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The Panorama of the Last Decade's Theoretical Groundings of
Educational Leadership Research:
A Concept Co-occurrence Network Analysis

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Abstract

Purpose: Given the essential role of theories in research, this study aims to identify the theories and concepts undergirding the educational leadership research, illuminate the interconnections among them, and examine the evolution of the theoretical groundings of the field from 2005 to 2014.

Methods: This study constructed a concept co-occurrence network, in which the nodes represent all framing concepts that theoretically framed the 1,328 articles published in four leading educational leadership research journals (*EAQ*, *JEA*, *EMAL*, and *JSL*) over the last decade, and the ties link the concepts that co-occur in an article. The reference frequency and centrality measures were used to identify the influential concepts. Next, the k -core analysis was performed to visualize the interconnections among the concepts. Moreover, a series of network cohesion measures were used to detect the changes in conceptual cohesion over the last decade.

Findings: While 295 framing concepts guided educational leadership empirical studies, a small number of concepts exerted disproportionately large influence on the research. Further, these influential concepts closely interplay with one another, and the strongest interconnection was seen between the concepts of leadership approaches and organizational perspectives. Lastly, the increasingly pluralistic theoretical foundation did not yield the growing conceptual cohesion in educational leadership.

Implications: This study for the first time elucidates the structure and evolution of the theoretical groundings of educational leadership research, laying the foundation for further theory development and inviting researchers to bring conceptual cohesion to our field through integrating concepts, allowing random ideas to mutate, and developing new theories.

Keywords: co-occurrence network, educational leadership, epistemological paradigm, epistemology, network analysis, theory, theory development

The Panorama of the Last Decade's Theoretical Groundings of
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The purpose of this study is to investigate the theoretical groundings of educational leadership over the last decade spanning from 2005 to 2014. Since the 1960s, there has been a growing number of studies reviewing and reflecting upon the educational leadership scholarship. Some focused on research designs and methodological issues (e.g., Hallinger, 2010, 2013, 2014; Hallinger & Heck, 1996); some examined the interdisciplinary nature of the field (e.g., Haller, 1968; Wang & Bowers, 2016); others conducted the historical analysis of the field (e.g., Oplatka, 2009, 2010). While prior studies shed light on the epistemological identity of our field, very few studies have focused on the theoretical groundings of educational leadership. Even when the question was raised, "Does educational administration have well-established theories or leading ideas?" (Tschannen-Moran, Firestone, Hoy, & Moore-Johnson, 2000, p. 360), explicit answers were rarely provided, despite the fact that "theory is at the core of quality empirical study" (Heck & Hallinger, 2005, p. 232) as theories serve as a guide to action, collecting facts, generating new knowledge, and explaining the nature of educational leadership (Griffiths, 1959; Oplatka, 2009; Owens & Shakeshaft, 1992). At the end of Oplatka's (2009) historical overview, in which the theory development of educational leadership from the mid-1960s to 2007 was included, he lamented that amid the growth in empirical studies, "the role of 'theory' in the field has been marginalized" (p. 23).

To understand the theoretical groundings of our field, this study draws on Kuhn's (1962, 2012) seminal work *The Structure of Scientific Revolutions* to cast a look upon how the theory development has unfolded in the field of educational leadership, and how the current theoretical

groundings shape future intellectual inquiries in the field. A scientific field, according to Kuhn (2012), has a structure associated with scientific revolutions. Within this structure, the field does not invariably progress in a linear fashion as a result of a steady knowledge accumulation. Rather, the history of a field is characterized by a series of punctuated equilibrium: long periods of knowledge accumulation punctuated by occasional revolutions in which the old paradigm is replaced by the new one. Specifically, this punctuated equilibrium process is composed of four stages: (1) the pre-paradigm stage, (2) the normal science stage that brings a paradigm to the field, (3) the emergence of anomalies (i.e., new ideas and assertions) that lead to a crisis, and (4) a paradigm shift induced by the crisis, and thus the scientific revolution transpires in the field. The Kuhn's work was first published in 1962, approximately the same time when educational leadership (also known as educational administration) became an established field of study. Fifty years later in 2012, thanks to the Kuhn's (1962) tremendous impact on scientific communities, *The Structure of Scientific Revolutions* had its 50th-anniversary edition. Very fittingly, in a commentary on new directions in research and practice of educational leadership, Riehl (2015) recently asked: "So, one might ask, does the history of the scholarship of educational leadership represent incremental change or... *punctuated equilibrium*?" (p. 225). In this study, I apply the Kuhn's (2012) four-stage structure to understand where our field has been by reviewing the history of the theory development from the 1950s to the early 2000s, to illustrate where we are by investigating the theoretical groundings over the last decade from 2005 to 2014, and to discuss the possible directions of theory development in educational leadership. Specifically, this study seeks to answer three research questions:

- What were the theories undergirding the educational leadership research from 2005 to 2014?

- What was the structure of the theoretical groundings of the educational leadership research from 2005 to 2014? In other words, how were the theories interconnected to one another in the educational leadership research over the last decade?
- How did the theoretical groundings evolve in the educational leadership field from 2005 to 2014? In other words, has the theoretical groundings evolved towards the paradigm shift?

The answers to these questions make substantive theoretical contributions to the field of educational leadership. This study fills the gap of the research on theoretical foundations of the field since the early 2000s. Despite the importance of theory in empirical studies and the marginalized role of theory in educational leadership research (Oplatka, 2009), there has been very limited scholarly inquiry devoted to this line of research, in particular since Oplatka's historical review of the field from the 1960s to the 2000s. For a field that has been criticized as so fragmented that lacked a conceptual cohesion (see Bates, 1980; Bridges, 1982; Erickson, 1979; Glatter, 1999; Riffel, 1986), an advanced understanding of the recent theory development and the current theoretical groundings of educational leadership not only guides empirical research in the field, but also facilitates the theory development in the future. Here, to set a historical backdrop of this study, I apply the Kuhn's (2012) four-stage structure of scientific revolutions to review the history of the theory development in the field of educational leadership.

The Pre-paradigm Stage: Prior to the Theory Movement

A field's pre-paradigm stage refers to the time when the field frequently engages in the *search* for "legitimate methods, problems, and standards of solution" (Kuhn, 2012, p. 48). In the 1950s, some educational leadership scholars were acutely dissatisfied with the field's prescriptive knowledge base, which merely "consisted of a description of practices, the cautious

recommendation of promising techniques, personal success stories, and lively anecdotes, all surrounded with the aura of common sense, and often purveyed by a more or less successful administrator” (Walton, 1955, p. 169). At the pre-paradigm stage, the field of educational leadership lacked a valid paradigm as a guide to solve the field’s central problem. Walton’s (1955) further vivid account illustrated how our field wrestled at the pre-paradigm stage, “it [educational leadership] lacks a well-defined, highly organized body of subject matter; it has no elegant simple theoretical structure; and as literature it is singularly devoid of aesthetic qualities” (p. 169). The mounting dissatisfaction in the educational leadership research community, amid the rising influence of logical positivism in social sciences, led to the theory movement in the 1950s and 1960s. Departing from the prescriptive nature of the field, the theory movement favored a cumulative, generalizable knowledge base built from rigorous, hypothetical-deductive empirical inquiries, and aimed to build a unique theory for educational leadership (Culbertson, 1988; Getzels, 1977; Griffiths, 1983; Halpin, 1970). What were advocated for in the theory movement thrust our field into the stage of normal science.

The Normal Science Stage: The Theory Development in Educational Leadership

In the wake of the theory movement, educational leadership entered into the prolonged stage of normal science. At this stage, the field has a well-embraced epistemological paradigm guiding intellectual inquiries (Kuhn, 2012). The epistemological paradigm is considered in Kuhn’s postscript as a “disciplinary matrix” (Kuhn, 2012, p. 181): an entangled matrix of theoretical, methodological, and evaluative strands woven in research. Each strand represents an essential dimension of the disciplinary matrix: theories guide research by bringing clarity in explaining phenomena; research methods allow empirical work to produce results that eliminate ambiguities of theories; evaluative standards serve as a means “to scrutinize theories in great

empirical detail” (Kuhn, 2012, p. 42). The disciplinary matrix is fundamental to any scientific field, because the phenomena of interest are “too complex and varied to be explored at random” (Kuhn, 2012, p. 109). Thus, the disciplinary matrix guides researchers as they explore the entities involved in the phenomena and how the entities behave. It is worth noting that Kuhn (2012) defined the term “discipline” very loosely. He not only used “field” and “discipline” interchangeably, but also asserted that a disciplinary matrix applies to a subfield or hundreds of people in the research community as long as the disciplinary matrix is unique enough to distinguish one from another. Following Kuhn’s (2012) assertion, despite the long-time debate over whether educational leadership should be called a scientific field, a field of inquiry, an applied field, or a discipline (Campbell, 1981; Culbertson, 1981; Glatter, 1987; Haller, 1968; Hodgkinson, 1981; Oplatka, 2012; Riffel, 1986; Rowan, 1995), this study considers the disciplinary matrix of educational leadership as the paradigm—the theoretical, methodological, and evaluative strands that distinguish educational leadership from other fields.

