Early Career Physical Therapy Faculty Networking and Scholarly Productivity: A Mixed-Methods Study

Betsy J. Becker
University of Nebraska Medical Center

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EARLY CAREER PHYSICAL THERAPY FACULTY NETWORKING AND SCHOLARLY PRODUCTIVITY: A MIXED-METHODS STUDY

By
Betsy J. Becker

A DISSERTATION

Presented to the Faculty of
The University of Nebraska Graduate College
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Medical Sciences Interdepartmental Area
Graduate Program
(Preventative and Societal Medicine)

Under the Supervision of Professors Susanna Von Essen and Gilbert Willett

University of Nebraska Medical Center
Omaha, NE

September 2018

Supervisory Committee:
Laura Bilek, PT, PhD   |   Victoria Kennel, PhD    |   Christopher J. Kratochvil, MD
ACKNOWLEDGEMENTS

Throughout this academic endeavor, my personal and professional connections were invaluable. I would like to express sincere gratitude to my supervisors, Dr. Von Essen and Dr. Willett, for their guidance, commitment to high standards, and insight throughout the process. The committee members, Dr. Kratochvil, Dr. Bilek, and Dr. Kennel, also provided valuable feedback and patience in group discussions and one-on-one meetings.

It is essential to also acknowledge the faculty and staff in the University of Nebraska Medical Center Division of Physical Therapy Education for their interest in the project, brainstorming, and reassurance. Although you did not know at the time, your words of encouragement came at just the right time to continue forward momentum.

Thank you to the American Physical Therapy Association (APTA) Academy of Physical Therapy Education former President, Dr. Musolino and Faculty Development Chair, Dr. Hilliard. You added credibility to the importance of the project for study participant recruitment at the New Faculty Development Workshop.

I am also thankful to the multi-talented individuals who provided assistance along the way with expertise in network analysis (Dr. Woehler and the LINKS workshop), statistics (Prof. Sayles), educational research (Dr. Shope, Dr. Beam), data entry (Mr. Rost), transcription (Ms. Wood, Ms. Kimble), faculty development (Dr. Love, Dr. Liu), and writing feedback and support (Dr. Bills, Dr. McBrien, Dr. Haggar, Dr. Koesters, Prof. Honeycutt, Dr. Skrabal, Prof. Sleddens, Prof Skinner, Dr. Webster). The generous funding provided by the College of Allied Health Professions and the APTA Academy of Physical Therapy Education was also a factor in the project completion.

I owe deep gratitude to my husband who kept me grounded, listened to my academic woes, helped me set realistic goals, and provided a running commentary of witty comments about the project. I credit my in-laws for their enduring support. To my three sisters, thank you for providing very practical advice learned from earning your doctoral degrees. Last but not least I would like to acknowledge my parents for their continuous support and instilling in me the values of hard work, persistence, tenacity, and the importance of education. Without you, I could never have reached my current level of success.
ABSTRACT

EARLY CAREER PHYSICAL THERAPY FACULTY NETWORKING AND SCHOLARLY PRODUCTIVITY: A MIXED-METHODS STUDY

Betsy J. Becker, Ph.D.
University of Nebraska, 2018
Supervisors: Susanna Von Essen, MD, MPH and Gilbert Willett, PT, Ph.D.

While it is well-known that physical therapist (PT) faculty must retain a scholarly agenda, few report being activity engaged and many programs have low scholarly dissemination. There is evidence that knowledge of the make-up of a faculty network leads to improved performance and innovation. The purpose of this explanatory sequential mixed methods study was to explore agency (behaviors and perspectives about career advancement) and the professional network structure and composition of early career PT faculty as they relate to scholarly activity. This dissertation research study included 50 early career faculty who worked in accredited entry-level physical therapy programs.

The quantitative phase results showed a more open and less interconnected network is associated with higher scholarly activity when controlling for the duration as a faculty member and whether the individual has an academic doctoral degree. Agency behavior and perspective scores were not associated with higher scholarly activity. The Scholar Score developed during this phase offered a clear and uniform, peer-validated approach to account for the quantity and quality of scholarly activities.

The qualitative phase used a grounded theory approach to analyze interviews with a sub-set of 20 study participants. The result was a central phenomenon of connecting with others for scholarly activity. The two constructs in the model are strategies used to
develop network connections and how these connections helped faculty participate in scholarly activity. The findings about the network development process helped explain the quantitative results of high and low performers of scholarly activity. Without both study phases important information would have been missed.

Key implications from this study include advancing the application of the Scholar Score and demonstrating network analysis for PT faculty. More importantly this study generated new knowledge about an effective network and the process used to create professional relationships to strengthen an early career PT faculty scholarly agenda. Network analysis made the connections visible for the early career faculty who reside at the lower end of the academic hierarchy in terms of tenure, academic rank, and scholarly productivity.
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<table>
<thead>
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>APTA</td>
<td>American Physical Therapy Association</td>
</tr>
<tr>
<td>ACAPT</td>
<td>American Council of Academic Physical Therapy</td>
</tr>
<tr>
<td>CAPTE</td>
<td>Commission on Accreditation in Physical Therapy Education</td>
</tr>
<tr>
<td>CV</td>
<td>Curriculum Vitae</td>
</tr>
<tr>
<td>DPT</td>
<td>Doctorate of Physical Therapy (a clinical doctoral degree, not an academic doctoral degree)</td>
</tr>
<tr>
<td>FDW</td>
<td>Faculty Development Workshop</td>
</tr>
<tr>
<td>FTE</td>
<td>Full Time Equivalent</td>
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<tr>
<td>PT</td>
<td>Physical Therapist</td>
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<td></td>
<td>When referring to the profession in general, the PT abbreviation is not used per the APTA Department of Education guidelines</td>
</tr>
<tr>
<td>T1</td>
<td>Time 1 (baseline)</td>
</tr>
<tr>
<td>T2</td>
<td>Time 2 (one year later)</td>
</tr>
<tr>
<td>UNMC</td>
<td>University of Nebraska Medical Center</td>
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</table>
Chapter 1 Introduction
INTRODUCTION

There are 2,899 full time faculty working in 242 accredited professional (entry level) physical therapist programs across the country.\(^1\) Of these, less than half (44.8%) have academic doctoral degrees, yet all are required by the Commission on Accreditation in Physical Therapy Education (CAPTE) to demonstrate an active scholarly agenda.\(^1\)\(^-{3}\) There are currently 141 full time physical therapist (PT) faculty vacancies, with 94 additional openings projected over the next few years.\(^1\) To sustain continued growth in the physical therapy profession, especially among those who lack formal research training, instruction will be needed for new PT educators regarding social and institutional structures that will affect them during their early faculty years. These faculty will need to establish relationships with colleagues to obtain guidance about setting a scholarly agenda. This will also be essential for navigating the academy; waiting for these connections to develop on their own is an unreliable and ineffective strategy.\(^4\)\(^,\)\(^5\) The long-term goal of the present research is to have a positive influence on the field of physical therapy through analysis of professional network connections for early career PT faculty advancement, especially as it relates to scholarship. This chapter provides background information so as to lay the foundation for this research project.

BACKGROUND

Network Connections and Scholarly Activity

The effectiveness of an institution of higher learning is directly related to the quality and vigor of its faculty. Therefore, encouraging optimal performance and assisting with the scholarly agenda of new faculty and their career advancement should be a top priority. Faculty, however, often describe their early years of establishing new patterns of the teaching, publishing, and service required by the academy as isolating, lonely, and stressful.\(^5\)\(^,\)\(^6\) Results from a study of medical faculty showed network
connections mattered a great deal in mitigating these issues.\textsuperscript{7} Findings showed that an effective professional network was a strong predictor of publishing research, productivity, retention and advancement, and, most importantly, in career satisfaction. There is also evidence that knowledge of the make-up of a faculty network leads to improved performance, innovation, and collaborations.\textsuperscript{7-9}

Studies demonstrate that the number of available connections (i.e., network size) and how well a faculty member knows about and understands these connections are as important as the depth and breadth of its member experiences.\textsuperscript{10-13} In the field of family medicine, for example, effective networks provided breadth of knowledge, career opportunities, and scholarly activity prospects.\textsuperscript{4,13} Faculty who examined the expertise and demographics of their contacts had a greater likelihood of success in scholarly activity and maintained greater interest in collaboration with faculty from other disciplines.\textsuperscript{14,15} One study on the value of research collaborations noted: "...no one person is capable of maintaining the deep understanding necessary to conduct truly interdisciplinary research."\textsuperscript{16} Therefore, it is clearly important to study successful methods to evolve scholarly activity networks. Models for collaboration in research continue to develop, and as another study advocates, for innovation to occur we must "...respond to shifts in the way work is created, completed, and gauged, so that talented clinicians and researchers will be able to flourish in their careers."\textsuperscript{17}

However, to date the study of how relationships are developed and how they contribute to an effective network for scholarly activity has not been applied to the field of physical therapy, where there is an urgent need to support scholarly activity, as will be demonstrated below.
Scholarly Activity in PT

While it is required that PT faculty have a scholarly agenda, only 21% of PT faculty describe themselves as active in scholarship. The meaning of scholarly activity as applied to physical therapy education includes the scholarship of discovery, integration, application and teaching. A recent study by Hinman and Brown of 2602 PT faculty at 225 accredited professional (entry level) physical therapy schools, found that scholarly productivity has remained stable over the past ten years. However, it was interesting to note that the majority of programs had at least one faculty member who had not yet disseminated a scholarly product. These authors suggest a continued focus remains on teaching and service, as reflected by the greater percentage of time assigned to these areas rather than to scholarship. The reported barriers to maintaining a scholarly agenda among PT faculty are similar to those in other healthcare research professions, including lack of time and institutional support, few available resources for successful ongoing projects, and for some, no academic doctoral training, only a clinical Doctorate in Physical Therapy (DPT). The definition of an academic doctoral degree is used by CAPTE to differentiate it from the clinical DPT. The definition was adopted from the Integrated Postsecondary Education Data System, a part of the Institute for Education Sciences within the United States Department of Education. The academic doctoral degree “requires advanced work beyond the Master’s level, including the preparation and defense of a dissertation based on original research, or the planning and execution of an original project demonstrating substantial scholarly activity.” Examples of academic doctoral degrees are Doctorate in Education (Ed.D.), Doctorate of Science (D.Sc.), and Doctor of Philosophy (Ph.D.).
Measuring Scholarly Activity

Prior studies that explored factors influencing scholarly productivity in PT used simple counts of publications and presentations without describing authorship order, journal impact factor, presentation audience (national, local, etc.), or peer-reviewed or invited opportunities. They also omitted grant awards, a very significant contribution of scholarly activity.\textsuperscript{21,23,24} For example, being the first author of a peer-reviewed published paper is universally recognized as a greater contribution than third author of five for a book chapter, but of course both of these comprise scholarship. The studies also only used databases and archival information rather than primary documents. For example, a faculty curriculum vitae (CV) would reflect a more complete record of achievement.

Even CAPTE considers only the quantity of items disseminated, with five categories to gauge productivity (Figure 1.1).\textsuperscript{20} Their expectation is faculty have “at least one accomplishment for every two years of academic service.”\textsuperscript{20} It is also stated that “new faculty (<5 years) are not expected to have an established scholarly record yet but should have an appropriate agenda to get there.”\textsuperscript{20} Thus, for accreditation purposes, a program could be in compliance if a faculty member did not have any scholarly output until their sixth year in the academy, a very generous time to produce one publication.

\begin{table}[h]
\centering
\begin{tabular}{|l|}
\hline
\textbf{Figure 1.1} Categories for ranking scholarly productivity \\
\hline
0 $\rightarrow$ no scholarly involvement \\
1 $\rightarrow$ active, but no products yet \\
2 $\rightarrow$ less than 5 disseminated products \\
3 $\rightarrow$ 5 to 10 disseminated products \\
4 $\rightarrow$ more than 10 disseminated products \\
\hline
\end{tabular}
\caption*{Information adapted from the Commission on Accreditation in Physical Therapy Education\textsuperscript{20}}
\end{table}
This ranking of scholarly productivity was used to describe the professoriate as a whole in a recent study, but the authors stated that a major limitation was “scholarly productivity is not clearly defined nor weighted by any objective measure of quality such as the type of scholarly product, level of authorship, or impact factor.”

Despite the measurement limitation, prior work can be used to demonstrate the ongoing difficulty with higher academic productivity in physical therapy. Richter et al. explored the professional (entry level) physical therapy program characteristics associated with the number of publications of PT faculty from 1998-2002, and showed that faculty size, whether programs offered a research doctoral degree, and Carnegie Classification were significant. The Carnegie Classifications are “time-specific snapshots of institutional attributes and behavior” (Table 1.1). Doctor of Physical Therapy Programs are housed in institutions in the Baccalaureate, Master’s, Doctoral, and Special Focus categories. Two studies by Kaufman et al., that used publications and presentation quantity as outcome measures showed that strong predictors of productivity were highest degree earned, appointment status, and faculty rewards. This study also found a gender gap in peer-reviewed publications with women publishing half as many works as men. Finally, although such studies provide helpful information on the status of scholarly productivity and factors associated with successful presentation and publication, findings may differ if various types of scholarship were weighted.

There are weighted values proposed within other professions, but these have severe limitations that make them unsuitable to implement for PT faculty. For example, a scoring system proposed for lawyers accounts for the length of a publication, and this is not a measurement in physical therapy scoring. A score for athletic trainers does not account for levels of authorship or presentation audience, and leaves out grant awards altogether. A scholarly activity point system was proposed for surgical residents, but
gave the same score to all grants regardless of amount awarded or role (this system was developed by four persons in-house at one medical center).29

A new scoring system that accounts for the value of different scholarly work would be a new and innovative way to report scholarship in physical therapy. If it also accounted for early work, such as published abstracts or middle authorship, this system would be sensitive enough to show progress by early career faculty. Gathering all scholarly information, not just presentations and publications from existing databases but primary documents including CVs or personal interviews, would also make this scoring system comprehensive. The system could also improve knowledge for early career faculty of different scholarly items so as to better judge where best to expend their limited time and effort for the best outcome. This last point may seem obvious to experienced faculty, but early career faculty may indeed not always know what constitutes value.
<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Doctoral Universities</td>
<td>Highest Research Activity</td>
<td>Includes institutions that awarded at least 20 research/scholarship doctoral degrees (this does not include professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). Excludes Special Focus Institutions and Tribal Colleges.</td>
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<td></td>
<td>Higher Research Activity</td>
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<td></td>
<td>Moderate Research Activity</td>
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<tr>
<td>Master's Colleges &amp; Universities</td>
<td>Larger Programs</td>
<td>Generally includes institutions that awarded at least 50 master's degrees and fewer than 20 doctoral degrees. Excludes Special Focus Institutions and Tribal Colleges.</td>
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<td>Medium Programs</td>
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<td>Small Programs</td>
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<tr>
<td>Baccalaureate Colleges:</td>
<td>Arts &amp; Sciences Focus</td>
<td>Includes institutions where baccalaureate or higher degrees represent at least 50 percent of all degrees but where fewer than 50 master's degrees or 20 doctoral degrees were awarded. (Some institutions above the master's degree threshold are also included) Excludes Special Focus Institutions and Tribal Colleges.</td>
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<td></td>
<td>Diverse Fields</td>
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<tr>
<td>Baccalaureate/Associate's Colleges</td>
<td>Mixed</td>
<td>Includes four-year colleges (by virtue of having at least one baccalaureate degree program) that conferred more than 50 percent of degrees at the associate's level. Excludes Special Focus Institutions, Tribal Colleges, and institutions that have sufficient master's or doctoral degrees to fall into those categories.</td>
</tr>
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<td></td>
<td>Baccalaureate/Associate's Dominant</td>
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<tr>
<td>Associate's Colleges</td>
<td>High Transfer-High Traditional</td>
<td>Institutions at which the highest-level degree awarded is an Associate’s degree. The institutions are sorted into nine categories based on the intersection of two factors: disciplinary focus (transfer, career &amp; technical or mixed) and dominant student type (traditional, nontraditional or mixed). Excludes Special Focus Institutions and Tribal Colleges.</td>
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<td>High Transfer-Mixed Traditional</td>
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<td>Traditional/Nontraditional</td>
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<td>High Transfer-High Nontraditional</td>
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<td>Mixed Transfer/Career &amp; Technical</td>
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<td>- High Traditional</td>
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<td>- Traditional</td>
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<td>- Mixed Transfer/Career &amp; Technical-Mixed</td>
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<td>Traditional/Nontraditional Mixed Transfer/Career &amp; Technical-Mixed</td>
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<td><strong>Associate's Colleges</strong> (continued)</td>
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<td>Arts &amp; Design</td>
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<td>High Career &amp; Technical-High Nontraditional</td>
<td>Fields other than Health and Technical Professions, Art &amp; Design</td>
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<td>Faith-Related Institutions</td>
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<td>Medical Schools &amp; Centers</td>
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<td>Other Health Professions Schools</td>
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<td>Engineering Schools</td>
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<td>Other Technology-Related Schools</td>
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<td>Business &amp; Management Schools</td>
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<td></td>
<td>Arts, Music &amp; Design Schools</td>
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<td>Law Schools</td>
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<tr>
<td></td>
<td>Other Special Focus Institutions</td>
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<tr>
<td></td>
<td>Institutions where a high concentration of degrees is in a single field or set of related fields. Excludes Tribal Colleges.</td>
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</tbody>
</table>

| **Tribal Colleges** | **Colleges and universities that are members of the American Indian Higher Education Consortium, as identified in IPEDS Institutional Characteristics.** |

Source: Adapted from the Carnegie Classification of Institutions of Higher Education by Indiana University Center for Postsecondary Research is licensed under a Creative Commons Attribution-Noncommercial-ShareAlike 4.0 International License. Based on work from http://carnegieclassifications.iu.edu.
Agency

So far, this chapter has covered how faculty network relationships may impact scholarly activity and the state of scholarly activity in physical therapy, including measurement methods. It is also important to consider individual faculty choices about career advancement and decisions about what scholarly activity to pursue. “Agency” is defined as taking strategic or intentional actions to achieve meaningful goals, and is shaped by prior experiences, social capital, and the context in which decisions are made. Sociological constructs consider agency as how individuals intentionally plan to influence the trajectory of their careers by creating work situations or opportunities conducive to its development. Agency has also been described as seeking meaningful work, contributing effectively, and being passionate about one’s profession. It can be divided into agency perspective (strategic views about a given situation) and agency behavior (action taken to help one advance).

Agency is important in academic career development, where success is typically related to promotion and tenure awarded for achievement, visibility, and recognition in teaching, scholarly activity, and service. In this context, it is also important to note that self-motivation is directly related to agency and may depend on the need for achievement, power, and affiliation with a successful group. Those with greater agency are also likely to be concerned with a high standard of excellence, wish to demonstrate a unique accomplishment, and have specific career goals. Terosky and O’Meara, who interviewed and observed hundreds of undergraduate and graduate faculty and faculty development directors, concluded that the sense of personal agency is one of four aspects related to professional growth, with learning, professional relationships, and commitment. In a qualitative study about agency and faculty who apply for promotion, results show both social context and relationships with others heavily influenced a sense of agency. The concept of agency has not been applied in
research about the physical therapy profession, but should be considered when studying early career faculty career advancement, and can be measured if desirable. A valid and reliable tool, developed by Campbell and O'Meara, measures agency perspective and agency behavior. There are also valid and reliable methods to measure network relationships that relate to agency, described in the next section.

**Social Network Analysis**

**Network structure**

Faculty agency and the value of collaborators can be jointly studied within a social context using social network analysis. This methodology is grounded in mathematics using graph theory to explain how connections form into social structures that influence individuals and the outcomes of the group. Graph theory is the study of how discreet objects (e.g. graphs) intersect based on the individuals and connections between one another. It is constructed around a set of people, called egos, nodes or vertices (V) and the connections between them (e.g. ties, links or edges (E)). The definition of a graph (G) is G=(V,E). Network structure is illustrated using network maps, size, and density measurements. Sample maps are shown in Figure 1.2, where each dot represents a network contact and lines run among those who know each other. The closer any person appears to another on the map, the more relationships they have in common.
The large circle is the network contact in which all others are compared.

By studying the maps, it is possible to identify four general shapes. The “clique” shape develops when one’s network includes few contacts who provide exclusive support and become partners or even best friends. The second shape is the “company,” where the network is comprised of a large group who are highly interconnected. It has been compared to a surrogate family wherein culture and norms form quickly. The other two network shapes, “core-periphery” and “contextualized component,” form when different contacts are needed for different tasks. For example, an early career faculty member may have long-standing relationships from residency training and begin to
maintain subgroups of contacts related to clinical practice or interprofessional scholarly collaborations.

In addition to maps, the network structure is described by the total number of contacts, or network size. A large network can be beneficial but can also pose drawbacks. For example, a network with numerous connections can provide information and resources that benefit an early career faculty member who is developing a scholarly agenda. However, this high number of connections may require a great deal of energy and effort to maintain these relationships, manifesting as too many projects that spread one too thin, or communication burdens that limit making new connections.

Density is the third network structure measure and accounts for degrees of interconnection, or the proportion of network contacts who are also connected with each other. When networks are densely interconnected (closed), ties are redundant and thus theoretically do not contribute new resources or information. In contrast, a less interconnected (open) network means one has greater control of information and resources because network contacts do not also talk to the others.

**Network composition**

In addition to the structure measures just described, networks can be further explored by similarities and differences among persons in the group. Homophily, similarity between network contacts and the early career PT faculty, may occur due to preference (PT faculty who prefer other faculty in their department at their university), peer influence (PTs encouraging their non-PT friends to attend a university meeting), or confounding issues (the best time to develop relationships is likely at one's institution, and proximity facilitates friendship). Persons tend to form relationships based on similarities and resources flow more quickly among them. The converse is also true, where dissimilar persons tend to be less likely to share resources.
However, network composition can also be measured by heterogeneity, or the variety of individual characteristics within the group.\textsuperscript{40} For example, one could measure the diversity of contacts by gender, academic rank, or subject expertise. A glossary of information and examples about how to calculate the network structure and composition measures is provided in Table 1.2.

The next section includes a description of the theory behind studying network structure and composition, and a review the literature where these concepts have been applied.

<table>
<thead>
<tr>
<th>Table 1.2 Network Structure and Composition Measurement Glossary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td>Calculation</td>
</tr>
<tr>
<td>Example</td>
</tr>
<tr>
<td><strong>Density</strong></td>
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<td>Calculation</td>
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<tr>
<td>Example</td>
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<tr>
<td><strong>Open</strong></td>
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<td><strong>Closed</strong></td>
</tr>
</tbody>
</table>
**Homophily**

Homophily is the measurement of similarity between characteristics of members in one’s network to self. It is the tendency for people to forge more ties with others who are similar to themselves. The EI Index is used to measure the number of external ties (E) one has to members in a category different from their own and the number of internal ties (I), which is the number of members in the same category. The range is from -1 to +1. A score and EI Index of -1 indicates that one has only ties with members in the same category as themselves, which is perfect homophily. A score of +1 means one has ties to members from different categories which is perfect heterophily.

**Calculation:**  \( EI = \frac{E-I}{E+I} \)

**Example:**
25 people in one’s network= 4 faculty at same institution in PT, 8 at different institution in PT, 9 at same institution, not PT, 4 clinicians only

\( EI \) index: \( I = 4, E = 21 \rightarrow \frac{(21-4)}{(21+4)} = 0.68 \). This number indicates a high degree of heterophily.

When interpreting this number, caution should be taken because this index only accounts for ties that have been formed without consideration for the pool from which the ties have been selected.

**Heterogeneity**

Heterogeneity is the measurement of the variety of characteristics each member brings for network diversity. This measure is Agresti’s IQV (Index of Qualitative Variation) which gives the amount of diversity among the number of categories. One’s network has no diversity or heterogeneity (i.e., equal to 0) when one is connected only to those in one group or with one characteristic (e.g., all women). One’s network has maximum heterogeneity (i.e., equal to 1-1/r, where r is the number of different relational types) when one has the same number of connections to those in each group or with each characteristic (e.g., an equal number of women and men).

**Calculation:**  \( H/(1-1/r) \)

**H formula:** \( H = 1 - P_1^2 - P_2^2 - P_3^2 \ldots - P_r^2 \)

An example includes the following network: 8 men, 19 professors & associate professors, 5 with scholarly activity \( r=3 \) relation groups

Total network members (excluding the early career faculty member, whose network is studied) = 22

Proportion (P) of ties in relation to the total number of members = 8/22, 19/22, 5/22 i.e.: .36, .86, .23

\( H=1 - .36^2 - .86^2 - .23^2 = 1 - .11 - .74 - .05 = .08 \)

IQV is = .3779 / (1-1/3) = .12 This number indicates diversity.
Social Capital Theory

The framework used here for social network analysis is the social capital theory, which includes the three constructs shown in Figure 1.3. One focuses on access to resources, where network contacts provide direct and indirect provision of information, supplies, or ideas which would not otherwise be available. A second construct places emphasis on social cohesion, with strong interconnected ties contributing to robust support and social integration. The third construct highlights brokering across gaps (also called structural holes). Brokers facilitate the flow of information, supplies, ideas, or resources across these holes for the benefit of the individual and the group. Social capital can be measured by accounting for the network structure and composition, especially considering those with highly valued expertise. In the academy, network members who are published, have grant funding, or are tenured at the rank of professor,
may be perceived as valuable to early career faculty members who seek collaborators for scholarly activity.

