

Running Head: Why So Difficult?

**Why So Difficult? Exploring Negative Relationships between Educational Leaders: The
Role of Trust, Climate, and Efficacy**

Alan J. Daly¹

University of California, San Diego

Nienke M. Moolenaar

University of California, San Diego

Yi-Hwa Liou

University of California, San Diego

Melissa Tuytens

Ghent University

Contact Information:

Alan J. Daly

University of California, San Diego

ajdaly@ucsd.edu

805.252.7819

¹ The first two authors contributed equally to the work.

Why So Difficult? Exploring Negative Relationships between Educational Leaders: the Role of Trust, Climate, and Efficacy

ABSTRACT

Purpose: Recent work suggests the importance of collaboration among district office and school leaders in support of educational reform. Studies have suggested that different “types” of relationships among educators can support or constrain efforts at reform. Most studies examine pro-social/neutral relationships, while negative social ties, which may be even more consequential, are rarely examined. Therefore, in this study we explore negative professional relationships between educational leaders by exploring factors that may contribute to forming such relationships.

Methods: Survey data were collected from 78 educational leaders in an underperforming school district on perceptions of trust, innovative climate, efficacy, and negative professional relationships. We conducted advanced social network analysis (multilevel $p2$ modeling) to test our hypotheses.

Findings: Results suggest that perceptions of trust, innovative climate, and efficacy were linked to the likelihood of forming negative relationships among leaders. The “senders” of these “difficult” ties tended to be district office leaders who often reported higher efficacy, perceived less trust and innovative climate. The “receivers” of difficult ties were more likely to perceive a more trusting environment, be male, and have been employed in the district longer.

Implications: This work makes a unique methodological and empirical contribution to both the literature on educational leadership and social networks by explicitly exploring negative relationships. The results suggest the importance of perceptual coherence and partnerships between the district office and school leaders to provide opportunities to learn together, build shared beliefs, and of community as a way to align perceptions and reduce negative relationships.

Keywords

Social network analysis; social network theory; multilevel $p2$ modeling, negative ties, difficult professional relationships; trust; innovative climate; efficacy

INTRODUCTION

Education reform has been increasingly relying on educational leaders to collaborate in developing and implementing change at the district and school level (Mintrop & Trujillo, 2005, 2007). Typically, and especially in underperforming systems, educational leaders aim to improve district and school performance through the implementation and optimization of formal structures, processes, and accountability levers (Daly, 2009). While these approaches are important, they have also yielded inconsistent improvement and have led many districts and schools to remain on, and often move toward, more intense accountability sanctions (Mintrop & Trujillo, 2007).

Recent studies indicate that in addition to paying attention to more technical approaches to educational reform, it is also imperative to address the social processes, or “social capital,” involved in the implementation of change efforts, which may be equally influential in the success of school and district improvement (Coburn & Russell, 2008; Daly & Finnigan, 2009; Daly, Moolenaar, Bolivar, & Burke, 2010; Penuel, Riel, Krause, & Frank, 2009). Until recently, studies have mainly examined the social process of reform by focusing on the development of collaborative structures *within* schools (Harris & Chrispeels, 2006; McLaughlin & Talbert, 1993; Newmann & Wehlage, 1995; Stoll & Louis, 2007). However, improved relationships *between* school site principals and district office administrators within a district may be critical in supporting complex, system-wide reform (Copland & Knapp, 2006; Daly & Finnigan, 2009). Building on recent scholarship that suggest the importance of the relational ties between leaders in supporting organizational change (Balkundi & Kilduff, 2005; Bartol & Zhang, 2007; Kilduff & Krackhardt, 2008; Mehra, Dixon, Brass, & Robertson, 2006), this study draws on social network theory to examine relationships between district office leaders and principals in an underperforming district.

Social network theory has the potential to increase our understanding of the social processes involved in educational reform, and how these processes take place among individuals and between levels of the educational system. In general, social network theory focuses on the pattern of social ties that exists between actors in a social network (Scott, 2000), and posits that this pattern of ties between actors within a network of interaction is important as it may facilitate or constrain the flow of resources (e.g., advice, information, materials, etc.) (Carolan, 2013; Degenne & Forsé, 1999). By shifting the main focus from the individual to the relationships among individuals, network scholars foreground the more dynamic supports and constraints that the larger social infrastructure poses to individuals, context, and outcomes (Borgatti & Foster, 2003; Cross, Borgatti, & Parker, 2002; Wellman & Berkowitz, 1998).