Since the inception of the educational leadership field, many scholars have strived to define the disciplinary matrix that shapes the field. There is a sizable body of literature addressing the methodological (e.g., Gronn, 1982; Haller & Knapp, 1985; Hallinger & Heck, 1996; Hill & Rowe, 1996; Thomas, 1986) and evaluative strands (e.g., Camburn, Spillane, & Sebastian, 2010; Goldring, Xiu, Murphy, Porter, & Elliott, 2015) in our field’s disciplinary matrix. The intellectual efforts on the theoretical strand, however, has been conspicuously scattered (Oplatka, 2009). Therefore, here I focus on the theoretical strand of the disciplinary matrix in this study. A summary of the dominant theories and concepts in educational leadership from the 1950s to the early 2000s was tabulated in Table 1. Here I review the extant studies on the theory development in our field.

Insert Table 1 here

In the 1950s and the 1960s, many theories and concepts in educational leadership were borrowed from social and behavioral sciences (Bates, 1980; Boyan, 1981; Hoy, 1982; Oplatka, 2009; Walton, 1955; Willower, 1975). In a theoretical review, Griffiths (1959) categorized the administrative theory into four groups: (1) social system and role theory, (2) leadership theory, (3) decision making theory; and (4) organizational theory. These four distinct groups of theories appear to explain why Walton (1955) bemoaned that our field “has no elegant simple theoretical structure” (p. 169). Further, these theories primarily framed that a school and its people are in a closed-system organization, in which the absence of social, economic, and political impact was palpable (Hoy, 1982).

As the scholarship of educational leadership continued to grow in the 1970s, the once dominant closed-system theories (e.g., scientific management, bureaucracy, and the social process theory) in the 1950s and 1960s became inadequate to explain the phenomena and formulate hypotheses in a “contingency-laden human context” (Culbertson, 1981, p. 41). As a result, the closed-system theories were replaced by the open-system theories; universal or grand theories of organizations were replaced by contingency theory (Hoy, 1982). Given the substantial influence of social and behavioral sciences on educational leadership (Boyan, 1981; Culbertson, 1988; Griffiths, 1983), Hoy (1982) sternly warned that “uncritically borrowing of concepts or models from the social and behavioral sciences does not provide useful theory” (p. 3). He further argued that the emergent theories in educational leadership should be situationally oriented, as well as strike a balance between theoretical complexity and utility (Hoy, 1982).

During the ensuing period of the 1980s, the field's rising interest in educational reform and school effectiveness (Oplatka, 2010; Wang, Bowers, & Fikis, 2017) elevated a set of theories that address leadership from an organizational perspective. The dominant theories and concepts include loosely coupled theory, efficacy, motivation, organizational culture, organizational climate, and organizational theory. In the 1980s, it was also the time when instructional leadership was conceptualized and began to be applied in the field (e.g., Ogawa & Hart, 1985; Rowan, 1982). The instructional leadership theory continued to gain traction, albeit slowly, in the 1980s and well into the 1990s.

In the 1990s, the topics of organizational change and innovation received much attention from the educational leadership research community (Oplatka, 2010; Wang et al., 2017). To study how to facilitate organizational change and innovation in schools, many studies drew upon the organizational theories and concepts that were used in prior literature, including loosely coupled theory, organizational culture, organizational climate, bureaucracy, and empowerment. In addition, leadership approaches were examined from various conceptualizations, such as instructional leadership, transformational leadership, distributed leadership, moral leadership, democratic leadership, and participative leadership (Oplatka, 2010). Accompanied with the knowledge explosion in the field in the 1990s, there was a considerable increase in theoretical diversity. However, the continued diversification evoked the debate on whether the field was too fragmented and thereby necessitated the conceptual unity, as envisioned by those who led the theory movement decades ago (Halpin, 1970; Griffiths, 1983; Culbertson, 1988; Getzels, 1977). On one side, scholars asserted that the field was so fragmented that lacked the conceptual unity (Bates, 1980; Bridges, 1982; Erickson, 1979; Glatter, 1999; Riffel, 1986). On the other side, the dissenting view holds that diverse theoretical viewpoints were needed, and it was futile to search

for a grand theory of educational leadership (Heck & Hallinger, 2005; Willower, 1981), as “the idea itself is at odds with the history of science which features a panorama of changing theories” (Willower, 1981, p. 130).

The period from 2000 to 2007 was considered as “a time of critical reflections” (Oplatka, 2009, p. 23). The nearly 50 years’ knowledge accumulation prompted scholars to reflect on the history of educational leadership, and more importantly, to ponder the field’s future direction (Heck & Hallinger, 2005). Meanwhile, with the increased attention on education in an international context (Bush, 2004; Wang et al., 2017), leadership for school improvement (Bush, 2004; MacBeath, 2007), and inequities in schools (Honig & Seashore Louis, 2007), scholars in the field continued their quest to define the field’s epistemological identity, or what Kuhn (2012) referred to as the paradigm or the disciplinary matrix. However, the studies devoted to the theoretical perspectives in educational leadership have been conspicuously scattered, as noted by Oplatka (2009) that “the role of ‘theory’ in the field has been marginalized” (p. 23). Here this study not only fills this gap by providing the answer to the question “Does educational administration have well-established theories or leading ideas?” (Tschannen-Moran et al., 2000, p. 360) asked more than a decade ago, but also examines the structure of the theoretical groundings and how they have evolved over the last decade.

The Stage of Anomaly, Crisis, and Eventually a Revolution

The history of educational leadership suggests that the field is highly likely still at the second stage of normal science, according to the Kuhn’s (2012) four-stage structure of scientific revolutions. As noted previously, at the normal science stage, a field has a well-embraced epistemological paradigm—a disciplinary matrix—guiding intellectual inquiries (Kuhn, 2012). As the knowledge continues to accumulate at the normal science stage, the paradigm frequently

fails to guide intellectual inquiries to answer new questions. The anomaly—that something was amiss—is followed by patching up the existing paradigm. When the anomalies grow to the point that the existing paradigm can no longer be patched up to explain the anomalies, the field is met by a crisis. Eventually, the old paradigm is replaced by a new one. The new paradigm is not a patched-up repair version of the old one, but a drastically new one, such as the sun-centered solar theory being drastically different from the earth-centered one. Consequently, a scientific field's paradigm shift transpires in a non-cumulative manner. This paradigm shift suggests the field enters into the scientific revolution stage, as articulated by Kuhn (2012), “scientific revolutions are here taken to be those non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an *incompatible* new one” (p. 92). In the field of educational leadership, despite continued diversification (Oplatka, 2009; Wang et al., 2017), there has been no emergent paradigm that has gained enough traction, broken our field's decade-long normal science stage or equilibrium, and eventually led the field's scientific revolution. Hence, considering the deficient efforts in theoretical studies, in particular very limited studies regarding the field's recent theory development since Oplatka's (2009, 2010) historical overview, mapping the panorama of theoretical groundings of educational leadership helps not only clarify our understanding of the current paradigm in the field, but also contemplate the future of educational leadership research.

Methods

As indicated above, a key contribution of this study is to provide the panorama of theoretical groundings of educational leadership. In the current study, the theoretical groundings were examined via the proxy of all theories and concepts used as the theoretical and conceptual frameworks in the empirical articles published in four leading educational leadership research

journals from 2005 to 2014. Next, all the theories and concepts were used to construct a co-occurrence network. In this network, theories and concepts are represented by nodes and their co-occurrences by ties. Then the analytical techniques in network science were employed to identify the theories and concepts undergirding the theoretical groundings of the field, visualize their interconnections, and examine the year-by-year structural cohesion to detect the changes of the theoretical groundings over the years. In this section, I present the detailed procedures used in data collection, network construction, and network analysis.

Data Collection

To investigate the theoretical groundings, this study examined the concepts in all empirical articles published in four leading educational leadership research journals: *Educational Administration Quarterly (EAQ)*, *Journal of Educational Administration (JEA)*, *Educational Management Administration & Leadership (EMAL)*, and *Journal of School Leadership (JSL)*. These four journals were chosen because they have been considered as the leading research journals in terms of the journals' prestige and interdisciplinarity (Campbell, 1979; Cherkowski, Currie, & Hilton, 2011; Haas, Wilson, Cobb, Hyle, Jordan, & Keamey, 2007; Murphy, Vriesenga, & Storey, 2007; Richardson & McLeod, 2009; Tschannen-Moran et al., 2000; Wang & Bowers, 2016). The time period of 2005 to 2014 was chosen because there has been very limited studies regarding the field's recent theory development since Oplatka's historical overview (Oplatka, 2009) which examined the published articles from the 1950s to 2007. With a small time overlap from 2005 (the starting time point in this study) to 2007 (the ending time point in Oplatka's study), this study builds on prior studies and extends Oplatka's work by examining the theoretical groundings of educational leadership research over the last decade. To

do so, a total of 1,328 articles published in all issues in these four research journals from 2005 to 2014 were collected, including 236 articles in *EAQ*, 376 in *JEA*, 376 in *EMAL*, and 340 in *JSL*.