The value of social capital for the scholarly activity of early career PT faculty is currently unknown. Furthermore, no studies report effective network structure (shape, size, density) or composition similarities (homophily) or diversity (heterogeneity) for established PT faculty, let alone for those in the early career years. The next section includes examples from other sectors of social network analysis using social capital theory as a framework.

**Application of Social Capital Theory and Network Analysis**

Rodan and Galunic explored the relationship between business manager performance and network structure (size) and composition measure of diversity (heterogeneity). The results showed networks with contacts who had a variety of knowledge mattered for overall performance, but that network size did not. They also concluded that the ability to exploit position in the network to gain social capital depended on the accuracy of perceptions about network structure and composition. Therefore, if one were not aware of network makeup, being able to access the social capital—the currency of success—was not possible. This study demonstrated that attaining and maintaining contacts and fostering relationships of trust and reciprocity permitted social capital to flow through the network.

A mixed methods study in social science by Ryan et al. showed that not only whether a network tie existed was significant but the “willingness of someone in a position of seniority to take an interest, share resources, and invest time and energy” contributed more to success. The networks were a dynamic process that changed depending on tasks and projects. The authors also reported the value of seemingly
fleeting acquaintances because these minor encounters could develop into a relationship of high value given the right circumstances.43

A study of medical faculty found high value with connections made at their institution through faculty development programs, which provided access to social capital resources.7 Network contacts brokered opportunities for increased visibility, and allowed mentors who were well-connected to make new introductions and thereby expand the faculty network.

The authors of another study of faculty success and networks concluded that, “…if one were allowed only one line of inquiry to predict a faculty member’s future success in the field, it might well be, ‘Tell me about your colleagues.’”44 Their findings support the merit of a variety of configurations for relationships among faculty. Although research collaboration was the impetus for the connections, the benefits extended into personal supports. They reported the value of formal meetings at professional association conferences for new collaborations and a place for idea exchange and project discussions. The value of frequent communication between contacts was also an important characteristic of relationships for medical faculty success.44

Faculty development and formal mentorship programs are one reported method to increase collaboration and facilitate introductions to new contacts. In a study of models for medical residents who aspired to clinical academic careers but had insufficient research training, the results showed the importance of having a network with persons already involved in scholarly activity to guide and mentor the new scholar.45 The authors concluded that when people were surrounded by others who were involved in and encouraged participation in scholarly activity, confidence improved, and it was suggested this could be one answer to the problem of “threatened clinical scholarship.” Another study showed the success of a program for primary care physicians to improve
network relationships with peers, mentors, and academic consultants by training in skills that contribute to academic advancement. The results showed that increased network size with new connections external to their institution and links to other influential contacts was significant (heterogeneity).

It is unclear whether faculty outside the field of medical education or those within it who emphasize teaching develop connections in the same way or benefit similarly from relationships with colleagues as do research faculty. While research has pointed out an effective network can improve career success in medicine, business, and social science, there are no published studies about early career PT faculty and the social capital gained by their network connections. It is, therefore, this gap in knowledge and understanding that the present study seeks to address. It is clear that a number of questions must be answered to provide data that could be used to impact network relationships, agency and scholarly activity for early career PT faculty and a mixed method design was used.

MIXED METHODS STUDY

Purpose and Aims

The purpose of this mixed methods study was to explore agency and the professional network structure and composition of early career PT faculty as they relate to scholarly activity. The study used an explanatory sequential mixed methods design in which qualitative and quantitative data were collected in series, analyzed separately, and merged (Figure 1.4). During the quantitative phase, a weighted scholarly activity scoring formula was developed and applied to each study participant’s scholarly items. Agency scores were calculated, and networks were examined using social network analysis. Quantitative data was used to predict the scholarly activity of early career PT faculty members in programs across the country over one year. Follow-up interviews were
conducted using a grounded theory approach to explain the results of the quantitative phase by exploring the process of how early career faculty create and use network connections to build scholarly activity. Both quantitative and qualitative data were collected so as to better understand the process faculty use to create a network to help advance their scholarly activity. Results from integrating the quantitative and qualitative phases were jointly reported in the final phase.

![Figure 1.3 Explanatory sequential mixed methods study design and timeline](image)

Achievement of this purpose was planned through the following specific aims and associated research questions:

**Quantitative Phase**

**Aim 1.** To determine the most effective network structure and composition for scholarly activity of early career PT faculty. **Research Question:** Does the network structure and composition at baseline predict scholarly activity one year later? **Hypotheses:** a) Early career PT faculty with a professional network structure that is large with low interconnectedness (density) will have higher scholarly activity. b) Early career PT faculty with a professional network composed of individuals with a variety of expertise will have higher scholarly activity.
**Aim 2.** To measure early career PT faculty strategic behaviors and perspectives about advancing their career. Research Question: Do agency behavior and agency perspective scores at baseline predict scholarly activity one year later? Hypothesis: Agency behavior and agency perspective scores are associated with higher scholarly activity among early career PT faculty. To meet the quantitative aims of this mixed methods study, a cross-sectional longitudinal study was implemented. Details of the experimental approach are in Chapter 2 and 3.

**Qualitative Phase**

**Aim 3.** To explore the process of how early career PT faculty develop professional network relationships and how these networks benefit their scholarly agenda. Research question: What is the process that early career PT faculty use to build a professional network that helps them advance their scholarly agenda? Three research sub-questions also guided the study and included the following: 1) What actions do early career faculty take to construct a professional network for building a scholarly agenda? 2) How do early career faculty use relationships in their professional network to help build a scholarly agenda? 3) What are the outcomes of developing a professional network related to career advancement with scholarly activity? (Hypotheses are not generated for qualitative aims.) To meet the aim for the qualitative phase a grounded theory study approach was implemented. This type of approach includes an inductive process to build a final model grounded in the opinions of the study participants. Full explanation of the approach is provided in Chapter 4.

**Mixed Methods Phase**

**Aim 4.** To describe how the follow-up findings of the process of using the professional network to build scholarly activity help explain the initial findings of agency, network structure and composition, and scholarly activity. Research Question: How do the
findings of the process of using the network to advance scholarly activity help explain the initial findings of agency, network structure and composition, and scholarly activity?

**Study Design**

The mixed methods research design was selected because quantitative and qualitative studies alone would not result in the data needed to answer the research questions. While a qualitative study of faculty experiences could provide information about the actions and processes faculty use for developing a professional network, generalizing these findings is enhanced by linking quantitative data that measure the network structure and composition, scholarly activity, and aligns agency to these emerging themes. Quantitative data alone, on the other hand, would limit the understanding of the depth of faculty experiences.

Through this explanatory sequential design, multiple perspectives were obtained to understand the effect of the professional network structure and its composition on scholarly activity. The design, methods, and procedures were predetermined at the beginning of the study. Creswell and Plano-Clark recommend making four key decisions when selecting a mixed methods study. The first key pertains to the level of interaction between the quantitative and qualitative phases. In this study, the interaction occurred after data from both phases had been collected separately. Secondly, the quantitative phase had greater emphasis while the qualitative findings played a secondary role. Third, the timing of each phase was sequential to expand the depth and breadth of understanding using varied data collection and analysis methods. The fourth key was the primary mixing strategy to connect the phases included a joint display illustrating congruence of findings.
**Innovation**

This project is innovative and beneficial to the academic physical therapy profession because it is the first to create a weighed score to account for scholarly productivity. As noted, the study emerges from concerns related to the high number of early career faculty entering academia and the importance of supporting the evidence-based practice from which PT practice is based. This study is also the first to use social network analysis to rigorously study effective professional network structure and composition, and its association with scholarly productivity by early career PT faculty. Study results will present new information by providing and reporting on the utility of a new scholarly productivity score for guiding early career faculty and mentors who monitor their development of an effective network.

This study can further advance the American Physical Therapy Association (APTA) Research Agenda and the strategic goals of the Academy of Physical Therapy Education of APTA and American Council of Academic Physical Therapy (ACAPT). The present project directly relates to goal three in the strategic plan of the APTA Academy of Physical Therapy Education: to disseminate education resources, information, and develop and mentor educators for various educator roles. ACAPT has also prioritized identification and cultivation of resources to achieve excellence in PT education by helping educators and programs to adapt to changes in higher education. This project is also in line with the APTA Research Agenda category of Education/Professional Development for determining, “the best methods to foster career development and leadership in physical therapy.”

Subsequent chapters explain the project. Chapter 2 describes the quantitative phase, including participant recruitment, data collection and analysis methods, results, and a discussion of findings. Chapter 3 describes the development and utility of the
scholarly activity weighted scoring system. Chapter 4 covers the qualitative phase (interviews, analysis methods, results, and discussion). Chapter 5 includes mixing the quantitative and qualitative data, results from the joint analysis, and a discussion of the implications. Chapter 6 includes the conclusion, project limitations, and plans for future study.

CHAPTER 1 SUMMARY

1. There is evidence in the physical therapy profession of low levels of scholarly activity by program faculty. Scholarly activity is currently measured by a simple count, without accounting for the variety of contribution, such as authorship order on publications or grant award amount.

2. Effective network structure and composition has been shown in other fields to aid in improved career advancement, innovation, and collaboration for scholarly activity. Networks can be measured using social network analysis based on the social capital theory.

3. Individual faculty choices about career advancement and decisions about pursuing scholarly activity should be considered by accounting for strategic and intentional actions by faculty. This concept is termed agency.

4. An explanatory, sequential, mixed methods research design was used to study the gap in the literature. Quantitative or qualitative studies alone would not result in the data needed to fully answer the research questions.

5. This project is innovative because it is the first to establish a weighted scoring system of scholarly activity. It is also the first study to analyze effective network structure and composition and their association with scholarly activity within early
career PT faculty. With an accurate understanding of the relationship between agency, professional networks and scholarly activity, early career PT faculty could more quickly and appropriately develop success in scholarship.
Chapter 2 The Quantitative Phase

Elements that make for an effective professional network for scholarly productivity in early career physical therapy faculty
INTRODUCTION

Faculty success in higher education is achieved by optimal performance in teaching, service, clinical expertise, and scholarly productivity. Although not always directly perceived in this way, the achievements in these areas constitutes the basis for evidence-based physical therapy practice. Faculty development for career success and advancement of the physical therapy profession must, therefore, include scholarly productivity as a top priority. Physical therapist (PT) faculty are required by CAPTE to have a scholarly agenda and to report their productivity and progress. Despite this requirement, less than one quarter of PT faculty are actively engaged in scholarly activity. A study of over 2000 PT faculty from the 225 CAPTE professional (entry-level) accredited physical therapy schools reported scholarly productivity has not increased in the last ten years, and, worse still, most physical therapy programs reported having at least one faculty member without distribution of scholarly work at all.

Having and being actively part of an effective professional network is a predictor of research publications, productivity, retention and advancement, and career satisfaction. There is also evidence that awareness about one’s network potential leads to higher performance, increased innovation, and varied collaborations. In this context, social capital theory can explain the value of network connections because of direct and indirect access to resources, social cohesion, and bridging across gaps in a network to facilitate the flow of information. The framework and methodology of social network analysis accounts for social capital through network connections, especially those with highly valued expertise. Faculty who are knowledgeable about their network contacts and social capital have a greater likelihood of achievement in scholarly productivity and success with partnership with an interprofessional group.
In addition to group interactions within a network, individual choices should also be considered. Physical therapist faculty choices about career advancement, such as creating a scholarly agenda is termed agency. This concept is defined as being strategic and taking intentional actions to realize goals. It is formed by one’s prior experience, awareness and use of social capital, and the situations in which decisions are made.\textsuperscript{30,31} Agency is essential in academic faculty development, where career advancement is linked to promotion and tenure, prominence, and credit in teaching, scholarly activity, and service.\textsuperscript{30,32,33} Persons with high agency seek meaningful work, are effective collaborators, and are ardent supporters of the profession.\textsuperscript{30} There are two subcategories of agency: 1) perspective, the self-talk or strategic views in a given situation, and 2) behavior, the specific action taken to help oneself advance.\textsuperscript{32}

Given the relevance of scholarly activity requirements for all PT faculty by the accrediting body,\textsuperscript{2} the high numbers of new faculty joining the academy,\textsuperscript{1} and the value of collaboration in scholarly work, it is important to consider network relationships that can aid in early career faculty success. However, studying how relationships are developed and how they contribute to an effective network for scholarly activity has not been applied to the field of physical therapy, where there is a vital need to promote scholarly activity.

This Chapter describes the quantitative phase of the mixed methods study, including a review of the research aims and research questions from Chapter 1, plus the methods, results, and discussion of the findings.

**QUANTITATIVE PHASE DESIGN**

Figure 2.1 shows a summary of the relationship between the quantitative phase aims, research questions, data collection and analysis within the larger study design.
As stated in the previous chapter, the hypotheses for this phase are: a) Early career PT faculty with a professional network structure that is large with low interconnectedness (density) will have higher scholarly activity; b) Early career PT faculty with a professional network composed of individuals with a variety of expertise will have higher scholarly activity; c) Agency behavior and agency perspective scores are associated with higher scholarly activity among early career PT faculty.

---

**Figure 2.1** Explanatory sequential mixed methods study – quantitative phase

**AIM 1:** To determine the most effective network structure and composition for scholarly activity of early career PT faculty. **Research Question:** Does the network structure and composition at baseline predict scholarly activity one year later? **AIM 2:** To measure early career PT faculty strategic behaviors and perspectives about advancing their career. **Research Question:** Do agency behavior and agency perspective scores at baseline predict scholarly activity one year later?

**QUANTitative Data Collection**
Survey & CV submission at baseline and 1 year later | fall 2016 and 2017

**QUANTitative Data Analysis**
- Calculation of agency scores
- Calculation of scholarly activity using weighted scoring system
- Social network analysis of network structure (map, size & density) and composition (homophily & heterogeneity) using UCINET software, Analytic Technologies, Harvard, MA, 2002
- Descriptive and Inferential statistics using SPSS (SPSS, Chicago, IL).

The gold frame identifies the focus of this chapter.
METHODS

Inclusion Criteria

Candidates for inclusion in the study included faculty working full-time (as defined by their institution) in an accredited professional (entry-level) physical therapy education program, in their first five years, with a workload that included primarily teaching and service responsibilities (40-50% full-time equivalent (FTE)), including Directors of Clinical Education. Faculty were excluded if they had research appointments (>50% FTE of dedicated time to scholarly activity), changed institutions during the study, worked at institutions that were not CAPTE accredited, or had more than one year of full-time teaching experience in a physical therapy school before their current faculty appointment. This definition of early career is used by CAPTE² and the Faculty Development committee of the Academy of Physical Therapy Education of the APTA.⁵⁴

Power Analysis

A power analysis determined that, with a sample of 30 participants, there would be 80% power to detect an increase in $R^2$ of 0.15 in an ordinary least squares regression of the Scholar Score. This analysis included an adjustment for the case where a multiple regression of the Scholar Score on only a set of three control variables in the regression model would yield an $R^2$ value of 0.3. Based on an estimated attrition rate of 40% over the year-long study, an enrollment goal of a minimum of 42 study participants was established.
Study Participant Recruitment

A key area of recruitment was the Academy of Physical Therapy Education of the APTA Faculty Development Workshop (FDW). Additional recruitment efforts included an email announcement to the FDW attendees from the year before and to all physical therapy Program Directors, and postings in the electronic newsletters for the APTA Academy of Physical Therapy Education and Academy of Neurologic Physical Therapy. Potential participants were provided a flier outlining the project, including their rights as a research participant, and were directed to the project website with a link to the survey. Screenshots of this website are provided in Appendix A. Written information and three, 3-minute videos describing social network analysis, defining scholarly activity, and providing examples of scholarly activity were found on the webpage. Participants received a $20 Amazon (Seattle, WA) gift card for each survey completed one year apart. The participant activity through the study is shown in Figure 2.2.

Figure 2.2 Participant activity through the study

1. Consent to participate
2. Completed questionnaire with items about agency, scholarly activity, their professional network and submitted CV (Time 1).
3. Received an individualized report about six months later summarizing their scholarly activity and professional network structure with a map, size and density measurements.
4. Completed questionnaire with items about agency, scholarly activity, their professional network and submitted CV (one year after the first survey, Time 2).
Data Collection

Data about study participants’ agency, network structure and composition, scholarly activity, and sociodemographic information was collected through an online questionnaire, by reviewing participant CVs, and though internet searches, as shown in Table 2.1.
<table>
<thead>
<tr>
<th>Source</th>
<th>Information gathered</th>
<th>Definition of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td>Demographics</td>
<td>Age, academic rank, tenure status</td>
</tr>
<tr>
<td>CV</td>
<td>APTA membership</td>
<td>APTA member</td>
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<tr>
<td>Internet</td>
<td>DCE</td>
<td>Director of Clinical Education</td>
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<td></td>
<td>Academic &amp; Professional Degrees</td>
<td>Academic and professional degree(s) including academic doctorate</td>
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<td></td>
<td>Current Institution</td>
<td>Institution where they work</td>
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<tr>
<td></td>
<td>Current Institution funding</td>
<td>Public, Private</td>
</tr>
<tr>
<td></td>
<td>Carnegie Classification</td>
<td>Special focus, Doctorate, Medical, Masters, Baccalaureate</td>
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<tr>
<td></td>
<td>Agency Perspective:</td>
<td>Self-talk or strategic views in a given situation; 3 questions to compute a score</td>
</tr>
<tr>
<td></td>
<td>Agency Behavior:</td>
<td>Specific action taken to help one advance 3 questions to compute a score</td>
</tr>
<tr>
<td></td>
<td>Professional Network Contacts</td>
<td>People who are important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration.</td>
</tr>
<tr>
<td></td>
<td>Characteristics about each Network Contact</td>
<td>Closeness, mentor, expertise in scholarly activity, primary work responsibilities, age, gender, race/ethnicity, academic rank, tenure status, highest academic degree, experience with presentations, publishing and grants.</td>
</tr>
<tr>
<td></td>
<td>Which Contacts Know Each Other</td>
<td>Which network contact know each other and could share information?</td>
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<td></td>
<td>Barriers to Scholarly Activity</td>
<td>Time, knowledge about processes, equipment, funding, interest</td>
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<td></td>
<td>Publications</td>
<td>Peer-reviewed/non-peer reviewed, authorship order</td>
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<tr>
<td></td>
<td>Presentations</td>
<td>Peer-reviewed &amp; invited at local, state/regional, national, international</td>
</tr>
<tr>
<td></td>
<td>Grants</td>
<td>Internal, external funding agency, competitive/non-competitive, amount</td>
</tr>
</tbody>
</table>
A five-part online questionnaire was administered using Qualtrics software (Version 2017, Provo, UT), with an estimated completion time of 60 minutes. An outline of the questionnaire is shown in Figure 2.3 and the full questionnaire is provided in Appendix B. Part 1 included demographic items; Part 2 comprised agency questions from a tool developed and validated by Campbell and O’Meara. Permission to use the agency questions was established. The three agency perspective questions asked for agreement, using a Likert-scale, with statements about feeling stuck in one’s ability to advance one’s career (reverse coded), feeling little control over one’s career advancement (reverse coded), and feeling in charge of the direction of one’s research agenda (alpha=.784). The three agency behavior questions asked respondents to

**Figure 2.3 Questionnaire outline of the five sections**

1. **Demographic information**
2. **Agency Perspective**
   - Agency Behavior
3. **Information about network contacts**
   - Which contacts are acquainted with each other?
4. **Current scholarly activity and interests**
   - Knowledge, interest and barriers for scholarly activity
5. **Submit CV**
reflect on the extent to which they consider themselves to be strategic in achieving their career goals, seizing opportunities, and making intentional choices to focus their careers in ways that are personally meaningful (alpha=.691).³³

Part 3 of the questionnaire employed an ego-network design, which asked participants (ego) for information about contacts and how they are acquainted with each other.⁴¹,⁵⁵ In the network name generator section, participants listed contacts they considered important sources of work-related information such as teaching, scholarly activity, and service and administration. Recalling names is a known limitation¹⁵,⁵⁵ and to assist in recalling network contacts, five category prompts were used, including: 1) a PT at the same institution as the participant; 2) a PT but at a different institution; 3) not a PT but at the same institution; 4) not a PT and at a different institution; and 5) PT working primarily in clinical care. Each name entered appeared in later items, allowing for personalized questions about network contacts (e.g., age, academic rank, expertise). The last group of questions were name interrelator items, which asked respondents to indicate which of their contacts know each other and could share information or ask a question.

Part 4 of the questionnaire asked participants about their scholarly activity, time available, equipment, funding, and interest.⁵⁶ The fifth and final part was an end-of-survey message directing participants to submit their CV. After two weeks, reminders were emailed to participants who had yet to submit a CV.

The questionnaire was designed based on other studies of faculty networks¹⁰,¹¹,⁵⁷ and in consultation with faculty at the LiNKS Center for Social Network Analyses, Gatton College of Business at the University of Kentucky.⁵⁸ The questionnaire was pilot-tested by seven faculty with similar characteristics to the study population, with embedded open-ended questions and text boxes for comments. Modifications to the final survey
included: 1) minor wording changes for clarification; 2) a reduction in the number of choices for scholarly activity topics (the list was too long to fit well on a computer or tablet screen); 3) adding the choice of Lecturer to academic rank; 4) adding Medical Doctor and Doctor of Osteopathic Medicine to categories for highest degree achieved for network contacts; and 5) embedding weblinks to the scholarly activity informational videos from the project webpage as a refresher.

**Calculating network structure and composition measures**

To calculate network structure and composition measures, the principal investigator (BJB) and a research student worker (TR) reformatted the data from Part 3 into the social network analysis software program, UCINet Version 6.646, (Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. UCINET for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies). First, network maps were generated to show the relationships between network contacts, where each dot represented an individual and the lines between them represented who was known to the other. The closer an individual appeared to another on the map, the more relationships they had in common. The maps were used to visualize the general shape of a participants’ network. Second, network structure measures of size and density were calculated. These included the number of persons in a network and the proportion of possible relationships between network contacts. Third, network composition measures of homophily (the similarity between the study participant and their network contacts) and heterogeneity (the diversity of network contact characteristics) were calculated. Diversity groups were also created from the single heterogeneity measures to account for the variety of characteristics and experiences a network brings. Detailed information about these network measurements are in Chapter 1.
Calculating Scholarly Activity

Curricula vitae were used to gather information about scholarly activity and sociodemographic information, such as start date and specialty certifications. Successful demonstration of data collection of scholarly activity via CVs has been shown to be a noninvasive method whereby study participants are not required to re-report productivity, a potentially time-consuming activity. As with Halvorson et al., this study used both CVs and follow-up to clarify items.

Each CV was systematically analyzed to account for all scholarly activities using the CV Review Instrument (Appendix C), which includes operational definitions for each category of scholarly activity and rules for including or excluding items. As expected, each CV was in a different format with varying heading names and amount of detail. Clarifying questions were emailed to study participants when additional information was needed about a reported scholarly activity. For example, information about grant funding rarely included whether a competitive or non-competitive selection process was involved, or whether the funding organization was internal or external to the faculty member’s institution. Study participant responses were very timely during this checking process, and all questions were answered. Two evaluators, the principal investigator (BJB) and GW, discussed scholarly activities if a category was unclear, and jointly finished coding CVs. Items for scholarly activity were included only if completed after the current start date as faculty. Additional validation strategies included a search of library databases to confirm accuracy of the reported publications, and a review of 10% of the CVs was conducted by a third reviewer (TR) to compare results.

Scholarly activity counts were entered into a database and exported to statistical software (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.) for calculation of a Scholar Score. The Scholar Score is a weighted formula that accounts
for the quality of different items versus just quantity and was created as part of this project; details are reported in the next chapter.

Ethics Approval

The University of Nebraska Medical Center Institutional Review Board approved this study, and all participants provided informed consent (Appendix D). Pseudonyms were used to protect the identity of the participants and network contacts.

Dependent and Independent Variables

The dependent variable accounting for scholarly activity was the Scholar Score. The independent variables were: a) network structure measurements of size and density; b) network composition measures of homophily (similarity between contacts and the study participant) and heterogeneity (diversity of characteristics of contacts in the network); and c) agency behavior and agency perspective scores. Control variables were gender, age, duration as a faculty member, academic doctoral degree, if the participant was a Director of Clinical Education, and the Carnegie Classification and public or private funding of the institution where the participant worked.

Statistical Analysis

Descriptive analyses were completed to summarize the study sample. Exploratory scatter plots were generated for continuous variables, and single independent variable ordinary least squares regression models were used to determine the existence of meaningful associations between control variables, independent variables, and the primary outcome of interest, the Scholar Score. Multivariable ordinary least squares regression models which included covariates were used to determine which of the independent variables were most predictive of the Scholar Score.
RESULTS

Response Rate

At Time 1 (T1), 97 responses had been received but 31 were excluded, one for not meeting the inclusion criteria and 30 for submitting an incomplete survey, leaving a total of 66 study participants. At Time 2 (T2), one year later at the end of the study, 51/66 possible responses (77.4%) were received. One was excluded because of a job change to a different physical therapy program. Data from the remaining 50 study participants were analyzed for this study which exceeded the minimum of 42 estimated to be needed for sufficient power to rather large effect sizes.