Most of the work in the network space focuses on productive relationships between individuals. These pro-social ties (e.g., advice, collaboration) have been associated with a variety of desired outcomes at both the individual and network level (Balkundi & Kilduff, 2005; Daly, 2010; Kilduff & Krackhardt, 2008; Moolenaar, Slegers, & Daly, 2011a). As such, most network studies both in and outside education privilege relatively “positive” or at least neutral ties while typically overlooking “negative” or “difficult” relationships (e.g., Anderson, 2010; Coburn & Russell, 2008; Cole & Weinbaum, 2010; Daly, 2010; Frank, 2009; Frank, Zhao, Penuel, Ellefson, & Porter, 2011; Levine & Marcus, 2010; Penuel et al., 2009; Spillane, Hunt, & Healey, 2009). We argue that this oversight is significant as a number of studies suggest that “negative” (e.g., gossip, avoidance) relations are consequential inhibitors to the exchange of resources and efforts at overall organizational change (Uzzi & Dunlap, 2012; Violino, 2012). In fact, some scholars outside of education have gone so far

as to argue that negative relationships may be even more consequential for outcomes, outweighing the effects of positive ties (Labianca & Brass, 2006; Padgett, Henwood, Abrams, & Drake, 2008; Uchino, Cawthon, Smith, Light, McKenzie, Carlisle, Gunn, Birmingham, & Bowen, 2012). However, empirical study of negative relationships among educators in general, and leaders in particular, is lacking. Moreover, we have limited evidence as to the way in which these negative ties take shape in educational systems that are striving to improve.

Therefore, the aim of this study is to explore factors that may contribute to the likelihood that educational leaders form negative professional relationships. Specifically, we focus on “difficult” professional relationships among district leaders and school site principals, and how such “difficult” ties are likely to occur given leaders’ perceptions of trust, innovative climate, efficacy, and demographics. In exploring our inquiry, we draw on data from 78 educational leaders from one mid-size urban fringe school district in the United States using an advanced social network technique, *p2* modeling (cf., Spillane, Kim, & Frank, 2012), that accounts for the interdependency of social network data. By exploring perceptions of trust, innovative climate, and efficacy as antecedents of difficult ties, this study suggests valuable insights into factors that may be associated with the formation of negative ties as well as add to theory in the area.

THEORETICAL FRAMEWORK

Improvement Context

In response to pressures from the current educational accountability context, districts and schools around the globe are enacting a number of reforms in an effort to improve outcomes (Mintrop, 2004; Mintrop & Trujillo, 2005). Typically such reform efforts include developing individual knowledge and skills, prescriptive curricula, and standardized measurement systems (Mintrop & Trujillo, 2007). This more “technical” focus on educational reform often emphasizes individual capacity and knowledge, and while this is critical, these efforts often background the social aspect of change. However, there is a growing literature base that suggests that in schools with high levels of social capital, consisting of a strong web of social relationships in which trust, risk taking, and interaction are central, educators may be better able to improve outcomes (Bryk & Schneider, 2002; Coleman, 1990; Lin, 2001; Mintrop, 2004; Mintrop & Trujillo, 2007; Pil & Leana, 2009). As such, scholars have argued that, in addition to more traditional technical approaches to reform, it is equally important to pay attention to the social capital that supports schools in the implementation of reform (e.g., Coburn & Russell, 2008; Penuel et al., 2009).

Social capital may not only be an important “asset” within schools, it may also be important at a larger “systemic” level, for instance in school districts and communities (Doerfel & Taylor, 2011; Joslyn & Cigler, 2001; Pollock, 2013). Building on this notion, researchers examining educational systems have begun to move beyond the school to examine interactions between the district office and schools in the work of educational reform (Finnigan, Daly, & Che, 2013; Hightower, Knapp, Marsh, & McLaughlin, 2002; Honig, 2006; Honig & Coburn, 2008; McLaughlin & Talbert, 2003; Rorrer, Skrla, & Scheurich, 2008; Togneri & Anderson, 2003). This line of work suggests the importance of social relationships between district office administrators and site leaders in aligning processes and structures to support a more coherent approach to reform (Agullard & Goughnour,

2006; Honig, Copland, Rainey, Lorton, & Newton, 2010; Honig & Ikemoto, 2008; Rorrer et al., 2008).

Studies of districts that applied such a systemic approach to change indicate a range of specific strategies that district offices and schools can take in building stronger relationships (Honig, 2004; Togneri & Anderson, 2003). These strategies include creating opportunities for increased collaboration (McLaughlin & Talbert, 2003), developing learning partnerships (Copland & Knapp, 2006), enhancing communication (Agullard & Goughnour, 2006), and distributing leadership (Leithwood, Mascall, Strauss, Sacks, Memon, & Yashkina, 2007; Spillane, 2006). While this research suggests the importance of a pro-social network of social relationships among district leaders and school site principals in supporting improvement, the literature base largely overlooks “negative” relationships between leaders that may inhibit reform. In order to theorize both the importance of relationships among district leaders and school site principals as well as negative ties, we draw on social network theory.

Social Network Theory and Negative Ties

Social network theory provides a framework for understanding the social processes between district and site leaders (Daly & Finnigan, 2011). Generally speaking, social network theory is concerned with the pattern of social ties that exists between individuals in a social network (Scott, 2000). A social network perspective is a move away from a strict focus on individual attributes to understanding the affordances and constraints of the larger social infrastructure (Borgatti & Foster, 2003; Cross et al., 2002; Wellman & Berkowitz, 1998). A network approach does not supplant the importance of individual attributes, but provides an additional perspective.