The Operational Definition of a Theory

What is theory? Despite the importance of theory in empirical studies, scholars defined theory in distinct manners. One of the most stringent definitions is “a set of assumptions from which empirical laws are derived by logico-mathematical deduction” (Feigl, 1949, p. 505). By contrast, a theory was defined as inclusively as a hypothesis that can potentially explain and predict events, as well as produce knowledge (Walker, 1965). This inclusive definition was similar to the one by Griffiths (1959) in his book *Administrative Theory*, “theories are developed to help in the identification and clarification of problems here and now and in the immediate future” (p. 11). Griffiths further clarified the definition of theory by stating what theory is *not*. “Regardless of what theory is, ... we can say with little equivocation that theory is not: (a) a personal affair, (b) a dream, (c) a philosophy, or (d) a taxonomy” (Griffiths, 1959, p. 13). Willower (1980) also asserted that much of the discussion on theory in educational leadership was more about philosophical positions (e.g., positivism, phenomenological perspective, subjectivism, naturalism, postmodernism, etc.)—a research line pursued by many pioneers (see Greenfield, 1980; Lakomski & Evers, 2001; Willower, 1981), but less about “the contents of various theories” (Willower, 1980, p. 1). As a result, building on Griffiths’ definition and Willower’s assertion, this study distinguishes theories from philosophical positions, and focuses on theories and concepts over the last decade from 2005 to 2014.

Despite the absence of a universally agreed upon definition of a theory, the common thread woven through an array of definitions (Feigl, 1949; Griffiths, 1959; Hoy, 1996; Hoy & Miskel, 1996; Merton, 1968; Willower, 1975, 1980) is that a theory is a set of concepts,

assumptions, and generalizations serving to explain a phenomenon or a problem. To that end, a theory comprises two elements: (1) the concepts as the building blocks of a theory, and (2) the assumptions of the concept relationships. The operational definition of a theory in this study therefore includes both elements. First, this study extracts not only theories but also concepts from the reviewed articles. This is because Willower (1975) argued that much of the scholarship in educational leadership was “better labeled theoretically *oriented* than theory” (p. 4). Indeed, many articles examined in this study focused on the concepts or theoretical constructs—the terms “to which a particular meaning has been attached” (Griffiths, 1959, p. 38)—instead of theories, thus the concepts were also included. For instance, some articles in this study’s dataset were theoretically framed by self-efficacy—a concept in social cognitive theory (Bandura, 1993)—rather than a theory. In this case, self-efficacy was included in this study.

In addition to the concepts, the theory definitions suggest that theories provide the assumptions of the concept relationships. Thus, this second element of the operational definition guided me to extract the theories and concepts that were used only to theoretically frame the empirical studies. As noted by Merton (1968), theories provide “general orientations toward data” and “suggest types of variables which theories must somehow take into account rather than clearly formulated, verifiable statements of relationships between specified variables” (p. 52). This data-oriented definition of theory provides for the current study with much operational clarity to exclude the theories and concepts that were only referenced in the discussion to interpret the results, but were not used to theoretically frame the study.

Further, this study also follows the criterion adopted by other studies identifying theories in empirical research (Anderson, 1996; Chung Barnett, Kim, & Lackaff, 2013): the theories must be followed by the “catering” citations to a pertinent scholarly discussion of the corresponding

theories. For instance, if social capital theory is followed by citing the work of Coleman (1988), Putnam (1993), and/or other related work, then the social capital theory is included in this study. Applying the operational definition of theories, this study identified 295 theories, mostly concepts, which were employed to theoretically frame the reviewed studies. To ease the confusion between theories and concepts, hereafter, I use the term “framing concepts” to refer to both theories and concepts, because most of the 295 “theories” are, to be precise, concepts that are likely undergoing the process of being developed into theories—an issue which I later return in Discussion. Next, the 295 framing concepts were used to construct a concept co-occurrence network of educational leadership.

Network Construction

To understand the structure of theoretical groundings of educational leadership, it is key to understand how the concept co-occurrence network was constructed. According to network science (Newman, 2013), the concept co-occurrence network (i.e., a concept-by-concept network) can be inferred from a two-mode network (i.e., concept-by-article network). To do so, I first created a concept-by-article matrix A in which each concept is in a row, and each article is in a column, as shown in Figure 1A. The matrix has elements A_{ix} such that

$$A_{ix} = \begin{cases} 1 & \text{if theory } i \text{ is used to theoretically frame article } x, \\ 0 & \text{otherwise.} \end{cases}$$

The matrix A can then be visualized in Figure 1B, in which ties connect the framing concepts to the articles that used a given concept to frame the empirical research in educational leadership. Please note Figure 1B displays a two-mode network that contains two types of nodes—concepts (in red circles) and articles (in blue squares)—with the ties connecting concepts to the articles.

To infer the connections among the framing concepts, the two-mode, concept-by-article network in Figure 1B needs to be converted into a concept-by-concept co-occurrence matrix in

Figure 1C (Newman, 2013). The product $A_{xi}A_{xj}$ will be 1 if and only if concept i and j co-occur in article x in the two-mode network. Thus, the total number P_{ij} of articles that both concept i and j co-occur is $P_{ij} = \sum_{x=1}^m A_{xi}A_{xj}$, where m is the total number of articles. For instance, the entry value of $P_{concept\ 2\ concept\ 5}$ is two, meaning concept 2 and 5 co-occur in two articles (article C and D); the entry value of $P_{concept\ 1\ concept\ 2}$ is one, meaning concept 1 and 2 co-occur in only one article (article D); the entry value of $P_{concept\ 1\ concept\ 3}$ is zero, meaning concept 1 and 3 do not co-occur in any of the articles in the database. Thus, the concept-by-article matrix shown in Figure 1A is converted into the concept-by-concept co-occurrence matrix in Figure 1C, in which the diagonal matrix elements are all zeros, and the matrix is symmetric because if there is a co-occurrence tie between concept i and j , then there is a tie between concept j and i as well, and thereby the ties do not have arrows as they suggest co-occurrences.

The matrix in Figure 1C can then be visualized as a concept-by-concept co-occurrence network in Figure 1D. In this concept-by-concept co-occurrence network, the nodes represent concepts, and two concepts are considered connected by a tie if they co-occur in an article. The underlying premise of the co-occurrence network, according to network science (Newman, 2013), is that the more co-occurrences between a pair of concepts, the more similarities the two concepts share. For instance, in this study's dataset, in an article on teacher-principal relationships (see Moye & Henkin, 2005), trust and empowerment were used to theoretically frame the study; therefore, a tie connects trust and empowerment. In another article on decision making in schools (see Bogler & Somech, 2005), empowerment and organizational citizenship behavior were used to frame the study; therefore, a tie connects empowerment and organizational citizenship behavior. Taken together, the two co-occurrence ties form a chain composed of three concepts (trust—empowerment—organizational citizenship behavior), suggesting the

interconnections between these three concepts. Using the 295 concepts identified in the 1,328 articles published in four leading educational leadership research journals, this study constructed a concept-by-concept co-occurrence network (hereafter referred to as the concept co-occurrence network) containing 295 concepts (nodes) and 489 co-occurrences ties.

Insert Figure 1 here

Data analysis

UCINET 6 network analysis program (Borgatti, Everett, & Freeman, 2002) was used to analyze and visualize the concept co-occurrence network of educational leadership. First, three centrality measures—Freeman degree centrality, Beta centrality, and betweenness centrality—are calculated to identify the concepts that are at the center of the network and exert a relatively large influence on the educational leadership research. Next, the network is visualized based on the results of a *k*-core analysis to highlight the interconnections among concepts. Finally, a series of network cohesion measures—including the number of components, component ratio, and fragmentation—are calculated and compared year by year to reveal the changes in network cohesion from 2005 to 2014. Here I turn to articulate how centrality measures are used to identify the influential concepts undergirding the educational leadership research.

