment. Table 15 displays the correlation between continuance commitment, highest degree, years at current organization, and years in current sonography position that showed correlations at .3 or higher. The correlations suggest relationships among the predictors. The highest degree variable correlated with type of sonography education (.394) suggesting that more education was focused on

sonography. The number of years participants were employed at their current organization correlated with wave (.306), age (.346), and the number of years participants had been in their current sonographer position (.431). The number of years participants had been in their current sonographer position also correlated with age (.439).

Table 15

RQ2 Pearson Correlation Table for Continuance Commitment

		Sonography education	Wave	Age	Years in current sonographer position
Pearson Correlation	Highest Degree	.394***			
	Years at current organization		.306***	.346***	.431***
	Years in current sonographer position			.439***	

p < .01; *p < .001

Table 16 presents the results of the regression analysis. The model summary results identify model 4 as the best model. A multiple correlation coefficient value of 0.359[®] implies this model has a low linear level of association between the predictors in the regression model and continuance commitment. R² for the best model was 12.9%, indicating living in Pennsylvania, not being married, and being a cardiac sonographer

explains 12.9% of the variability in the sonographer's score on continuance commitment to their organization.

The statistical significance of the overall model indicates living in Pennsylvania, a sonographer's marital status, and if they are a cardiac sonographer significantly predict their continuance commitment, $F(4,105)= 3.876, p < .01$. Marital status explains 4.9% of the variance and the model change is $p < .021$. Being a cardiac sonographer explains an additional 4.1% of the variance and the model change is $p < .031$. Living in Pennsylvania explains an additional 3.9% of the variance, significant at $p < .032$.

Examination of the standardized coefficients (β) shows that predicted continuance commitment scores for sonographers who live in Pennsylvania are more than sonographers who live in other states in the Mid-Atlantic region. Additionally, a sonographer's marital status and being a cardiac sonographer is associated with a decrease in their continuance commitment to their organization. Magnitude of relationships were consistent across models, ranging from $-.232$ to $.198$. There was little change from model to model in beta weights suggesting that the contributions to explained variance in continuance commitment was relatively independent of the predictors included in the model. Since R^2 change is only 3.9% for the included Ivs, it should be assumed there is little to no practical value in the model, and there are other factors that can be influencing the participant's continuance commitment.

Table 16

Stepwise Regression Model Summary for Continuance Commitment and RQ2

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	
1	Wave	.000	.000	.890	.013	
2	Marital Status	.049	.049	.021	Wave	.028
					Marital status	-.221
3	Registered Diagnostic Cardiac Sonographer	.090	.041	.031	Wave	.024
					Marital status	-.228
					Registered cardiac sonographer	-.202
4	State of Residence Pennsylvania	.129	.039	.032	Wave	.030
					Marital status	-.232
					Registered cardiac sonographer	-.218
					State of Residence Pennsylvania	.198

In comparing the three regression analyses performed on the dependent variables (affective, normative, and continuance commitment), living in Pennsylvania was a statistically significant variable contributing to the variation in the commitment component scores. Living in Pennsylvania was associated with a decrease in both the normative commitment score and affective commitment score for sonographers in the Mid-Atlantic region of the United States. Living in Pennsylvania was found to increase

scores on the continuance commitment scale. Additionally, organizational tenure (the amount of years working at an organization) was noted in the literature to be positively related to affective commitment. Similarly, in the analysis for affective commitment, the results showed a one unit increase in years at current organization is associated with an increase in affective commitment by .238. Marital status was also noted in the literature to be unrelated to affective commitment. This study also showed it to be unrelated to affective commitment as it did not enter the regression model. Contrarily, not being married, however, showed to be a statistically significant contributing variable in the variability of a sonographer's continuance commitment. Not being married in this study decreases a sonographer's continuance commitment by .232. Lastly, being a registered diagnostic cardiac sonographer also had a statistically significant negative impact on continuance commitment, decreasing it by .218.

Research Question 3 Results

Is affective, normative, and continuance organizational commitment affected by perceived organizational support after controlling for sociodemographic variables?

Hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is greater than zero with 95% confidence.

Null hypothesis: The relationship between support and commitment after adjusting for sociodemographic variables is zero with 95% confidence.

Separate hierarchical multiple regression analyses were performed for each commitment component (DV). Wave and the sociodemographic variables that were

shown to be the best model of predictors in RQ2 were entered into the analysis first as covariates. Followed by perceived support, the independent variable.

Affective commitment. Table 17 displays the correlation between the variables to determine which variables shared at least 9% variance (.3 x .3) (Tabachnick & Fidell, 2013). All 110 cases and correlation at .3 or higher were included. For the affective commitment analysis, overall affective commitment, years at current organization, wave and support showed correlations at .3 or higher. The correlations suggest some statistically significant relationship among the predictors. Overall affective commitment correlated with wave (.335), years at current organization (.323), and support (.685). Years at current organization also correlated with wave (.306).

Table 17

RQ3 Pearson Correlation Table for Affective Commitment

		Wave	Overall Affective Commitment
Pearson Correlation	Overall Affective Commitment	.335***	
	Years at current Organization	.306***	.323***
	Support		.685***

***p < .001

Table 18 presents the results of the regression analysis for affective commitment. The model summary shows a multiple correlation coefficient value of 0.735 (R) implying

a moderate linear level of association between the predictors in the regression model and affective commitment. The coefficient of determination, R^2 , was 54%, but since wave, living in Pennsylvania and years at current organization are covariates (error variance), perceived support is the focus of this research question. Of the total variance explained in the model (54%), perceived support explains 56% (30/54) and the model change is $p < .000$.

The statistical significance of the overall model ($p < .000$) indicates a better fit to the data than the mean model and the improvement from this model is greater than the probability of obtaining the same improvement by chance. Explicitly, a sonographer's perception of the organizational support that they receive is statistically significant in predicting their score on affective commitment. Model statistics produced $F(4,105) = 30.797$, $p < .000$.

In examining the standardized coefficients (β) there is a strong effect between overall perceived support (.596) and affective commitment ($p < .000$). There was also a notable decrease from model to model in beta weights which showed support removing much of the variance from the CVs in the model. Specific to this research question, a one unit increase in perceived support is associated with an increase in affective commitment. Since R^2 change in the best model was 30.1% for support, the IV of interest, it should be expected that there is practical value in the model and perceived support should be viewed as having the potential to alter the variance in a sonographer's affective commitment.