Study Participant Characteristics

Participants included 80% (n=40) females, 96% (n=48) White Caucasian. The majority reported themselves to be in the age range of 35-44 years (40%, n=20) or 45-54 years (28%, n=14). On average, the duration as a faculty member was 1.6 years ±1.09 (range=.06-3.94) (Table 2.2). Nearly half were on a tenure track (48%, n=24). Most had a clinical specialty (78%, n=39) and/or were assistant professors (90%, n=45) and few held an academic doctoral degree (16%, n=8). This sample represented 39 different institutions in 24 states. Of these institutions, about half were publicly funded (46%, n=18). The Carnegie Classifications were Doctoral (33%, n=13), Special Focus (15%, n=6), Master’s (44%, n=17), and Baccalaureate (8%, n=3). Two-thirds of respondents (66%, n=33) attended an APTA FDW, and all but five were members of the APTA (92%, n=45). Although the response rate was high, non-response bias was considered. There were no statistically significant differences between respondents and non-respondents at T2 based on gender, age, or duration as a faculty member.

Nearly all study participants reported being interested in scholarship (94% (n=47), worked with colleagues with similar interests (90%, n=45), and were involved in
a current project 94% (n=47). Of note, 72% (n=36) had distributed at least one scholarly product, (e.g., grant, presentation or publication) before their faculty appointment. Most reported someone had spoken with them about scholarly activity once a month or more (69%, n=34). The top three barriers to scholarly activity reported by respondents were insufficient funding (32%, n=16), insufficient equipment and supplies (48%, n=24), and lack of time (42%, n=21).
Table 2.2 Early career PT faculty study participant characteristics and their respective institutional characteristics at baseline (Time 1)

<table>
<thead>
<tr>
<th>Individual Characteristics (n=50)</th>
<th>N (%)</th>
<th>Mean (SD, range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>40 (82%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10 (20%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34 years</td>
<td>11 (22%)</td>
<td></td>
</tr>
<tr>
<td>35-44 years</td>
<td>20 (40%)</td>
<td></td>
</tr>
<tr>
<td>45-54 years</td>
<td>14 (28%)</td>
<td></td>
</tr>
<tr>
<td>55-64 years</td>
<td>5 (10%)</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Caucasian</td>
<td>48 (96%)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Director of Clinical Education</td>
<td>12 (24%)</td>
<td>1.6 years (1.09, 0.06-3.94)</td>
</tr>
<tr>
<td>Duration as faculty member</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Doctoral degree</td>
<td>8 (16%)</td>
<td></td>
</tr>
<tr>
<td>Academic Rank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>45 (90%)</td>
<td></td>
</tr>
<tr>
<td>Instructor</td>
<td>5 (10%)</td>
<td></td>
</tr>
<tr>
<td>APTA Member</td>
<td>46 (92%)</td>
<td></td>
</tr>
<tr>
<td>Clinical Specialist</td>
<td>39 (78%)</td>
<td></td>
</tr>
<tr>
<td>On Tenure Track</td>
<td>24 (48%)</td>
<td></td>
</tr>
<tr>
<td>Attended Faculty Development Workshop&lt;sup&gt;a&lt;/sup&gt;</td>
<td>33 (66%)</td>
<td></td>
</tr>
<tr>
<td>Institutional Characteristics (n=50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnegie Classification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td>13 (33%)</td>
<td></td>
</tr>
<tr>
<td>Special focus</td>
<td>6 (15%)</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>17 (44%)</td>
<td></td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>3 (8%)</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>18 (46%)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>21 (54%)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Workshop hosted by the Academy of Physical Therapy Educators of the American Physical Therapy Association
Descriptive Statistics

Scholar Score

The Scholar Scores were analyzed to determine whether one year was enough time to detect a change in scholarly activity. The mean Scholar Score at T1 was 32.7 (SD=46.5, range 0-220) and doubled one year later to 66.6 (SD=77.6, range 0-371).

Although the Scholar Score doubled, this does not mean that two times more scholarly items were disseminated, for this reason: the Scholar Score is weighted for quality and not just a count. Figure 2.4 and Table 2.3 provide an illustration of the composition of weighted items that contributed to the total Scholar Score and changes that occurred over the course of the one-year study. A statistical analysis comparing between baseline and one year later was not completed because scholarly productivity could only increase by virtue of the duration of time as a faculty member. Therefore, the activity at T2 had to be greater than the activity at T1; although, it is not guaranteed that over a one-year period a faculty member would disseminate a scholarly product, it is extremely unlikely that a group of 50 would not produce something.
Table 2.3 Scholar Scores and subcategories

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n=50)</th>
<th>One Year Later (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Grants</td>
<td>2.7</td>
<td>6.5</td>
</tr>
<tr>
<td>Publications</td>
<td>11.0</td>
<td>25.3</td>
</tr>
<tr>
<td>Presentations</td>
<td>18.5</td>
<td>22.9</td>
</tr>
<tr>
<td>Total</td>
<td>32.7</td>
<td>46.5</td>
</tr>
</tbody>
</table>

The Scholar Score is a weighted measure of accounting for the quality and quantity of presentations, publications and grants.
Network Structure and Composition Measures

At T1 the mean size of the networks were 25.4 contacts (SD=13.4, range 4-62) and mean density was 40.2% (SD=16.6, range 18.6-100%). All four network shapes were represented, with examples shown in Figure 2.5. Descriptions of network shapes are found in Chapter 1. There were six measures of homophily and 16 measures of heterogeneity analyzed in this study (Table 2.4). The analysis of diversity included a review of single measures and the aggregation of respondents into diversity groups which attempted to account for the variety of experiences and demographics of the network.
Figure 2.5 Network maps illustrating shape, size and density structures for one participant for each shape

<table>
<thead>
<tr>
<th>Shape</th>
<th>Size</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clique</td>
<td>7</td>
<td>81%</td>
</tr>
<tr>
<td>Core-Periphery</td>
<td>27</td>
<td>37%</td>
</tr>
<tr>
<td>Company</td>
<td>24</td>
<td>54%</td>
</tr>
<tr>
<td>Contextualized component</td>
<td>62</td>
<td>37%</td>
</tr>
</tbody>
</table>

The large square is the study participant in which all others are compared. The shape of the dots indicates where the network member works: square- PT at the same institution, triangle- PT at a different institution, circle-in-square- non-PT at a different institution, diamond-non-PT at the same institution, hourglass-clinician.
Table 2.4 Network homophily and heterogeneity measures

<table>
<thead>
<tr>
<th>Description</th>
<th>Mean (SD, range)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Homophily (EI Index)a</strong></td>
<td></td>
</tr>
<tr>
<td>Work location &amp; PT or non-PT</td>
<td>+0.32 (0.26, -0.43 – +0.73)</td>
</tr>
<tr>
<td>Academic Degree</td>
<td>+0.32 (0.33, -0.43 – +1.00)</td>
</tr>
<tr>
<td>Age (five category ranges)</td>
<td>+0.32 (0.19, +0.00 – +1.00)</td>
</tr>
<tr>
<td>Clinical Specialty (yes, no)</td>
<td>-0.22 (0.54, -1.00 – +0.96)</td>
</tr>
<tr>
<td>Gender (male, female)</td>
<td>-0.30 (0.34, -0.83 – +0.69)</td>
</tr>
<tr>
<td>Academic Rank</td>
<td>+0.94 (0.11, +0.57 – +1.00)</td>
</tr>
<tr>
<td><strong>Heterogeneityb</strong></td>
<td></td>
</tr>
<tr>
<td>Work location &amp; PT (not PT)</td>
<td>0.81 (0.09, 0.48 – 0.93)</td>
</tr>
<tr>
<td>Job Role-Teaching</td>
<td>0.59 (0.16, 0.00 – 0.75)</td>
</tr>
<tr>
<td>Job Role-Scholarly Activity</td>
<td>0.78 (0.26, 0.00 – 1.00)</td>
</tr>
<tr>
<td>Job Role-Clinical Practice</td>
<td>0.78 (0.21, 0.00 – 1.00)</td>
</tr>
<tr>
<td>Academic Degree</td>
<td>0.68 (0.12, 0.42 – 0.93)</td>
</tr>
<tr>
<td>Age</td>
<td>0.75 (0.16, 0.00 – 0.89)</td>
</tr>
<tr>
<td>Tenure</td>
<td>0.78 (0.12, 0.00 – 0.95)</td>
</tr>
<tr>
<td>Race</td>
<td>0.15 (0.14, 0.00 – 0.57)</td>
</tr>
<tr>
<td>Gender</td>
<td>0.80 (0.20, 0.31 – 1.00)</td>
</tr>
<tr>
<td>Academic Rank</td>
<td>0.82 (0.08, 0.56 – 0.95)</td>
</tr>
<tr>
<td>Clinical Specialty</td>
<td>0.66 (0.21, 0.08 – 0.92)</td>
</tr>
<tr>
<td>Expertise in grants, presentations, or publishing</td>
<td>0.75 (0.13, 0.33 – 0.94)</td>
</tr>
<tr>
<td>Diversity group 1: Clinical specialty + Work location + Grants + Presenting + Publishing + Job Role-Teaching + Scholarly Activity + Administration and Services</td>
<td>0.74 (0.09, 0.50 – 0.83)</td>
</tr>
<tr>
<td>Diversity group 2: Academic Rank + Tenure + Academic Degree + Race + Age + Gender</td>
<td>0.66 (0.07, 0.37 – 0.77)</td>
</tr>
<tr>
<td>Diversity group 3: Academic Rank + Tenure + Academic Degree</td>
<td>0.76 (0.09, 0.46 – 0.88)</td>
</tr>
<tr>
<td>Diversity group 4: Race + Age + Gender</td>
<td>0.56 (0.11, 0.12 – 0.74)</td>
</tr>
</tbody>
</table>

*a* Homophily measures the similarity between network contact and study participant. The range is from -1 to +1. A score of -1 indicates that one only ties with members in the same category as themselves which is perfect homophily. A score of +1 means one has ties to members from different categories which is perfect heterophily.40

*b* Heterogeneity measures diversity of network contacts’ characteristics in the study participant’s network. A score of 0 indicates no diversity and one is connected only to those with one characteristic (e.g., all women). One’s network has maximum diversity (i.e., equal to 1-1/r, where r is the number of different relational types) when one has the same number of connections to those in each group or with each characteristic (e.g., an equal number of women and men).40
Agency

Agency perspective scores, measuring self-talk or strategic views, were calculated by summing responses of three different questions for a maximum of 21. Agency behaviors scores to measure specific actions taken to help a faculty member advance were calculated the same way. Higher scores are better and indicate more individual agency. The mean agency perspective at T1 was 17.5 (SD 2.4) and mean agency behavior was 18.4 (SD 2.3).

Regression Analyses

Univariate Analyses

Univariate comparisons of the covariates of interest against a change in Scholar Score from baseline to one year later was completed to ascertain potential confounding variables, using a cutoff of .10 for significance (Table 2.5). The potential control variables of race or ethnicity and academic rank were not included as there was not enough variation in the study sample.

Neither agency behavior (p=.78) or agency perspective (p=.30) scores were significant. Additional analysis of the six individual questions that made up these scores was completed to determine if a lack of significant change was driven by one or two items. If differences had been detected in individual questions, those may have provided meaningful, practical information to consider.

The network structure measure of density was significant (p=.067), as was the network composition measure of gender homophily (having network collaborators of the same gender as the study participant) (p=.099). No other network structure or composition measures were significant predictors of the Scholar Score. The two demographic measures that emerged as significant were duration as a faculty member (p=.038) and holding an academic doctoral degree (p=.006).
Multivariate Analysis

A multivariable regression model was developed to determine which covariates were most predictive of the Scholar Score. An alpha level of less than 0.05 was established as a cutoff for a variable remaining in the model and assumptions of non-multicollinearity, independence of residuals, and homoscedasticity (i.e., variance around the line of regression) were evaluated.\textsuperscript{51}

The initial multivariable model with gender homophily, network density, duration as a faculty member, and attainment of academic doctorate showed that all four measures were significant predictors of Scholar Score. However, when three outlier observations were removed, gender homophily was no longer a significant predictor. Thus a decision was made to exclude it from the final model shown in Table 3. The final model showed that the network structure measure of density was a significant predictor of the Scholar Score when controlling for the duration as a faculty member and academic doctoral degree attainment ($B_{\text{density}} = -1.099$, $p=0.048$).
<table>
<thead>
<tr>
<th>Control Variables</th>
<th>Univariate Analysis</th>
<th>Multivariate Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constant)</td>
<td>B = 66.047</td>
<td>B = 52.864</td>
</tr>
<tr>
<td></td>
<td>Sig. = .018</td>
<td>Sig. = 0.062</td>
</tr>
<tr>
<td>Gender</td>
<td>34.435</td>
<td>31.325</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.196</td>
<td>Sig. = .000</td>
</tr>
<tr>
<td>Age</td>
<td>-13.763</td>
<td>-26.803</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.240</td>
<td>Sig. = 0.210</td>
</tr>
<tr>
<td>Carnegie Classification</td>
<td>-5.393</td>
<td>-3.520</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.508</td>
<td>Sig. = 0.889</td>
</tr>
<tr>
<td>Public/Private institution</td>
<td>-26.803</td>
<td>-26.803</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.210</td>
<td>Sig. = 0.210</td>
</tr>
<tr>
<td>Director of Clinical Education</td>
<td>-3.520</td>
<td>-3.520</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.889</td>
<td>Sig. = 0.889</td>
</tr>
<tr>
<td>Duration as a faculty member</td>
<td>20.286</td>
<td>20.286</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.038</td>
<td>Sig. = 0.038</td>
</tr>
<tr>
<td>Academic Doctoral degree</td>
<td>77.988</td>
<td>85.424</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.006</td>
<td>Sig. = .001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92.527</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sig. = 0.000</td>
</tr>
<tr>
<td>Agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agency behavior</td>
<td>1.379</td>
<td>1.379</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.771</td>
<td>Sig. = 0.771</td>
</tr>
<tr>
<td>Agency perspective</td>
<td>0.038</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.295</td>
<td>Sig. = 0.295</td>
</tr>
<tr>
<td>Network Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.754</td>
<td>0.754</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.355</td>
<td>Sig. = 0.355</td>
</tr>
<tr>
<td>Change in size (over 1 year)</td>
<td>0.093</td>
<td>0.093</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.523</td>
<td>Sig. = 0.523</td>
</tr>
<tr>
<td>Density</td>
<td>-1.191</td>
<td>-1.191</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.067</td>
<td>Sig. = -1.107</td>
</tr>
<tr>
<td>Change in density (over 1 year)</td>
<td>0.554</td>
<td>0.554</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.654</td>
<td>Sig. = 0.654</td>
</tr>
<tr>
<td>Network Composition: Heterogeneity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work location &amp; PT (not PT)</td>
<td>181.047</td>
<td>181.047</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.135</td>
<td>Sig. = 0.135</td>
</tr>
<tr>
<td>Job Role-Teaching</td>
<td>84.073</td>
<td>84.073</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.218</td>
<td>Sig. = 0.218</td>
</tr>
<tr>
<td>Job Role-Scholarly Activity</td>
<td>54.303</td>
<td>54.303</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.212</td>
<td>Sig. = 0.212</td>
</tr>
<tr>
<td>Job Role-Clinical Practice</td>
<td>-44.988</td>
<td>-44.988</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.373</td>
<td>Sig. = 0.373</td>
</tr>
<tr>
<td>Academic Degree</td>
<td>-23.689</td>
<td>-23.689</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.789</td>
<td>Sig. = 0.789</td>
</tr>
<tr>
<td>Age</td>
<td>-2.093</td>
<td>-2.093</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.975</td>
<td>Sig. = 0.975</td>
</tr>
<tr>
<td>Tenure</td>
<td>111.571</td>
<td>111.571</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.121</td>
<td>Sig. = 0.121</td>
</tr>
<tr>
<td>Race</td>
<td>-81.144</td>
<td>-81.144</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.300</td>
<td>Sig. = 0.300</td>
</tr>
<tr>
<td>Gender</td>
<td>34.435</td>
<td>34.435</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.196</td>
<td>Sig. = 0.196</td>
</tr>
<tr>
<td>Academic Rank</td>
<td>119.036</td>
<td>119.036</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.382</td>
<td>Sig. = 0.382</td>
</tr>
<tr>
<td>Clinical Specialty</td>
<td>-14.047</td>
<td>-14.047</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.784</td>
<td>Sig. = 0.784</td>
</tr>
<tr>
<td>Expertise in grants, presentations, or publishing</td>
<td>119.017</td>
<td>119.017</td>
</tr>
<tr>
<td></td>
<td>Sig. = 0.142</td>
<td>Sig. = 0.142</td>
</tr>
</tbody>
</table>
(continued) | B     | Sig. |
---|-------|------|
Diversity group 1: Clinical specialty + Work location + Grants + Presenting + Publishing + Job Role-Teaching + Scholarly Activity + Administration and Services | 199.251 | .107 |
Diversity group 2: Academic Rank + Tenure + Academic Degree + Race + Age + Gender | 25.690 | .860 |
Diversity group 3: Academic Rank + Tenure + Academic Degree | 127.904 | .305 |
Diversity group 4: Race + Age + Gender | -51.726 | .586 |

**Network Composition: Homophily**<sup>c</sup>

<table>
<thead>
<tr>
<th>Work location &amp; PT</th>
<th>53.558</th>
<th>0.190</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Degree</td>
<td>-46.408</td>
<td>0.160</td>
</tr>
<tr>
<td>Age</td>
<td>19.132</td>
<td>0.740</td>
</tr>
<tr>
<td>Clinical Specialty</td>
<td>-11.718</td>
<td>0.505</td>
</tr>
<tr>
<td>Gender</td>
<td>45.532</td>
<td>0.099</td>
</tr>
<tr>
<td>Academic Rank</td>
<td>-55.260</td>
<td>0.536</td>
</tr>
</tbody>
</table>

<sup>a</sup> Regression run with removal of outlier of unstandardized residuals >2 SD from the mean, the models are very similar.

<sup>b</sup> Diversity among network members (IQV) individual was left in as the results are substantially the same.

<sup>c</sup> Similarity to early career faculty member (EI Index).
DISCUSSION

The study emerged from concerns related to the high number of early career PT faculty entering academia and the importance of supporting the evidence-based practice from which physical therapy is based. The quantitative portion of this study used a survey to gather data to construct networks. This study was the first to use social network analysis to study faculty network structure and the network composition of early career PT faculty. In addition to the social capital gained from these network connections, scores for individual agency perspective and agency behaviors were also considered. The results present new information to guide early career faculty and mentors who monitor their career advancement.

The two research questions guiding the quantitative portion of this mixed-methods study were: 1) Does the professional network of an early career PT faculty member at baseline (Time 1) predict scholarly productivity one year later? and 2) Do agency behavior and agency perspective career advancement scores measured at baseline (Time 1) predict scholarly activity one year later (Time 2)? To answer these questions, a longitudinal cross-sectional survey study was developed and implemented. Social network analysis was used to calculate network structure (maps, size, and density) and composition measures (homophily and heterogeneity). Agency perspective and agency behavior scores were calculated using an existing valid tool.33

Five major points can be drawn from these findings in the three measured areas of scholarly activities, agency, and connection to professional networks.

Scholarly Activity

First, the Scholar Scores nearly doubled over the course of the study, indicating that one year was sufficient time for the study demonstrating the correlated factor that
early career faculty tend to be productive. Grants were the lowest category of scholarly activity. This finding is not surprising, given that it is difficult to apply for and receive a grant in the short time the faculty in this study had been employed (mean 1.6 years). Presentations were the highest category, likely due to the expedited turnaround time for acceptance compared to manuscript submissions or grant applications. The Scholar Score appeared sensitive enough to account for scholarly activity of early career PT faculty. This finding could be attributed to the inclusion of scholarship of discovery, application, teaching, and integration, as well as abstracts and platform presentations, where early career PT faculty are more likely to have initial success. One measure to account for all scholarly activity in the analysis versus separate counts for grants, publications, and presentations was beneficial because it is a combination of these items that contribute to career advancement.

Second, these results demonstrated that scholarly achievement is far more than just days on the job. The results seem to strongly suggest that early career faculty can be successful in their very early years when securing an effective network of collaborators. Third, although an academic doctoral degree is one route into success in the academy, this study shows that with an effective network, success can be achieved in the PT field without the formal credential. It has been suggested that having an academic doctorate will lead to increased scholarly productivity in the field of PT, but these results suggest that other factors should also be considered.

Agency

The fourth important finding is that although faculty agency perspective and agency behavior may be essential concepts related to individual career advancement, in this study these scores were not associated with higher Scholar Scores. The high agency scores could well be attributed to the positive outlook of new faculty arising from
the honeymoon phase of a new job before the reality of duties and responsibilities that may impact scores are fully realized. High agency could also be related to participant self-selection for the study, since by definition, participating in a study that provides information about scholarly activity and the advantages of network connections demonstrates agency. Demonstrating strategic agency is known to be important for success in academic career development, where, as noted above, success is typically related to promotion and tenure based on achievement, visibility, and recognition in teaching, scholarly activity, and service. Terosky and O'Meara reported that acting intentionally for career success with the development of a supportive network appears to serve as a mechanism for success, especially given the demanding workload of faculty members. Perhaps if an effective network is established early in the career, higher agency can be retained for the long term. Further exploration about agency is included in the next (qualitative) phase of the mixed methods study during interviews.

**Professional Network**

Finally, through the innovative use of social network analysis, this study found that an effective network structure for early career PT faculty is one that is less interconnected and more open. Early career faculty should take stock of their collaborations and the social capital gained from their network. There is evidence that people who actively learn about their network can modify relationships over time versus those that are not self-aware of their actual and potential collaborators. Change in a network is more than increasing its size, although it is related. Rodan et. al. showed profound results with business managers who modified their network from 75% of members who knew each other (highly densely interconnected) to 25% who knew each other (lower density). Another study showed access to resources was improved when network contacts were less densely interconnected, even when these contacts were not
close confidants. A PT faculty member could implement several practical strategies for making a network less densely interconnected.

One strategy would be for the faculty member to ask mentors for introductions to others not already highly-connected in their network. In this study, an average of 43% (SD .21) of the network contacts were identified as mentors. This indicates early career PT faculty members have several people to reach out to for these introductions. With high agency behavior and agency perspective scores of the study participants, this strategy is likely to be used successfully. Mentors may also initiate new introductions as this is a common activity some mentors incorporate already. New introductions increase the network size and, because these persons are not already highly-interconnected, the network becomes more open. Conversely, if new members know many others within the existing network, then size increases but the network becomes more interconnected and closed, the less desirable consequence.

Attending conferences and profession-related meetings are an effective method to make new connections, especially when a faculty member can offer or benefit by a specific project where new information or skills are needed. However, it is worthwhile to note that when the event only serves to facilitate meeting new people, results are less advantageous in terms of reducing network interconnectedness. In one study, persons interested in meeting new connections attended a networking event to facilitate introductions, but with no incentive such as an upcoming project in which to express interest or converse, participants gravitated to known friends and network interconnectedness changed very little.

Preventing a network from becoming too densely interconnected includes a combination of networking through both formal groups (e.g., professional organizations, journal clubs) and less formal interactions, such as talking to an unknown person sitting
beside one on an airplane. This chance meeting can develop into relationships of value given the right situation, and therefore an effective third strategy for early career PT faculty is to both initiate conversations with others outside of formal groups and get involved in different activities to make new contacts especially with people unlike themselves.

Using one or more of these strategies could allow early career faculty members to develop less densely interconnected networks and gain the social capital of novel information, opportunities, and resources to create an effective network for scholarly productivity. The innovation process for creating scholarly activity within an organization is influenced by the relationships among network contacts. Interacting with these persons and learning from them is a critical component of this process. Network analysis was a successful methodology for analyzing the support system and collection of potential and actual collaborators for early career faculty. The analysis made these connections visible for the early career faculty who reside at the lower end of the academic hierarchy in terms of tenure, academic rank, and scholarly productivity. Their social capital could be very high if the network member knowledge and expertise are used to build scholarly agendas.

In contrast to the significant finding about the importance of network structure (density), there was a lack of significance of the network composition (heterogeneity and homophily). Both significant and non-significant findings of the quantitative portion of the study helped guide the interview questions in the next phase of this explanatory mixed methods project. Next, the qualitative phase was implemented, using a grounded theory approach. This, an in-depth exploration, demonstrates the process of early career faculty developing professional network relationships, and the results for their scholarly agenda. These findings are described in Chapter 4.
CHAPTER 2 SUMMARY

1. The first aim of this longitudinal study was to determine whether the scholarly activity of early career PT faculty increases depending on network connections.
   a. Research question: Does the network structure and composition at baseline predict scholarly activity one year later?
   b. Social network analysis was used to examine the characteristics and relationships between members in the networks of early career PT faculty.
   c. The results show network density, specifically a more open network, predicts higher Scholar Scores when controlling for duration as a faculty member and whether the person holds an academic doctoral degree.

2. The second aim was to explore the strategies of early career faculty in advancing their careers.
   a. Research question: Do agency behavior and agency perspective scores at baseline predict scholarly activity one year later?
   b. Agency perspective and agency behavior scores were calculated for study participants; results showed that neither agency score predicted scholarly activity.