Centrality

In network analysis, the measures of “centrality” suggests relative importance and influence of a node (concepts in this study) within the overall network (Bonacich, 1987; Freeman, 1979; Newman, 2013). Specifically, the more central a concept is in the network, the more important and influential the concept is. Among many centrality measures, three

measures—Freeman degree centrality, Beta centrality, and betweenness centrality—were chosen in this study to identify the influential concepts in educational leadership research over the last decade. Each centrality quantifies relative influence in a unique way. Freeman centrality (Freeman, 1979), as one of the most intuitive centrality measures, not only calculates how many co-occurrence ties a concept has, but also takes into account the strength of each co-occurrence tie—the frequency of a pair of concepts co-occur in the network. Beta centrality (Bonacich, 1987), also known as Bonacich Power, is “a measure of the total amount of potential influence a node can have on others” (Borgatti et al., 2013, p. 171). Betweenness centrality (Freeman, 1979) measures the influence of a node from the brokerage perspective, calculating the extent to which a node positions itself on the shortest path between any two nodes. In this study, these three centrality measures—the measures that depict the concepts’ structural positions in the network built by the co-occurrence ties, along with the conventional frequency counts of concept occurrence, are used to in this study to identify the concepts undergirding the educational leadership research.

Network visualization

In addition to identifying the concepts undergirding the educational leadership research, I visualized the concept co-occurrence network, which consists of 295 concepts and 489 co-occurrences ties, to map the contours of the educational leadership theoretical foundation and to answer the second research question on the interconnections among concepts. In a network with hundreds of concepts and co-occurrence ties, to accentuate the interconnections among concepts, I ran a *k*-core analysis—a large-scale network visualization technique (Borgatti et al. 2013)—to identify the well-connected subgroups of concepts in the network. A *k*-core is a subgraph in which every node (the concept examined in this study) has degree *k* or more with the other nodes

(Seidman, 1983). In a large-scale network, a k -core analysis helps identify well-connected subgroups by removing the peripheral nodes in the network. Specifically, a k -core analysis first removes the most peripheral nodes—the nodes with only one tie participate in a 1-core subgroup, and then remove the next most peripheral nodes—the nodes with two ties and thus participate in a 2-core subgroup. This procedure is repeated until the network is left with the well-connected nodes serving as the inner core of the network. Therefore, the nodes in the same k -core have similar structural positions in the network (Borgatti et al. 2013). In this study, rather than combing through the entire network with 295 concepts and 489 co-occurrences, the concepts in different k -cores are color coded to speed up the process of identifying well-connected subgroups of concepts in the network.

Network changes over time

To answer the third research question on how the theoretical groundings evolved over the last decade, this study examined the temporal changes in network structure. To do so, I first dissected the cumulative concept co-occurrence network of educational leadership in Figure 2 into 10 year-by-year slices as seen in Figure 4, and then conducted network analysis to derive a series of network cohesion measures—including the number of components, component ratio, and fragmentation—to capture and compare the temporal network changes from 2005 to 2014. Below I present in detail how these measures were used to illuminate the patterns of the structural changes of the network.

Component.

In network science parlance, a component is defined as “a maximal set of nodes in which every node can reach every other by some path” (Borgatti et al. 2013, p. 16). For instance, in Figure 1D, the network contains only one component that consists of all five concepts (concepts

1, 2, 3, 4, and 5), because every concept can reach any other concept in the network. However, if concept 2 is removed, the network becomes fragmented with two components: one component consists of concept 1, 4, and 5; the other component consists of only concept 3 which is now isolated from the rest of the network. Therefore, the more components a network has, the more fragmented a network is, the less cohesive a network is.

Component ratio.

Another network cohesion measure is the component ratio. In addition to calculating the number of components in the network, the component ratio takes into consideration the number of nodes in the network (Borgatti et al., 2013). Let us denote by c the number of components and n the number of nodes, then component ratio = $(c - 1)/(n - 1)$. The value of component ratio ranges from 0 to 1. In the concept co-occurrence network in this study, if all concepts are isolated from one another with no co-occurrence ties connecting the concepts, then the component ratio reaches its maximum at 1. If all concepts are in one component, just like the five concepts in Figure 1D, then the component ratio reaches its minimum at 0. Therefore, the component ratio inversely measures the cohesion of a network. The higher component ratio a network has, the less cohesive the network is.

Fragmentation.

One of the most sensitive network cohesion measures is fragmentation (Borgatti, 2006) or connectedness (Krackhardt, 1994). The connectedness of a network is the proportion of the pairs of nodes that are in the same component, ranging from 0 to 1 (Krackhardt, 1994). Thus the network fragmentation = $1 - \text{connectedness}$ (Borgatti, 2006), indicating the proportion of the pairs of nodes that are not in the same component. Like the component ratio, the network

fragmentation is also an inverse measure of the network cohesion. As the name suggests, the higher the value of a network fragmentation is, the more fragmented the network is.

Taken together, the aforementioned measures derived from network analysis were used in this study to examine the theoretical groundings of educational leadership research. First, three centrality measures—Freeman degree centrality, Beta centrality, and betweenness centrality—were calculated, along with frequency counts, to identify the concepts undergirding the educational leadership research. Second, the concept co-occurrence network was visualized based on the results of the *k*-core analysis to accentuate the interconnections among concepts. Lastly, a series of network cohesion measures—including the number of components, component ratio, and fragmentation—are compared year by year to capture the temporal structural changes in the networks from 2005 to 2014.

Results

Theoretical Groundings of Educational Leadership Research

A total of 295 framing concepts were used to theoretically frame the 1,328 articles published in four leading educational leadership research journals. Among these 295 concepts, not every concept attracted the equal amount of attention from the research community. On one end of the spectrum, 63.05% (186) of the concepts were used only once in all articles examined in this study. On the other end of the spectrum, only 20 concepts were used more than 10 times over the last decade from 2005 to 2014, as seen in Table 2. The most frequently used concept is distributed leadership (55 times), followed by instructional leadership (38), trust (36), transformational leadership (32), organizational theory (30), organizational learning (24), social justice theory (24), social cognitive theory (21), critical race theory (20), social justice leadership (19), organizational/school culture (17), social capital theory (16), organizational citizenship

behavior (15), teacher leadership (15), collective efficacy (13), critical theory (13), motivation (12), social network theory (12), contingency theory (11), and institutional theory (11).

These 20 most frequently used concepts, albeit a rather small number, account for a disproportionately large share of importance in the concept co-occurrence network of educational leadership. This is because most of the frequently used concepts—such as trust, instructional leadership, transformational leadership, distributed leadership, organizational learning, and social cognitive theory—also have high centrality in the concept co-occurrence network (see Table 3), indicating they co-occur with many other concepts frequently in educational leadership research as evidenced by Freeman centrality, and/or they co-occur with many other concepts that co-occur with even more concepts as evidenced by Beta centrality, and/or they function as a bridge connecting other concepts in the network as evidenced by betweenness centrality. Furthermore, some concepts are not used frequently—such as distributed cognition, organizational commitment, community of practice, similarity-attraction theory, and empowerment, but because they co-occur with, relatively speaking, many well-connected concepts, they also have high Freeman degree centrality and Beta centrality.

After examining the content of these most frequently used and high-centrality concepts, four themes emerged. The first theme addresses leadership approaches, including distributed leadership, instructional leadership, transformational leadership, social justice leadership, and teacher leadership. The second theme revolves around organizations, such as organizational theory, organizational learning, organizational/school culture, and institutional theory. The third theme presents a social and psychological perspective, such as trust, collective efficacy, social capital theory, and social network theory. The fourth theme is related to social justice, such as social justice theory and critical race theory. It is important to note that the groupings of all these

high-centrality framing concepts are not mutually exclusive. Rather, they are all closely interconnected to one another at the center of the theoretical groundings of educational leadership. I now turn attention to the second finding on the structure of the theoretical groundings of our field.

Insert Table 2 here

Insert Table 3 here

The Structure of the Theoretical Groundings

How did the framing concepts interplay with one another in educational leadership research? To answer this question, I visualized the concept co-occurrence network in Figure 2, which consists of 295 concepts and 489 co-occurrences ties. In Figure 2, the node size is proportional to degree centrality (i.e., how many times a concept co-occurs with others in the network), and the node colors indicates k -cores (0-core nodes in red, 1-core gray, 2-core black, 3-core blue, 4-core pink, 5-core in dark green, and 6-core light green). The concepts coded by the same color suggest they have similar structural positions in the concept co-occurrence network of educational leadership. For instance, in the upper left, we see the concepts in red (e.g., leadership succession theory and ethical climate) do not co-occur with other concepts, suggesting they are isolates disconnected from the rest of the network. In contrast, the concepts in light green (e.g., trust and transformational leadership) co-occurred with at least five other concepts, and they are all at the center of the network.