As in other fields, social network studies in education (e.g., Anderson, 2010; Coburn & Russell, 2008; Cole & Weinbaum, 2010; Daly, 2010; Frank, 2009; Frank et al., 2011; Levine & Marcus, 2010; Moolenaar, 2010; Penuel et al., 2009; Spillane et al., 2009), primarily focus on the pattern of relationships among individuals, the way in which this pattern of ties facilitates or constrains the flow of “relational resources” (information, ideas, advice, etc.), and how individuals both gain and distribute these resources (Degenne & Forsé, 1999). As with other perspectives, social network studies make several basic assumptions (Degenne & Forsé, 1999). First, actors in a social network are assumed to be interdependent and interconnected (Degenne & Forsé, 1999; Wasserman & Faust, 1994). Second, relationships are regarded as ties that provide for the exchange and flow of resources between actors (Burt, 1982, 1997; Kilduff & Tsai, 2003; Powell, Koput, & Smith-Doerr, 1996). Third, the structure of a network has influence on the resources that flow to and from an individual and across a system (Borgatti & Foster, 2003). Fourth, social networks yield both opportunities and constraints for individual and collective action (Brass & Burkhardt, 1993; Burt, 1982; Gulati, 1995).

A growing body of work in education suggests that social ties and resulting networks are consequential in terms of supporting or constraining the exchange of best practices, collaboration, support, and advice seeking (Daly & Finnigan, 2009; Liou & Daly, in press; Moolenaar et al., 2011a; Spillane et al., 2012). These pro-social or positive ties with others within a workplace can be beneficial to both the individual as well as the overall organization in terms of increasing effectiveness and meeting goals (e.g., Crosby, 1982; Cross, Cowen, Vertucci, & Thomas, in press; Cross, Ehrlich, Dawson, & Helderich, 2008; Liou, Daly, Forbes, Moolenaar, Cornelissen, & Hsiao,

2013; Mathieu & Zajac, 1990). Dense pro-social networks have been found to result in increased productivity, higher levels of innovation, and improved organizational functioning (Daly, Liou, & Moolenaar, 2013; Katzenbach & Smith, 1993; Lawler, 1992; Reagans & Zuckerman, 2001; Tsai & Ghoshal, 1998; Walker, Kogut, & Shah, 1997).

While positive relationships may facilitate information transfer that improves group or organizational outcomes (Daly, 2010; Tsai, 2001), negative relationships may impede exchanges that are beneficial to organizational improvement (Labianca & Brass, 2006). In general, studies on negative relationships are rare, especially among educators, likely because of the difficulty of collecting empirical data to examine such relationships. In classroom research, there have been a few studies investigating bully-victim relationships (e.g., Huitsing, van Duijn, Snijders, Wang, Sainio, Salmivalli, & Veenstra, 2012; Sijtsema, Ojanen, Veenstra, Lindenberg, Hawley, & Little, 2010; Veenstra, Lindenberg, Zijlstra, De Winter, Verhulst, & Ormel, 2007; Zijlstra, Veenstra, & Van Duijn, 2008) that shed light on the social structure of such negative relationships. Recently, organizational research has started to examine such relationships by studying maladaptive relationships (e.g., gossip and maltreatment) and this work suggest the importance of the role of negative effects of these relationships in terms of organizational and relational outcomes (Blase & Blase, 2002; Ellwardt, Wittek, & Wielers, 2012; Grosser, Lopez-Kidwell, & Labianca, 2010) and workplace difficulties (Labianca & Brass, 2006; Robins, Judge, Odendaal, & Roodt, 2009; Venkataramani, LaBianca, & Grosser, in press). Moreover, this literature suggests that such negative relationships may in fact overshadow the effects of positive ties (Padgett et al., 2008; Uchino et al., 2012).

Our understanding of how relationships, both positive and negative, among educators form, and which factors contribute to tie formation, is limited (cf., Spillane et al., 2012). Over time, judgments regarding “like and dislike” of individuals, along with the complex emotions, attitudes (Leskovec, Huttenlocher, & Kleinberg, 2010), and perceptions associated with individuals, lead people to form personal schemas about those with whom they interact (Labianca & Brass, 2006). This complex mix of schemas, cognitions, and emotions are likely to influence interactions and ability to connect. In this regard, negative relationships may in fact represent an enduring, recurring set of negative judgments, feelings, and behaviors toward another, which may inhibit or constrain the flow of resources or work flows in an organization and as such may have greater explanatory power as to outcomes than positive or neutral events (e.g., Labianca & Brass, 2006; Taylor, 1991).

In sum, the literature suggests the constraining influence of negative ties on the quality of information flow and network cohesiveness, which in turn may result in less distribution and utilization of critical information necessary for effective change efforts. However, we have limited empirical work investigating the topic. Therefore, better understanding and theory development regarding the potential factors that may increase the likelihood of sending, receiving, or sharing negative ties is important. In the next section we hypothesize several factors that may be related to the formation of negative ties.