3. Key implications from this study include: a) the Scholar Score was a good measure for capturing a variety of scholarly activities; b) faculty can be productive in their first five years regardless of “days on the job”; c) those
without an academic doctoral degree can be successful with scholarly activity; d) high agency perspective and agency behavior scores indicate high interest in career advancement; and e) practical strategies can make networks more effective (i.e. less interconnected and open).
Chapter 3 The Scholar Score

Development of a Scoring System to Account for the Quantity and Quality of Dissemination of Scholarly Products
INTRODUCTION

Prior studies of scholarly productivity in physical therapy used a count of publications and presentations without considering different values of the contribution to the literature. For example, all items were given equal weight without considering authorship order or whether the presentation audience was local, regional, national or international. Early career faculty are unlikely to have last (senior) author papers unless they have already established themselves in research before joining a PT faculty. In these studies, grant awards were not accounted for thus negating important scholarly achievements. Another limitation of prior work is the studies used archival data including databases rather than primary sources such as interviews with faculty or their CV. Use of a CV would provide a complete record of achievements as some products (e.g., platform presentation, book chapters) are not indexed in these databases.

Professional (entry-level) physical therapy programs report their faculty’s scholarly productivity annually to CAPTE. As reported in Chapter 1, even CAPTE only considers the number of items disseminated. According to their standards, faculty must have “at least one accomplishment for every two years of academic service.” Since only a count is used, it is impossible to tell if the scholarly contribution is increasing in value over time for a given faculty, their Program, or the profession as a whole. Counting scholarly items was used to describe the professoriate in a recent study, and the authors reported a limitation in their study was “scholarly productivity is not clearly defined nor weighted by any objective measure of quality such as the type of scholarly product, level of authorship, or impact factor.”

Other professions have published work on weighting scholarly activities beyond count, but they are not appropriate to apply to PT. For example, a scoring system for lawyers gave higher weight to publications with more pages, a measure not used in PT
or healthcare in general. A proposed athletic training formula did not account for items valued in physical therapy such as authorship order, presentation audience (e.g., national, state, local), and grants. A point system created by four people for an in-house measure for surgical residents counted all grants the same without noting funding agency or the amount awarded.

The goals of this Chapter are to: 1) explain how a scoring system that accounted for the quantity and quality of different scholarly work was created; and 2) describe how the CV review instrument was applied to score scholarly activity among early career PT faculty.

**METHODS**

This section explains the methods of the cross-sectional study within the larger mixed-methods project. It includes a description of participant recruitment, the questionnaire, statistical analysis, and the CV review instrument development.

**Study Participant Recruitment**

There were 39 different institutions represented by the 50 study participants described in the quantitative phase of this mixed-methods project (Chapter 2). Program Directors from those institutions were recruited to rate different scholarly activities via a questionnaire. Program Directors were selected because they have experience guiding the early career faculty including for promotion and tenure because this is a CAPTE requirement. The emails for the Program Directors were obtained from the institution’s public websites or the list of CAPTE schools. An additional six PT faculty were invited. These individuals had experience in faculty development through the APTA. In addition, they were current or former Program Directors or promotion and tenure committee
members, and consulted on the Scholar Score project with a strong interest in contributing.

Institutional Review Board approval was received (Chapter 1), and consent was assumed for those who completed the questionnaire.

**Questionnaire**

Rating the value of scholarly activities was collected via Qualtrics, an online survey administration tool. This questionnaire asked respondents to propose a relative weight of scholarly activity for 28 items including publications (peer-reviewed/non-peer reviewed, authorship order), presentations (invited/peer-reviewed, local, state, national, international), and grants (internal/external, competitive/non-competitive and amount) as shown in Table 3.1. As a benchmark, a peer-reviewed publication carried a value of 10. For example, a score of 0 meant the activity was unimportant, and a score of 20 meant that activity was two times more important than authoring a peer-reviewed journal article. To make the survey user-friendly two types of question formats were implemented. First, a slider was used where the respondent moved a marker left or right from the benchmark or percentage (Figure 3.1). Secondly, open text boxes allowed the respondent to provide comments about their ratings. The questionnaire is in Appendix E.

The questionnaire was pilot tested by three experienced PT faculty members to review the categories, ease of survey use, and overall comments. Only minor wording revisions were made before implementation. The grant amounts are low but based on feedback from the pilot test; the amounts were deemed appropriate for what an early career PT faculty would be expected to achieve. Dillman’s Survey Design protocol was used to increase survey responses including a pre-announcement followed by the survey link a week later. Up to three more reminders followed for non-respondents.
Statistical Analysis

Descriptive analyses were completed to summarize the survey respondents. Then an average score was calculated for each scholarly item using Excel (Microsoft Excel for Mac, Version 16.14.1, Redmond, WA). The final weights assigned to each item were entered into SPSS (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp) code to calculate Scholar Score totals. The individual item weights are under review for commercialization through UNeMed, the technology transfer office for the University of Nebraska (UNMC). Per the recommendations from UNeMed, the weights for each item are not reported.

Curriculum Vitea Review Instrument

Since each CV was expected to be formatted differently with a variety of activities reported, a CV review instrument was created. An a priori and iterative process was used to create the CV Review Instrument listing operational definitions of scholarly activities in the categories of publications, presentations, and grants (Appendix C). All types of scholarly activity were included based on Boyer's definitions of scholarship of discovery, integration, application, and teaching. This instrument was the companion to the scoring categories since there are many different methods of reporting dissemination with varying heading names and amount of detail provided. These differences occur due to accreditation and institutional requirements and personal preference. For example, grant funding may not have included whether it was competitive or non-competitive selection process or whether the funding organization was internal or external to their institution. These were important distinctions when using the Scholar Score system because the subcategories have different weighted scores.
Table 3.1 Scholarly Activity items assessed in the questionnaire

**Publication**

<table>
<thead>
<tr>
<th>Item</th>
<th>Peer-reviewed</th>
<th>Non-peer reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Article</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book</td>
<td>Authored</td>
<td>Edited</td>
</tr>
<tr>
<td>Book Chapter</td>
<td>Authored</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Peer-reviewed</th>
<th>Non-peer reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authorship Order</td>
<td>First</td>
<td>Second</td>
</tr>
<tr>
<td></td>
<td>Last</td>
<td>Not 1st, 2nd, or last</td>
</tr>
</tbody>
</table>

**Grant**

<table>
<thead>
<tr>
<th>Item</th>
<th>Less than $5,000</th>
<th>$5,000 - $10,000</th>
<th>Greater than $10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal grant funding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External grant funding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role on a grant</th>
<th>Research Assistant</th>
<th>Co-Investigator</th>
<th>Principal Investigator (PI) &amp; Co-PI</th>
</tr>
</thead>
</table>

**Presentation**

<table>
<thead>
<tr>
<th>Item</th>
<th>Peer-reviewed</th>
<th>Invited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poster or platform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education session</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Local</th>
<th>State/Regional</th>
<th>National</th>
<th>International</th>
</tr>
</thead>
</table>

\[a\]Publication type that all other items were compared against.
**Figure 3.1** Slider question format in the questionnaire

This question asks you to place a value on **EXTERNAL grant funding**. Please assign a value between 0 and 20 for each of the five options. For this question, consider the grants to be competitive in nature and include the total grant amount (direct + indirect). Later in the survey you will be asked about non-competitive grant funding.

These values should reflect the importance of each type of grant activity for physical therapy faculty.

As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

---

Q10.1 This question asks you to place a **bonus** value for **role on a grant**. Please assign bonus percentages for the following.

For example, a **bonus of X%** is awarded for being the **primary investigator**.

<table>
<thead>
<tr>
<th>% Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role</th>
<th>% Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Assistant (3)</td>
<td></td>
</tr>
<tr>
<td>Co-Investigator (1)</td>
<td></td>
</tr>
<tr>
<td>Principal Investigator (2)</td>
<td></td>
</tr>
</tbody>
</table>

Respondents moved the marker left or right from the benchmark of 10 (a) or moved it left for percentage bonus (b).
RESULTS

Study Participant Characteristics

Of the 45 Program Directors and experienced faculty members recruited, 22 agreed to participate and were sent the survey link. The response rate was 91% (20 of 22). Information about the institutions in which they work is shown in Table 3.2.

<table>
<thead>
<tr>
<th>Carnegie Classification</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>5 (29%)</td>
</tr>
<tr>
<td>Special Focus</td>
<td>3 (18%)</td>
</tr>
<tr>
<td>Master’s</td>
<td>8 (47%)</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>1 (6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Institution Funding</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>10 (59%)</td>
</tr>
<tr>
<td>Private</td>
<td>7 (41%)</td>
</tr>
</tbody>
</table>

Scholarly Activity Item Scores

Responses were exported from the survey software into a spreadsheet (Microsoft Excel, version 16.14.1). Data cleaning included reviewing individual surveys where missing data was observed. A limitation of the survey software is when a respondent did not move the marker and left it at the default of 10, it appeared the data was missing. When comments were not provided, the missing data was left as missing. However, when comments supported a measure of 10, this was manually entered. Averages for each scholarly activity item were calculated. The weighting system formula was entered as code for calculation of Scholar Scores in SPSS (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp).
The weights for each scholarly item are currently under review for licensing as part of a computer application. Per the recommendations of UNeMed, the technology transfer commercialization office for UNMC, the individual weights are not reported.

**Application of Scholar Score**

The CVs were submitted as part of the Quantitative phase by early career PT faculty described in Chapter 2. It was essential to uniformly identify the scholarly items from these CVs, and the use of the CV Review Instrument made it systematic.

**Calculating a Scholar Score for each Faculty**

The scholarly activity counts determined from the CVs were entered into a database (Microsoft Access for Windows, Version 1805, Redmond, WA). Then they were exported to statistical software (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp) for calculation of a Scholar Score from the written code. The total count of scholarly items compared to the Scholar Score is illustrated in Figure 3.2 for the study sample reported in Chapter 2.

At Baseline, the average count was 3.9 (SD 4.7) with a Scholar Score average of 32.2 (SD 45.1). One year later, the average increased to a count of 7.8 (SD 7.9) with a Scholar Score average of 65.8 (SD 74.9). The difference of 3.9 more items produced over the year is small compared to the average increase in Scholar Score of 33.6. This shows the Scholar Score is sensitive to small changes in count rendering it a viable tool to account for scholarly activity in a short period. It also appears sensitive enough to apply to early career PT faculty without many scholarly items.
Example

The application of the Scholar Score compared to count is shown in Figure 3.3 for four study participants. Person 1 and 2 both have 11 scholarly items disseminated, but Person 2 has a Scholar Score 25% higher. A similar difference exists for Person 3 and 4 where both have 7 items counted but a difference in Scholar Scores of 45%. The higher score is due to dissemination of scholarly items that have a higher value.
DISCUSSION

This proposed new scoring system to evaluate scholarly activity for PT faculty is innovative. Like Emerick, who studied medical residents, the goal was to account for the “complexity, significance and degree” of involvement in activity by faculty. The proposed score unifies the value of 28 unique scholarly activity items from the categories of publication, presentations, and grants into a Scholar Score. The utility of the Scholar Score was demonstrated with a thorough evaluation of scholarly activities during the quantitative phase described in Chapter 2.

The concept of a scoring system is new to the profession of physical therapy as there are no published studies on the topic. Other professions have studied this concept, but there are flaws that make them impractical in physical therapy. For example, a system in the law sector that gives more weight to length of a publication is not
appropriate²⁷ nor is one that does not account for grants from the athletic training field.²⁸ The internal system developed by four individuals for surgical residents is also unusable because it gives the same score to all grants regardless of the amount awarded or role.²⁹

The Scholar Score goes beyond the traditional approach of a simple count of scholarly products by accounting for the various level that distinguishes one item from another. This includes items such as authorship order, funding amount, or presentation audience. This one score that accounts for scholarly activity has several applications beyond the use as the outcome measure for this study. First, it is valuable for early career faculty to aid in their understanding of what scholarly contributions are most valued especially related to promotion and tenure. A second proposed use is by Program Directors to gauge the outcomes of their collective faculty year-over-year or when recruiting new faculty. A program could tout, “our faculty have an average Scholar Score of 250 compared to the institution down the street that only has a 75.” Third, the scoring system should also be used by future researchers as a systematic outcome measure for analysis of scholarly activity. A final application of the score could be in program assessment or when reporting to accreditation agencies.

CONCLUSION

Scholarly activity plays an integral role in the advancement of early career PT faculty. A Scholar Score offers a clear and uniform, peer-validated approach to the valuation of scholarly activities for PT educators. A universal method of which to gauge the varying value of scholarly activities is valuable to consider. The proposed Scholar Score has utility to account for the variety of scholarly activity items disseminated. This practical and realistic tool to rank scholarly activities that heretofore has not been utilized is a unique contribution to the field of physical therapy.
This creation of the Scholar Score is limited by the number of respondents. A future study should include inviting Program Directors from all CAPTE accredited Programs to allow more generalizability. The Delphi survey method, a structured group facilitation technique with an expert panel, using an iterative multistage process is another method that could be used to further develop the scoring system.\textsuperscript{73} Due to time and resource constraints, this was not feasible for this dissertation. Another limitation is the lack of demographic information about the respondents. Knowing whether these individuals have experience with promotion and tenure committees or the length of time in their role mentoring faculty should be considered. Because this information was not asked in the questionnaire, no analysis between response groups was completed.

CHAPTER 3 SUMMARY

1. There is no current scoring system to account for quality and quantity of publications, presentations, and grants in the field of physical therapy.

2. A score was developed using scholarly items with input from PT faculty and Program Directors from professional (entry-level) physical therapy programs across the country. The study method was a cross-section survey design.

3. The CV Review Instrument was developed to identify items from CVs for uniform and objective scoring of both traditional and unique scholarly items.

4. The Scholar Score is sensitive to small changes in count rendering it a viable tool to account for scholarly activity in a short period. It also appears sensitive enough to apply to early career PT faculty without many items.
5. This practical and realistic tool is a unique contribution to the field of physical therapy as it is the one and only ranking system available. It should be used by physical therapy programs to account for faculty productivity, as the outcome measure for research about scholarly activity, and for program assessment when reporting to the Commission on Accreditation in Physical Therapy Education.
Chapter 4 The Qualitative Phase

Early Career Physical Therapy Faculty Connecting with Others for Scholarly Activity: A grounded theory study
INTRODUCTION

The professional relationships of early career PT faculty aid in career advancement by supporting scholarly activity. As shown in the quantitative phase described in Chapter 2, a professional network structure that is more open and less interconnected (lower density) is an effective network for higher scholarly activity. This holds true even when controlling for time spent as a faculty member and whether an academic doctoral degree has been attained. It is also important to note the study results showed that the composition of who was in the network was not significant. The network composition studied included six homophily measures, or similarity of characteristics, among network contacts, and 16 measures of heterogeneity, or how evenly characteristics are distributed through the network (gender, academic rank, and the like). A glossary of network structure and composition measurements is in Table 1.1.

Now that an effective network structure has been identified for faculty success in scholarly activity, it is relevant to explore the process early career PT faculty use to build a professional network to help them advance their scholarly agenda. Working on scholarship by oneself is not only inefficient for faculty, but the work created is likely not as innovative, comprehensive, or informative compared to when a team of people with differing expertise works together. Several studies report successful research team collaborations and faculty success with career advancement when their network is examined. However, little research has been done to understand how early career faculty build these collaborative networks. Although the significant value of scholarly activity is unquestioned, many studies about help for early career faculty continue to focus on the outcomes of workshops or mentor relationships, and fail to account for the social capital gained by connections within their unique professional
network.\textsuperscript{76-78} It is known from the quantitative study (Ch. 2) that some faculty have an effective network while others do not. This Chapter describes the qualitative phase, using the grounded theory approach to address this gap in knowledge, and provides insight into how early career PT faculty build a professional network to advance their scholarly agendas.

**Qualitative Phase Within the Mixed Methods Study**

The aim of this grounded theory study was to explore how early career PT faculty develop professional network relationships for building a scholarly agenda. The relationship between the qualitative phase aims, research questions, data collection and analysis within the larger mixed methods study design is shown in Figure 4.1. The use of the qualitative phase was appropriate to gain insight by exploring the perceptions of early career PT faculty as they were building their scholarly agendas in their current faculty roles. Prior studies on professional networks of faculty and scholarly activity do not exist in PT and those from other fields have not provided a clear link to theory.\textsuperscript{4,7,8,11}

The central research question guiding this phase of the study addressed the process that early career PT faculty use to build a professional network that helps them advance their scholarly agenda. Three research sub-questions also guided the study, including:

1. What actions do early career faculty take to construct a professional network for building a scholarly agenda?
2. How do early career faculty use relationships in their professional network to help build a scholarly agenda?
3. What are the outcomes of developing a professional network related to career advancement with scholarly activity?
**METHODS**

**Grounded Theory Approach**

A constructivist grounded theory was the predominant approach for this phase of the mixed methods study. This approach included a process to build a model grounded in the opinions of the study participants. This type of approach results in a final...
model that is substantive where it can be applied to everyday-situations, is specific and useful to practice. It is used for addressing questions about process and how something changes over time, such as network connections.\textsuperscript{79} The other qualitative approaches (i.e. phenomenology, ethnography, narrative analysis, case study) were not selected based on the goals of this study and associated research question.\textsuperscript{79}

The grounded theory incorporates elements wherein multiple opinions are shared by study participants, and to that end, data was collected using active dialogue.\textsuperscript{80} Knowledge was created mutually, rather than discovered, by the observer (BJB) and the study participants, with the aim of in-depth understanding for both researcher and participants. This approach was necessarily inductive given that little is understood about how early career PT faculty build network collaborations for scholarly activity. Participant perspectives developed during these collaborations were used to build categories to establish a final theory grounded in the opinions and perspectives of early career PT faculty themselves.\textsuperscript{81}

**Study Participants and Sampling**

**Brief Review of the Quantitative Phase**

Participants were selected from the 50 recruited during the quantitative phase. The aim of that phase was to determine an effective network structure and composition for scholarly activity of early career PT faculty. Inclusion criteria included faculty with less than five years of experience, who work full-time in a CAPTE accredited program, and who have a primary workload of teaching and service (40-50% of their time).

These early career PT faculty described their network collaborators through an online survey. Network structure and composition measurements were calculated using social network analysis.\textsuperscript{35} A glossary of network terms is in Table 1.1 of Chapter 1. Faculty Scholar Scores were calculated as a measure of the quantity and quality of
scholarly activity, including the grants, publications, and presentations reported on their CV. The Scholar Score is a unique formula created as part of this project and explained in Chapter 3.

The quantitative results showed that an effective network for predicting higher Scholar Scores is one that is more open. In other words, it is not one in which not all members connect to each other. This network measurement is termed density, which is a calculation of interconnection between members of a professional network. This measure also indicates the proportion of network members who are also connected with each other. Figure 4.2 illustrates two examples of professional networks of study participants, comparing similar size but varying openness of the network. These maps show individual network contacts: the closer one connection is to another, the more relationships have in common.

<table>
<thead>
<tr>
<th>Figure 4.2 Sample professional network maps for network shape, size and density</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Network Map" /></td>
</tr>
<tr>
<td><img src="image" alt="Network Map" /></td>
</tr>
<tr>
<td>23 contacts 18% Open ← Density → Closed 33 contacts 49%</td>
</tr>
<tr>
<td>Each small blue circle represents a network member. The large orange circle represents the early career PT faculty. Individuals are placed nearest to those with whom they share the most connections. The closer an individual is to another, the more relationships they have in common.</td>
</tr>
</tbody>
</table>
Participants for the Qualitative Phase

Participants for the qualitative phase were purposely selected to represent variations of scholarly productivity (Scholar Score) and effectiveness of their professional network (e.g., varying density levels). Additional consideration was given to the Carnegie Classification of their institution and length of time of CAPTE Accreditation for their physical therapy program. Interviews were conducted with 20 study participants, including six men and 14 women (Table 4.1) representing 15 institutions from 12 states. Two (10%) individuals held an academic doctoral degree, and most (n=15, 95%) had a specialty certification with all but three holding more than one. The mean Scholar Score of this group was 45.7 (SD 64.5, 0-220) at Time 1 and 87.1 (SD 96.0, 0-336) one year later. The mean network density score was 40.1% (SD 14.8, 19-83%) and the mean number of people in the networks was 29 (SD 15, 4-62%). Descriptive information of study participants grouped by network effectiveness and scholarly productivity is shown in Table 4.2.

Study participants with high Scholar Scores were termed “high performers,” and those with lower Scholar Scores, “low performers.” This process of variation of case sampling recruitment was used to understand why some faculty are more or less successful in their scholarly productivity even if they belong to an otherwise effective network of collaborators.

Faculty were invited to participate via email. The UNMC Institutional Review Board approved this study, and all participants were re-consented (Appendix G). Participation was voluntary. All early career PT faculty who were invited agreed to the interview.
Table 4.1 Study participant characteristics for the qualitative phase and their respective institutional characteristics

<table>
<thead>
<tr>
<th>Individual Characteristics (n=20)</th>
<th>N (%)</th>
<th>Mean (SD, range)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14 (82%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (20%)</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34 yrs</td>
<td>05 (25%)</td>
<td></td>
</tr>
<tr>
<td>34-44 yrs</td>
<td>11 (55%)</td>
<td></td>
</tr>
<tr>
<td>45-54 yrs</td>
<td>3 (15%)</td>
<td></td>
</tr>
<tr>
<td>55-64 yrs</td>
<td>1 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Caucasian</td>
<td>18 (90%)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1 (5%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Director of Clinical Education</strong></td>
<td>4 (20%)</td>
<td></td>
</tr>
<tr>
<td>Duration as faculty member</td>
<td>1.6 years</td>
<td>1.04, 3.59</td>
</tr>
<tr>
<td><strong>Academic Doctorate degree</strong></td>
<td>2 (10%)</td>
<td></td>
</tr>
<tr>
<td><strong>Academic Rank</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>19 (95%)</td>
<td></td>
</tr>
<tr>
<td>Instructor</td>
<td>1 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>APTA Member</strong></td>
<td>19 (95%)</td>
<td></td>
</tr>
<tr>
<td><strong>Clinical Specialist</strong></td>
<td>15 (75%)</td>
<td></td>
</tr>
<tr>
<td><strong>On Tenure Track</strong></td>
<td>12 (60%)</td>
<td></td>
</tr>
<tr>
<td><strong>Institutional Characteristics (n=15)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Institution Carnegie Classification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td>7 (47%)</td>
<td></td>
</tr>
<tr>
<td>Special Focus</td>
<td>1 (7%)</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>5 (33%)</td>
<td></td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>2 (13%)</td>
<td></td>
</tr>
<tr>
<td><strong>Institution Funding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>7 (47%)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>8 (53%)</td>
<td></td>
</tr>
</tbody>
</table>
Interview Protocol

An open-ended question format for the one-on-one semi-structured interviews was used as the best means to gather information about experience. The primary investigator (BJB) completed all interviews for consistency and flexibility to follow-up on emerging topics (the interviews were also part of her dissertation research). The final interview protocol question list (Appendix F) was developed after analysis of the quantitative data from social network analysis, scholarly productivity, and agency perspective and behavior scores described in Chapter 2. The order of the questions about networks was based upon concepts gleaned from the business sector. Questions began with building network relationships and asking respondents to consider why individual members were included and how connections were formed. These questions were followed by asking about the information and resources gained from these connections, and respondents were asked to explore examples of or outcomes from the relationship. Questions were reviewed in consultation with educational researchers at the UNMC Interprofessional Academy of Educators (BB, RS) and

Table 4.1 Descriptive information about study participants interviewed

<table>
<thead>
<tr>
<th></th>
<th>↑NW</th>
<th>↓SS</th>
<th>↑NW</th>
<th>↑SS</th>
<th>↓NW</th>
<th>↓SS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=5</td>
<td>n=6</td>
<td>n=6</td>
<td>n=6</td>
<td>n=3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Network Density</td>
<td>28% (9)</td>
<td>28% (2)</td>
<td>54% (16)</td>
<td>45% (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholar Score at Time 2</td>
<td>24 (17)</td>
<td>162 (99)</td>
<td>15 (12)</td>
<td>122 (102)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration as faculty member (years)</td>
<td>1.0 (.7)</td>
<td>2 (1.2)</td>
<td>.97 (.8)</td>
<td>1.6 (.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

↑NW = Effective network: less interconnected, open (low density)
↓NW = Less effective network: highly interconnected, closed (high density)
↑SS = High Scholar Score
↓SS = Low Scholar Score
members of the Ph.D. supervisory committee for BJB, and were approved after minor wording changes.

At least two days before an interview, each participant was given a copy of the questions and their network map illustrating the configuration of members, which allowed time to review questions and deliberate on answers if desired. Maps were used as a reference throughout the interviews, including questions about their completeness as a check in case network contacts had been omitted by mistake.⁵⁵

All interviews took place using secure video conferencing software, Vidyo (Hackensack, NJ, Version 2.2.2), except two that were privately completed face-to-face. Interviews were recorded, transcribed, and coded using NVivo qualitative data analysis software (QSR International Pty Ltd. Version 10, 2014). Each participant was assigned letters to protect their identity (i.e. AA, BB, CC, etc.). Pseudonyms were used to identify network contacts named.