Yet it is still rather noisy to uncover the patterns of the interplay among 295 framing concepts in the panorama of theoretical groundings of educational leadership research visualized in Figure 2. A close-up view is therefore needed. To do so, I zoomed in on the center of the network in Figure 3, where the high-centrality concepts are located in the network. In Figure 3, in addition to the node size representing degree centrality and the node color representing k -cores, the thickness of the ties corresponds to the frequency of co-occurrence of a pair of concepts (i.e., interconnectedness between concepts, as noted in the Methods section). The higher frequency counts of a co-concurrence tie connecting a pair of concepts, the stronger the interconnectedness between the concepts. For instance, trust and social capital theory co-occurred six times, indicating a strong interplay between trust and social capital theory.

According to the color-coded concepts by k -cores, the concepts on leadership approaches and organizations are closely interconnected to one another, because they are all in a tight-knit cluster in green color at the very center of the concept co-occurrence network of educational leadership. As delineated in the procedure of k -core analysis earlier, the concepts coded by the same color have similar structural positions in the network. In Figure 3, the leadership approach-themed concepts (e.g., instructional leadership and distributed leadership) and organization-themed concepts (e.g., organizational culture and organizational learning) have similar structural positions in the network, because they are all in the 6-core subgroup. Further, these 6-core concepts in light green color not only are well-connected to one another, but also are connected to many other concepts in the network. For instance, the leadership approach-themed concepts in the 6-core subgroup also interplay with social- and psychological-themed concepts (e.g., social exchange theory and collective efficacy in the 5-core subgroup in dark green), social justice-themed concepts (e.g., critical race theory and social justice leadership in the 4-core subgroup in

pink), as well as theory of planned behavior in 2-core subgroup in black. However, the interconnections among these different k -core concepts are not as strong as the one between leadership approach-themed concepts and organization-themed concepts in the same 6-core, as evidenced by the k -core analysis results.

Moreover, closely examined, the network in Figure 3 also reveals how high-betweenness concepts serve as the bridge connecting other concepts. For instance, instructional leadership serves as the bridge between social justice-themed concepts (4-core subgroup in pink) and theory of planned behavior in 2-core subgroup; trust bridges organizational citizenship behavior (6-core subgroup in light green) and collective efficacy (5-core subgroup in dark green); theory of planned behavior bridges instructional leadership (6-core subgroup in light green) and job choice theory (4-core subgroup in pink).

 Insert Figure 2 here

 Insert Figure 3 here

The Evolving Structure

How did the theoretical groundings of educational leadership evolve over the last ten years from 2005 to 2014? The year-by-year network structural changes are manifested in Figure 4 of the concept co-occurrence networks of educational leadership. To quantify the structural changes, a series of network cohesion measures, as shown in Table 4, were used to capture the temporal network changes from 2005 to 2014. First, the network size of the theoretical

groundings of educational leadership has grown substantially. The number of concepts and co-occurrence ties, despite some fluctuations, are overall on a steady rise. The increase in the number of concepts—from 21 concepts in 2005 to 73 in 2014—indicates a growing number of concepts were used as the theoretical groundings of educational leadership research. The increase in the number of co-occurrence ties—from seven in 2005 to 95 in 2014—indicates the concepts increasingly co-occur in the articles over the years. Second, along with the substantial growth of the network size in terms of the number of concepts and co-occurrence ties connecting them, no compelling evidence suggests the growing network cohesion. Overall, the increasingly pluralistic theoretical groundings of educational leadership research did not yield a more cohesive network over the last decade. Specifically, there is no clear pattern pertains the number of components over the last decade. The number of components reached its minimum at 17 in 2005 and 2007, and the maximum at 32 in 2012. By the definition of components, the lower the number of components, the less fragmented the network is. Thus, the lack of a clear pattern of the number of components provides no strong evidence that the network grew cohesively from 2005 to 2014. In addition to the number of components, the results of two network cohesion measures—component ratio and fragmentation—suggest the network grew less fragmented from 2005 to 2007. However, the network cohesion growth was not sustained, followed by a sharp increase in fragmentation from 2007 to 2008, almost erased the earlier network cohesion growth. Since then, no drastic change was discerned as the network fragmentation fluctuated between 0.863 and 0.920 from 2009 to 2013, until a sudden fall from 2013 to 2014. The most fragmented network was the 2010 concept co-occurrence network, in which only 64 co-occurrence ties connecting 68 concepts in the network. The 2010 network is so fragmented that only 8% of pairs

of concepts are connected in the same component, whereas the rest of 92% of pairs of concepts did not co-occur in the same component.

Insert Figure 4 here

Insert Table 4 here

Discussion

This study presents for the first time the panorama of theoretical groundings of educational leadership from 2005 to 2014. The network analytical approaches provide an alternative to understanding and clarifying the theoretical groundings of the field. While grounded in the Kuhn's four-stage structure of scientific *revolutions*, this study uncovered and visualized the structure of scientific *evolution* in the field of educational leadership—the normal science stage characterized by long periods of knowledge accumulation in a well-embraced epistemological paradigm (Kuhn, 2012). The findings have the potential to make a substantive contribution to the understudied theoretical realm in the field of educational leadership. In this concluding section of the paper, I interpret the key findings and discuss their implications on educational leadership research, and ruminate on what the future holds for our field's theory development.

The Core of the Theoretical Groundings

The first finding indicates that despite a large number of framing concepts (295) used to theoretically frame the empirical studies in educational leadership, only a small number of

concepts—the concepts used frequently and having high centralities—demonstrate their disproportionately large influence on the educational leadership research and serve as the cornerstones undergirding the field’s theoretical foundation. How do these dominant framing concepts differ from the influential ones identified in prior studies (e.g., Griffiths, 1959; Oplatka, 2009; Willower, 1975)? The most conspicuous discrepancy is that the presence of concepts and theories on decision making, as identified by (Griffiths, 1959), has faded and been replaced by social justice-themed concepts (e.g., social justice theory and critical race theory). The absence of the concepts or theories on decision making is in sharp contrast to the robust decision making research in the fields of psychology, behavior economics, and cognitive neuroscience (Glimcher & Fehr, 2014). Despite being understudied, the educational leaders’ decision making mechanism is apparently important in effective leadership for teaching and learning (Evers & Lakomski, 2015). It could be a tantalizing area as educational leadership researchers apply the advances in psychology, behavior economics, and cognitive neuroscience to study school leaders’ decision making process.

In addition, there are discernable differences in the dominant conceptualizations of leadership between administrative science and educational leadership over the last decade. Prior studies indicate that scholars in the field of educational leadership borrowed the concepts from social behavior science, psychology, organization science, and administrative science (Boyan, 1981; Haller, 1968; Walton, 1955; Willower, 1975). After decades’ theory development, some of the dominant leadership conceptualizations (e.g., transformational leadership and distributed leadership) remained as the mainstream in our field, as evidenced by these concepts’ high reference frequency and high centrality. Our field has also developed its own leadership conceptualizations such as instructional leadership and teacher leadership. This appreciable

progress spotlights the teachers and their instructional activities that are unique in school contexts in comparison with the leadership in non-school context (Greenfield Jr., 1995). Further, in comparison with the leadership approaches in the field of administrative science over almost the same period (Meuser, Gardner, Dinh, Liden, & Lord, 2016), three dominant leadership approaches—charismatic leadership, strategic leadership, and trait theories—did not win much favor in our field. In particular, after falling out of favor in the administrative science community, trait theories have gained renewed interest and came back to the fore over the last decade (Dinh, Lord, Gardner, Meuser, Liden, & Hu, 2014; Meuser et al., 2016). By contrast, in our field of educational leadership, since Bridges (1982) harshly criticized that “studies that merely describe the traits or attitudes should be discontinued unless they shed light on a problem of practical, social, or theoretical significance” (p. 26), no sign of the re-surface of trait theories in educational leadership research.

Moreover, the dominant framing concepts are closely interconnected to one another, nestling together at the center of the concept co-occurrence network of educational leadership. The results of *k*-core analysis illustrate that the interconnection between the concepts of leadership approaches and organizations is the strongest than the interconnections between other themes of concepts. This relatively stronger linkage can be explained by the long-established connections between school leadership and schools as organizations (Bidwell, 2001; Corwin, 1974; Griffith, 1959; Heck, 2015; Oplatka, 2014). In contrast, many social- and psychological-themed concepts (e.g., social exchange theory, social network theory, and network theory of social capital) and social justice-themed concepts (e.g., critical race theory) were not frequently used in educational leadership research until the 2000s (see Daly, 2010; Howard & Navarro, 2016), and still in the process of building linkage to the concepts in leadership and organization

studies. To some extent, the tight-knit, interlocked concepts still bring in some, though maybe not substantial, conceptual cohesion, epitomizing what the field has been grappling with over the last decade and serving as part of the fundamental knowledge base of our field.