Table 18

Hierarchical Regression Model Summary for Support, Affective Commitment and RQ3

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	
1	Wave	.112	.112	.000	.335	
2	Pennsylvania	.238	.126	.000	Wave	.254
	Years at Current Organization				Pennsylvania	-.270
					Years at current organization	.238
3	Overall Perceived Support	.540	.301	.000	Wave	.102
					Pennsylvania	-.114
					Years at current organization	.201
					Perceived support	.596

Normative commitment. Table 19 displays the correlation between the variables to determine which variables shared at least 9% variance (.3 x .3) (Tabachnick & Fidell, 2013). All 110 cases and correlation at .3 or higher were included. For the normative commitment analysis, overall normative commitment and support showed correlations at .3 or higher. The correlations suggest some statistically significant relationship among these two predictors. Overall normative commitment correlated with support at .629.

Table 19

RQ3 Pearson Correlation Table for Normative Commitment

		Overall Normative Commitment
Pearson Correlation	Perceived Support	.629

Table 20 presents the results of the regression analysis for normative commitment. The model summary shows a multiple correlation coefficient value of 0.675 (R) implying a moderate linear level of association between the predictors in the regression model and normative commitment. The coefficient of determination, R^2 , was 45.6%, but since wave and living in Pennsylvania were covariates (error variance), perceived support is the focus of this research question. Of the total variance explained in the model (45.6%), perceived support explains 53% (24/45.6) and the model change is $p < .000$.

The statistical significance of the overall model ($p < .000$) indicates a better fit to the data than the mean model and the improvement from this model is greater than the probability of obtaining the same improvement by chance. Explicitly, a sonographer's perception of the organization support that they receive statistically significantly predicts their score on normative commitment. Model statistics produced $F(3,106) = 29.562$, $p < .000$.

In examining the standardized coefficients (β), there is a strong effect between overall perceived support (.531) and normative commitment ($p < .000$). There was also a notable decrease from model to model in beta weights which shows support removing

much of the variance from the CVs in the model. Specific to this research question, a one unit increase in perceived support is associated with an increase in normative commitment. Since R² change in the best model was 24% for support, the IV of interest, it should be expected that there is practical value in the model and perceived support should be viewed as having the potential to influence the variance in a sonographer's normative commitment score.

Table 20

Hierarchical Regression Model Summary for Support, Normative Commitment and RQ3

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	
1	Wave	.087	.087	.002	.294	
2	Pennsylvania	.216	.129	.000	Wave	.283
					Pennsylvania	-.359
3	Overall Perceived Support	.456	.240	.000	Wave	.138
					Pennsylvania	-.220
					Perceived support	.531

Continuance commitment. There were no correlations among the variables at .3 or better. Table 21 presents the results of the regression analysis for continuance commitment. The model summary shows a multiple correlation coefficient value of .360 (R), implying a low linear level of association between the predictors in the regression model and continuance commitment. The coefficient of determination, R², was 12.9%,

but since wave, being a registered diagnostic cardiac sonographer, marital status, and living in Pennsylvania were covariates (error variance), perceived support is the focus of this research question. With the inclusion of support as the independent variable in the model, there was a 0.1% change in the model and the model change is $p = .779$ (not significant). Model statistics produced $F(5,104) = 3.089$, $p = .012$. This shows support as having no value in influencing the continuance commitment of sonographers.

Table 21

Hierarchical Regression Model Summary for Support, Continuance Commitment and RQ3

Model	Variable Entered	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	
1	Wave	.000	.000	.890	.013	
2	Registered Diagnostic Cardiac Sonographer	.129	.128	.002	Wave	.030
	Marital Status				Marital Status	-.232
	Pennsylvania				Registered Diagnostic Cardiac Sonographer	-.218
					Pennsylvania	.198
3	Overall Perceived Support	.129	.001	.779	Wave	.022
					Marital Status	-.231
					Registered Diagnostic Cardiac Sonographer	-.219
					Pennsylvania	.206
					Perceived support	.028

In comparing the three hierarchical regression analyses performed on the dependent variables (affective, normative, and continuance commitment) in this research question, support showed to positively influence a sonographer's affective commitment and normative commitment. Support, however, did not influence a sonographer's continuance commitment.

After all analyses were performed and the final models were determined, post hoc power analyses were conducted using Soper (2020) software. For research question 2, affective commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.24$, and 3 predictors which yielded an observed statistical power of 0.99. For research question 2, normative commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.22$, and 2 predictors which yielded an observed statistical power of 0.99. For research question 2, continuance commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.13$, and 4 predictors which yielded an observed statistical power of 0.90. For research question 3, affective commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.54$, and 4 predictors which yielded an observed statistical power of 1.0. For research question 3, normative commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.46$, and 3 predictors which yielded an

observed statistical power of 1.0. For research question 3, continuance commitment component, the following parameter values were used: sample size (N) of 110, α (probability level) = 0.05, observed $R^2 = 0.13$, and 5 predictors which yielded an observed statistical power of 0.88.

Power analyses aid in reducing the risk of Type II errors, enhance the statistical conclusion validity of a study, and offer support for rejecting the null hypothesis (Polit & Beck, 2017). Based on each post hoc power analysis conducted from the final models in research question 2, the probability of detecting a true relationship and rejecting the null hypothesis, which states the relationship between sociodemographic variables and commitment is zero with 95% confidence, is high (post hoc power = .90 - .99). Hence, rejecting the null hypothesis infer that there is probably a relationship between sociodemographic variables and affective commitment and sociodemographic variables and normative commitment, and sociodemographic variables and continuance commitment.

Based on each post hoc power analysis conducted on the final models in research question 3, the probability of detecting a true relationship and rejecting the null hypothesis, which states the relationship between support and commitment after adjusting for sociodemographic variables is zero with 95% confidence, is high (post hoc power = 1.0). Hence, rejecting the null hypothesis infer that there is probably a relationship between support and affective commitment and support and normative commitment.

Because of the nonsignificant results between support and continuance commitment, there is no evidence of the truth or falsity of the hypothesis that the relationship between support and commitment after adjusting for sociodemographic variables is zero with 95% confidence.

Overall, this study demonstrated good statistical conclusion validity.