The Density and Reciprocity of Negative Ties

Network density. In social systems there are both positive (e.g., friendship) and negative (e.g., difficult) relationships. The constellation of these ties across individuals forms an overall pattern, which enables researchers to describe both the quality and quantity of the network. One of the most

useful measures in networks in this regard is “density,” which is the proportion of existing to potential ties in a network. Studies estimate that negative relationships make up only one to eight percent of the total number of relationships in an organization (e.g., Baldwin, Bedell, & Johnson, 1997; Gersick, Bartunek, & Dutton, 2000; Kane & Labianca, 2005; Labianca & Brass, 2006; Labianca, Brass, & Gray, 1998). Although rare, these difficult ties are argued to be consequential as they create either active gaps in the network or passive bottlenecks in terms of moving information. For example, if a person dislikes you, that person may make it more difficult for you to accomplish your tasks by withholding important information, failing to provide necessary supports, or damaging your reputation through the spread of gossip. In a typical workplace setting it may be challenging to cut these negative ties due to workflow, interdependence, and hierarchy (Bakkenes, De Brabander, & Imants, 1999; Labianca & Brass, 2006) and as such these negative/difficult ties can be particularly problematic in systems that are attempting to build coherence around a change effort, such as a district. Given that the limited studies on negative ties have suggested these relationships are rare, we hypothesize that the difficult professional relationship network will be made up of few ties, and as such represent a sparse network (Hypothesis 1).

Reciprocal negative ties. Studies in organizations and classrooms indicate that negative relationships, in comparison to positive relationships, are more likely to be reciprocated, meaning that if one person dislikes another, this “disliking” relationship is likely to be mutual (Card, 2010; Huitsing et al., 2012; Labianca & Brass, 2006). These reciprocated negative ties are likely to create additional social liabilities as they represent at best a gap in the network or at worst an ongoing conflict that can grow and diffuse across a system influencing other actors. These conflicts inhibit the flow of resources both between the individuals as well as the larger network, due in part to the self-reinforcing cycle of negative responses. Following these studies we hypothesize that difficult professional relationships among educational leaders are likely to be reciprocated (Hypothesis 2).

Sending or receiving negative ties. A negative relationship can also exist in the form of a unidirectional (one-way) relationship with an individual either being the initiator (‘sender’) or the recipient (‘receiver’) of a negative relationship. In the following paragraph, we hypothesize that certain factors at the individual level (e.g., perceptions of trust, innovative climate, and efficacy), and demographics (e.g., work level, gender, and experience) may contribute to sending and/or receiving negative ties among educational leaders as they work together in improving outcomes. In addition, we hypothesize that negative relationships may form as a result of “dyadic” characteristics that describe similarity between two individuals, for instance when both individuals are at the same work level. In estimating the likelihood of leaders to send and/or receive negative ties, we draw on several key factors that the literature suggests may be associated with negative ties. For each area we provide a general overview and associated hypotheses.

Individual Characteristics Associated with the Formation of Negative Ties

Trust. Trust is an interactive process with each party discerning the trustworthiness of the other (Bryk & Schneider, 2002; Tschannen-Moran, 2004). Trust plays an important role in social relationships and typically results from interpersonal interdependence (Rousseau, Sitkin, Burt, & Camerer, 1998) and being embedded in a network of relationships (Hoy & Tschannen-Moran, 2003). Given these core ideas, trust has been conceptualized as a multi-faceted construct that can be defined as an individual’s or group’s willingness to be vulnerable to another party based on the

confidence that the latter party is benevolent, reliable, competent, honest, and open (Cummings & Bromiley, 1996; Daly & Chrispeels, 2008; Hoy & Tschannen-Moran, 2003).

In educational settings, trust has been found to be an important component of improvement, innovation, and reform (Forsyth, Adams, & Hoy, 2011; Moolenaar & Slegers, 2010; Tschannen-Moran, 2004; Van Maele & Van Houtte, 2012). As a relational resource, trust has been associated with cooperation and collaboration (Bryk & Schneider, 2002; Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010; Cosner, 2009; Deutsch, 1958; Hoy & Tschannen-Moran, 2003; Kensler, Caskie, Barber, & White, 2009; Tschannen-Moran, 2001, 2004), group cohesiveness (Zand, 1997), and social network structure (Moolenaar & Slegers, 2010; Moolenaar, Karsten, Slegers, & Daly, in press; Van Maele, Moolenaar, & Daly, 2013). When individuals feel able to take risks with one another and expose vulnerabilities, they are better able to seek support and feedback, share concern, and connect to others across units within an organization (Bryk & Schneider, 2002; Edmondson, 2004; Moolenaar et al., in press; Tschannen-Moran, 2004).

Conversely, as high levels of trust are associated with an increased likelihood of engaging in supportive relationships, research also suggests that school climates characterized by low trust, or even distrust, may negatively impact relationships (Bryk & Schneider, 2002; Tschannen-Moran, 2004). A number of studies have suggested that a lack of trust can lead to a rigid response to change efforts that inhibit risk taking and innovative and flexible approaches to change (Daly, 2009; Olsen & Sexton, 2009; Tuytens & Devos, 2010). Moreover, low levels of trust have also been associated with lower academic outcomes in comparison to higher performing schools (Bryk & Schneider, 2002). Further, a lack of trust has been associated with higher levels of stress and pressure that erode positive social interactions both within and outside the school community (Troman, 2000). These low trust environments may lead to difficulty in reaching consensus and result in sustained conflictual environments (Bryk & Schneider, 2002). Moreover, in high distrust contexts, educators are also less likely to engage with one another, which may contribute to creating a climate of isolation and misunderstanding (Hoy & Tschannen-Moran, 2003; Sergiovanni, 2005). Therefore, given that high trust is viewed as important in positive educational outcomes, and that low trust environments may be more conducive to climates of isolation and conflict, we hypothesize that leaders who perceive their environment to be characterized by low trust will have a higher likelihood of sending and receiving difficult professional relationships (Hypothesis 3).