The Diversity of the Theoretical Groundings

To envisage the future of our field, I now turn attention to the majority of framing concepts that are not at the center of the theoretical groundings. As we zoom out to the panorama of the theoretical groundings, we see a majority of the framing concepts are not at the center of the network in Figure 2. These concepts at the periphery of the theoretical groundings of education leadership fit very well with the Donmoyer's (1999) "big tent" metaphor—the big tent where all the un-unified concepts reside. Yet "adopting the 'big tent' solution is easy. Finding ways to interact across difference is considerably more difficult" (Shield & Edwards, 2005, p. 32), as attested by this study's finding that the increasingly pluralistic theoretical foundation from 2005 to 2014 did not yield a more cohesive network in a substantial manner. Over 30 years ago, Bridges (1982) contended that many of the studies in our field were "intellectual random events" (p. 22). Fast forward three decades, looking at our field's theoretical groundings visualized in Figure 2, one might ask whether the concepts at the periphery of the network are "intellectual random events". Or should we share Willower's uplifting (1980) sentiment, "In spite of all its [theories'] limitations, I find the field vibrant and exciting, and believe considerable progress has been made in understanding educational organizations as a variety of theoretical perspectives have been brought to bear on them" (p. 6)? Or should we consider the seemingly opposing views by Bridges (1982) and Willower (1980) are, in essence, not dualistic but complementary to each other?

It is possible that the concepts at the periphery of the network in Figure 2 are the “intellectual random events”, and they have not yet gained traction in the field. If a field’s revolution, the one sparked by few prominent, towering giants, spans only a short period of time, then the field’s evolution, which is propelled by many scholars in a research community, takes most of the time in a field’s history. The philosopher of science Eric Scerri regards science progresses as “organic evolution, complete with the random mutation of ideas, some of which survive, while others simply wither away” (Scerri, 2016, p. x), and the random ideas are the rule rather than an exception in scientific progress. Even if a novel, or maybe half-baked, idea survives, it still takes time for the idea to take root in scientific communities. The examples abound in the history of scientific discoveries. Graph theory was proposed in 1969 (Harary, 1969), but it did not gain much attention until it was applied to study social networks in the 1990s (Watts & Strogatz, 1998; Watts, 2003). This example of the evolving social network theories epitomizes that “if the idea is suited to the extant scientific milieu, it survives and leads others to capitalize on any aspect of the idea that might turn out to be useful.” (Scerri, 2016, p. xxii). Given the time it takes for a concept to take root, grow, and flourish, what is important is to have an open and critical mind—as Hoy (1996) noted “theoretical perspectives in educational administration must be open, fluid, and pluralistic” (p. 366). In doing so, we take a rigorous trial-and-error approach to evaluate and integrate the concepts, and thus develop theories (Evers, 2007).

Evolution Rather Than Revolution

The findings in this study do not provide compelling evidence suggesting the paradigm shift in the theoretical groundings of educational leadership research. That is, the growing number of concepts and their increasing interconnectedness suggests the incremental knowledge

accumulation—the evolution, rather than revolution, of knowledge in our field. The prolonged period of knowledge evolution might derive from the fact that the concepts and theories are not static entities. They “are tentatively held, waiting to be disapproved or simply discarded for a variety of reasons and replaced by new conjectures” (Willower, 1980, p. 1). Scerri (2016) further elaborated on the evolving nature of the concepts, “One strength of science is that it is often wrong. It proceeds by overthrowing preconception, perhaps replacing misconceptions by a more sophisticated misconception until that misconception is replaced by yet another, until ultimately (we optimists all hope) arriving at some version of the truth” (p. x). While new concepts can be the ones that are incompatible with the old (Kuhn, 2012), more often the new concepts and theories are the old ones integrated with new concepts (Hunt, 1983, 2010; Reichers & Schneider, 1990). For instance, the concept of social capital—one of the dominant concepts in educational leadership as attested by the findings in this study—has evolved into three dimensions: structural, relational, and cognitive (Coleman, 1990; Lin, 2001). Social capital was integrated with trust, and trust was considered as the relational social capital (Fukuyama, 1995); social capital was integrated with social network theory to develop the network theory of social capital to explain the mechanism of mobilizing social capital (Lin, 1999). In fact, concept integration is part of the process as a research field evolves. When a new concept is introduced to the field, efforts are made to test the concept empirically. As the concept takes root in the field, it integrates other concepts explaining the same phenomena, and thus leads to the theory development in the field (Hunt, 1983, 2010; Reichers & Schneider, 1990). It is “the gradual, piecemeal, and at times almost random development of ideas” (Scerri, 2016, p. xx) that contributes to the evolution of a field. In educational leadership, many concepts are undergoing this concept integration process, as seen in the interconnections between concepts in Figure 2

and 3, and the growing number of concepts at the center of the networks in Figure 4. To build conceptual cohesion to our field, there are a few gaps that merit attention: the gaps between educational leadership research and policy (e.g., Hoy, 1994), political science (e.g., Hargreaves & Goodson, 2006; Hoy, 1994; Iannaccone, 1970, 1984; Wiles, 1974), economics (e.g., Bowman, 1969; Wang et al., 2017; Willower, 1975), technology (Anderson & Dexter, 2005; McLeod & Richardson, 2011), and the rising tide of big data in education (Wang, 2016). This study did not find robust concepts that link these fields to educational leadership research over the last decade. These gaps, according to Kuhn (2012), are the sources of anomalies, as the gaps provide the hotbed for new discoveries. Therefore, it is likely that the robust framing concepts, the ones that fill the conceptual void, might bring some clarity and conceptual cohesion to the field.

Limitations and Suggestions for Future Inquiry

Despite the substantive theoretical contributions to educational leadership, this study has three limitations. The first limitation is that the current study does not go beyond mapping the theoretical groundings of educational leadership. Are there any competing concepts? How much value and impact does a concept bring to the rigorous empirical inquiries and leadership practices? Consider contingency theory. One might ask “whether contingency theory is a theory in the first place. Put another way, is contingency theory a set of related concepts and generalizations that serve to explain or is it a broad injunction to focus on the complexity of relationships and the contingency that affect them?” (Willower, 1980, p. 4). Willower raised the question, but did not provide the answer. Nor did other studies in our field. I thus recommend future inquiry to investigate the value and impact of the framing concepts in educational leadership research.

The second limitation is centered around the proxy for the theoretical groundings in this study. Following the operational definitions of theories and theory identification procedures used in other fields (e.g., Anderson, 1996; Chung et al., 2013), this study zeroed in on the framing concepts used to theoretically frame the empirical studies. The framing concepts were excluded if they were referenced only to interpret empirical findings, or if they were referenced only in editorials or conceptual articles. Thus, future studies would add much value by taking a more comprehensive view of the theoretical groundings of educational leadership research.

The third limitation of this study is that the included the 1,328 articles in this study are fairly representative of the educational leadership research literature, but not necessarily exhaustive. Instead of focusing on every educational leadership journal, this study investigated the articles in four leading research journals identified in prior studies (Campbell, 1979; Cherkowski et al., 2011; Haas et al., 2007; Murphy et al., 2007; Richardson & McLeod, 2009; Tschannen-Moran et al., 2000; Wang & Bowers, 2016). It is assumed that those published articles are the collective outcomes of the scholarly inquiries involving authors, peer reviewers, editors, and editorial boards, and therefore represent the direction of scholarly inquiries in the educational leadership field. Still, an inclusion of all research journals would provide a complete picture of the field's theoretical foundations. I thus encourage future researchers to include more journals in future studies.

To conclude this paper, let us henceforth carry on and further the theoretical studies in the educational leadership field. The findings of this study not only lay the groundwork for future theory development in educational leadership, but also present challenges for future researchers. Given the limited theoretical studies and the marginalized role of theory in our field (Oplatka, 2009), it is hoped that the findings of this study will prompt future researchers to venture into the

theoretical realm by conducting empirical inquiries to refine concepts and theories, by addressing the theoretical gaps identified in this study (e.g., decision making, politics and policy, and economics), and by examining the impact of the concepts and theories in empirical studies and leadership practices. By doing so, we bring conceptual cohesion through integrating concepts, allowing random ideas to mutate, and developing new theories that explain the phenomena of educational leadership, guide leadership practices, and facilitate new knowledge creation.