Chapter Summary

The results for research question one indicate the sample of sonographers in the Mid-Atlantic region of the United States that participated in this study exhibited an average score of 4.62 for continuance commitment and 4.30 for affective commitment to their organization. In other words, the study's sample of sonographers remain with the organization for which they are employed because they feel the need to (continuance commitment) after calculating the costs of leaving and because they have a desire (affective commitment) to be with the organization. The results also showed this study's sample displaying an average score of 3.46 for normative commitment which means they do not generally feel obligated to work for the organization for which they are employed. These results can be generalized as being a characteristic of the reference population.

The results for research question two revealed four significant variables that influenced a sonographer's commitment in this study. Living in Pennsylvania was shown to be a negatively significant variable in the variability of affective and normative commitment and a positively significant variable in the variability of continuance commitment. There could be a possibility that salary and taking call makes a difference

among the sonographers that were from PA in the sample. Years at current organization was shown to be a positively significant variable when determining a sonographer's affective commitment. Presumably, this is because sonographers need to acquire a certain amount of experience with an organization to become attached to the organization.

The variables of marital status and being a registered cardiac sonographer, both showed to be negatively significant when determining a sonographer's continuance commitment. Presumably, this is because not being married does not require sonographers to have a "provider role" or have part in the responsibility of a married unit. Thus, their costs of leaving an organization is not high as it would be for someone who considers the burden it would cause on their mate. Similarly, registered cardiac sonographers may feel that they have various opportunities awaiting them if they decide to leave their organization. At the time of the study there were more than 380 cardiac sonographer job postings on LinkedIn, 150 cardiac sonographer jobs posted on Indeed and 119 cardiac sonographer jobs posted on the Zip Recruiter website, cardiac sonographers definitely have options, which would lower their continuance commitment scores toward the organization for which they work.

Research question three demonstrated that, without the inclusion of the influences from the four variables found to be significant in research question two, a sonographer's perception of the support received from their organization was significant at influencing and increasing a sonographer's affective and normative commitment. Sonographers who felt supported by their organization would not have a reason to leave

hence developing attachment to (affective commitment) and a sense of obligation to (normative commitment) the organization for which they worked.

Chapter 5: Discussion

The purpose of this study was to identify three organizational commitment components reported by sonographers in the Mid-Atlantic region of the United States. Analysis allowed for examining the relationship between each commitment component (i.e., affective organizational commitment, continuance organizational commitment and normative organizational commitment) and certain sociodemographic variables and the affect perceived organizational support has on the organizational commitment components of sonographers. Four main sections guide this chapter. Section one specifically will support and interpret the results of research question 1, 2, and 3 by utilizing information gathered from the review of the literature and the Three Component Model created by Meyer and Allen. Section two provides information on consequences, recommendations, policy, and practice for the sonography profession; study limitations are found in section three. The last section discusses insight to future research.

Interpretation of Results

The literature review demonstrated that organizational commitment has been studied for more than five decades. Meyer and Allen (1990) summarized organizational commitment as collectively having three distinct constructs - affective commitment, normative commitment, and continuance commitment - that should be examined as a multidimensional construct with antecedents and consequences. The three-component model provides a complete picture of the connection employees have with their

employing organization and each component was evaluated separately for the three research questions.

Documenting the mean score of each organizational commitment component (affective, continuance, normative) for a sample of 110 sonographers residing in the Mid-Atlantic region of the United States was the focus for the first research question.

Research Question 1

What is the affective organizational commitment, continuance organizational commitment, and normative organizational commitment among a sample of registered sonographers in the Mid-Atlantic region of the United States?

Affective commitment mean score. Affective commitment describes employees' emotional attachment to their organization and to the work that they do. Employees identify with the organization's goals and values and possess a sense of fitting in. Employees demonstrating more affective commitment remain with the organization because they desire to be there (Allen & Meyer, 1996).

Sonographers in this study had a mean score of 4.30 out of 7 ($SD = 1.31$) for affective commitment. Hence, sonographers in this sample would agree with the statement, "I have somewhat of a desire to be with the organization that I work for." Compared to normative data taken from Meyer et al. (2011), this study's sample mean for affective commitment is higher than approximately 40% of the affective commitment studies conducted in the United States.

Continuance commitment mean score. Continuance commitment refers to the connection developed after all costs of leaving an organization has been evaluated

(Meyer & Allen, 1996). Employees identifying more with this commitment component will remain with an organization because they feel the need to after calculating the costs of leaving (Allen & Meyer, 1996). Of the three constructs of organizational commitment, this construct is more negative, implying less of a commitment and more force or pressure to stay with an organization. The findings of this study showed continuance commitment to be the highest ranked organizational commitment component among sonographers in this sample, with a mean score of 4.62 out of 7 ($SD = .96$). Hence, sonographers in this sample would agree with the statement, "I'm here working for this organization, because I would lose too much if I left." Sonographers have realized that they have made costly investments that would be lost if they left the company that employs them. Compared to normative data taken from Meyer et al. (2011), this study's sample mean for continuance commitment is higher than approximately 84% of the continuance commitment studies conducted in the United States.

Normative commitment score. Normative commitment is defined as sense of obligation to the organization (Meyer & Allen, 1990). Expressing more normative commitment indicates a sonographer's obligation to their organization. This study showed sonographers in this sample not being that obligated – with a mean score of 3.46 out of 7 ($SD = 1.53$). Hence, sonographers in this sample would agree with the statement, "I do not feel obligated to the organization that I work for." Compared to normative data taken from Meyer et al. (2011), this study's sample mean for normative commitment is higher than approximately 13% of the normative commitment studies conducted in the United States.

The three-component model has shown organizational commitment to be a multidimensional construct that is best understood when each component is analyzed together. Collectively, the organizational commitment scores of sonographers in this sample indicate higher levels of continuance commitment, followed by affective commitment, and, lastly, by normative commitment (see Figure 3).