Innovative climate. While the development, adoption, and implementation of actual innovations is an important field of inquiry for understanding school improvement (Ellis, 2005; Fullan, 1992; Huberman & Miles, 1984), literature has also argued that organizations with climates that are open to innovation, in which members are willing to take risks, and share new ideas to improve the organization, are more successful at implementing actual innovations than organizations with less innovative climates (Geijsel, 2001; Van den Berg & Slegers, 1996). An innovative climate can be conceptualized as the shared perceptions of organizational members concerning the practices, procedures, and behaviors that promote the generation of new knowledge and practices (Van der Vegt, Van de Vliert, & Huang, 2005). Research suggests that when educators perceive their organization's climate to be innovative and openly orientated towards new practices and change, they are more inclined to seek others out for work related interactions and the development of innovative practices (Amabile, 1998; Moolenaar et al., 2011a; Moolenaar & Slegers, 2010).

In contrast, research also suggests that in risk averse climates, meaning those in which there is limited openness to new practices and the risk taking, individuals are less likely to engage in “exploration” and absorption of novel information, which includes forming new relationships (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; March, 1991; Nystrom, Ramamurthy, & Wilson, 2002; Tsai & Ghoshal, 1998). As such, individuals may be less open, approachable, and willing to experiment, which may foster a climate of isolation, lowered trust, and maintenance of the status quo (Daly, 2009). Further, a low level of perceived innovative climate and social engagement has also been associated with limited ability to embrace and enact change (Daly & Finnigan, 2011; Greenhalgh et al., 2004). Leaders who are risk averse may have greater difficulty gleaning information from team members in terms of problem solving efforts and change initiatives (Gürhan-Canli & Batra, 2004; Moolenaar, Daly, & Slegers, 2010; Moolenaar & Slegers, 2010). Moreover, those leaders who perceive the environment to be risk averse are also less likely to support the risk taking and interactions of subordinates, which in turn may reduce the overall system’s ability to innovate and develop new strong ties within the organization (Greenhalgh et al., 2004; Nystrom et al., 2002). Therefore, we hypothesize that leaders who perceive their environment to be less innovative will have a higher likelihood of sending and receiving difficult professional relationships (Hypothesis 4).

Efficacy. Individuals’ sense of efficacy (self-efficacy) refers to one’s belief that she/he can successfully take actions to accomplish certain tasks or achieve some goals (e.g., leaders’ confidence to implement reform or affect learning) (Bandura, 1993, 1997). Efficacy has been studied widely in psychology, business, and other fields. In education, researchers have investigated several aspects of efficacy including: students’ self-efficacy (Pajares, 1996, 1997), teachers’ self-efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998), and collective efficacy among teachers (Goddard, Hoy, & Woolfolk Hoy, 2000). Scholars argue that educators’ perceptions of efficacy are related to their collaboration and interdependency in social relationships, as well as the amount and type of social relationships in which they engage (Bandura, 1993; Kurz & Knight, 2004; MacKenzie, 2000; Moolenaar, Slegers, & Daly, 2011b).

Extending the concept of self-efficacy to the field of educational leadership, recent studies have examined leader efficacy in the context of school organizations (Gareis & Tschannen-Moran, 2005; Leithwood & Jantzi, 2008; Louis, Leithwood, Wahlstrom, & Anderson, 2010; McCullers & Bozeman, 2010; Smith, Guarino, Strom, & Reed, 2003; Tschannen-Moran & Gareis, 2004). These studies suggest that to affect learning, educational leaders need to possess not only the skills and knowledge necessary to lead but also the belief that they can successfully implement educational change and achieve purposive goals (Leithwood & Jantzi, 2008; McCormick, 2001; McCullers, 2009; Smith et al., 2003). As school leaders occupy key positions within school organizations and their perceptions about their own ability to carry out leadership is crucial to improved teaching and learning, district/school leaders who believe in their ability to lead changes may be more likely to successfully enact reform efforts (Bandura, 1977, 1986; Carr, 2008; Cohen, 2006; Fullan, 2002, 2007; Lunenburg & Ornstein, 2008; Paglis & Green, 2002; Tschannen-Moran & Gareis, 2004). Moreover, highly efficacious leaders may persist longer in carrying out such efforts when they encounter obstacles, as well as being able to motivate others to implement and sustain reform efforts (Gareis & Tschannen-Moran, 2005; Pitre, 2003; Tschannen-Moran & Gareis, 2004). This suggests that persistence in one’s efforts through interaction with others is important in achieving specific goals. Highly efficacious leaders, therefore, are able to connect with others and motivate them in terms of moving and sustaining change efforts.