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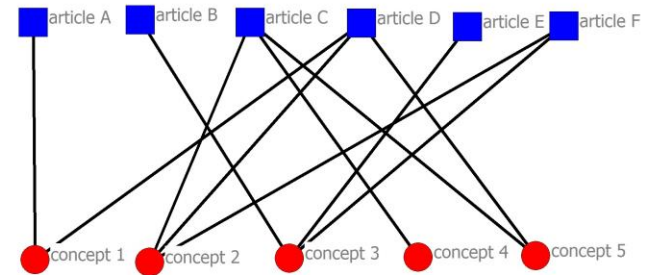
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Table 1 *Dominant Framing Concepts in Educational Leadership Research (the 1950s—the early 2000s)*

Time periods	Dominant framing concepts identified in prior studies
The 1950s and the 1960s	Griffiths (1959): social system and role theory, leadership theory, decision making theory, organizational theory
The 1970s	Culberton (1981), Hoy (1982), Willower (1980): role theory, social system theory, open system theory, contingency theory, loosely coupled theory
The 1980s	Oplatka (2009, 2010): organizational culture, organizational climate, organizational theory, motivation, efficacy, loosely coupled theory, instructional leadership
The 1990s	Oplatka (2009, 2010): organizational theory, loosely coupled theory, organizational culture, organizational climate, bureaucracy, empowerment, instructional leadership, transformational leadership, distributed leadership, moral leadership, democratic leadership, participative leadership
The early 2000s	Oplatka (2009, 2010): social justice leadership, distributed leadership, moral leadership, transformational leadership, democratic leadership, trust, school culture

	article A	article B	article C	article D	article E	article F
concept 1	1	0	0	1	0	0
concept 2	0	0	1	1	0	1
concept 3	0	1	0	0	1	1
concept 4	0	0	1	0	0	0
concept 5	0	0	1	1	0	0

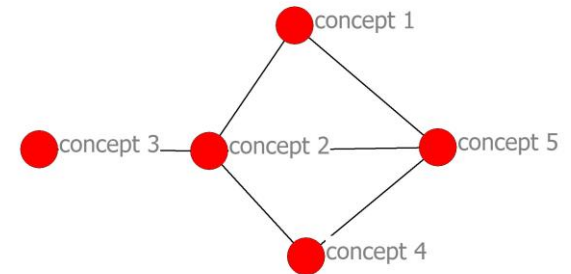
(A) An example of a concept-by-article matrix



(B) A visualization of the concept-by-article matrix in (A)

	concept 1	concept 2	concept 3	concept 4	concept 5
concept 1	0	1	0	0	1
concept 2	1	0	1	1	2
concept 3	0	1	0	0	0
concept 4	0	1	0	0	1
concept 5	1	2	0	1	0

(C) An example of the concept-by-concept co-occurrence matrix converted from the concept-by-article matrix in (A)



(D) A visualization the concept-by-concept co-occurrence matrix in (C)

Figure 1 An Illustration of the procedures used to create the concept co-occurrence network of educational leadership.

Table 2 *Top 20 Framing Concepts by Frequency*

Rank	Theory/concept	Frequency	Example article
1	distributed leadership	55	Sun, M., Frank, K. A., Penuel, W. R., & Kim, C. M. (2013). How external institutions penetrate schools through formal and informal leaders. <i>Educational Administration Quarterly</i> , 49(4), 610-644.
2	instructional leadership	38	Halverson, R., Grigg, J., Prichett, R., & Thomas, C. (2007). The new instructional leadership: Creating data-driven instructional systems in schools. <i>Journal of School Leadership</i> , 17(2), 159-194.
3	trust	36	Moye, M. J., & Henkin, A. B. (2005). Teacher-principal relationships: Exploring linkages between empowerment and interpersonal trust. <i>Journal of Educational Administration</i> , 43(3), 260-277.
4	transformational leadership	32	Leithwood, K., & Sun, J. (2012). The nature and effects of transformational school leadership: A meta-analytic review of unpublished research. <i>Educational Administration Quarterly</i> , 48(3), 387-423.
5	organizational theory	30	Hofman, W. H. A., & Hofman, R. H. (2011). Smart management in effective schools: Effective management configurations in general and vocational education in the Netherlands. <i>Educational Administration Quarterly</i> , 47(4), 620-645.
6	organizational learning	24	Rusch, E. A. (2005). Institutional barriers to organizational learning in school systems: The power of silence. <i>Educational Administration Quarterly</i> , 41(1), 83-120.
6	social justice theory	24	Karpinski, C. F., & Lugg, C. A. (2006). Social justice and educational administration: mutually exclusive? <i>Journal of Educational Administration</i> , 44(3), 278-292.
8	social cognitive theory	21	Goddard, R. D., & Skrla, L. (2006). The influence of school social composition on teachers' collective efficacy beliefs. <i>Educational Administration Quarterly</i> , 42(2), 216-235.
9	critical race theory	20	Horsford, S. D. (2010). Mixed feelings about mixed schools: Superintendents on the complex legacy of school desegregation. <i>Educational Administration Quarterly</i> , 46(3), 287-321.
10	social justice leadership	19	Hernandez, F., Murakami, E. T., & Cerecer, P. Q. (2014). A Latina principal leading for social justice influences of racial and gender identity. <i>Journal of School Leadership</i> , 24(4), 568-598.

Table 2 *Top 20 Framing Concepts by Frequency (continued)*

Rank	Theory/concept	Frequency	Example article
11	organizational/school culture	17	Zhu, C., & Eagels, N. (2014). Organizational culture and instructional innovations in higher education: Perceptions and reactions of teachers and students. <i>Educational Management Administration and Leadership</i> , 42(1), 136-158.
12	social capital theory	16	Ortiz, F. (2001). Using social capital in interpreting the careers of three Latina superintendents. <i>Educational Administration Quarterly</i> , 37(1), 58-85.
13	organizational citizenship behavior	15	Wagner, C. A., & Dipaola, M. F. (2011). Academic optimism of high school teachers: Its relationship to organizational citizenship behaviors and student achievement. <i>Journal of School Leadership</i> , 21(6), 893-926.
13	teacher leadership	15	Watt, K. M., Mills, S. J., & Huerta, J. (2010). Identifying attributes of teacher leaders within the advancement via individual determination program: A survey of school principals. <i>Journal of School Leadership</i> , 20(3), 362-368.
15	collective efficacy	13	Angelle, P., & Teague, G. M. (2014). Teacher leadership and collective efficacy: teacher perceptions in three US school districts. <i>Journal of Educational Administration</i> , 52(6), 738-753.
15	critical theory	13	Vang, M. (2012). Forty acres and a mule: A critical audit of California's Williams Legislation implementation and the implications for educational leaders. <i>Journal of School Leadership</i> , 22(5), 1024-1058.
17	motivation	12	Mountford, M. (2004). Motives and power of school board members: Implications for school board–superintendent relationships. <i>Educational Administration Quarterly</i> , 49(5), 704-741.
17	social network theory	12	Daly, A. J., Liu, Y., Tran, N. A., Cornelissen, F., & Park, V. (2014). The rise of neurotics: Social networks, leadership, and efficacy in district reform. <i>Educational Administration Quarterly</i> , 50(2), 233-278.
19	contingency theory	11	Somech, A. (2010). Participative decision making in schools: A mediating-moderating analytical framework for understanding school and teacher outcomes. <i>Educational Administration Quarterly</i> , 46(2), 174-209.
19	institutional theory	11	Covrig, D. M. (2005). Mountains, flatlands and tenuous meaning: Organizational sociology in administrative sense-making. <i>Journal of School Leadership</i> , 43(1), 102-120.

Table 3 Top 20 Framing Concepts by Centrality Measures

Rank	Theory/concept	Freeman degree centrality	Theory/concept	Beta centrality	Theory/concept	Betweenness
1	trust	54	transformational leadership	6628	instructional leadership	5933
2	instructional leadership	42	trust	5908	trust	2790
3	transformational leadership	39	instructional leadership	4855	organizational theory	2535
4	distributed leadership	38	distributed leadership	4715	distributed leadership	2455
5	social capital theory	33	motivation	4669	transformational leadership	2384
6	social cognitive theory	28	organizational learning	4669	theory of planned behavior	2013
7	collective efficacy	25	organizational/school culture	4636	social capital theory	2013
8	organizational theory	25	organizational theory	4582	job choice theory	1862
9	motivation	24	contingency theory	4110	social justice theory	1800
10	organizational learning	24	social capital theory	3794	motivation	1698
11	contingency theory	23	social network theory	3759	social cognitive theory	1616
12	organizational/school culture	22	organizational citizenship behavior	3398	critical race theory	1420
13	organizational citizenship behavior	21	organizational/school commitment	3322	contingency theory	1400
14	social network theory	18	social cognitive theory	3312	organizational learning	1226
15	social justice theory	17	empowerment	3257	adult learning theory	1141
16	institutional theory	15	distributed cognition	3010	organizational citizenship behavior	1093
17	social exchange theory	14	community of practice	2895	institutional theory	1019

Table 3 *Top 20 Framing Concepts by Centrality Measures (continued)*

Rank	Theory/concept	Freeman degree centrality	Theory/concept	Beta centrality	Theory/concept	Betweenness
18	empowerment	13	institutional theory	2819	organizational/school culture	935
19	community of practice	12	similarity-attraction theory	2753	social justice leadership	917
20	organizational/school commitment	12	collective efficacy	2723	collective efficacy	878
21	social justice leadership	12				