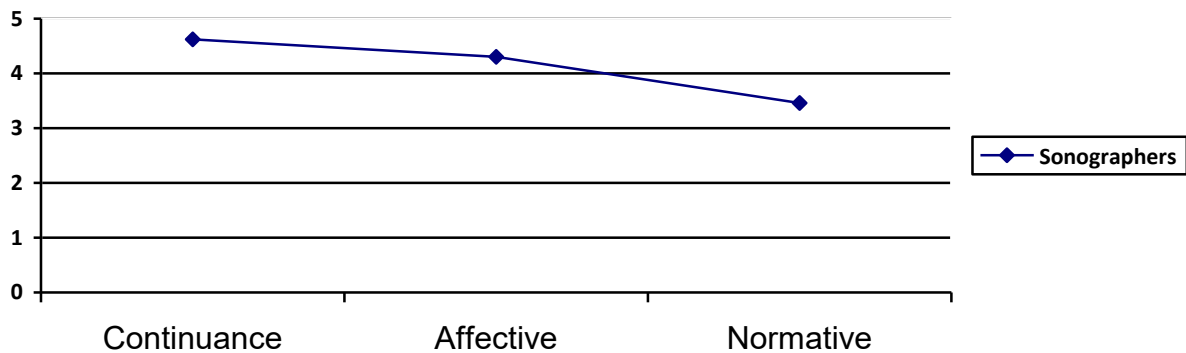


Figure 3. Comparison of mean score for commitment components.

Research Question 2

Is there a relationship between affective, continuance, and normative commitment and the following sociodemographic characteristics: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting?

Documenting the relationship between the following sociodemographic factors: state of residence, ARDMS credentials, age, ethnicity, gender, sonography education, highest degree obtained, employment tenure, employment status, position tenure, marital status, and environment setting (i.e., used as independent variables) and each

of the components of organizational commitment (i.e., affective, continuance, and normative) was the focus of the second research question. Specifically evaluated was the amount that each commitment variable could be explained by sociodemographic variables. Three separate stepwise regression analyses were used to determine which sociodemographic variables had a relationship with each of the components of commitment. Of the sociodemographic variables used, not all contributed to the variability of each organizational commitment component.

Affective commitment and sociodemographic variables. The results found the wave variable, Pennsylvania, and years at current organization (tenure) contributed to the variance in affective commitment among sonographers. Although the wave variable explained 11.2% of the variance, 7.5% of the variance was contributed to Pennsylvania followed by 5.1% representing the variance contributed by years at current organization. The regression equation for the best model is expressed in the following form:

Affective commitment = (b₁ x Pennsylvania) + (b₂ x years at current organization) where the slope (b₁) for variable one is -.712, and the slope (b₂) for variable two is .039. Since the slope coefficient for years at current organization is positive it indicates that as a sonographer completes one additional year working at the organization where they are employed their score on affective commitment will increase by .039. Since the slope coefficient for Pennsylvania is negative it indicates that as a sonographer continues to live in Pennsylvania their score on affective commitment will decrease by .712.

Normative commitment and sociodemographic variables. The results found the wave variable and living in Pennsylvania contributed to the variance in normative commitment among sonographers. Although the wave variable explained 8.7% of the variance, living in Pennsylvania explains an additional 12.9%. The regression equation for the best model is expressed in the following form:

$$\text{Normative commitment} = (b_1 \times \text{Pennsylvania})$$

where the slope (b_1) for variable one is -1.102. Again, since the slope coefficient for Pennsylvania is negative, it indicates that as a sonographer continues to live in Pennsylvania, their score on normative commitment will decrease by 1.102.

Continuance commitment and sociodemographic variables. Although the results found marital status, registered diagnostic cardiac sonographer, and living in Pennsylvania contributed to the variance in continuance commitment among sonographers, these contributions were smaller than the contributions of variables in the other two commitment components. Wave did not contribute to the variance in continuance commitment as it did in affective and normative commitment. Marital status explained more of the variance in continuance commitment than other variables in this model. The regression equation for the best model is expressed in the following form:

$$\text{Continuance commitment} = (b_1 \times \text{marital status}) + (b_2 \times \text{cardiac sonographer}) + (b_3 \times \text{Pennsylvania})$$

where the slope (b_1) for variable one is -.497, the slope (b_2) for variable two is -.512, and the slope (b_3) for variable three is .381. Since the slope coefficients for marital status and registered diagnostic cardiac sonographer are negative, it indicates being married

and/or being a registered diagnostic cardiac sonographer will decrease the score on continuance commitment by .497 and .512 respectively. Because the slope coefficient for Pennsylvania is positive, it indicates that as a sonographer continues to live in Pennsylvania their score on continuance commitment will increase by .381.

Meyer and Allen (1997) noted organizational characteristics, person characteristics (i.e., gender, age, and tenure), and work experiences have been examined in the past to determine if correlations exist between them and affective commitment. Overall, Meyer and Allen (1997) noted the relations between demographic variables and affective commitment are neither strong nor consistent. This study is consistent with Meyer and Allen's (1997) analysis since the beta weights in this research did not show very strong relationship between sociodemographic variables and affective commitment. A meta-analysis conducted by Mathieu and Zajac (1990) showed gender and affective commitment being unrelated, age and affective commitment being significantly, albeit weakly, related and tenure and affective commitment having a positive relationship. Meyer and Allen (1997) noted difficulty in offering an unequivocal interpretation of the tenure finding from Mathieu and Zajac (1990). They felt that employees need to acquire a certain amount of experience with the organization to become strongly attached or employees who have been employed for a longer time with an organization could have retrospectively developed affective commitment to the organization. Considering these reasons, the findings in this research related to tenure should be considered reliable because the average years

(12.4) sonographers in this study had been employed by their organization provides more than enough time to develop affective commitment.

Although there were no studies in the literature that evaluated state of residence with each of the commitment components, it is interesting to find that living in Pennsylvania was the only variable that demonstrated a statistically significant relationship with all of the components of organizational commitment. This variable was the only variable in research question two that demonstrated a statistically significant relationship with all the commitment components.

Figure 4 is an explanatory model of this study's significant variables and their influence on the organizational commitment of sonographers in the Mid-Atlantic region of the United States.

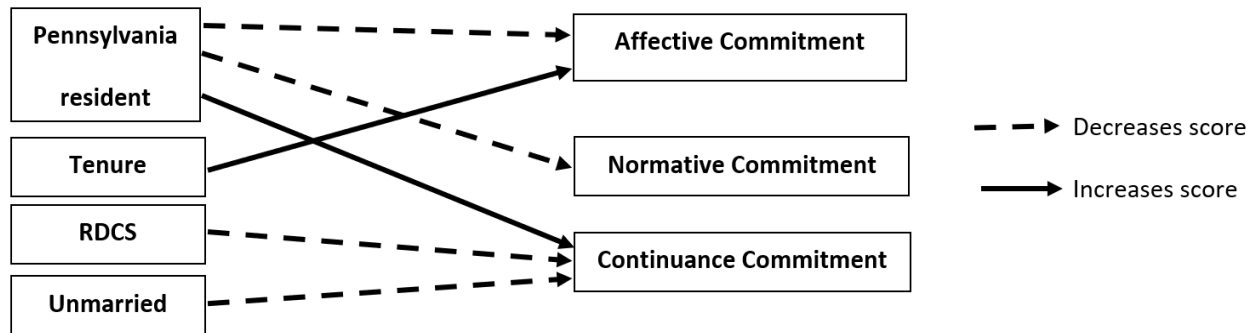


Figure 4. Significant sociodemographic variables and organizational commitment.