Despite the positive outcomes of positive self-efficacy, there is also a growing line of work that suggests high self-efficacy beliefs do not always lead to positive outcomes as these beliefs may actually lead to an unrealistic overestimation of performance (Vancouver & Kendall, 2006; Vancouver, Thompson, & Tischner, 2002; Vancouver, Thompson, & Williams, 2001). Bandura observed a similar effect when students playing a management simulation game retained a high level of self-efficacy in the face of declining performance, referred to as the complacency of self-assurance (Bandura, 1977, 1997). High levels of self-efficacy may reduce motivation to improve and as such inhibit future performance as these highly efficacious individuals may have a premature belief that a goal has been reached and therefore may provide less effort in reaching that goal (Moore & Chang, 2009; Vancouver & Kendall, 2006). In support of this idea of complacency, Bandura and Locke (2003), stated, “some self-doubt about one’s performance efficacy provides incentives to acquire the knowledge and skills needed to master the challenges.” In education, efficacy doubts have indeed been suggested to be potentially beneficial for educational reform as they support learning and reflection (Wheatley, 2002). A lack of such doubts, or over-estimation of one’s own capacity may actually negatively impact an individual, as they may be more likely to revert back to previous approaches and resist change (Wheatley, 2002). Moreover, recent work suggests that leaders who overestimate their leadership skill sets are associated with lower levels of teacher attitude and school culture variables than “under estimators” (Devos, Hulpia, Tuytens & Sinnaeve, 2013). In general, this seems to indicate that overly efficacious leaders/over estimators may actually have a “blind spot” in judging their abilities and those of others, which seems to also negatively effect the overall organization.

In sum, high efficacy individuals tend to work with and through others in accomplishing goals and as such often make additional social connections. An increase in the number of relationships associated with higher efficacy also may result in some of these ties becoming negative due in part to perhaps an inflated sense of self-confidence, complacency, and potential commitment to the status quo. For example, complacency or over-confidence may result in leaders sending negative ties to others not viewed as “accomplished” or to those who might call into question the highly self-efficacious leader’s approach to work. Others may also tire of a highly self-efficacious leader’s over-estimation of abilities and contributions. Therefore, we hypothesize that leaders who report higher levels of efficacy will have a higher likelihood of sending and receiving difficult professional relationships (Hypothesis 5).

Demographic Characteristics Associated with the Formation of Negative Ties

Social network studies in education have suggested that in addition to more perhaps malleable climate and beliefs, such as the factors described above, the formation of social relationships may also be dependent on demographic characteristics (Heyl, 1996; Moolenaar, 2010; Moolenaar et al., in press; Spillane et al., 2012). Leaders bring experiences, training, and hold formal roles in organizations, all of which may be associated with the sending and receiving of negative ties. Following this argument, we focus on work level, gender, and years of experience as demographic characteristics that may potentially affect leaders’ likelihood to be engaged in difficult professional relationships.

Work level. Previous research in organizations (Lazega & Van Duijn, 1997; Moore, 1990) and education (Coburn & Russell, 2008; Daly & Finnigan, 2009; Spillane et al., 2012) suggests that the formal position of individuals (e.g., role, grade level, and work level) may be related to the extent to

which they are engaged in social relationships. For instance, Lazega and Van Duijn (1997) found that lawyers were more often sought out for advice when they held a higher hierarchical position. Similarly, the amount of relationships in which leaders are involved may be partly defined by the requirements and affordances provided by their work level (district office versus school sites) by way of professional development and opportunities to interact (Daly & Finnigan, 2011; Honig, 2006; Spillane et al., 2012).

Research outside education has indicated that the network position of an organizational leader is important in terms of accessing and leveraging social resources through social relationships as well as brokering to others who are themselves disconnected (Balkundi & Harrison, 2006; Balkundi & Kilduff, 2005). As district leaders are expected to relay important policy and organizational information from the district office to site principals and as such “broker” information among other leaders in the district (e.g., Coburn & Russell, 2008; Daly, Finnigan, Jordan, Moolenaar, & Che, in press), they may not only generate more relational “traffic” in general, but also run a higher “risk” to be involved in more “difficult” professional relationships. We therefore expect that leaders in the district office are more likely to send and receive more relationships than principals given their formal position in the organizational hierarchy and as such we hypothesize that district office leaders will have a higher likelihood of sending and receiving difficult professional relationships (Hypothesis 6).

Gender. Research outside education has indicated that the likelihood of being involved in social relationships may be associated with gender (Ibarra, 1993, 1995; Moore, 1990; Pugliesi & Shook, 1998; Stoloff, Glanville, & Bienenstock, 1999) and that, in general, women tend to be engaged in more social relationships than men (Mehra, Kilduff, & Brass, 2001). These differences appear to be consistent throughout life, and can already be found in early childhood (Frydenberg & Lewis, 1993; Parker & De Vries, 1993; Van der Pompe & De Heus, 1993). In several settings, men have been shown to be more frequently sought out for relationships by both men and women in order to achieve goals and acquire information from more distant connections (Aldrich, Reese, & Dubini, 1989). As these studies have all taken place outside education, we have to take into account that these gender differences may not hold in educational settings, especially since such settings are typically characterized by a high percentage of women (e.g., Moolenaar, 2010). Research in schools until now has provided no evidence of gender differences among male and female teachers in the amount of relationships they send and receive (e.g., Moolenaar et al., in press). Yet, studies have found that there are suggestions of gender differences in educational leadership style, with women tending to display more transformational leadership styles and men engaging in more transactional exchanges (Ostos, 2012). This difference is potentially important, as transformational leaders are more likely to be engaged in more social relationships (Leithwood & Jantzi, 2005; Moolenaar et al., 2010). Based on the limited work available, we include a hypothesis around gender differences by suggesting that female leaders may have a higher likelihood to be involved in social relationships given the larger percentage of women in education and identified tendency toward transformational leadership. Therefore, we hypothesize that female leaders will have a higher likelihood of sending and receiving difficult professional relationships than male leaders (Hypothesis 7).