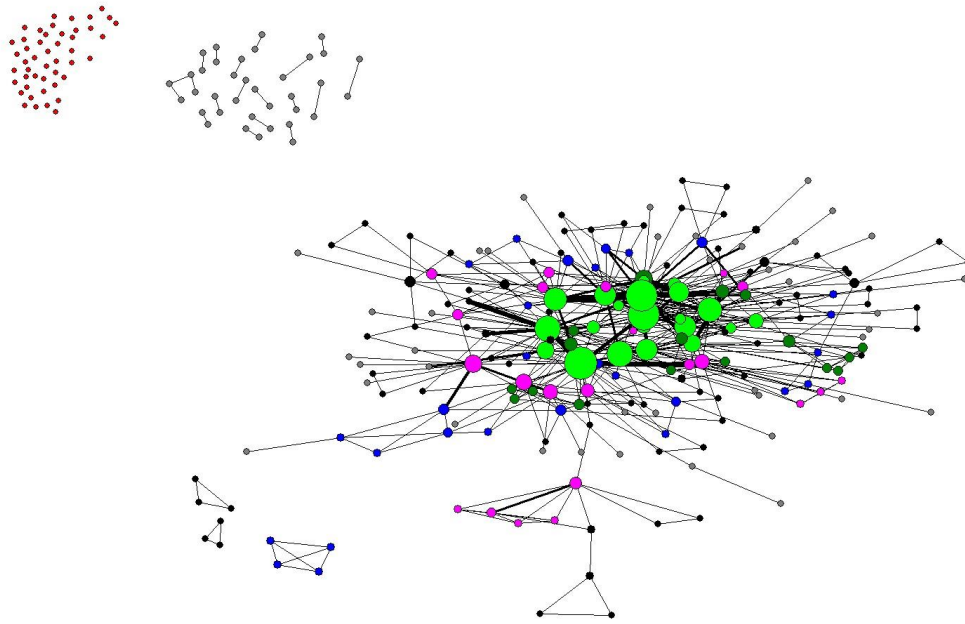


Figure 2 A visualization of concept co-occurrence network of educational leadership. This visualized network contains 295 framing concepts and 489 co-occurrence ties. The node size is proportional to degree centrality (i.e., how many times a theory co-occurs with others in the network), and the node color indicates *k*-cores (0-core nodes in red, 1-core gray, 2-core black, 3-core blue, 4-core pink, 5-core dark green, and 6-core light green).

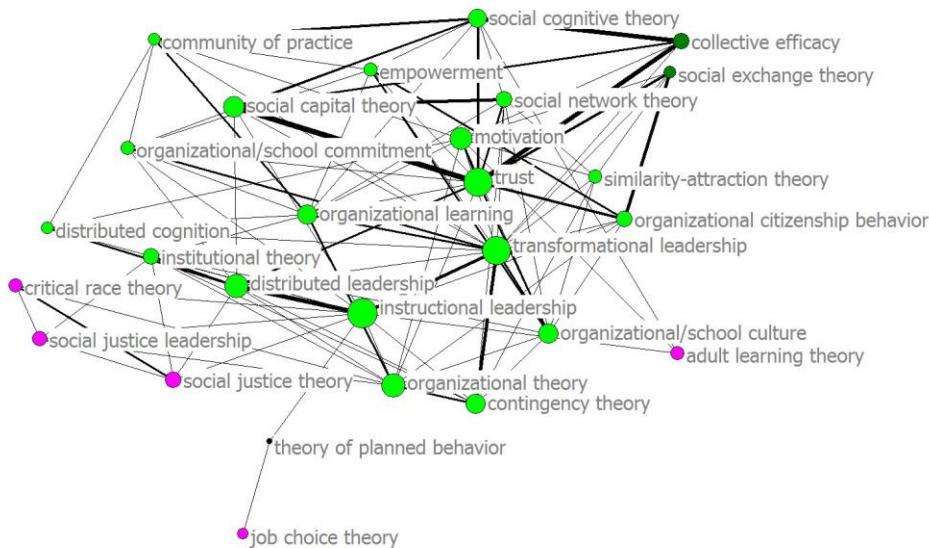


Figure 3 A close-up view of the high-centrality framing concepts. The node size is proportional to degree centrality, the thickness of the ties is proportional to the co-occurrence frequency of a pair of concepts, and the node color indicates *k*-cores.

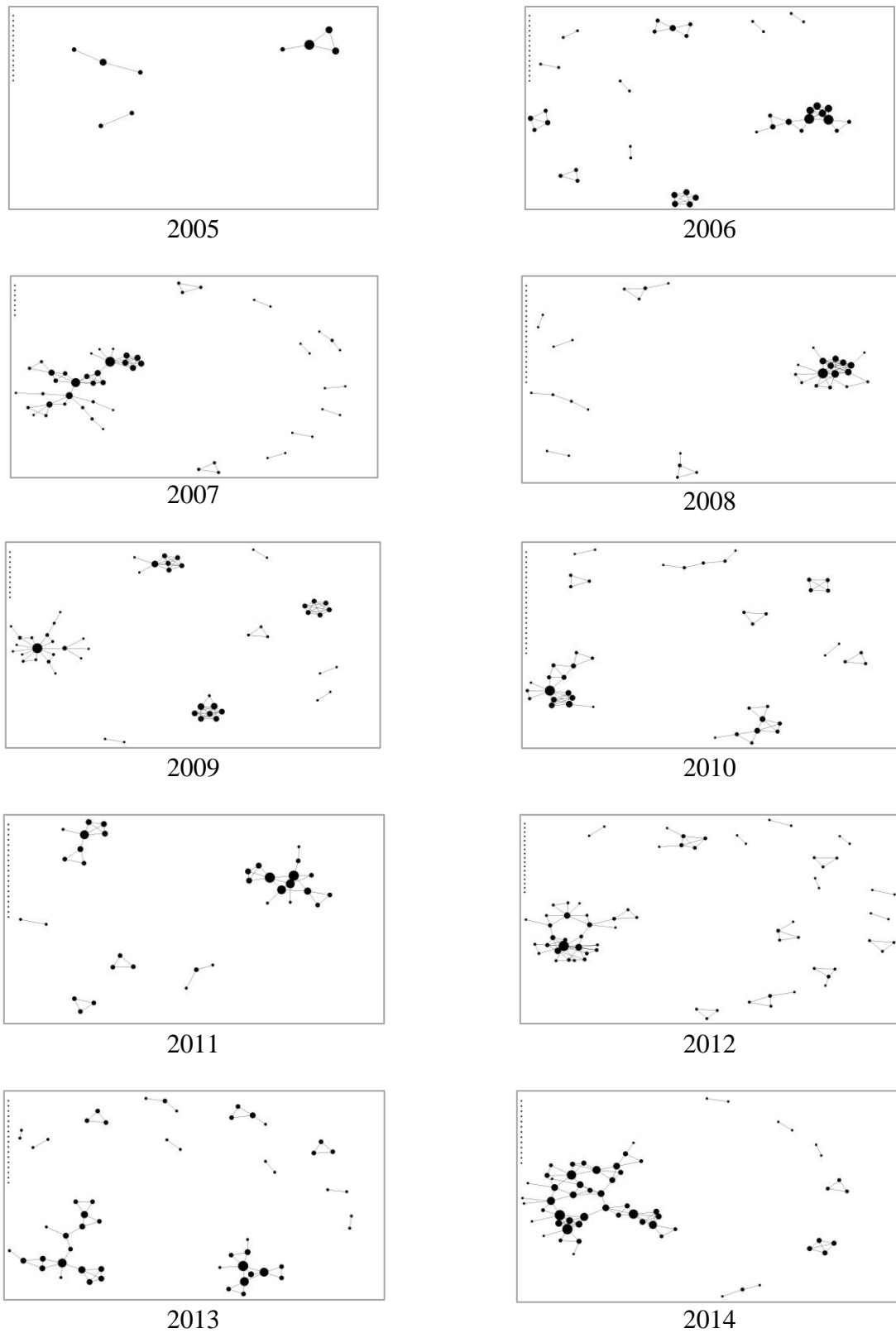


Figure 4 Visualizations of the year-by-year concept co-occurrence network of educational leadership.

Table 4 *Measures of the Concept Co-occurrence Networks of Educational Leadership by Year*

	Number of concepts	Number of co-occurrence ties	Number of components	Component ratio	Fragmentation
2005	21	7	17	0.730	0.960
2006	56	55	25	0.436	0.927
2007	60	67	17	0.271	0.711
2008	55	56	27	0.481	0.894
2009	63	85	19	0.290	0.863
2010	68	64	30	0.433	0.920
2011	53	43	25	0.462	0.896
2012	87	86	32	0.360	0.878
2013	72	59	29	0.394	0.906
2014	73	95	20	0.264	0.634