Research Question 3

Is affective, normative, and continuance organizational commitment affected by perceived organizational support after controlling for sociodemographic variables?

After finding and documenting which sociodemographic variables had a relationship with each component of organizational commitment, the focus of research

question three was to control for those relationships (variances) and document the affect perceived organizational support had on each component of organizational commitment. Three separate mixed hierarchical stepwise regression analyses were conducted (one for each organizational commitment component).

Affective, normative, and continuance commitment and perceived support.

The results of the regression analyses showed perceived organizational support explaining over half (55%) of the total variance in a sonographer's affective commitment score. This influence was also seen in normative commitment with perceived organizational support explaining 53% of a sonographer's normative commitment. Both affective and normative commitment showed to increase as a sonographer's support that they received from their employer increase. Lastly, the study's results showed perceived organizational support having no influence on a sonographer's continuance commitment. In the model evaluating continuance commitment the sociodemographic variables showed more accountability in the variability of continuance commitment than when the support variable was added to the model.

Strong and positive correlations observed in this study between normative commitment and perceived support and affective commitment and perceived support is like studies in the literature that demonstrated the same (Akroyd et al., 2007; Eisenberger et al., 1986; Meyer et al., 2002; Shore & Tetrick, 1991).

Figure 5 illustrates the final conceptual model for the study of organizational commitment among sonographers in the Mid-Atlantic region of the United States. This conceptual model shows relationships between Pennsylvania, tenure, marital status,

For organizations these findings clearly show room for improving the organization commitment of sonographers so to circumvent negative consequences. Meyer and Allen (1990) cite consequences that can be potentially demonstrated among employees who display more of one component of organizational commitment than another (those applicable to the results of this study are discussed). They noted employees with more continuance commitment are with their organization not for reasons of emotional attachment; hence, there will be no strong desire to make positive contributions to the organization. In fact, sonographers with higher continuance commitment could show feelings of resentment or frustration that has the potential to lead to inappropriate or unethical work behaviors like absenteeism. As a result, an ultrasound department may demonstrate increased or consistent turnover in sonographers, poor job performance, and sonographers that are not willing to engage in organizational citizenship behaviors.

Meyer and Allen (1997) cite affective commitment is the most desirable commitment component that organizations should seek to instill and increase among their employees. Meyer and Allen (1990) provided suggestions and empirical evidence on how human resource management policy and practice improves an employee's commitment. For example, training intended to provide employees with opportunities for future advancement/promotion and skills developed on the job that contribute to an employee's profession development can increase the components of commitment. Meyer and Allen also note that a potential employees' recruitment and selection process can set the stage for the development of a 'committed' employee. This entails creating realistic job previews that provide applicants with honest and accurate information,

positive and negative aspects of the job, and opportunities for them to decide if they want to work for the organization based on the true ambience of the work environment. In addition, the degree to which newcomers receive more positive support, after being hired by an employer, from experienced organizational members tends to increase an employee's organizational commitment.

In considering these human resource management practices, the following recommendations are made to managers in which sonographers are employed:

1. Create and provide an effective onboarding process so that newly hired sonographers feel welcomed and have an opportunity to slowly work their way into the work rotation.
2. Create opportunities (i.e., mentorships) for experienced sonographers to be a part of new hires' initial training.
3. Evaluate the ultrasound department and provide candid information about the work environment, the sonographers in the department, number of ultrasound exams the sonographer should expect to perform, and any other expectations to reduce role ambiguity that may influence a newly hired employee's commitment.
4. Get to know employed sonographers informally by understanding their commitment to the organization and your department.
5. Lastly, perform a self-assessment to determine if one's managerial style fits within the ultrasound department.

Study Limitations

As discussed, organizational commitment has many antecedents that may impact a sonographer's organizational commitment. The variables chosen for this study may or may not have shown to be contributing factors in influencing the organizational commitment of sonographers in the Mid-Atlantic region of the United States. The second limitation of the study is the use of systematic sampling. If the list of sonographers taken from InFocus Marketing, Inc was previously arranged in their database in a way that grouped specific characteristics of those sonographers, then the list provided to the researcher could possibly not give an opportunity for some sonographers to participate as part of the sample (Polit & Beck, 2017). A third limitation of the study was the low response rate (11%). The low response rate leads to the fourth limitation, which is wave effect. There were differences noted between the wave of respondents, which could have likely affected the relationships being investigated in the study. Therefore, wave was used as a covariate during statistical analyses.

The last three limitations were beyond the author's control. Conducting this study during the COVID-19 pandemic, the overly advertised presidential election, and the ending of the supporting university's academic semester caused a slowdown in the movement of the surveys through the mail.

Future Research

This was the first known study of commitment among sonographers utilizing Meyer and Allen's three-component model of organizational commitment. This is also the first study to evaluate the relationship between the organizational commitment of

sonographers and sociodemographic variables or perceived organizational support. While this study's results helped to contribute to the current literature on organizational commitment and serve as a baseline for future organizational commitment studies among sonographers, several areas for future research are noted.

After receiving many surveys containing written comments on sonographers' perceptions of their organizations, it may be beneficial to conduct a mixed method study. This method could allow for a more responsive sample and an in-depth opportunity to obtain more information about what sonographers feel is important and to evaluate their work-life experiences. The last suggestion for future research is to focus on the antecedents that lead to the three components of organizational commitment. If antecedents can be identified, the reasons why sonographers express more of a commitment component over the other will be better understood. In addition, some of the antecedents could change or be eliminated.

In conclusion, four variables were identified as having an influence on the organizational commitment of sonographers in the Mid-Atlantic region of the United States. Those factors are: (a) living in Pennsylvania, (b) number of years employed at an organization, (c) being a registered cardiac sonographer, and (d) being unmarried. While living in Pennsylvania, being a registered cardiac sonographer, and unmarried showed to decrease the commitment scores of some of the commitment components, living in Pennsylvania and years employed at an organization increased other components. In addition, this study found no relationship between age, ethnicity,

gender, sonography education, highest degree obtained, employment status, position
tenure, or environment setting and organizational commitment.