Experience. Finally, the likelihood of forming social relationships may also be affected by the demographic characteristic of seniority, or years of experience in a particular organization. Results from the law study mentioned earlier (Lazega & Van Duijn, 1997) suggested that senior lawyers were more often sought for advice than junior lawyers. Senior lawyers had a higher likelihood of being

asked for advice because they have more work experience, as well as possess a strong and reliable network through which they may acquire resources that are more difficult to access for more junior lawyers. In educational settings, recent work suggests that more experienced educators, who have had more opportunities to develop and strengthen relationships, tended to have more social relationships, and possess a more diverse network, than less experienced educators (Daly, Moolenaar, Der-Martirosian, & Liou, in press; Moolenaar, 2010; Moolenaar et al., in press; Van Waes, Van den Bossche, & Van Petegem, 2013). Accordingly, we hypothesize that educational leaders who have been working in the district for a longer period of time will have had more time and opportunities to build their network, and consequentially, will have a higher likelihood of sending and receiving difficult professional relationships than educational leaders with fewer years of experience in the district (Hypothesis 8).

Dyadic Characteristics Associated with the Formation of Negative Ties

In addition to individual factors affecting the likelihood of forming negative ties, we may also argue that similarities between individuals may result in the formation of a negative tie. This suggestion is grounded in the concept of network homophily. Network homophily is arguably the most well-known social network concept that often explicitly focuses on shared demographic characteristics of network members. The concept of homophily, also known by the adage “birds of a feather flock together,” addresses the increased likelihood of similar individuals forming a dyadic (paired) relationship. Homophily literature builds on the notion that individuals are more likely to develop and maintain social relationships with others that are similar to them on specific attributes, such as gender, organizational unit, or educational level (Marsden, 1988). Similarly, individuals who differ from each other on a specific attribute are less likely to initiate relationships, and when they do, heterophilous relationships also tend to dissolve at a faster pace than homophilous relationships (McPherson, Smith-Lovin, & Cook, 2001). In this study we focus on two types of similarity that may define leaders’ relationships and influence development of negative ties, namely work level and gender similarity.

Work level similarity. Studies suggest that educators who work at a similar level in terms of position are more likely to interact with each other than with others who occupy different positions (Coburn & Russell, 2008). Leaders’ work level (district office or school site) may to a certain extent affect the amount of interaction among educators since leaders at different work levels, and in different roles, may attend different professional development initiatives and leadership meetings (Daly et al., 2010; McLaughlin & Talbert, 1993). Leaders at different work levels may have less shared experiences and less opportunities to interact with one other, while leaders who share similar work levels may be in more frequent contact than more “distantly” located leaders. These shared experiences and increased opportunities to interact may result in a higher likelihood for leaders from similar work levels to interact with each other (Moolenaar et al., in press; Suitor & Pillemer, 2000), and as such, also have a higher likelihood to develop negative ties. Therefore, we hypothesize that leaders who work at the same work level (district office or school site) will have a higher likelihood to form difficult professional relationships than leaders who work at different work levels (Hypothesis 9).

Gender similarity. Gender similarity between leaders may affect their likelihood to develop difficult professional relationships (e.g., Moolenaar et al., in press). Often, organizations are found to be segregated across gender lines (Bielby & Baron, 1986; McGuire, 2000; McPherson & Smith-Lovin, 1986, 1987), and in education, studies found that same-gender work relations are more frequent and

intense than relationships with the opposite gender (Heyl, 1996; Moolenaar, 2010). Building on these findings, we hypothesize that leaders will have a higher likelihood to form same-gender difficult professional relationships than relationships with leaders of the opposite gender (Hypothesis 10).

Based on the literature we pose ten separate hypotheses in regard to the individual, demographic, and dyadic characteristics associated with the likelihood of forming difficult professional ties. For ease of review, these factors and associated hypotheses as well as study findings are provided in Table 7.

METHOD

Sample

The data for this study were gathered at an underperforming urban fringe school district in California in 2011. Data were collected from a total of 78 educational administrators, reflecting a response rate of 81%. These educational administrators worked at either the district office ($N = 34$) or as a principal at one of the district's school sites ($N = 44$). Of the sample, 62.8 % was female. Administrators had been between 1 and 37 years of experience working in the district ($M = 13.2$ years, $SD = 8.7$). Additional sample demographics and mean scores are presented in Table 1.