**Data Analysis**

Transcripts were analyzed using the constant comparative process to develop the grounded theory.⁸⁵,⁸⁶ Each participant transcript, network map, and interviewer notes were reviewed and assigned codes as tentative labels for passages. As data were analyzed, codes were further developed and revised with more detail with written memos by the reviewer. The aim of this iterative process was to achieve data saturation guided by open, axial, and selective coding.⁸⁷ Although minor variations in the final theory can always be elucidated, these currently established criteria of conceptual depth are important to ensure that additional gathering of data or analysis would add very little to the final theory.⁸⁸,⁸⁹
Conceptual Depth

Conceptual depth, also called conceptual saturation, is the point at which the researcher has reached sufficient depth of understanding to allow for the creation of the final model. To adhere to sound methodological practice for validity, trustworthiness and transparency, conceptual depth was established based on five criteria. First, a wide range of evidence about the research questions was gathered from the interviews. This was a straightforward process using the NVivo software to calculate multiple instances of open codes during the line-by-line review of transcripts. The open coding process included breaking apart the interview phrases and demarking codes to stand for the interpretation. To ensure the meaning of the codes was the focus rather than their frequency, positional maps were created to illustrate the given topic of focus. An example of a hand-drawn positional map that was used to sort what was learned from the interviews is shown in Figure 4.3. This map was used to understand the complexities and consider different positions expressed about the information given about network connections. Diagram columns are divided by high and low performers in scholarly activity, and by those with an effective or ineffective network. “Leverage” was a working term to characterize this portion of information during analysis. The position map aids in illustrating that the network connections were clearly understood as they applied within the categories and not in isolation.
Figure 4.3 Example of a positional map

The map was drawn by BJB and used during analysis to understand the complexities between different perspectives of study participants related to information and resources. The networks (NW) and Scholar Score (SS) were used to define the groups: high (H) and low (L) performers with scholarly activity and those with a good effective (G) network and those with poor (P) ineffective network.
Secondly, complexity was demonstrated through coding trees and matrixes. Throughout the analysis process, these were modified to aid in sorting codes, comparing meaning among interviews, and understanding connections within the emerging categories. Figure 4.4 shows an example of the matrix for low versus high performers in scholarly activity and perspectives on how they connected. This figure illustrates the working idea for early career faculty reaching out to their contacts and vice versa, with differences noted between high and low performers. The position maps, coding tree, and matrixes from these first two steps continuously evolved during the concurrent data collection and analysis process.

**Figure 4.4 Matrix for initial analysis**

The matrix, drawn by BJB, shows initial thoughts about how people connected with each other for scholarly activity among higher versus lower performers for scholarly activity. The term, ego was used to identify the early career faculty study participant and the term, alter identified the ego’s network contact.
The third criteria included further interpretation of codes. This axial coding process included rearranging open codes out of the order in which they had been established and grouping them to determine connections and relationships. It also involved determining the core meaning of the data by re-reading interview passages, referring back to memos written during the open coding process, and comparing the data through selective coding. Coding is shown in Table 4.3. For example, study participants often referred to the help of others when talking about scholarly project success. Through comparison of “help of others,” it could be seen that the range of meanings included help with large or small projects and work issues, and help initiated by the study participant or by a network collaborator. This “help of others” also varied between high and low performers.

The use of reflective memos throughout the coding process is a well-established procedure in grounded theory studies and was used here to revisit and expand categories and reflect on meaning. Memos began as rudimentary representations of initial thoughts and complexity increased during the analysis process. They were used for initial data exploration, identification of concepts worthy of further exploration, making comparisons with earlier ideas, and aided in developing the final model. A handwritten memo related to how early career faculty reported time is shown in Figure 4.5. As may be seen, participant references illustrating these codes were marked throughout the analysis. This sample displays another example of the multi-dimensional elements of establishing conceptual depth.
## Table 4.3 Open coding and links to axial and selective codes

<table>
<thead>
<tr>
<th>Open Codes&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Axial Codes&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Selective Codes&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreditation</td>
<td>• Wanting to move career forward</td>
<td>Help with scholarly agenda &amp; specific project</td>
</tr>
<tr>
<td>Job requirements</td>
<td>• Unable to do it alone</td>
<td></td>
</tr>
<tr>
<td>Promotion and tenure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholarly activity goals for productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desire to contribute to evidence in PT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building new relationships</td>
<td>• Creating and re-creating relationships</td>
<td>Strategies to develop connections</td>
</tr>
<tr>
<td>Associations (APTA, state PT)</td>
<td>• Making meaningful and intentional connections</td>
<td></td>
</tr>
<tr>
<td>Faculty initiative, proactive, cold call</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interprofessional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlier contacts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residency, fellowship, DPT program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unplanned meetings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact became a mentor later</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former teachers in Ph.D. training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>• Social capital, help, guidance</td>
<td>Outcomes of working with others</td>
</tr>
<tr>
<td>Manuscript</td>
<td>• Contacts for career advancement</td>
<td></td>
</tr>
<tr>
<td>DPT students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty development on campus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of communication about scholarly activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitation by someone to get involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Release time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promotion &amp; tenure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meeting network contacts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacts outside institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Challenges with communication distance</td>
<td>• Navigating academia is difficult</td>
<td>Conditions that impair ability for career advancement (challenges)</td>
</tr>
<tr>
<td>“I know I should be doing something”</td>
<td>• Making meaningful or intentional network connections</td>
<td></td>
</tr>
<tr>
<td>Lack of experience – don’t know what I don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigating the system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at high research institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources, including money</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My own project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time – self &amp; others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family and personal time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies to manage time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Open codes are concepts to stand for meaning of the raw interview data.  
<sup>b</sup> Axial codes are reassembled open codes into logical groups.  
<sup>c</sup> Selective codes are the integration of the axial codes for the core categories.
The fourth criterion for conceptual depth was resonance between these findings and existing literature. In grounded theory, literature reviews can bias analysis due to exposure to information, but naturally one cannot complete a mixed methods study without a thorough review of prior work. To mitigate bias from studies in other fields, reflective memos were used to identify personal biases. As shown in the memo written by BJB in Figure 4.5, the reflection focused on specific time examples from the interviews for an in-depth review (e.g. strategies to manage time, time of self and time of others). Also, the categories and emerging theory were discussed with colleagues who were not as familiar with the literature.

The fifth and final criteria for conceptual depth relates to validity. Several strategies to check validity, feasibility, and relevance of findings to the project aim were incorporated. Member-checking was performed by emailing to study participants the list
of themes, ensuring accuracy and allowing for clarification that the information obtained was realistic, understandable, and trustworthy. The response rate for member-checking was 75% (15/20). Of those who responded, 100% agreed that the themes were appropriate. Another validation strategy was the use of rich, thick descriptions to account for experiences shared by participants. Finally, peer debriefing was incorporated with two persons at UNMC (RS, VK) who have expertise in qualitative studies, to confirm that findings appeared to resonated with multiple readers.

RESULTS

Overview of the Theory

The central phenomenon for the final model is connecting with others for scholarly activity. The model is shown in Figure 4.6, and reflects the actions, perspective, and interplay between early career faculty and their career advancement related to scholarly activity. The two constructs presented include strategies to develop professional network connections and how connections help participation in or increase scholarly activity. The outcomes from connecting with others are interrelated. The model also includes challenges found to be influential in this process. The next section describes this model in detail.
Figure 4.6 Grounded theory illustrating the central phenomenon and the process early career faculty use for connecting with others for scholarly activity
Strategies to Develop Professional Network Connections

Four strategies were discovered in the data that identified how professional network connections develop. Most participants used two or more strategies. The first was maintaining connections established before the current faculty appointment, relationships begun during their academic training (entry-level DPT, Ph.D., or residency or fellowship training) or while in full-time clinical practice. One faculty member, for example, reported network connections from “a previous job when I was a clinician.” Another mentioned a connection with a “Professor from when I was in PT school.” WW reported network contacts who were “classmates in residency and fellowship.”

The second strategy to develop connections was becoming acquainted with new contacts by working side-by-side as colleagues at their current institution (both within and outside the departments of physical therapy). Specifically, some connections developed between peers with similar scholarly productivity, faculty start dates, and academic rank. For example, BB said, “We all kind of latched together and developed projects,” because there were many questions about navigating academia and achieving success as a faculty member. Another participant reported, “We all needed scholarship, so we formed our own group to learn about a new topic each month.”

The third strategy for developing new connections was through unplanned encounters, described as a “fluke meeting,” “falling into an opportunity,” and after “one weird conversation.” This happened to participant YY, who ran into a former classmate at a national meeting and found out they were both doing similar work. They stayed in touch and are now collaborating on a project. The fourth strategy included the early career faculty reaching out to someone previously unknown. An example is provided by CC:
I just cold called him, sent him an email and said, ‘I’ve read a lot of your stuff, and it seems similar or aligned with what I’m doing.’ He was very willing to have a phone conversation and talk through some things.

Other examples of the cold call were emailing authors of a manuscript or introducing themselves to speakers after national convention sessions. One person reported putting herself “out there” to make new connections, and that this was highly valuable and outweighed feelings of self-doubt or fear of possible rejection. Another explained how she “put her name out there, put her face out there” to see what relationships could develop. For her, this led to connections with colleagues with similar interests through committee work for a national association.

**Network Connections Help Faculty Participate in Scholarly Activity**

Participants cited three main reasons network connections helped faculty participate in or increase scholarly activity. First were the external influences of the requirement by CAPTE that all faculty must have a scholarly agenda. This was specifically noted by those who had recently completed an accreditation annual review of programs or a self-study. Collaboration was essential to the success of gathering accreditation materials and was accompanied by discussions between co-workers about their scholarly projects and progress.

Second, participants reported department or institutional influences such as scholarly activity as a job requirement to demonstrate productivity and to achieve academic rank advancement and tenure. All participants devoted a portion of their full-time equivalent (FTE) to scholarly activity. MM reported the value of her connections for career advancement: “That’s where my network has been able to really fill in the blanks for me…some members are department chairs so that helps get a better understanding of the culture [so I can meet the requirement]”. Another described this as “pressure” to
publish. Several recognized the importance of others helping them learn and aiding in productivity by stating that without this help, they would not be as successful. DD reported looking for new contacts because, “I’m doing it on my own and I don’t have the self-confidence [needed to be successful].”

Third were intrinsic or internal influences. For example, scholarly activity was reported as something individuals had a desire to do through exploring a research question and contributing to evidence-based practice in physical therapy. For example, DD said, “the professional relationships I’ve had really helped to enhance my scholarly work.” Another participant talked about the help of a colleague who told her, “you can make anything into scholarly activity if you just think about it,” and this resulted in an educational scholarship project with a colleague while she learned through the process.

**Outcomes of Connecting with Others for Scholarly Activity**

Three outcomes from connecting with others for scholarly activity are embedded in the model, including opportunities, advancing connections, and feedback. Opportunities were described in a variety of ways and seen as a positive step to achieving career goals. Self-initiated opportunities included asking for and receiving specific examples of scholarly work to serve as a guide. Examples included manuscripts, grants, IRB applications, poster design, and research question development. Editing manuscripts and abstracts, selecting journals to publish in, assistance in finding an “opportunity for a grant I would never have thought of,” and guidance for achieving promotion and tenure were all important components.

Other opportunities for connecting with others for scholarly activity were originated by the network contact. One result was the network contact reaching out to an early career faculty member with an invitation to participate in a specific scholarly project. An example was being taken "under their wing" to learn more about the IRB and
the process of submitting a manuscript. Also reported as valuable was getting advice about "when to say no to opportunities." Managing time effectively for the best outcome was important, and getting overly involved was realized as a potential issue.

Another outcome of connecting with others for scholarly activity was advancing connections beyond existing relationships. One faculty reported going to a state physical therapy meeting with a colleague who knew everyone in the room and who provided many new introductions. This lead to a role on a committee and new connections through service. The committee became a scholarly group that worked on publishing clinical practice guidelines. Others reported advancing their connections through email introductions when the early career faculty member needed information or resources unavailable through existing contacts.

Feedback about scholarly activities was the final outcome in the model and seen as extremely valuable. Reassurance and encouragement about ideas for projects being worthy were expressed by FF, who said, “I wouldn't have gone for the grant without the encouragement of others.” Another reported:

I needed help to channel the scholarly agenda to one thing, versus spaghetti [tangled and unorganized]. I needed to narrow my focus and help with a vision of where it could go.

The proposed model shows the positive outcomes of connecting with others for scholarly activity; however, challenges to this process were also noted.

**Challenges to Developing Network Connections and Scholarly Activity**

**Time**

Lack of time was universally reported as a challenge for all study participants, regardless of scholarly productivity or network effectiveness. “Teaching gets in the way,”
and preparing for class or lab “takes forever because I’m new,” leaving even less time for scholarly work. JJ said, "I have to cram it in after finals week since there is no time before that." KK described having “only having a few minutes here and there,” so she only jots down ideas. Another described “sitting on data that could be out there but no time to write.” All work tasks, not just scholarly activity, make time management difficult as reported here: “I want to be JJ the Mom and JJ the Wife too” who works around her children’s schedules at home in the evenings. Time was also spent “going to so many meetings” and few of these were directly related to scholarly activity.

There was also limited time available from the network contacts for collaboration. This led to delayed responses to emails and phone messages, long periods between meetings, or declining to get involved at all due to time-constraints in their workload. One participant reported receiving mixed messages when a colleague said to let her know if she needed help but then was too busy to get together.

**Funding**

Finding funding agencies and being qualified for funding opportunities was also reported as a challenge. Meeting experienced contacts to assist in submitting a successful grant was another problem. There were a variety of funding amounts discussed for early success in scholarly projects; for example, one person was interested in applying for a large federal grant, while another only wanted funding to pay parking fees for study participants.

**Institution-related factors**

Several institution-related factors emerged in the final theory as challenges to connecting with others for scholarly activity, including pressure to do research and be productive; unclear expectations for success with promotion and tenure; and geographic distance between network collaborators (campuses or clinical practice). There were
varying degrees of agreement on two of these factors. For example, some reported a lack of institutional resources (e.g., statistical or grant writing assistance), while others reported having every needed resource, even if they did not know how to use it. A second example was competition among faculty for the attention of experienced researchers for assistance and inclusion, special opportunities, and funding. This is compared to others that reported a collaborative environment of support.

**Individual Elements**

Other challenges are specific to individuals, such as being unsure of how to begin scholarly activity, as reported by KK, “I didn’t really have a good understanding of what it meant to form a scholarly agenda.” I spent the first two years “figuring out what I should be doing.” And LL said,

I would say the biggest challenges are just knowing what questions to ask, knowing who to ask the questions of, so I have these people on my network, but it's not always clear if they have the information that I'm looking for.

MM concurred: “I think my first challenge is trying to figure out what the heck I do for scholarly activity.” There were also worries conveyed such as, “not sounding stupid when asking a question about research you don’t know very well,” “knowing how to speak the language more fluently would probably help,” and “my own insecurity in being able to reach out and ask the question….. I almost feel like everybody’s watching just to see how I am going to do.”

There were differences in interpretation of challenge as well. For example, PP noted his big challenge was the lack of institutional resources and support for grants. He attributed this to working at a small private school with a Master’s Carnegie
Classification. His physical therapy program was the first Doctoral degree offered on campus so "they don't know how to handle us." By contrast, LL is faculty member at a Doctoral of Highest Research Carnegie Classification institution in an existing physical therapy program. She had access to many institutional resources, but nevertheless had a different experience. She asked a trusted colleague about who she needed to talk to about "how to do scholarship" and was sent to the grants office. LL reported being "completely overwhelmed" because she wanted to learn the components of a research project. Over a two-hour meeting, she was inundated with information about writing grants and was given a book to read that still only sits on her shelf. Clearly, even when there are institutional resources available, they do not automatically translate to scholar success.

As a result of the grounded theory study, the central phenomenon of connection with others for scholarly activity was established. The qualitative analysis resulted in the following two propositions: 1) faculty who are higher performers are more likely to initiate a new network connection; and 2) faculty with institutional support have higher scholarly activity. These are further explained in Chapter 5, where the quantitative and qualitative data are merged and discussed jointly.

**DISCUSSION**

During the qualitative phase of the mixed methods study, the study explored the process early career PT faculty use to develop a professional network to build their scholarly agenda. Participants explained how they became acquainted with professional network contacts and how those connections resulted in scholarly activity.
Practical Implications

The final model has practical, meaningful implications as a framework in several ways. First, early career faculty scholars should reflect on connecting with others for scholarly activity. Strong consideration should be given to taking the initiative to reach out to potential collaborators regardless of whether or not they are known to the scholar. No study participant who initiated such an introduction, many of which were recent, regretted the decision, even though the potential of that introduction had not fully been realized and might not ever be.

Second, this model should serve as a framework for Program Directors to guide early career faculty in appraising professional network connections and assisting with introductions where gaps may exist. Institutional support, such as travel and registration to events where like-minded collaborators will convene for unplanned encounters or cold-calls with new contacts, could be prized. The value was clear for attending conferences with others with similar interests as a prime method for establishing meaningful new connections. So was a willingness to take the initiative and serve on a committee or introduce oneself to a potential collaborator. Although electronic communication may be an efficient method for some occasions, one should not underestimate the value of face-to-face meetings at the local, regional, and national levels. This is particularly vital given the findings about “chance encounters” and “fluke meetings” discussed by some respondents.

Third, several challenges are related to connecting with others for scholarly activity. It was not unexpected that time was a hindrance; however, it was not only the lack of time of the early career faculty member but also that of their collaborators that proved difficult. This mixed message (a contact saying they are willing to help but not making time to provide the help) was discouraging when few alternatives for accessing
the information or resources exist. Participants reported hoping that time constraints would improve once they figured out their teaching roles, but caution should be taken given that time is a barrier even beyond the early years as faculty, making this an optimistic but likely unrealistic justification.

There are benefits described related to scholarly activity received from the professional network relationships. These outcomes of social capital provided by the professional network relationships include access to resources and social cohesion, such as feedback, encouragement, and reassurance. These concepts are more thoroughly described in the mixed methods phase.

The model presented in this chapter is aligned with previous work that has shown collaborations to be essential for navigating academia, that establishing purposeful strategies for development is valuable, and that there is a complex interplay of individual characteristics and motivations involved in taking initiative. A faculty development study about nurses did not advocate specifically for establishing an effective network beyond finding a mentor to whom one could go for advice. However, while a mentor is extremely important, the social capital gained from other connections may be equally so. Here it is suggested that the results of this study begin to fill the knowledge gap about the process early career PT faculty members use to build a professional network to help them advance their scholarly agenda. These findings also show outcomes of the process and barriers that may impede progress in scholarship.

The next chapter describes the final mixed methods phase, including how the findings from the model described in this chapter about connecting with others for scholarly activity help explain the initial findings and conclusions about agency, network structure and composition, and scholarly activity reported in Chapter 2.
CHAPTER 4 SUMMARY

1. Based on the qualitative phase findings, the final model includes the central phenomenon of connecting with others for scholarly activity. The two distinct constructs include strategies used to develop professional network connections, and that network connections help faculty participate in or serve to increase scholarly activity.

2. The outcomes of this process are realized in new opportunities of invitations to participate in projects, reviewing high-quality examples as references for future ideas, and collaboration on existing projects. Advancing network connections was also a positive outcome through self-initiated means and introductions by existing contacts. A last outcome was feedback about projects, reassurance, and encouragement for career advancement.

3. Overcoming challenges can be difficult, including lack of time and funding, individual elements, and institutional factors.

4. This theory improves the understanding of the process of how early career faculty build a professional network and use the relationships to generate a scholarly agenda. Faculty and administrators should be encouraged to use it in their settings with further investigation.
Chapter 5 The Mixed Methods Phase
INTRODUCTION

As described in Chapter 2, an effective professional network for early career PT faculty scholarly activity success is one that has a less interconnected network structure. In Chapter 4, the grounded theory qualitative study was reported. It was a follow-up on the quantitative findings and resulted in a model presenting the central phenomenon of the process faculty use to connect with other for scholarly activity. This chapter includes the consolidation of the data from the quantitative and qualitative phases. The aim of the mixed methods phase was to describe how the follow-up findings of the process of using the professional network to build scholarly activity help explain the initial results of agency, network structure and composition, and scholarly activity. The mixed methods research question was, How do the findings of the process of using the network to advance scholarly activity help explain the initial results of scholarly activity? The study sequence is shown in Figure 5.1 and the focus of this chapter is the phase outlined in gold. Before reporting the results, it is essential to thoroughly review the worldview and methods used throughout the entire study.81,97
Figure 5.1 Explanatory sequential mixed methods study – Mixed methods phase

**AIM 4:** To describe how the follow-up findings of the process of using the professional network to build scholarly activity help explain the initial findings of agency, network structure and composition, and scholarly activity. **Research Question:** How do the findings of the process of using the network to advance scholarly activity help explain the initial findings of agency, network structure and composition, and scholarly activity?

**Integrate QUALitative & QUANTitative Phases**

The grounded theory will help explain the agency scores and network structure and composition to better understand the process that faculty use to help with scholarly activity. Data integrated into a joint display matrix. | spring 2018

The gold frame identifies the focus of this chapter.
Worldview

The four required elements in developing a mixed methods study were implemented in this project (Figure 5.2). The philosophical foundation for completing a mixed methods study is important to consider and should be clearly explained. Plans began with broad worldview paradigms from each study phase and moved to the theoretical lens using the social capital theory. These two elements informed the mixed methods approach for data collection through surveys and interviews. The next section includes a description of these elements as it relates to the project.

**Figure 5.2. Elements of the mixed methods study**

- **Paradigm Worldview Elements**
  - Epistemology: relationship between the investigator and that being researched
  - Axiology: role of values within the study
  - Ontology: nature of the reality (e.g. singular, multiple)
  - Methodology: research process and approach
  - Rhetoric: language of the final writing

- **Theoretical Lens**
  - Social Capital Theory

- **Methodological Approach**
  - Post-positivism (quantitative)
  - Constructivism (qualitative)
  - Pragmatism (mixed methods)

- **Methods of Data Collection**
  - Explanatory Sequential Mixed Methods
  - Surveys Interviews

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\[a\] Epistemology: relationship between the investigator and that being researched
\[b\] Axiology: role of values within the study
\[c\] Ontology: nature of the reality (e.g. singular, multiple)
\[d\] Methodology: research process and approach
\[e\] Rhetoric: language of the final writing
The worldview utilized to construct the quantitative phase using a survey was post-positivist where the relationships among variables was assessed and described using statistics. The epistemology for the quantitative data about network connections and scholarly activity was collected objectively from early career PT faculty. The role of values (axiology) was on established instruments, without bias leaving distance and impartiality between the primary investigator (BJB) and the early career PT faculty study participants. The ontology was one of a singular reality where the results about the association between scholarly activity and the network and agency were compared against the research questions. The research methodology was determined a priori, with deductive testing and operational definitions of variables. The rhetoric, or language of the research, was formal using well-defined variables about the network structure and composition, agency perspective and behavior and the Scholar Score. It is these elements that made up the quantitative phase described in Chapter 2 and 3.

The worldview shifted for the qualitative phase where constructivism became predominant. Differing paradigms during the different study phases is common and encouraged. Using a constructivist worldview, the goal was to seek an understanding through the multiple realities and perspectives of early career PT faculty about the development of network connections for scholarly activity (ontology). The epistemology for data collection was through the follow-up interviews with questions developed in-part from results of the quantitative phase. Data were collected through active discussions face-to-face or using video conferencing where closeness and rapport was established between the interviewer (BJB) and the study participant. The role of values (axiology) included interpretations which left room for bias during analysis. The inductive process started with the study participants' perspectives building to a final theory grounded in the data and more thoroughly described in Chapter 4. The rhetoric for the qualitative phase included an informal style of writing where quotes were
provided along with stories shared by study participants.\textsuperscript{81} The worldview, that began as post-positivism in the quantitative phase and shifted to constructivism for the qualitative phase, changed again for the integration of datasets in the final phase.

Pragmatism was the worldview that best fit the mixed methods phase of the study where the results were combined (methodology). The research question drove the selection of the numeric and narrative data, with analysis by integrating categories from the final grounded theory and statistics. The philosophy of pragmatism is an essential one for mixed methods research as it embraces ideas and considers perspectives from both quantitative and qualitative phases and allows them to interact in real-world circumstances (ontology).\textsuperscript{81} Pragmatism rejects either/or choices and is the middle ground between dogmatism and skepticism to determine workable solutions to answer the research questions about early career faculty career advancement (epistemology).\textsuperscript{98} This worldview is process-oriented realizing links between the environment and where the study participants work. To understand the early career PT faculty involved in the study, pragmatism endorsed careful consideration where differing perspectives were used in understanding the experiences (axiology). These pragmatic views occur in day-to-day life as well as research where people check their beliefs through experiences and questioning to solve problems for practical action versus philosophizing.\textsuperscript{98} This chapter is written with a rhetoric of both formal writing styles consistent with reporting statistical information and informal descriptions from the qualitative phase.

To operate at a more narrow perspective than the worldviews, the theoretical foundation was the lens taken for the overall direction of the study.\textsuperscript{81} The premise of the study was based on the social capital theory. As described in Chapter 1 and shown in Figure 1.3, there are three constructs of this theory.\textsuperscript{42} The first includes access to resources from network contacts that are connected both directly and indirectly. The second is social cohesion where strong support can aid in integration among network
contact relationships. Thirdly, social capital can include brokering which is to serve as a bridge to the flow of resources and information. This theory has been used to describe network relationships in medicine,\textsuperscript{7,45} business\textsuperscript{8,47,48} and social science.\textsuperscript{43}

The worldviews and theoretical lens informed the selection of the methodological approach and methods of data collection. The latter two elements are detailed in prior chapters. The next section includes the methods used for integrating the quantitative and qualitative data.