Appendix A: Operational Definitions

Within this study the following operational definitions are used:

Affective commitment – commitment in which an employee identifies with the organization’s goals and values and possesses a sense of fitting in and remaining with the organization because of their desire to be there. The positive feelings of identification with, attachment to, and involvement in the work organization.

Antecedent - a thing or event that existed before another.

Continuance commitment - commitment in which employees feel they need to stay with their organization after considering the costs associated with leaving.

Correlation - a relationship or association between two variables, which shows that the variation in one variable will be related to the variation in another variable.

Diagnostic medical sonographer (“sonographer or ultrasonographer”) - imaging professionals who utilizes ultrasound machines to capture diagnostic images.

Normative commitment - commitment in which employees feel the sense of obligation to the organization. This is influenced by experiences both prior to and following entry into an organization.

Organizational commitment - a mindset reflecting a desire, a need, and/or obligation to maintain membership in an organization.

Sonography (“ultrasonography” or “ultrasound”) - a diagnostic imaging technique using high frequency mechanical and longitudinal sound waves to create images of the human body

Appendix B: Letter for Voluntary Participation

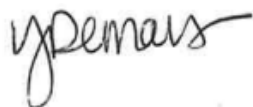
Dear Fellow Sonographer:

I am performing this study on sonographers to determine their commitment to their employing organizations. My purpose is to identify the organizational commitment scores of sonographers and assess the impact sociodemographic characteristics and perceived organization support have on one's organizational commitment. Hopefully, the information that I gain from this study will improve our work environments, benefit our profession, and make us aware of our own commitment to our employing organizations.

Participation in this research is entirely voluntary and confidential. Your identity and responses throughout the study and publication of this research is totally confidential and completely anonymous. Return of the survey to me is your consent for your responses to be compiled with others. Although the survey is coded to allow for follow-up with non-respondents, no names are recorded, nor will you be identified with your responses. This survey should only take 7 minutes of your time to complete. In appreciation of your time I have included an ink pen for you to keep after completing and returning your surveys in the included self-stamped envelope within the next two weeks.

Again, I greatly appreciate your time in completing this survey. If you have any questions, please feel free to contact me at demarsy@vcu.edu or 804-828-9104.

Thank you so much,



Yonella Demars, MSRS, RDMS (AB, OB/GYN, PS), RVT
Health Related Sciences Doctoral Student
Virginia Commonwealth University

Appendix C: Demographic Sheet

Please answer the following questions by checking the appropriate box.

State for which you reside (choose 1): Delaware District of Columbia
Maryland Pennsylvania Virginia West Virginia

ARDMS Credentials: RDMS AB FE BR PS OB/GYN
RDCS AE PE FE
RVT VT

Are you currently working as an educator, lead/manager/supervisor, or application specialist? Yes No

Gender at Birth: Male Female

Age (in years): _____

Race/Ethnicity: American Indian or Alaska Native Asian White
Black or African American Native Hawaiian or Other Pacific Islander
Hispanic or Latino

Degree obtained in Sonography: Certificate Associate degree
Bachelor's degree Master's degree Doctorate degree

Highest Degree Obtained: Certificate Associate degree
Bachelor's degree Master's degree Doctorate degree

Marital Status: Single Married In a significant relationship Divorced
Widowed

How long have you been employed by your current organization (in years)? _____

(If less than one year, enter zero.)

How long have you been in your current sonography position (in years)? _____

(If less than one year, enter zero.)

Are you currently part-time or full-time? _____

Which of the following best describes your current work environment? _____

Hospital

Outpatient facility (to include imaging centers)

Doctor's office

Other (please specify) _____

Appendix D: Commitment Scales

Instructions: Listed below are statements about how people may feel about their organizations. Using the seven-point scale provided, please indicate your level of agreement or disagreement with each numbered statement by circling the number to the right of the statement that best represents your point of view about the organization for which you are employed as a sonographer.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Disagree nor Agree	Slightly Agree	Moderately Agree	Strongly Agree

1	I would be very happy to spend the rest of my career with this organization.	1	2	3	4	5	6	7
2	I enjoy discussing my organization with people outside it.	1	2	3	4	5	6	7
3	I really feel as if this organization's problems are my own.	1	2	3	4	5	6	7
4	I think I could easily become as attached to another organization as I am to this one.	1	2	3	4	5	6	7
5	I do not feel like 'part of the family' at my organization.	1	2	3	4	5	6	7
6	I do not feel 'emotionally attached' to this organization.	1	2	3	4	5	6	7

7	This organization has a great deal of personal meaning for me.	1	2	3	4	5	6	7
8	I do not feel a strong sense of belonging to my organization.	1	2	3	4	5	6	7
9	I do not feel an obligation to remain with my current employer.	1	2	3	4	5	6	7
10	Even if it were to my advantage, I do not feel it would be right to leave my organization now.	1	2	3	4	5	6	7
11	I would feel guilty if I left my organization now.	1	2	3	4	5	6	7
12	This organization deserves my loyalty.	1	2	3	4	5	6	7
13	I would not leave my organization right now because I have a sense of obligation to the people in it	1	2	3	4	5	6	7
14	I owe a great deal to my organization.	1	2	3	4	5	6	7
15	I am not afraid of what might happen if I quit my job without having another one lined up.	1	2	3	4	5	6	7
16	It would be very hard for me to leave my organization right now, even if I wanted to.	1	2	3	4	5	6	7
17	Too much in my life would be disrupted if I decided I wanted to leave my organization now.	1	2	3	4	5	6	7

18	It wouldn't be too costly for me to leave my organization in the near future.	1	2	3	4	5	6	7
19	Right now, staying with my organization is a matter of necessity as much as desire.	1	2	3	4	5	6	7
20	I believe that I have too few options to consider leaving this organization.	1	2	3	4	5	6	7
21	One of the few negative consequences of leaving this organization would be the scarcity of available alternatives.	1	2	3	4	5	6	7
22	One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice; another organization may not match the overall benefits I have here.	1	2	3	4	5	6	7
23	If I had not already put so much of myself into this organization, I might consider working elsewhere.	1	2	3	4	5	6	7