**METHODS**

The mixed methods phase included data comparison to answer the research question and draw conclusions using quantitative and qualitative methodologies within the analysis.\textsuperscript{99,100} Comparison included group differences between high and low performers in scholarly activity determined from the quantitative phase, with the model about strategies used to develop professional network connections from the qualitative phase.\textsuperscript{100}

**Considerations for Quantitative and Qualitative Data Merge**

There were six considerations used for mixing data as recommended by Teddlie and Tashakkori.\textsuperscript{99} The first included a straightforward one: using the qualitative data to further expand the results of the quantitative analysis. A second consideration was the study was variable-oriented. This began with a study of the independent and dependent variables (Ch. 2) followed by the development of the central phenomenon of network connections for scholarly activity, in the qualitative phase (Ch. 4). Third, this study included explanatory components because little was previously known about the networks of early career PT faculty members and their scholarly activity. The results were confirmatory meaning that conclusions were drawn based on the results from both phases.
The fourth consideration was the order of data collection. The sequential method was most appropriate because the quantitative data assisted with purposeful selection of the study participants for interviews and in determining the final interview questions. Fifth, assumptions were related to each data collection phase. For example, in the quantitative statistical analysis, the assumptions were clearly shown mathematically (e.g., normality of distribution). In the qualitative phase, the assumptions were less-straightforward but equally as important (e.g. trustworthiness and credibility). The qualitative assumptions were mitigated through prolonged engagement with the study participants using a mid-term summary report of their network and scholarly activity halfway through the project. Also, saturation was demonstrated by reporting conceptual depth. The final pre-analysis consideration for mixed methods analysis was the computer software tools used for data analysis. Software included UCInet for the social network analysis, SPSS for the inferential statistical analysis, and NVivo for the qualitative data analysis.

Integrating the data from both phases of the study was the final step. The strategy for the mixed methods analysis was to link group variables of the Scholar Score and agency scores to the model. A joint data display of the quantitative and qualitative results in a table visually shows the relationship to each study phase.

RESULTS

Results from 50 early career PT faculty were analyzed to determine an effective network structure for scholarly activity includes one that is less densely interconnected. This was true even when controlling for the duration as a faculty member and achievement of an academic doctoral degree (Ch. 2). From this group of study participants, 20 were interviewed to follow-up on the initial findings using the grounded theory approach. The individuals selected for interviews included those with varying
scholarly activity and network structure. The final model, grounded in the data, included the central phenomenon of connecting with others for scholarly activity (Ch. 4).

The joint display shown in Table 5.1 includes quotes from high and low performers of scholarly activity. The high and low performers were determined from the quantitative phase using the Scholar Scores. Also reported are the agency perspective and behavior scores for the high and low performers (Ch. 2). The quantitative findings are aligned with the four strategies used to develop professional network connections from the qualitative phase. These strategies are affiliated with the central phenomenon of connecting with others for scholarly activity (Ch. 4).

The first strategy was whether the network contact was known to the early career PT faculty before their current position. These relationships were initiated during academic preparation, post-professional education, and during work as a clinician. The second strategy was connecting with co-workers at their current institution. These connections were made through working alongside colleagues both inside and outside of the physical therapy department. Next was the unplanned encounter resulting in a new relationship where new contacts joined networks through unexpected meetings. During analysis of the interview data for this strategy, it was clear that these early career PT faculty put themselves in situations for these “fluke meetings” to occur. One even mentioned, "another" encounter indicating that these unplanned meetings had occurred several times. Lastly, the self-initiated strategic actions demonstrate high agency for career advancement for high performers.
### Table 5.1 Quotes related to categories of strategies to develop professional connections for scholarly activity for low and high performers

<table>
<thead>
<tr>
<th>Strategies used to develop professional network connections</th>
<th>Low Performer (n=25)</th>
<th>High Performer (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Known before faculty position</strong></td>
<td></td>
<td></td>
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<tr>
<td>Relationships were initiated during academic preparation,</td>
<td></td>
<td></td>
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<tr>
<td>post-professional education, and during work as a clinician PT</td>
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<td></td>
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<tr>
<td><strong>Strategy 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“It was really big department, but it was</td>
<td>“Dr. C was one of my professors that I did</td>
<td></td>
</tr>
<tr>
<td>a very close department, because of</td>
<td>some research with when I was in PT</td>
<td></td>
</tr>
<tr>
<td>the way we were structured and the</td>
<td>school and still kind of have been able to</td>
<td></td>
</tr>
<tr>
<td>kinds of patients that we were seeing-it required a lot of</td>
<td>stay connected to him.”</td>
<td></td>
</tr>
<tr>
<td>teamwork”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strategy 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“We’re doing interdisciplinary work, so we’re</td>
<td>“She does a lot of work with grant writing, so she’s</td>
<td></td>
</tr>
<tr>
<td>partnered with speech therapy or we’re partnered with</td>
<td>been helpful in those areas. Dr. A did a Functional</td>
<td></td>
</tr>
<tr>
<td>College of Medicine. They always have ideas for</td>
<td>Imaging study. So I did a study with them and I’ve</td>
<td></td>
</tr>
<tr>
<td>research because there’s always</td>
<td>been connected with them just through that one</td>
<td></td>
</tr>
<tr>
<td>expectations from their side as well.”</td>
<td>research project.”</td>
<td></td>
</tr>
<tr>
<td><strong>Strategy 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New contacts joined their network through an unplanned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>meeting”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“So, that group was originally formed as a support group</td>
<td>Professor S invited me to the cardiovascular</td>
<td></td>
</tr>
<tr>
<td>then we started talking about opioid misuse because it’s a</td>
<td>educators’ meeting at the national association</td>
<td></td>
</tr>
<tr>
<td>topic that you can relate to OT and PT. We started</td>
<td>meeting, a super informal meeting. From there I met SS</td>
<td></td>
</tr>
<tr>
<td>talking about how we can do scholarship wrapped around</td>
<td>who’s at XYZ college in [city name] and she and I</td>
<td></td>
</tr>
<tr>
<td>this opioid misuse and abuse, so a lot of my scholarship</td>
<td>have kept our connection. Now we’re doing a national</td>
<td></td>
</tr>
<tr>
<td>has been that so far.”</td>
<td>presentation this year so just another fluke</td>
<td></td>
</tr>
<tr>
<td><strong>Strategy 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacting someone previously unknown based on shared</td>
<td>“I’ve really learned that it’s really just about</td>
<td></td>
</tr>
<tr>
<td>interests”</td>
<td>asking people and they almost</td>
<td></td>
</tr>
<tr>
<td>“She is in the school of XYZ here on campus and how did</td>
<td>always seem willing to help you out.”</td>
<td></td>
</tr>
<tr>
<td>we connect? I went to a presentation that she gave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>within the first year of being here and now we’ve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>collaborated on a couple of talks together and we have two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>more planned for the future.”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* All names are pseudonyms to protect the identity of the network contact named
DISCUSSION

The purpose of this explanatory sequential mixed methods study was to explore the professional network of early career PT faculty as it relates to scholarly activity. The research question for this phase was: How do the findings of the process of using the network to advance scholarly activity help explain the initial findings of agency, network structure and composition, and scholarly activity?

In the quantitative phase social network analysis was used to understand the network structure and network composition of early career PT faculty. Individual agency perspective and behavior scores were also considered. The results showed it is not the number of individuals in a network that facilitated scholarly activity but rather the openness (low density interconnectedness) that was found to be a predictor of higher Scholar Scores. This was true even after accounting for duration as a faculty member and attainment of an academic doctoral degree.

The quantitative phase provided a snap-shot of the network at a given point in time. It was through the qualitative phase, that study participants provided their experiences about how the contacts became part of their network and the outcomes of the relationships. The grounded theory analysis revealed the central phenomenon of connecting with other for scholarly activity. The model explained the strategies early career faculty use to develop professional network connections. It also described how network connections helped faculty participate in or increase scholarly activity. The outcomes of this process included opportunities for scholarly projects, receiving feedback and encouragement, and advancing connections with new network contacts. Lack of time and funding, individual elements, and institutional factors were challenges during this process.
Without the latter phase, important information about the dynamic process of network development would have gone unaccounted for and would have limited the practical implications about career advancement for early career PT faculty. With the added information it is possible to describe the social capital gained from the connections. The approach selected for interpreting the connected quantitative and qualitative results of the study was based on Creswell and Plano-Clark\textsuperscript{100} and Teddlie and Tashakkori.\textsuperscript{92} Inferences were drawn after each phase\textsuperscript{92} and are provided in the discussion sections of Chapter 2 and 4. In an explanatory study, such as this, meta-inferences are drawn at the end of the study as part of another discussion to provide a better understanding about the way the qualitative findings about the strategies used to develop professional network connections further explain the initial quantitative results about scholarly activity.\textsuperscript{92,100,101}

The quantitative findings highlighted similarities and differences among high and low performers of scholarly activity and they are reported in the next section in alignment with the four strategies of developing network connections from the qualitative findings.

**Strategies Used to Develop Professional Network Connections**

**Known before faculty position**

Both high and low performers reported several network contacts were known prior to their faculty position. These connections were forged during time as a clinician, during their entry-level degree education, or during post-professional residency or fellowship training. Since the study participants were all in their first five years as faculty, these relationships were recent, and the connections were still working in the jobs where they interacted. This strategy of developing a connection is supported in the literature where networks are composed of people who were influential. Role models such as clinical instructors, former professors, or supervisors become trusted advisors during
training and are influential in others’ career decisions.\textsuperscript{102} Several study participants, both high and low performers, as shown in the quotes selected for the joint display, mentioned former faculty members that are now collaborators and how grateful they were for the opportunity to work together. The interactions of participants provided a positive sense of well-being with sustained interactions indicating rich social capital attained from the connection. Another strategy used to develop network connections was through co-workers.

**Co-worker at current institution**

Both high and low performers also developed their network with co-workers at their current institution. This was an expected finding, so it was further explored during the interviews to determine how the connections were made and the outcomes from the relationships. Several low performers’ comments appeared to have a more negative tone such as “getting pulled along” for a project by a co-worker or meeting someone because they were “sent to the grant office.” However, there were some positive experiences reported by this group too. For example, the quote shown in the joint display includes mentioning interdisciplinary work indicating strategic thinking and collaboration that may lead to a scholarly project.

The high performers’ comments were all more positive with an eagerness to take a chance to find out where the opportunity may lead. They wanted to capitalize on the social capital of information and resources available to them at their current institution. For example, in the sample quote shown in the joint display, one high performer talked about a contact in the imaging department for future collaboration and another described the help received from the grant writing office versus just being “sent” there, like reported by the low performer. Other high performers spoke about a willingness to learn and get involved despite feelings of ineptitude or that they had little of offer. Expressions of gratitude for those opportunities and wanting to take full advantage were common.
The findings about co-worker interactions indicate a tendency of forward thinking and strategic views for a situation (agency perspective). The high performers took action to help them advance (agency behavior), were more intentional, and took advantage of opportunities while low performers were more reluctant. A variation in the willingness to act was also reported in a study of undergraduate faculty that described when opportunities were presented some ignored the prospect while others jumped on board. Other authors have studied the power of strategy and networks, and proposed faculty who assume agency and make positive events happen are also helpful to their faculty-peers. Therefore, a high performer with high agency tendencies could influence other network contacts, which may be especially helpful if the contact is a low performer.

Several study participants (both high and low performers) also mentioned a chain of introductions. This included a current network contact from their institution introducing them to someone, and then that person introducing them to another. Since networks are dynamic and constantly evolving, one must have a description of the network to know how the network developed over time. Without verbal accounts about the network, these chains of introductions could not be identified.

Planned encounters such as retaining relationships from before joining the academy and engaging in collaborations with co-workers at their institution were reported as strategies for network development by both the high and low performers. It appeared from reviewing the network maps, that study participants who have relied heavily on these two strategies for developing network connections could run the risk of a more closed and densely interconnected network as many of the contacts also know each other. This limits novel social capital of information and resources available to the early career faculty. The final two strategies were reported more by high performers.
Unplanned encounter

The unplanned meetings were described by high performers as “falling into an opportunity” or after “one weird conversation.” Only one low performer mentioned a similar situation when describing meeting with a support group that ended up turning into a scholarly opportunity. It is possible that high performers positioned themselves in situations where these encounters were more likely to happen. These chance meetings occurred at conferences, optional university events, and sidebar conversations at their institutions. Without the interview data that explored the network development, this strategy would have remained unknown. The use of the network maps during the interview aided the study participants because they explained the said contact, which was usually not highly interconnected with others.

Because this strategy was useful by high performers it bears mentioning. The term “fluke meeting” was also reported in a case study about a college administrator that took an unexpected meeting into a partnership between his university and the community.103 The informal meeting complimented the formal plans that were already in place. Social capital gained from an effective professional network is too valuable to be left up to unplanned meetings or fluke interactions. An early career faculty should use purposeful strategies to develop a professional network but if an unplanned informal encounter comes along, the opportunity should not be ignored. A more reproducible strategy for network development are those that are self-initiated to meet new contacts.

Self-initiated

The final strategy for network development of network connections was initiated by the early career faculty. Most high performing scholars reported using this network development strategy by reaching out to others for new connections. One defined it as the cold call. Another described her approach of asking people for advice or to collaborate saying, “they are almost always willing to help.” This positive experience led
to many more self-initiated network contacts. The high performers mentioned developing connections outside of their institution by finding contact information in manuscripts or at a national conference presentation. Only one low performer described a self-initiated strategy and it was a much lower-stakes encounter than the high performers. The new contact was someone on-campus who gave a presentation and the early career PT faculty followed-up afterwards in an email about a shared interest in the topic. Unbeknownst to the faculty, these self-initiated actions made their network less densely interconnected and therefore more effective.

Low performers did not mention taking an initiative as illustrated by DD, who said her approach was “intentional relationships with a few key people.” This approach is likely why a more closed network was seen and resulted in less new information or opportunities compared to others who actively explore new contacts. Another low performer shared different opinions about the opportunities when she said she “was pulled along” showing less openness and hesitancy in creating new relationships.

Those who reported using the self-initiation network development strategy had examples of a reason why the connection was started. This strategy was also shown in a study about network development for projects in business. Persons attended a networking event to facilitate introductions and the results showed that unless there was a specific need to meet new people (e.g. an upcoming project, unanswered question), attendees gravitated to known friends and the networks changed very little.65

One tactic reported for developing networks is asking an existing contact for an introduction to someone not already highly-connected.63,64 This approach has been shown in other studies to be successful when trying to develop an effective network that is open and less interconnected. No participants in the current study specifically reported this method for developing their network. This could be due to most study
participants, even those with a less effective networks, reporting the information needed about scholarly activity were answered by current network contacts.

The outcomes from the network connections differed between the high and low performers and is reported in the next section.

**Outcomes from the Network Connections**

The first difference included low performers reported requests for more general and less defined information such as institution policies and procedures, campus resources, or information about the culture of higher education. HH, a lower performer, summed up her thoughts saying she had “no idea how to move forward” with her scholarly activity and did not know the questions to ask or even the help she needed. Another admitted, “I’m not very skilled at working my connections” and unless it “just happens naturally with a colleague” I don’t know what to ask.

The second difference was the high performing scholars reported a willingness to learn and get involved even when they felt there was little they could offer. They reported being grateful for the chance to learn, work with someone interested in similar topics, and being open to participating in a project. Some of these connections resulted in formal mentor relationships and coauthors on manuscripts or as co-presenters.

A third variation between high and low performers was about the type of feedback solicited from network contacts. High performers asked for feedback on very specific items including research questions, brainstorming data collection and analysis plans, and their scholarly agenda items. In contrast, low performers asked for feedback on general topics about policies, getting started, the IRB process, or with setting an agenda. There were worries conveyed from low performers such as, “not sounding stupid when asking a question about research you don’t know very well,” “knowing how to speak the language more fluently would probably help,” and “my own insecurity in
being able to reach out and ask the question….. I almost feel like everybody’s watching just to see how I am going to do.”

Through the analysis, a fourth difference was discovered that high performers did not specify their lack of formal research training through attainment of an academic doctoral degree as being a limitation of their work. However, several low performers, and especially those with an ineffective network, mentioned they felt left out, less valued, or not prepared because they did not have the academic doctoral degree. One individual said, “I don’t have a Ph.D., I don’t have an EdD, I have a DPT and a specialist certification, so it’s been really challenging for me to figure out scholarship.” No participants brought up a seeking a Master’s degree in clinical research to mitigate these feelings. This may be an alternative to an academic doctoral degree for those who seek additional formal training but do not have the time or resources to invest in an academic doctoral program.

Lastly, the high performing group appeared more open to new relationships and building contacts without expectations of immediate outcomes but rather were willing to serve and foster the relationship. Low performers were cautious about initiating new connections which could be a major limitation in career advancement regardless of their current scholarly productivity. Their worries of failure or uncertainty about the benefit of starting a new connection appeared to be limits. Low performers also provided fewer examples of information and resources gained from their network connections compared to the higher performers who self-initiated many worthwhile interactions.

The connections to colleagues, particularly those from other institutions, are essential for documenting a regional, national and international reputation for scholarship. This kind of reputation is necessary for promotion. The potential value of external network contacts may also be realized when requesting letters of support for career advancement.
Agency and Network Connections for Scholarly Activity

Differences between high and low performers were not detected in the individual agency behavior or agency perspective scores reported in the quantitative phase of the study (Ch. 2). When more in-depth information was gathered about specific experiences and the role of their connections, it appears their experiences may be shaped more by those they connect with than individual agency. When drawing on the social capital theory, the low performers do not appear to have maximized the social capital from their network. This could be due to the network contacts themselves having little social capital to offer or the early career faculty is unaware, unwilling or unable to elicit access to resources and social cohesion that the social capital theory is based upon. If one is reluctant to advance connections, they risk their network becoming more interconnected and thus less effective for scholarly activity. For example, an early career faculty member may avoid applying for a grant based on the cues of their surroundings that the awards are too competitive, no junior faculty has ever received one at their institution, or the amount of money is not enough.

It is evident the qualitative findings about network development strategies helped explain the quantitative findings among high and low performers. It was valuable to find out how the contact became part of the network not just that they are a part of the network. These strategies can be used by early career PT faculty themselves. In addition, mentors of these faculty should provide opportunities, ongoing follow-up about success with a given approach, and establish a culture where social capital can be shared.

The next, and final chapter, of this dissertation includes study conclusions in addition to study limitations and future research plans.
CHAPTER 5 SUMMARY

1. The aim of the mixed methods phase was to describe how the follow-up findings of the process of using the professional network to build scholarly activity help explain the initial results of agency, network structure and composition, and scholarly activity.

2. The research question was, How do the findings of the process of using the network to advance scholarly activity help explain the initial results of scholarly activity?

3. The worldview utilized to construct the quantitative phase of the survey was post-positivist where relationships among variables was assessed and described using statistics. In the qualitative phase, the worldview shifted to constructivism where the goal was to seek an understanding through multiple perspectives of the study participants. The pragmatism paradigm was the worldview that best fit the mixed methods phase of the study. The theoretical lens was the social capital theory.

4. Six considerations were used for mixing the data. These included:
   a. Qualitative data further expanded on the quantitative results,
   b. Variable oriented-study was the first phase,
   c. Explanatory components were included,
   d. Order of data collection,
   e. Assumptions were related to each data collection phase, and
   f. Use of computer software to aid in analysis.

5. Results are shown in a joint display of quotes from high and low performers in scholarly activity. The quantitative findings are aligned with the four strategies used to develop professional network connections (central phenomenon).
Without the interview data, key pieces of information about how the connections were made would have been missed. It was valuable to find out how the contact became part of the network not just that they are a part of the network.
Chapter 6 Conclusions
CONCLUSIONS

The final chapter in this dissertation includes the study conclusions. This section includes implications for the profession, limitations, and future study plans. The starting point of this project identified a knowledge gap in the field of early career PT faculty who are developing a scholarly agenda with the engagement of a professional network. High numbers of new faculty are projected to enter the academy. Many are without in-depth training in traditional research through the requirements of obtaining an academic doctoral degree, and many experiencing for the first time the requirements of and finite time to fulfill the academic obligations of teaching, service, clinical work, and scholarly activity.

The quantitative phase of this mixed methods study was based on the principle that social capital can be gained from an effective professional network to aid in faculty success. The method by which to measure the network requires systematic evaluation and analysis. The results of this study phase show that the most effective network to enable higher Scholar Scores is one that is less densely interconnected. These findings contribute to the literature by identifying the type of network that supports the scholarly activity of early career PT faculty. It is not the number of individuals in a network that facilitates scholarly activity but rather the openness (low density interconnectedness) that supports the flow of information and resources to support early career PT faculty. For example, when individuals collaborate on a funded grant or disseminate a project, all involved are rewarded with advancing the profession. When a PT faculty lacks an effective network, strategies should be incorporated to change the structure.

The qualitative phase of the study investigated the process early career PT faculty use to create a professional network and utilize information and resources to build their scholarly agenda. The results revealed that at the center of the model is
connecting with others for scholarly activity. Early career faculty realize the importance of network relationships as successful careers cannot be made alone. Also embedded in the model are strategies used to develop professional network connections, and the reasons network connections help participation in or increasing scholarly activity. The outcomes support scholarly activity opportunities, advancing connections of the network and valuable feedback including reassurance and encouragement. Challenges to both connecting with others and scholarly activity related to time, funding, individual elements of the early career PT faculty and factors about the institutions from which they work. These findings add to the literature about early career faculty development and offer a model related to success with scholarly activity highlighting the social capital from engaging through network relationships.

Without the qualitative phase, these key factors related to the process of network development would have been missed. The combined findings reported in the mixed methods phase enable a better understanding about the strategies for connecting with others between high and low performers in scholarly activity. Developing an effective network is not the sole responsibility of the early career PT faculty member. They require mentorship to be up-an-coming. This guidance should come from not just one experienced mentor but rather a group of individuals with information and resources to share (e.g. prior and current colleagues). It is through these contacts, along with newly developed relationships from self-initiated or unplanned encounters that feedback about existing projects and encouragement about career advancement is possible and can be attained. Some of the guidance reported by study participants came from formal mentors with expertise as well as peer-mentors learning together.

Methodologically, this study further demonstrates the application of mixed methods approaches. The complexity of the issues explored and the need for a range of
methodologies to understand and evaluate these complexities has been pointed out as a rationale for the value of using mixed methods. Advancing the use of network analysis as a methodology to study the relationships between individuals was illustrated using unique data collection and analysis tools. This study showed a comprehensive analysis of a professional network using a visual diagram and network structure and composition measures and interviews to account for the relationships in- and outside the institution and among an interprofessional group of individuals.

There is value in using the new Scholar Score as a tool for which to measure scholarly productivity that accounts for the quantity in addition to the effort given (e.g., authorship order) and dissemination (e.g. presentation audience). This research also aimed to describe the process, including the creative strategies, early career faculty used to advance their scholarly agenda and the results should play a key role for developing faculty development programming and mentoring. The information on the value of networking and where to devote time for the most benefit should be main topics shared with early career PT faculty during institution orientation, individual mentoring sessions, or during profession-sponsored workshops. The results from this project as a whole advanced the application of the Scholar Score, demonstrated the application of network analysis for PT faculty, and most importantly, generated new knowledge that could contribute to a more effective professional network to strengthen an early career PT faculty scholarly agenda.

LIMITATIONS

This project is not without limitations. The study included an in-depth review of the individual professional network; however, there are many other factors that may have an impact upon productive scholarly activity from an organizational level, including the type of institution, organizational structure, and productivity of other faculty members.
Individual factors must also be considered, including personal and family obligations outside of work. It should also be noted that scholarly activity is a long process and the length of this study, one year, is a short time to observe or account for it. Attempts to mitigate this limitation included accounting for the more preliminary dissemination of scholarly work, such as abstracts and platform presentations, and using the Scholar Score.

Analysis of the networks of individual respondents, using an ego-network design, can also only account for relationships formed without consideration of the pool from which members have been selected. Therefore, it is impossible to account for errors of omission when a network member is not listed, or errors of commission when a network member is included but that relationship nevertheless does not exist.

The results did not show significant findings related to the network composition measure of diversity of members' characteristics, heterogeneity (e.g., gender, age, academic rank, expertise). It is possible that the sample size was not large enough nor did it have sufficient variability in network composition to detect significant effects. In this study, respondents were to identify network members who could help with scholarly activity. Therefore, it is likely some identified will not be actual collaborators but may be valuable for other aspects of work not studied here.

Potential bias must be acknowledged as a limitation in the qualitative phase. The interviewer (BJB) was listed in some networks and is also an early career faculty member. Attempts to mitigate this bias included using the conceptual depth and validation strategies described previously. In qualitative studies, the aim is not to select a random sample but rather to select diverse study participants from the quantitative phase. Individuals were chosen who could provide in-depth insights into their experiences with scholarly activity and professional network development. It is possible
that had other individuals joined the quantitative phase initially, a different group of participants may have been selected for the interviews resulting in a different grounded theory. Many individuals attended the Faculty Development Workshop hosted by the Academy of Educators of the American Physical Therapy Association. It is unknown whether or not the other study participants attended different faculty development offerings instead. Nevertheless, the study sample used represented variation of several characteristics.

Also, the research question focused on the network connections of early career faculty with a focus only on scholarly productivity. A full exploration through interviews of additional factors associated with network relationships was not completed due to limited resources and time available for this study.