Appendix E: Survey of Perceived Organization Support

Instructions

Listed below are statements that represent possible opinions that you may have about working at your **<current employer>**. Please indicate the degree of your agreement or disagreement with each statement by writing the number on the line next to the statement that best represents your point of view about your current employer as it corresponds to the score seen in the box below:

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. **<current employer>** values my contribution to its well-being. _____
2. If **<current employer>** could hire someone to replace me at a lower salary it would do so. _____
3. **<current employer>** fails to appreciate any extra effort from me. _____
4. **<current employer>** strongly considers my goals and values. _____
5. **<current employer>** would ignore any complaint from me. _____
6. **<current employer>** disregards my best interests when it makes decisions that affect me. _____
7. Help is available from **<current employer>** when I have a problem. _____
8. **<current employer>** really cares about my well-being. _____
9. Even if I did the best job possible, **<current employer>** would fail to notice. _____
10. **<current employer>** is willing to help me when I need a special favor. _____
11. **<current employer>** cares about my general satisfaction at work. _____
12. If given the opportunity, **<current employer>** would take advantage of me. _____
13. **<current employer>** shows very little concern for me. _____
14. **<current employer>** cares about my opinions. _____
15. **<current employer>** takes pride in my accomplishments at work. _____
16. **<current employer>** tries to make my job as interesting as possible. _____

References

- Abdelmoteleb, S. (2018). A new look at the relationship between job stress and organizational commitment. *Journal of Business and Psychology, 34*(3), 1–16.
- Adler, A., & Carlton, R. (2016). *Introduction to Radiologic & Imaging Sciences & Patient Care*. St. Louis, MO: Elsevier.
- Akroyd, D., Jackowski, M. B., & Legg, J. S. (2007). Factors affecting radiographers' organizational commitment. *Radiologic Technology, 78*(6), 467–475.
- Akroyd, D., Legg, J., Jackowski, M., & Adams, R. D. (2009). The impact of selected organizational variables and managerial leadership on radiation therapists' organizational commitment. *Radiography, 15*(2), 113–120.
- Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance, and normative commitment to the organization. *Journal of Occupational Psychology, 63*, 1–18.
- Allen, N. J., & Meyer, J. P. (1996). Affective, continuance, and normative commitment to the organization: An examination of construct validity. *Journal of Vocational Behavior, 49*, 252–276.
- American Registry for Diagnostic Medical Sonography. (2019). Get certified. Retrieved from <https://www.ardms.org/get-certified/>
- Baker, J. P. (2005). The history of sonographers. *Journal of Ultrasound in Medicine, 24*(1), 1–14.
- Becker, H. S. (1960). Notes on the concepts of commitment. *American Journal of Sociology, 66*(1), 3–40.
- Brown, M. E. (1969). Identification and some conditions of organizational involvement. *Administrative Science Quarterly, 14*(3), 346–355.
- Buchanan, B. (1974). Building organizational commitment: The socialization of managers in work organizations. *Administrative Science Quarterly, 19*(4), 533–546.

- Bureau of Labor Statistics. (2018a, April 13). Medical sonographers and cardiovascular technicians and technologists. Retrieved from <http://www.bls.gov/ooh/healthcare/diagnostic-medical-sonographers.htm>
- Bureau of Labor Statistics. (2018b, Aug 14). Occupational Employment and Wages, May 2020, 29-2032 Diagnostic Medical Sonographers. Retrieved from <http://www.bls.gov/oes/current/oes292032.htm>
- Chang, H. Y., Shyu, Y. I., Wong, M. K., Chu, T. L., Yuan Yu, L., & Teng, C. I. (2017). How does burnout impact the three components of nursing professional commitment. *Scandinavian Journal of Caring Science*, 31(4), 1003–1011.
- Cook, J., & Wall, T. (1980). New York attitude measures of trust, organizational commitment and personal need non-fulfilment. *Journal of Occupational Psychology*, 53, 39–52.
- Creswell, J. W. (2002). *Educational research planning: Conducting, and evaluating, quantitative and qualitative research*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Cummings, S. M., Savitz, L. A., & Konrad, T. R. (2001). Reported response rates to mailed physician questionnaires. *Health Services Research*, 35(6), 1347–1355.
- Daugherty, J. (2002). Burnout: How sonographers and vascular technologists react to chronic stress. *Journal of Diagnostic Medical Sonographer*, 18(5), 305–312.
- Eisenberger, R., Fasolo, P., & Davis-LaMastro, V. (1990). Perceived organizational support and employee diligence, commitment, and innovation. *Journal of Applied Psychology*, 75(1), 51–59.
- Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology*, 71(3), 500–507.
- Field, A. (2009). *Discovering statistics using SPSS*. Thousand Oaks: Sage.
- Galais, N., & Moser, K. (2009). Organizational commitment and the well-being of temporary agency workers: A longitudinal study. *Human Relations*, 62(4), 589–620.
- Garland, B., Lambert, E. G., Hogan, N. L., Kim, B., & Kelley, T. (2014). The relationship of affective and continuance organizational commitment with correctional staff occupational burnout: A partial replication and expansion study. *Criminal Justice and Behavior*, 41(10), 1161–1177.

- Gouldner, H. P. (1960). Dimensions of organizational commitment. *Administrative Science Quarterly*, 4(4), 468–490.
- Grusky, O. (1966). Career mobility and organizational commitment. *Administrative Science Quarterly*, 10(4), 488–503.
- Hall, D., Schneider, B., & Nygren, H. (1970). Personal factors in organizational identification. *Administrative Science Quarterly*, 15(2), 176–190.
- Hrebiniak, L., & Alutto, J. (1972). Personal and role-related factors in the development of organizational commitment. *Administrative Science Quarterly*, 17(4), 555–573.
- Jackson, S., Turner, J., & Brief, A. (1987). Correlates of burnout among public service lawyers. *Journal of Occupational Behaviour*, 8, 339–349.
- Juliusson, G., Thorvaldsdottir, B., Kristjansson, J. M., & Hannesson, P. (2019). Diagnostic imaging trends in the emergency department: An extensive single-center experience. *Acta Radiologica Open*, 8(7), 1–6.
- Jung, J., & Kim, Y. (2012). Casues of newspaper firm employee burnout in Korea and its impact on organizational commitment and turnover intention. *The International Journal of Human Resource Management*, 23(17), 3636–3651.
- Kang, J.-S. (2012). Relationship among job burnout, organizational commitment and organizational citizenship behavior in social workers using structural equation modeling. *International Journal of Contents*, 8(3), 57–63.
- Kanter, R. M. (1968). Commitment and social organization: A study of commitment mechanisms in utopian communities. *American Sociological Review*, 33(4), 499–517.
- Kim, B. (2016, May 20). *Hierarchical Linear Regression*. University of Virginia Library Research Data Services + Sciences. Retrieved from <https://data.library.virginia.edu/hierarchical-linear-regression/>
- Makanjee, C. R., Hartzel, Y. F., & Uys, I. L. (2006). The effect of perceived organizational support on organizational commitment of diagnostic imaging radiographers. *Radiography*, 12(2), 118–126.
- Mannevu, M. (2018). The riddle of adaptation: Revisiting the Hawthorne studies. *The Sociological Review*, 66(6), 1242–1257.