Although this explanatory sequential mixed methods study design has advantages, there are limitations to mention. It requires significant time to complete each phase, and precise planning of the qualitative phase cannot be determined until after analysis of quantitative data: those results are essential for purposeful sampling and final development of interview questions. The Principal Investigator (BJB) gathered a team to consult on the research where a variety of knowledge and skills in quantitative and qualitative methods was represented. Long-term follow-up with participants can be difficult and is a known limitation, but this was mitigated with reporting of professional networks at mid-year with individualized materials for participant review.

**FUTURE STUDY PLANS**

Plans to continue exploring the relationships between the professional networks and scholarly activity of PT faculty include analyzing sub-sets of the networks studied here, such as mentor-only networks or networks of women faculty. It would be interesting to observe how the network is built and what constitutes a valuable network
member for these sub-groups. Future studies could include analyzing differences among new faculty based on ethnicity or gender. The group sizes in the current study were too small to include in this analysis. There are also plans to continue to examine the Scholar Score as a measure of scholarly activity by including more input from experienced scholars about the relative value of items and the list of items themselves.

Another important direction for further investigation is to find out how the strategies of early career faculty change when they are no longer early career. It would also be noteworthy to apply this model with a new group of early career faculty to more fully study the utility and explore the challenges and successful methods faculty use for career advancement. A future study could help validate and enhance the proposed model.
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2. Commission on Accreditation for Physical Therapy Education (CAPTE) standards and required elements for accreditation of physical therapist education programs.
   http://www.capteonline.org/uploadedFiles/CAPTEorg/About_CAPTE/Resources/


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APPENDICES
Appendix A: Website Screen Shots
Website URL:  https://www.unmc.edu/alliedhealth/research/projectlink.html

YouTube link for project trailer video:  
https://www.youtube.com/watch?time_continue=1&v=xA8Dr-_Avg0

Project LINK

Early Career Faculty LINK: Leveraging Individual Faculty Networks (Project LINK)

Help shape the future of PT Faculty Success!

The path to a successful career as a Physical Therapy faculty member is full of challenges but it may be a little easier with a network of supporters. As a faculty member in PT education, you may be eligible to participate if at least 40-50% of your job includes teaching or service (including committee work, administration or clinical practice). The research study is called Early Career Faculty LINK: Leveraging Individual Faculty Networks.

About Project LINK

This project is an important research study to find out more about supporting PT faculty in their first five years. This study is a unique opportunity to help us better understand the professional network of faculty and how it may relate to scholarly activity productivity. This information could be helpful so we can more effectively support new faculty.

The purpose of this mixed methods study is to explore early career faculty perceptions of their professional network as it relates to their scholarly agenda. It is called mixed methods because it includes both a survey and personal interviews. Other factors likely play a role in the professional network including the extent to which a faculty member can foresee advancement in their career; the actions required to make that happen as well as characteristics of the members in the network.

Learn more about your own network! Each participant in the study will receive a Personal Summary Report with a diagram of their professional network and progress with scholarly activity.
About Project LINK
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Learn more about your own network! Each participant in the study will receive a Personal Summary Report with a diagram of their professional network and progress with scholarly activity.

About Scholarly Activity
There are various types of scholarly activity, each type can dynamically interact for a project.

Scholarship categories: description and examples

IBR 210-10 EX

For more information about the Study:
Satter J. Becker, PT, DPT, CEEAA
Principal Investigator
Assistant Professor
Physical Therapy Education
College of Allied Health Professions
University of Nebraska Medical Center
Bennett Hall 5014
984420 Nebraska Medical Center
Omaha, NE 68198-4420
402-559-3003
Email

This project is funded by the College of Allied Health Professions and Division of Physical Therapy Education at the University of Nebraska Medical Center and the Education Section of the American Physical Therapy Association.
Appendix B: Questionnaire
Q138 **EARLY CAREER FACULTY LINK: Leveraging Individual Network Knowledge**

Institutional Review Board (IRB) #263-16-EX  
You are invited to take part in this research study. This information is meant to help you decide whether or not to take part. **If you have any questions, please ask.**

You are eligible to participate in this study because you are a faculty member in a Physical Therapy Education Program and your role in education is primarily teaching (as opposed to a research position). The purpose of this study is to explore how a professional network relates to scholarly activity outcomes in early career faculty. Also of interest is the extent to which faculty have strategic views or plans about their academic career using information and relationships they encounter. Knowing more about professional networks could lead to faculty development for strategically or proactively creating connections. **Complete 3 surveys over the next 18 months** You will be asked to answer a series of questions on a survey about people who provide information and assist you in your role as a faculty member (which make up your professional network). In addition, there will be questions about your scholarly activity and background information. You will also be asked to provide a copy of your most recent CV so that we can gather information such as your academic training, past and current employment, clinical experience, detailed information about scholarly activity and certifications and licenses. Each survey will take about one hour to complete. **The online surveys will be completed July/August 2016, July/August 2017 and January/February 2018.** One interview You may be asked to participate in a one-on-one interview about your professional network development and scholarly activity. The interviews will take place next year (October through December, 2017) and last for about an hour. A separate consent with more details will be presented at that time. Benefits of this study may include knowing more about how professional networks relate to scholarly activity in early career PT faculty members. This information could be used to assist faculty development in strategically developing network relationships and collaborations that may impact scholarly activity outcomes. The outcome of this project may aid in realizing the larger vision of increasing the aggregate numbers of PT faculty doing research to benefit their educational institutions, students, patients and the PT community as a whole. You will receive a $20 Amazon gift card for completing each of the three surveys and the interview (up to $80). Reasonable steps will be taken to protect your privacy. Information from this study may be published in scientific journals or presented at meetings but identity will be kept confidential. You have rights as a research subject. If you have questions or concerns, contact the UNMC Institutional Review Board (IRB) at (402) 559-6463. You can decide not to be in this research or stop at any time. You are freely making a decision whether to be in this research or not. By completing the survey is implied consent. **If you have any questions during the study, you should talk to: Principal Investigator Betsy J. Becker, PT, DPT, CLT-LANA BetsyJ.Becker@unmc.edu 402-559-5053**
consent I understand that by completing this survey I have consented to participate in the study. I understand the purpose, the risks and know that I can withdraw from the study at any time.  Yes (1) No (2)

FTE My faculty work responsibilities include at least 40-50% of teaching-related focus and/or service. Service includes tasks such as committee work, governance, administration. My faculty work is at a CAPTE accredited or CAPTE eligible (e.g. developing or candidate) physical therapy education program. Yes (1) No (2)

Thank you for agreeing to be a part of the study!! Please watch this short video (about 3 minutes) before you begin. Thanks!

Here are two more short videos about scholarly activity. Each one is less than 2 minutes.

Name & Email.
First Name __________________________________________________________
Last Name __________________________________________________________
Email Address ______________________________________________________
Re-enter Email Address _____________________________________________  

Note: This survey does not allow you to return back to previously answered questions.
Please rate your agreement with the following statements.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have been strategic in achieving my career goals.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I seize opportunities when they are presented to me to advance my career.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I have intentionally made choices to focus my career in ways that are personally meaningful to me.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am in charge of the direction of my scholarly activity agenda.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Please rate your agreement with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel stuck in my ability to advance in my career.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I have little control over whether I advance in my career.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

How frequently does someone at work communicate with you about scholarly activity including future or current projects, on average?

Never | Once a year | Every few months | Once a month | Every few weeks | Once a week | More than once per week

The next set of questions is about people you know who are important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration. You will be asked to identify them by their first and last name. Please list as many as people you can. *As a reminder, all answers will be kept confidential.* Do not list people that you have only encountered briefly. For example, someone you met who said, "let me know if want to collaborate" but you and that person have never interacted since. There are several groups of people you will be asked to name. Including people who:
1. work in physical therapy education AT your institution.
2. work in physical therapy education at a DIFFERENT institution (such as a different college or university than you)
3. do not work in physical therapy education but are AT your institution.
4. do not work in physical therapy education and at a DIFFERENT institution than you.
5. work primarily in physical therapy clinical practice (not faculty)
List only people that work in physical therapy education at your institution. (you can list up to 20 people but if you have more names than this, there will be a place to list them later) Remember these are people you know who are important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration.

Person 1

........ Person 20

The next group of people to name are those who work in physical therapy education but are at a DIFFERENT institution than you. They may work at another college or university. Like the last group, list people you know who are important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration. Remember to list their first and last names. You can list up to 15 people but if you have more names than this, there will be a place to list them later. Also, if you remembered another person to add from the previous group, you can do that later too!

Person 1

........ Person 15

The next group of people to name are those who work DO NOT work in physical therapy education but are at the SAME institution than you. Like the last group, list people you know who are important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration. Remember to list their first and last names. You can list up to 15 people but if you have more names than this, there will be a place to list them later. Also, if you remembered another person to add from one of the previous groups, you can do that later too!

Person 1

........ Person 15
Now think of people who **DO NOT work in physical therapy education and do NOT work at the same institution as you.** They may work at another college or university. Like the last group, list people you know who are **important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration.** Remember to list their first and last names. You can list up to 15 people but if you have more names than this, there will be a place to list them later. Also, if you remembered another person to add from one of the previous groups, you can do that later too!

Person 1  ________________________________________________

........  Person 15  ________________________________________________

Think of people who work primarily in physical therapy clinical practice as a clinician or medical center/clinic administrator. Like the last group, list people you know who are **important sources of work-related information such as teaching, scholarly activity (current or future), service and/or administration.** Remember to list their first and last names. You can list up to 15 people but if you have more names than this, there will be a place to list them later. Also, if you remembered another person to add from one of the previous groups, you can do that later too!

Person 1  ________________________________________________

........  Person 15  ________________________________________________

Do you have anyone else you would like to list who is an important source of information for teaching, scholarly activity (current or future), service and/or administration?

Yes  No
Please list them here by their first and last names.

<table>
<thead>
<tr>
<th>Person 1</th>
<th>Works in PT at same Institution</th>
<th>Works in PT at different Institution</th>
<th>Not in PT at same Institution</th>
<th>Not in PT at different Institution</th>
<th>Clinical Practice</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you selected "other" for someone, please explain.

________________________________________________________________

The next set of questions is for you to provide information about the people you just named.

close How close do you consider each person you listed? Think of very close as someone with whom you have a deep relationship with and would go to for advice or support with a particular issue whether or not it was work related. Feel free to use the entire scale.

| Person 1          | Not Close at All | | Somewhat Close | | Very Close |
|-------------------|------------------|------------------|------------------|------------------|
|                   | $(PTI/ChoiceTextEntryValue/1)$ (PTI_1c) | | | | |
A mentor assists in the professional development and academic success of a new faculty member through a supportive relationship. The mentor may "open doors" for the new faculty member to pursue opportunities such as involvement in committees, organizations or research teams. The relationship can be formal, where a mentor is matched based on common interests and set up by the Institution or it can be informal and may occur spontaneously or be self-directed based on a specific need.

Please indicate which person(s) you would consider a mentor.

<table>
<thead>
<tr>
<th>Mentor</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the people you have listed, which of the following topics related to scholarly activity do they have expertise in and could provide guidance or advice to you? Select all that apply.

<table>
<thead>
<tr>
<th>Scholarly Activity</th>
<th>Funding</th>
<th>Design &amp; Methods</th>
<th>Data Analysis</th>
<th>Publishing</th>
<th>None Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select the TWO primary categories where this person spends the most time in their job.

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Scholarly Activity</th>
<th>Service/Admin</th>
<th>Clinical</th>
<th>Other</th>
<th>I don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please answer the following for EACH person.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race/Ethnicity (drop down box)</th>
<th>Age (years) (drop down box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>▼ Asian (1) ... I don't know</td>
<td>▼ 18-24 (1) ... I don't know</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please answer the following for EACH person.

<table>
<thead>
<tr>
<th>Tenure (drop down box)</th>
<th>Rank (drop down box)</th>
<th>Highest Academic Degree (drop down box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼ Tenured... I don't know</td>
<td>▼ Professor... none</td>
<td>▼ MD, DO ... I don't know</td>
</tr>
</tbody>
</table>

Certified Clinical Specialist

<table>
<thead>
<tr>
<th>Yes (1)</th>
<th>No (2)</th>
<th>n/a (3)</th>
<th>I don't know (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Please answer the following for EACH person.

<table>
<thead>
<tr>
<th>Has published scholarly work in at least one peer reviewed journal.</th>
<th>Has presented scholarly work in the last year (e.g. poster or platform) at a regional, national or international meeting</th>
<th>Currently has Grant funding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>I don’t know</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>I don’t know</td>
</tr>
<tr>
<td>Yes</td>
<td>Other</td>
<td>No</td>
</tr>
</tbody>
</table>

Yes

No

I don’t know

The next set of questions will ask you whether the people you listed know each other and could share information or ask a question. The information shared or questions asked between them could be on a personal level or about work-related tasks. Here is the first one:

$[Nameadd/ChoiceTextEntryValue/13]$

☒ no one on this list

☒ I don’t know

Display This Question:

If This is the last group of people to identify! Think of people who work primarily in physical therapy clinical practice as a clinician or ☒ I don’t know

The next set of questions are about scholarly activity. If you need a refresher on scholarly activity, you can watch these videos again:

Scholarly Activity Definitions

Video links here
Please rate your opinion about participating in scholarly activity.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have a topic selected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have enough time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have knowledge about data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have knowledge in research design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have enough equipment and supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have sufficient funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am interested in scholarly activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have colleagues with similar interests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please explain other opinions about participating in scholarly activity.

________________________________________________________________________
I am currently involved in at least one scholarly activity project.

Yes  No

Which of the following categories is/are your current scholarly activities? (select all that apply)

Education | Basic Science | Clinical interventions |
Clinical examination | Health services research (practice management) | other, please explain |

Which practice setting(s) are you currently studying? (select all that apply)

Acute Care | Aquatic | Cardiovascular & Pulmonary | Clinical electro & Wound Mgt |
Geriatrics | Hand Rehab | Home Health | Neurology | Oncology | Orthopedic |
Pediatric | Private Practice | Sports | Women’s Health | ☒ none | Other - please explain |

My interests in future scholarly activity, as of today, include which of the following? (mark all that apply)

Education | Basic Science | Clinical interventions | Clinical examination | Health services research (practice management) | other, please explain |
__________________________________________________________
Display This Question:

If My interests in future scholarly activity, as of today, include which of the following? (mark al... = Clinical interventions

Or My interests in future scholarly activity, as of today, include which of the following? (mark al... = Clinical examination

Or My interests in future scholarly activity, as of today, include which of the following? (mark al... = Health services research (practice management)

Since you selected clinical interventions, clinical examination and/or health services research, which practice setting(s) are you most interested in studying? (select all that apply)

    Acute Care | Aquatic | Cardiovascular & Pulmonary | Clinical electro & Wound Mgt | Geriatrics | Hand Rehab | Home Health | Neurology | Oncology | Orthopaedic |

    Pediatric | Private Practice | Sports | Women's Health | ❌ none | Other - please explain | ________________________________________________________________

The next set of questions include information about you.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race/Ethnicity (drop down box)</th>
<th>Current Age (years) (drop down box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ego attribute)</td>
<td>▼ Asian... prefer not to answer</td>
<td>▼ 18-24 ... 75-85</td>
</tr>
</tbody>
</table>

What is your current academic rank?

    adjunct | instructor | lecturer | assistant professor |

    associate professor | professor | Other, please explain |

Are you on a tenure track?

    Yes  | No  | I don't know
Duration as a faculty member in physical therapy education at your **current** institution.  
(drop down box)

▼ < 12 months... 5 or more years

Duration as a faculty member in physical therapy education at a **different** institution.  
(drop down box)

▼ 0 ... 5 or more years

I have been a faculty member in a field other than physical therapy education.  
Yes  No

_Skip To: End of Block If I have been a faculty member in a field other than physical therapy education. = No_  
_Skip To: If I have been a faculty member in a field other than physical therapy education. = Yes_  
Display This Question:  
If I have been a faculty member in a field other than physical therapy education. = Yes

How long were you a faculty member in a field other than physical therapy?  (drop down box)

▼ 1-11 months... does not apply

What type(s) of programs were you previously a faculty member? (select all that apply)  
PTA  | OT/OTD  | OTA/COTA  | Other - please explain

As part of the study, we also will be reviewing your CV (or resume).

At the end of the survey you will be directed to a secure site for the upload. If you don't have it ready now, that's OK! You can submit it later either directly to Betsy via email:  Betsyj.becker@unmc.edu or upload it from a link on the Project LINK website.

A reminder will be sent to you if your CV is not received within about a week.
Appendix C: CV Review Instrument with study participant names redacted
<table>
<thead>
<tr>
<th>Presentation</th>
<th>Category</th>
<th>Study participants where it applies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI credentialing course teaching</td>
<td>State *rationale: APTA related event and they are state and regional audiences</td>
<td>(Names redacted)</td>
</tr>
<tr>
<td>Presentation appears on CV1 but not on CV1</td>
<td>Count on both</td>
<td></td>
</tr>
<tr>
<td>Posters or presentations with exactly the same name at &gt;1 event</td>
<td>Count 1x using the highest scored area (e.g. national)</td>
<td></td>
</tr>
<tr>
<td>Invited educational session at state meeting at another state or University or PTA program</td>
<td>Invited State *rationale: the audience is from a state/regional area</td>
<td></td>
</tr>
<tr>
<td>Submitted</td>
<td>Not counted *rationale: no rigorous enough to score and not consistently reported on study participants’ CVs</td>
<td></td>
</tr>
<tr>
<td>Continuing Education Teaching</td>
<td>Clarify with person whether it was local, state or national audience</td>
<td></td>
</tr>
<tr>
<td>Facilitator of Continuing Ed Event</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Webinar – national</td>
<td>Counted as national presentation</td>
<td></td>
</tr>
<tr>
<td>University CME course</td>
<td>State/regional *rationale: the audience is from a state and regional area</td>
<td></td>
</tr>
<tr>
<td>Poster/Platform presentation then followed with published abstract (also listed in publications)</td>
<td>Count 1x as PR presentation</td>
<td></td>
</tr>
<tr>
<td>Online webinar</td>
<td>National</td>
<td></td>
</tr>
<tr>
<td>Online journal (e.g. home health section advanced.)</td>
<td>Change to NPR Presentation *rationale: we looked this up and it is in the APTA learning center</td>
<td></td>
</tr>
<tr>
<td>Publication Activity</td>
<td>Category</td>
<td>Study participants where it applies (Names redacted)</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Publication <em>in press</em></td>
<td>Count as publication with appropriate NPR or PR with authorship order</td>
<td>Jenny Bagwell (E44)</td>
</tr>
<tr>
<td>University newsletter</td>
<td>NPR publication</td>
<td></td>
</tr>
<tr>
<td>Submitted (article or book)</td>
<td>Not counted</td>
<td>*rationale: not rigorous enough to score and not consistently reported on study participants’ CVs</td>
</tr>
<tr>
<td>Authored book chapter</td>
<td>Credit regardless of author order add bonus for authorship of NPR, PR or Book authorship order</td>
<td></td>
</tr>
<tr>
<td>Publication Reviews</td>
<td>Non-peer reviewed</td>
<td>*rationale – we looked up in the SIG and it was an invited commentary</td>
</tr>
<tr>
<td>Poster/Platform presentation then followed with published abstract (also listed in publications)</td>
<td>Count in presentation only. See note in the presentation section of this document</td>
<td></td>
</tr>
<tr>
<td>Journal reviewer</td>
<td>Not counted</td>
<td>*rationale: unknown how many per year reviewed, no published</td>
</tr>
<tr>
<td>Edited chapter in a book, not the book itself?</td>
<td>Not counted</td>
<td>*rationale: for this person, he edited several chapters and it is not published or in press yet</td>
</tr>
<tr>
<td>Dissertation</td>
<td>Add as PR Publication if it occurred after the start date as a faculty member</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Category</td>
<td>Study participants where it applies (Names redacted)</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Grant – bonus for role is awarded if competitive or non-competitive</td>
<td>Bonus awarded</td>
<td></td>
</tr>
<tr>
<td>Submitted</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Tuition for grad assistant</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Role- Site coordinator role on grant</td>
<td>= research assistant</td>
<td></td>
</tr>
<tr>
<td>Book authorship funding?</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Travel award</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Grant awarded to student and faculty advisor?</td>
<td>Not counted</td>
<td></td>
</tr>
<tr>
<td>Role reported as associate investigator, site primary investigator</td>
<td>Assoc invest = co-I; Site PI = research assistant</td>
<td></td>
</tr>
</tbody>
</table>

**OTHER:**

Publications – impact factor not considered, Open source journals are OK

*Consideration at this phase in career all are counted as just getting career going.*

state = regional
Appendix D: IRB with informed consent
EXEMPT EDUCATIONAL, BEHAVIORAL, AND SOCIAL SCIENCE RESEARCH
SECTION I

1. Status:
New Submission
- Revised electronic IRB Application; IRB# 263-16-EX
- Initial electronic submission of an existing exempt IRB approved protocol; IRB#

2. Title of Protocol:
Early Career Faculty LINK: Leveraging Individual Network Knowledge

3. Responsible Personnel:
A. Principal Investigator (PI):
Becker, Betsy Jane - Physical Therapy Education - 402-559-5053 - bree.becker@unmc.edu - alt #: 402-559-4259 - degree: PT, DPT (Nebraska License #1818) - address: BTH 3014B (Zip 4420) - phone: 9-5053

B. Secondary Investigator (SI):
Kennel, Victoria Lynette - AH Research Administration - 402-559-8830 - victoria.kennel@unmc.edu - alt #: 402-759-1302 - degree: n/a - address: BTH 3014 (Zip 4420) - phone: 9-8830

Rost, Anthony (Tony) Hudson - Physical Therapy Education - 402-559-4217 - tony.rost@unmc.edu - alt #: 402-559-4259 - degree: n/a - address: BTH 3013 (Zip 4420) - phone: 402-559-4217

Sayles, Harlan R - COPH Biostatistics - 402-559-4515 - hsayles@unmc.edu - alt #: 402-559-5405 - degree: N/A - address: MCPH 3046 (Zip 4375) - phone: 9-4515

Von Essen, Susanna G - Int Med Pulmonary - 402-559-7397 - svonesse@unmc.edu - alt #: 402-559-7397 - degree: MD - address: UT 7113 (Zip 2465) - phone: 9-7397

Willett, Gilbert Michael - Genetics Cell Biology & Anatomy - 402-559-6595 - gwillett@unmc.edu - alt #: 402-559-6595 - degree: PT, Ph.D., OCS, CSCS - address: 503 West Centennial Road Papillion (68046) - phone: 402-339-2341

C. Participating Personnel:
Wood, Mary Sanford - Allied Health-Hlth Serv Admin Div - 402-559-4321 -
mary.wood@unmc.edu - alt #: 402-559-4321 - degree: AD (no license) - address: BTH 3013 (Zip 4420) - phone: 9-4321

D. Lead Coordinator:

E. Coordinator(s):

F. Data/Administrative Personnel:

G. Are you a student or house officer?
No

4. Funding Source:
Check all that apply and provide the source of the funding.
- Grant - Provide source: Education Section of the American Physical Therapy Association
- Commercial - Provide company name:
- State
- Department of Defense
- Other - Provide source: Departmental Funds (Division of PT)

5. Funding Agency Deadline for IRB Approval:
Yes
- No

6. Study Sites
A. Provide the names and locations of all study sites where this research will be conducted under the oversight of the UNMC IRB or the Joint Pediatric IRB. Submit a letter from an authorized official at all external performance sites other than UNMC, TNMC, UNO or CH&MC granting permission to conduct the research at that site.
Northwestern University - Chicago campus, Chicago, IL
University of Nebraska Medical Center, Omaha, NE

B. Does this study involve any international sites where the PI will either conduct or supervise the study?
No

7. Principal Investigator Assurance
The Principal Investigator understands and accepts the following obligations
to protect the rights and welfare of research subjects in this study:

- I certify that I have carefully reviewed this application and all supporting documents. I have determined that the application is accurate, complete and ready for submission to the IRB.

- I recognize that as the PI it is my responsibility to ensure that this research and the actions of all research personnel involved in conducting the study will comply fully with the IRB-approved protocol and HRPP policies.

- I certify that all listed research personnel will be given a copy of the final IRB approved application and any other relevant study related documents in accordance with their defined responsibilities.

- I recognize that it is my responsibility to ensure that valid informed consent/assent has been obtained, as appropriate, from all research subjects or their legally authorized representative (LARs).

- All listed study personnel have completed the IRB required CITI Training.

- I will not initiate any change in protocol without ORA approval.

- I will maintain all required research records on file and I recognize that the IRB is authorized to inspect these records.

- I will inform the Office of Regulatory Affairs (ORA) immediately of any research related problems which impact the subjects.

- I understand that IRB approval is valid for a maximum period of five years.

Becker, Betsy Jane - 2017-10-17 15:09:00.000
SECTION II
PURPOSE OF THE STUDY AND BACKGROUND

1. Purpose of the Study
What are the specific scientific objectives of the research?
   1. To establish the extent to which the size and strength of professional networks of early career faculty relate to their scholarly productivity.
   2. To assess agency perspective (strategic views) and agency behavior (actions to advance one’s career) of early career faculty as it relates to scholarly productivity.
   3. Explore the perceptions of early career faculty about network composition and relationships for scholarly productivity.