- Mathieu, J. E., & Zajac, D. M. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *American Psychology Association, 108*(2), 171–194.
- McLaughlin, S. M. (2002). Focusing on the issues: Government recognizes sonography occupation. *Journal of Diagnostic Medical Sonography, 18*(2), 112–116.
- McNeese-Smith, D., & Nazarey, M. (2001). A nursing shortage: Building organizational commitment among nurses/practitioner application. *Journal of Healthcare Management, 46*(3), 173–186.
- Meyer, J. P., & Allen, N. J. (1984). Testing the "side-bet theory" of organizational commitment: Some methodological considerations. *Journal of Applied Psychology, 69*(3), 372–378.
- Meyer, J. P., & Allen, N. J. (1987). A longitudinal analysis of the early development and consequences of organizational commitment. *Canadian Journal of Behavioural Science, 19*(2), 199–215.
- Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review, 1*(1), 61–89.
- Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research, and application*. Thousand Oaks, CA: Sage.
- Meyer, J. P., Stanley, D. J., Herscovitch, L., & Topolnytsky, L. (2002). Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior, 61*(1), 20–52.
- Meyer, J. P., Stanley, D., Jackson, T. A., McInnis, K. J., Maltin, E. R., & Sheppard, L. (2012). Affective, normative, and continuance commitment levels across cultures: A meta-analysis. *Journal of Vocational Behavior, 80*(2), 225–245.
- Meyer, J., Irving, P. G., & Allen, N. (1998). Examination of the combined effects of work values and early work experiences on organizational commitment. *Journal of Organizational Behavior, 19*, 29–52.
- Mowday, R. T., Porter, L., & Steers, R. M. (1982). *Employee-organization linkages: The psychoogy of commitment, absentessism, and turnover*. New York: Academic Press.

- Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. *Journal of Vocational Behavior, 14*, 224–247.
- Painter, J., & Akroyd, D. (1998). Predictors of organizational commitment among occupational therapists. *Occupational Therapy in Health Care, 11*(2), 1–15.
- Polit, D., & Beck, C. (2017). *Nursing research: Generating and assessing evidence for nursing practice*. Philadelphia, PA: Wolters Kluwer.
- Porter, L., Steers, R., Mowday, R., & Boulian, P. (1974). Organizational commitment, job satisfaction and turnover among psychiatric technicians. *Journal of Applied Psychology, 59*(5), 603–609.
- Power Analysis and Sample Size Software. (2019). Kaysville, UT, USA: NCSS,LLC. Retrieved from ncss.com/software/pass
- Ritzer, G., & Trice, H. M. (1969). *An occupation in conflict: A study of the personnel manager*. Ithaca, NY: New York State School of Industrial and Labor Relations.
- Rizzo, J., House, R., & Lirtzman, S. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly, 15*(2), 150–162.
- Rui, P., & Okeyode, T. (2015). *Centers for Disease control and Prevention*. Retrieved November 25, 2017, from Ambulatory Health Care Data: https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2015_namcs_web_tables.pdf
- Rui, P., Hing, E., & Okeyode, T. (2014). *Centers for Disease Control and Prevention*. Retrieved November 26, 2017, from Ambulatory Health Care Data: https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2014_namcs_web_tables.pdf
- Santos, A., Chambel, M. J., & Castanheira, F. (2016). Relational job characteristics and nurses' affective organizational commitment: The mediating role of work engagement. *Journal of Advanced Nursing, 72*(2), 294–305.
- Schalk, R. (2011). The influence of organizational commitment and health on sickness absenteeism: A longitudinal study. *Journal of Nursing Management, 19*(5), 596–600.
- Seruya, F. M., & Hinojosa, J. (2010). Professional and organizational commitment in paediatric occupational therapists: The influence of practice setting. *Occupational Therapy International, 17*(3), 125–134.

- Sheldon, M. E. (1971). Investments and involvements as mechanisms producing commitment to the organization. *Administrative Science*, 16(2), 143–150.
- Shore, L. M., & Tetrick, L. E. (1991). A construct validity study of the survey of perceived organizational support. *Journal of Applied Psychology*, 76(5), 637–643.
- Society of Diagnostic Medical Sonography. (2013, May). Scope of practice and clinical standards for the diagnostic medical sonographer. Retrieved from <https://www.sdms.org/docs/default-source/Resources/scope-of-practice-and-clinical-standards.pdf?sfvrsn=8>
- Soper, D. S. (2020, Jan 7). A-priori Sample Size Calculator for Multiple Regression [Software]. Retrieved from <http://www.danielsoper.com/statcalc>
- Steers, R. M. (1977). Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly*, 22(1), 46–56.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. Upper Saddle River, NJ: Pearson.
- U.S. Department of Health & Human Services. (2019, January 16). *Agency for Healthcare Research and Quality*. HCUPnet Healthcare Cost and Utilization Project. Retrieved from <http://hcupnet.ahrq.gov/#query/eyJJEQVRBU0VUX1NPVVJDRSI6WyJEU19OSVMiXSwiQU5BTFFITSVNFVFIQRSI6WyJCVF9Ull0sIkNBVEVHT1JJWkFUSU9OX1RZUEUiOlsiQ1RfSUNEOWAiXSwiVEFCTEVfVFIQRSI6WyJUVF9BTEExDT0RFUyJdLCJkVF9JQ0Q5UCI6WylzNjgzliwiMzY4NCIsIjM2ODYiLCIzNjg3liwiMzY4OCIsIjM>
- Wu, L., & Norman, I. J. (2006). An investigation of job satisfaction, organizational commitment and role conflict and ambiguity in a sample of Chinese undergraduate nursing students. *Nurse Education Today*, 26(4), 304–314.