2. Background and Rationale
Describe the background of the study.
My research will explore the value of strategically and proactively creating a quality professional network for early career PT faculty and how this network contributes to achieving their scholarly agenda. This research direction is in alignment with the APTA Research Agenda category of Education/Professional Development which is oriented toward determining the best methods to foster career development and leadership in physical therapy. According to Dr. Snyder-Mackler in her 2015 McMillan Lecture, only 21% of PT faculty describe themselves as actively involved in research. This planned research will aid in realizing the larger vision of increasing the aggregate numbers of PT faculty doing research to benefit their educational institutions, students, patients and the PT community as a whole.

The Commission on Accreditation in Physical Therapy Education (CAPTE) Aggregate Data Report for 2014-2015 calculated 282 current and projected faculty vacancies in PT programs. With this large number of potential new faculty entering academia it is critical to provide guidance and mentorship in their scholarly agenda during their first five years. Unlike the route to clinical practice, the career trajectory to becoming an educator-investigator in PT is ill-defined so my research plans are directed toward resolving this lack of clarity. Development needs for new PT faculty related to scholarship differ between 1) faculty with an academic doctorate (e.g., PhD, EdD) who are trained in the classical scholarship of discovery and 2) faculty who transition directly from the clinic with an entry-level DPT degree and specialty certification. Therefore, this research will be inclusive of faculty from each level of training because all PT faculty should have a scholarly agenda.

There is limited literature available on PT faculty professional network development which is why this project will be so beneficial to the profession. There is evidence that both the size and the connectedness of who is in a professional network is just as important as the depth and breadth of experiences each member-connection brings. The project will draw on the Social Network Theory where the interaction between individuals or organizations can be
analyzed to determine patterns and influence entities. Waiting for the professional network to develop on its own will likely take too long to positively impact new faculty, thereby increasing tension between the requirements of teaching, scholarly activity and service, and hindering progress to meet the goals of promotion and tenure. This project also directly relates to goal three in the strategic plan of the Education Section of APTA which is to disseminate education resources, information, and develop and mentor educators for various educator roles. Additionally, the American Council of Academic Physical Therapy (ACAPT) has prioritized identifying resources and then cultivating those resources to achieve excellence in academic PT by supporting and positioning PT educators and programs to adapt to changes in higher education. This project can further advance the APTA Research Agenda and the strategic goals of the Education Section and ACAPT. The outcome of this project will be essential to achieving the larger vision of increasing the aggregate numbers of PT faculty doing research to benefit their educational institutions, students, patients, and the PT community as a whole.

CHARACTERISTICS OF THE SUBJECT POPULATION

3. Accrual
A. What is the number of subjects that must complete the study in order to achieve the scientific objectives of the research?
The total number of subjects needed to complete the research in order to achieve the objectives of the research is greater than or equal to 30 and a recruitment goal of 200 for the quantitative portion (Survey) and 50 for the qualitative interviews. The interview subjects will be selected from the group who completed the surveys.

B. What is the statistical or other justification for the number of subjects needed to complete the study?
To run regression analysis with 2-3 variables, at least 30 subjects must be included for accurate calculations.

C. What is the maximum number of subjects that will be participating in this research study at all sites under the oversight of the UNMC IRB OR THE JOINT PEDIATRIC IRB and what is the justification for this number?
It is expected to have dropout and therefore 200 subjects will be recruited to begin the study.

4. Gender of the Subjects
Are there any enrollment restrictions based on gender?
No
5. Age Range of the Subjects
   A. What is the age range of the adult subjects?
      19-70 years of age for adult subjects

   B. What is the rationale for selecting this age range?
      This is the expected minimum and maximum age of working-age for faculty employed in a
      Physical Therapy program who would be in their first five years as a faculty member.

   C. Will children (18 years of age or younger) be included in this research?
      No

   What is the justification for excluding children from this research?
   This research is irrelevant to children. The age of majority is required to be a licensed
   physical therapist.

6. Race and Ethnicity
   Are there any subject enrollment restrictions based upon race or ethnic origin?
   No

7. Inclusion Criteria
   What are the specific inclusion criteria?
   Inclusion criteria for this study includes: faculty teaching in Physical Therapy (PT) Education
   Programs; in their first five years as a faculty member; workload includes primary teaching
   and service responsibilities of 40-50% FTE (or equivalent)

METHODS AND PROCEDURES

8. Description of Procedures
   A. Describe the procedures, evaluations and/or tests that will be done.
      Study timelines, diagrams and a matrix of project tasks are attached.
      Study participants will be recruited by the PI, Betsy J. Becker, at the American Physical
      Therapy Association (APTA) Education Section Faculty Development Workshop July 14-17,
      2016 and July 13-15, 2017 at Northwestern University Chicago Campus in Chicago, IL.
      Recruitment at this event will include an oral presentation (script attached), flier (attached)
      and The Rights of Research Subjects. Additional recruitment efforts will include an email
      sent (see attached), with the flier, by the APTA Education Section to workshop attendees
      from the 2015 session.
      Prospective subjects will be able to contact the PI with questions about study participation
      via email, phone and for those attending the workshop, face-to-face. Subjects who consent
(see attached) to participate, will be emailed a link to the online Survey 1 (see attached) or may access the survey via a website listed on the recruitment flier. Two reminders about the study will be provided to subjects who attended the Workshop but did not complete the survey about 2-3 weeks later.

Additional recruitment:
1. Information in the American Physical Therapy Association Neurology Section newsletter (see content attached)
2. Fliers at registration table and Education Section booth at the American Physical Therapy Association Educational Leadership Conference in Oct 2016, hosted by the APTA Education Section.
3. Email to PT Program Directors, email and names gathered from the Commission on Accreditation Physical Therapy Education list of programs at http://www.capteonline.org/Programs/

Subjects who join the study will receive a summary report about their scholarly activity and their network composition about six months later (sample attached).

Survey 2 same as survey 1 will be conducted in July/August the following year. Email notification of the forthcoming survey will be sent on or about July. The survey link will be emailed about one week later followed by two reminders for survey completion over the next 2-3 weeks for non-respondents.

Purposeful sampling following analysis of the survey data will be completed in September. Persons selected for interview will be determined based on survey results. For example, if three clearly delineated patterns (groups) of results emerge, then five persons from each group would be invited to be interviewed. Another example includes interviewing persons whose results are outliers as well as those who demonstrate more similar group characteristics. Subjects will be contacted by the PI via email and re-consented (interview consent form) prior to the one-on-one interview that will be scheduled between October and December. The interview protocol (see attached) questions may be revised based on the quantitative findings to fully explore the results.

Survey 3 (same as survey 1) will be administered to all study participants (regardless of whether they were interviewed). Email notification of the forthcoming survey will be sent on or about January 2018. The survey link will be emailed about one week later followed by two reminders for survey completion over the next 2-3 weeks for non-respondents.

Scholarly Activity Productivity Scores will be calculated based on feedback about the proposed scoring system from graduate faculty (see attached survey).

Attachments:
1. Study timelines, procedures
2. Oral presentation script
3. Recruitment Flier
4. Summary of scholarly activity and network composition report for subjects
5. Consent Form (interview)
6. Interview protocol
7. Survey
8. Scholarly Activity Feedback

revised attachments:
1. neuro section newsletter content
2. email to 2015 participants to faculty development workshop
3. email to Program Directors

B. Does the research involve review of identifiable private information, including information from public or other registries or databases?
No

9. Confidentiality
Where will the research data be stored during the study and how will it be secured?
Survey will be administered via an online survey tool, Qualtrics, which is username and password protected. Data will be stored on a UNMC secure server that is username and password protected. Survey data (from the survey & submitted CVs) will be housed in an Access Database and exported to SPSS and UCINET (via Excel). Qualitative interviews transcripts, coding will be housed in a Word document.

The data will be stored for 3 years following the study.

10. Privacy
How will you ensure that the privacy is protected during recruitment and in ongoing interactions with participants?
Answering subject's questions about consent in a private conference room or area, ensuring only the personnel listed in the IRB application are present during the consent process and ensuring the fewest number of individuals possible are aware of the subject's participation in the research and that research activities are performed in as private of a place as possible.

RISK/BENEFIT ASSESSMENT

11. Potential Risks
Are there any potential risks associated with the research procedure, intervention, evaluation and/or test?
No

12. Potential Benefits to the Subject
Are there potential benefits to the subjects that may reasonably be expected from participation in the research?
Yes

Describe.
Subjects will receive a summary of their survey results. This report will include:
1. summary of scholarly activity
2. Personalized map of network composition

13. Potential Benefits to Society
What are the anticipated benefits (i.e. value) to society that may reasonably be expected to result from this research?
Benefits of this study may include knowing more about how professional networks relate to scholarly activity in early career PT faculty members. This information could be used to assist faculty development in strategically developing network relationships and collaborations that may impact scholarly activity outcomes. The outcome of this project may aid in realizing the larger vision of increasing the aggregate numbers of PT faculty doing research to benefit their educational institutions, students, patients and the PT community as a whole.

FINANCIAL COMPENSATION

14. Compensation to the Subject for Participation
Will the subject receive any compensation for participation?
Yes

Describe the form of compensation, dollar amount (if applicable) and the prorated compensation plan (if applicable).
The compensation is determined in consideration of the amount of time required of the subject. All subjects will complete the survey (60 minutes) three times during the study and a sub-group will also complete an interview (60 minutes).

A $20 Amazon Giftcard will be given for every hour of activity which is up to 4-hours.

SUBJECT IDENTIFICATION, RECRUITMENT AND CONSENT/ASSENT

15. Method of Subject Identification and Recruitment
A. How will prospective subjects be identified (e.g., previous research participants, class rosters, databases)?
The PI (Betsy J. Becker) will attend faculty development workshops to share information about the study with prospective subjects in attendance at the workshop. These workshops are designed for early career faculty members that will meet the study inclusion criteria.

Program Directors of PT programs can also forward the information (provided via email) to prospective subjects who are faculty in their programs. Fliers for the project can be distributed at conferences where the study population will attend: October Educational Leadership Conference registration table and booth for the APTA Education Section.

B. Describe how the principal, secondary investigator, participating personnel have ethical access to the names of potential subjects or how these names will be obtained?
The PI will have access to the potential subjects by attending the professional development workshop at Northwestern University. The workshop host, has given permission to come to recruit. The workshop sponsoring organization, the American Physical Therapy Association, Education Section, will also send, via email, recruitment information to attendees from last year’s workshop.

The list of program directors for PT programs is on the website by the Commission of Accreditation for Physical Therapy Education: http://www.capteonline.org/Programs/

C. How will prospective subjects be contacted for recruitment into the study?
Subjects will be attending the 3-day professional development workshop and the PI will make an in-person announcement describing the Project to the attendees (see script). The PI will be available to answer questions about the study throughout the workshop such as during breaks, lunch and dinner. Each subject will also be given a printed flier with information about the project with contact information for the PI.

Subjects who attended the 2015 Workshop will be contacted via email by the Education Section of the American PT Association with the recruitment flier. Subjects may ask the PI questions via email or phone.

Program Directors can forward the information on to faculty who may be eligible.

16. Informed Consent
Will informed consent be obtained from prospective subjects?
Yes

A) Describe the process of informed consent.
Subjects who complete the survey is implied consent. A private location within the conference center will be located that is conducive to discussion for private conversations.
with subjects who have additional questions. Questions may also be answered by phone.

The subjects selected to be interviewed will complete a second consent which will be discussed between the PI and the subject when the interview is scheduled (which will be 1-20 days prior to the actual interview). The consent form will be emailed to the subject and will be returned (via email) a signed copy. Prior to the start of the interview, we will allow as long as needed to answer questions from the subject. It is anticipated this process will take less than 15 minutes.

B) Indicate and submit the form(s) to be used for the research.
Written consent form
☆ Notification (e.g., cover letter on a survey; email notice)
☆ Written narrative of information to be orally conveyed to the subject

EXEMPTION CATEGORY

17. Exemption Category
A) Specify the exemption category [1-6] under which this protocol should be classified.
1
2
3
4
5
6

LITERATURE REVIEW

18. References
Provide a full listing of the key references cited in the background (Section II.3). The references should clearly support the stated purpose of the study.


SECTION III

GENERAL INFORMATION

• Research activities in which the only involvement of human subjects will be in one or more of the categories specified by HHS Regulations at 45 CFR 46.101(b) or 21 CFR 56.104(d) may be exempt from the requirements of the regulations.
• In accordance with HRPP policy, certain types of research activities are either not exempt or, depending upon the nature of the study, may not be exempt. Therefore, investigators should review this policy before submitting an application for exemption.
• In order for research to qualify for exempt status, the attached Exemption Application must be submitted and approved by the ORA.
• Exempt research has a maximum approval period of five years. Studies that continue beyond five years must be resubmitted.
• The ORA reserves the right to reclassify applications and/or refer those applications for either expedited review or full board review as appropriate. In some cases, investigators may be asked to resubmit the project using the IRB Application for Behavioral and Social Science Research

SUBMISSION DEADLINE

EXEMPT REVIEW: Applications that qualify for exempt review have no submission deadline and can be reviewed independent of the IRB meeting schedule. The ORA reserves the right to reclassify applications and/or refer those applications for either expedited review or full board review as appropriate. In some cases, investigators may be asked to resubmit the project using the IRB Application for Behavioral and Social Science Research.

Call the Office of Regulatory Affairs for assistance in determining if your study meets the requirements for exempt review.

SUBMISSION CHECKLIST

Check all that apply.
♦ Subject recruitment material
Performance site approval for all non-UNMC, TNMC, UNO and CH&MC sites
Copy of all questionnaires, surveys, assessment tools, and other relevant materials
Grant Application
No attachments

ADDITIONAL REVIEW REQUIREMENTS

Final IRB approval and release of studies is contingent upon approval by the following UNMC committees or departments. Check the appropriate boxes:

Sponsored Programs Administration (SPA)/Office of Regulatory Affairs:
For commercial sponsored studies, the consent form and contract will be compared for consistency. Final IRB approval and release is contingent upon completion of a signed contract for all commercially sponsored research.

Investigational Device Review Committee (IDRC): Review by the IDRC is required for all protocols involving the use of investigational or marketed devices.

Other Review
No Additional Reviews Required
Appendix E: Scholar Score Questionnaire
Q1.1 Thank you for taking the time to complete this survey to help create a scoring system for scholarly productivity for early career PT faculty. This system will be used in my dissertation where I am studying the professional network contributions to one’s scholarly activity. The questions in this survey will ask your opinion about the significance of different scholarly activities completed by early career physical therapy (PT) education faculty members in their first five years. We will be considering the Carnegie Classification of your institution. You will be asked to assign a numeric value between 0 and 20 to various scholarly activities including publications: peer-reviewed or non peer-reviewed journal; grants: dollar amount, internal/external, competitive/non-competitive; and presentations: peer-reviewed or invited, local, state, national or international.

As a benchmark, authoring a peer-reviewed journal article carries a value of 10. Please base your responses to the other scholarly activities on this value. For example, a score of 0 means you feel that particular scholarly activity is unimportant. A score of 20 means you believe that activity is two times more important than authoring a peer reviewed journal article.

The survey should take about 20 minutes to complete the questions. Please use a tablet or laptop to complete the survey to enable you to view all answer choices.
Q2.1 Move the circle with your mouse along the line to assign a value between 0 and 20 for authoring a **NON-peer reviewed article**. The value should reflect the importance of this activity in the development of an early career PT faculty member in their first five years. As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

10 = PR Journal Article

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

<table>
<thead>
<tr>
<th>Non-peer reviewed article</th>
</tr>
</thead>
</table>

Q2.2 Please provide comments explaining the values you assigned for non-peer reviewed articles.

__________________________________________________________________________
Q3.1 This question asks you to place a value on **INTERNAL grant funding**. Please assign a value between 0 and 20 for each of the five options. Note there are categories about whether the grant selection process is **competitive** (such as peer reviewed) or **non-competitive**. The next question will ask about **external grants**. These values should reflect the importance of each type of grant activity in the development of an early career PT faculty member (in their first five years). As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

10 = PR Journal Article

<table>
<thead>
<tr>
<th>Grant Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal grant less than $5,000 (competitive)</td>
<td></td>
</tr>
<tr>
<td>Internal grant less than $5,000 (NON-competitive)</td>
<td></td>
</tr>
<tr>
<td>Internal grant between $5001 - $10,000 (competitive)</td>
<td></td>
</tr>
<tr>
<td>Internal grant between $5001 - $10,000 (NON-competitive)</td>
<td></td>
</tr>
<tr>
<td>Internal grant greater than $10,000 (competitive)</td>
<td></td>
</tr>
<tr>
<td>Internal grant greater than $10,000 (NON-competitive)</td>
<td></td>
</tr>
</tbody>
</table>

Q3.2 Please provide comments explaining the values you assigned for grant funding.

__________________________________________________________________________________________
Q4.1 This question asks you to place a value on **EXTERNAL** grant funding. Please assign a value between 0 and 20 for each of the five options. Note there are categories about whether the grant selection process is **competitive** (such as peer review) or **non-competitive**. These values should reflect the importance of each type of grant activity in the development of an early career PT faculty member (in their first five years). As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

\[ 10 = \text{PR Journal Article} \]

```
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
```

<table>
<thead>
<tr>
<th>External grant less than $10,000 (competitive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External grant less than $10,000 (NON-competitive)</td>
</tr>
<tr>
<td>External grant greater than $10,000 (competitive)</td>
</tr>
<tr>
<td>External grant greater than $10,000 (NON-competitive)</td>
</tr>
</tbody>
</table>

Q4.2 Please provide comments explaining the values you assigned for grant funding.

________________________________________________________________________
________________________________________________________________________
Q5.1 This question asks you to place a value on **PEER REVIEWED presentations**. Please assign a value between 0 and 20 for each of the four options. The next question will ask about *invited* presentations. These values should reflect the importance PR presentations locations in the development of an early career PT faculty member (in their first five years).

As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

10 = PR Journal Article

<table>
<thead>
<tr>
<th>Local Presentation</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Presentation: poster or platform</td>
<td>8</td>
</tr>
<tr>
<td>State Presentation: several hours or longer</td>
<td>6</td>
</tr>
<tr>
<td>National Presentation: poster or platform</td>
<td>4</td>
</tr>
<tr>
<td>National Presentation: several hours or longer</td>
<td>2</td>
</tr>
<tr>
<td>International Presentation: poster or platform</td>
<td>0</td>
</tr>
<tr>
<td>International Presentation: several hours or longer</td>
<td>0</td>
</tr>
</tbody>
</table>

Q5.2 Please provide comments explaining the values you assigned for peer reviewed presentations.

___________________________________________________________________
Q6.1 This question asks you to place a value on **INVITED presentations**. Please assign a value between 0 and 20 for each of the four options. These values should reflect the importance of locations for invited presentations in the development of an early career PT faculty member (in their first five years). As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

\[ 10 = \text{PR Journal Article} \]

\[ \begin{array}{ccccccccc}
0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 \\
\end{array} \]

<table>
<thead>
<tr>
<th>Local Presentation</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Presentation</td>
<td>[ ]</td>
</tr>
<tr>
<td>National Presentation</td>
<td>[ ]</td>
</tr>
<tr>
<td>International Presentation</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

Q6.2 Please provide comments explaining the values you assigned for invited presentations.

__________________________________________________________________
__________________________________________________________________
Q7.1 This question asks you to place a value **books (textbooks or other)**. Please assign a value between 0 and 20 for each of the three options. The values should reflect the importance of this activity in the development of an early career PT faculty member (in their first five years). As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

\[ 10 = \text{PR Journal Article} \]

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

<table>
<thead>
<tr>
<th>Activity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewed a book</td>
<td></td>
</tr>
<tr>
<td>Authored a chapter</td>
<td></td>
</tr>
<tr>
<td>Edited a book</td>
<td></td>
</tr>
<tr>
<td>Authored a book</td>
<td></td>
</tr>
</tbody>
</table>

Q7.2 Please provide comments explaining the values you assigned for books.

________________________________________________________________
________________________________________________________________
Q8.1 This question asks you to place a value on scholarly activities involving **published abstracts**. Please assign a value between 0 and 20 for each of the two options. The values should reflect the importance of this published abstracts in the development of an early career PT faculty member (in their first five years). As a reminder, a peer-reviewed journal article (value of 10) is the measuring stick that all other items are to be compared against.

10 = PR Journal Article

<table>
<thead>
<tr>
<th>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authored abstract in a <strong>NON peer-reviewed</strong> Journal</td>
</tr>
<tr>
<td>Authored abstract in a <strong>peer-reviewed</strong> Journal</td>
</tr>
</tbody>
</table>

Q8.2 Please provide comments explaining the values you assigned for published abstracts.

________________________________________________________________
________________________________________________________________
Q9.1 This question asks you to place a bonus value for authorship ORDER in publications. Please assign a percent bonus for the following. For example, a bonus of X% is awarded for being the first author on a peer-reviewed journal article. This means the total value for being first author on a peer-reviewed journal article would be 10 + X%.

<table>
<thead>
<tr>
<th>% Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
</tr>
</tbody>
</table>

1st author

Last author

Not 1st or last author

---

Q9.2 Please provide comments about the bonus value you selected.

________________________________________________________________
Q10.1 This question asks you to place a **bonus** value for **role on a grant**. Please assign bonus percentages for the following. For example, a **bonus of X%** is awarded for being the **primary investigator**.

<table>
<thead>
<tr>
<th>% Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
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<td>60</td>
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<tr>
<td>70</td>
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<tr>
<td>80</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Assistant</td>
<td></td>
</tr>
<tr>
<td>Co-Investigator</td>
<td></td>
</tr>
<tr>
<td>Principal Investigator</td>
<td></td>
</tr>
</tbody>
</table>

Q10.2 Please provide comments about the bonus values you selected.

________________________________________________________________

Q10.3

Thank you for providing your opinion about the importance of different scholarly activities of early career PT education faculty.

Please provide any other comments you would like us to consider.

________________________________________________________________

________________________________________________________________
Appendix G. Informed Consent (re-consent for interview)
Informed Consent for Interviews

Project title: Early Career Faculty LINK: Leveraging Individual Network Knowledge

As an early career faculty member in physical therapy education, you have the opportunity to participate in a study. The purpose of this mixed methods exploratory sequential study is to explore early career faculty perceptions of their professional network as it relates to their scholarly agenda. At this stage of the research, perception of the professional network is generally defined as the size and strength of relationships within the network.

If you decide to participate, you will be interviewed by Betsy J. Becker, PT, DPT, CLT-LANA about your opinions about your professional. The interview will take about 45-60 minutes and will take place either in a private room or over a secure network via distance telecommunication. The conversation will be audio-recorded and Dr. Becker will likely take some notes during the interview. The recording will be transcribed word-for-word in order for review, analysis and reflection on what was discussed.

This interview is for a dissertation project and information (including quotes) may be included in a paper, dissertation and shared with the graduate committee. Prior to turning in the dissertation, Dr. Becker will give you the opportunity to review information from the discussion to be sure she interpreted what you said correctly. All faculty who participate in the study will be de-identified when quotes and themes from the interview are written. The data will be stored on a secure server in the College of Allied Health Professions at UNMC and destroyed one year after the study is complete.

There will be no impact on your role as a faculty member in your Institution if you decide not to participate in this study. You may ask questions concerning this study and have those questions answered before agreeing to participate in or during the study. You will receive compensation for participating in the study ($20 giftcard to Amazon).

There is minimal chance for harm or risk due to study participation. The potential benefits include providing input for future use and development of professional networks of early career faculty and their scholarly activity.

Participation in this study is voluntary. If you decide to opt out of the study at any time contact Betsy J. Becker, PT, DPT, CLT-LANA at 402-559-5053 or betsyj.becker@unmc.edu and your relationship with Dr. Becker will not be harmed.

A signature certifies that you have decided to participate and have read and understood the information presented. You will be given a copy of this consent form to keep.

Name (print) ____________________________________________

Signature ___________________________________________ Date: _____________

Principle Investigator

Betsy J. Becker, PT, DPT, CLT-LANA

Betsyj.becker@unmc.edu

402-559-4259

IRB #263-16-EX
Appendix H. Interview Questions
Questions (probing and follow-up questions) and rationale

**NETWORK MAP & ACCURACY**

1) Take a look at your network map and the people you have listed who support your scholarship related to grants, publications and presentations. Are there any modifications or additions you might make to the map? *(rationale: making sure map is accurate and in front of the person for reference during the interview)*

**CONSTRUCTION**

2) How did you become acquainted with the people in your network? *(rationale: Serendipitous? Planned by self? Planned by other? At conferences, on-campus activities)*
   a) Tell me about how you became acquainted with the people who appear on the edges of your map? – and I point to the outliers that are not connected with very many others on their map – IF they haven’t already mentioned them *(rationale: getting at weaker ties or people who they are less close with or have infrequent communication)*

3) What are some challenges you have experienced in developing relationships with people who support your scholarship related to presentations, publications or grants? *(rationale: this will help with the cause when developing the theory)*
   TIME –
   SUPPORT “how supportive is your organization (or family, or xyz)?”
   “describe the support” “how could this be improved?”
   a) Tell me about some successes you have experienced as well.

**LEVERAGE**

4) How have you leveraged or sought help your professional network of members to help build your scholarship related to presentations, publications or grants? *(rationale: frequency of communication, type of information leveraged and for grant, publication or presentation? Take advantage of a weaker tie and made it stronger?)*
   a) Describe particular member connections that are helpful in working toward building your scholarship related to publications, presentations, or grants?
   b) What types of information or resources are helpful from this network member? *(rationale: is it frequency of communication, access to information, review of materials, funding)*