Insert Table 1 About Here

Instruments

Social networks. We collected data on the relationships among district office and site leaders using a social network survey. Based on earlier work (Daly et al., 2010; Labianca & Brass, 2006; Moolenaar et al., 2011; Moolenaar et al., 2010, 2011; Moolenaar, Slegers, Karsten, & Daly, 2012), we developed a network question that would address a “negative” relationship, while limiting the risk of respondent attrition due to the nature of the question. In addition, we crafted a question that would represent the negative affectivity typically associated with negative ties, without making respondents unnecessarily uncomfortable. Therefore in examining the negative ties among educational leaders, we asked respondents: “With whom do you have a difficult professional relationship?” This was followed with a clarifying prompt, “By ‘difficult’ we mean a relationship in which you have to exert significant extra effort to communicate, share perspectives, and/or come to a common understanding about important topics.” Our field tests of this “negative relationship” item suggested that the question tapped into the negative affectivity we were interested in without “turning off” respondents. For ease of response, we provided a roster with the names of the district office leaders and the school site principals. Respondents could indicate with whom they had a difficult professional relationship by selecting any of the names of their fellow administrators. The number of nominations that respondents could make was unlimited.

Trust. Trust among the educational administrators was assessed with a modified scale that has been widely used in education (Daly & Finnigan, 2012; Goddard, Tschannen-Moran, & Hoy, 2001). The items assess the degree to which educational administrators perceive their colleagues as being open,

honest, trustworthy, and reliable. A sample item to measure trust is, “Even in difficult situations, administrators can depend on each other.” The scale included a Likert-type scale, ranging from 1 (Strongly disagree) to 6 (Agree). The scale had a high internal consistency (4 items, $\alpha = .87$). Principal component analysis with varimax rotation resulted in a single-factor solution that explained 60.9 % of the variance.

Innovative climate. The innovative climate scale was composed of items targeted at the district office and principals, based on a modified version of a well used scale (Bryk, Camburn, & Louis, 1999; Consortium on Chicago School Research, 2004). These items reflect the extent to which the educational administrators perceive their environment to be open to innovation and are willing to take risks to improve the organization. The items were targeted once at the district office and again at the principals in order to measure the perceived level of innovative climate at the district office as well as the innovative climate of the principals. A sample item to measure innovative climate is, “Administrators in the district office/principals are generally willing to try new ideas.” Respondents could rate the items on a Likert-type scale, ranging from 1 (Strongly disagree) to 6 (Agree). The internal consistency of the scale was high for both the district office (7 items, $\alpha = .96$) as well as the principals (7 items, $\alpha = .96$). For the Innovative Climate – District office construct, principal component analysis with varimax rotation yielded a single-factor solution that explained 80.0 % of the variance. For the Innovative Climate – Principals construct, a principal component analysis with varimax rotation yielded a single-factor solution that explained 81.3 % of the variance. The correlation between both types of innovative climate were found to be high ($r = .71, p < .01$) and a principal component analysis with direct oblimin rotation in which both scales were included, yielded a two-factor solution that explained 69.7 % of the variance with the original items loading highly onto their respective a priori scales (for Innovative Climate – District office .73-.97 and for Innovative Climate - Principals .63-.98).

Efficacy. We drew upon a modified and shortened version of the Leadership Efficacy Scale used in Tschannen-Moran and Gareis’ (2004, 2005) studies as well as in our previous work (Authors, 2011, 2013) that examined the perceptions of efficacy for instructional improvement, which allowed us to capture perceptions of individual efficacy. The efficacy scale comprised of four items which all began with the sentence stem, “In your current role as a leader, to what extent can you... generate enthusiasm for a shared vision?” Responses for each item were based on a 9-point Likert scale ranging from “None at all” to “A great deal.” The scale had a high reliability (4 items, $\alpha = .92$), and principal component analysis with varimax rotation yielded a single-factor solution explaining 80.8 % of the variance.

The items and factor loadings of all principal component analyses for each of the constructs are summarized in Table 2.

Insert Table 2 About Here

Demographic variables. Several demographic variables were included to examine the influence of demographics on the likelihood of having difficult professional relationships. The following individual variables were included: years of experience in the district, work level (district office/school site), and gender (male/female).

Data Analysis

Social networks. We first provide a visualization of the difficult professional ties of the leaders in order to highlight the pattern of difficult ties across the leadership group using Netdraw (Borgatti, 2002). In order to quantify the network of difficult professional relationships between district and site administrators, we calculated various network measures using the Ucinet 6.0 software package (Borgatti, Everett, & Freeman, 2002). For each administrator, we calculated out-degree, in-degree, and ego-reciprocity. The social network measure of *out-degree* corresponds to the number of colleagues nominated by the respondent with whom they have a difficult relationship and can be interpreted as an indication of individual “activity”. In other words, leaders with high out-degree nominate more individuals as ‘being difficult’ compared to leaders with low out-degree. The measure of *in-degree* reflects the number of colleagues from whom the respondent received a difficult tie nomination, and can thus be regarded as an indication of individual “popularity”. Meaning, leaders with high in-degree are viewed as often being more “difficult” in comparison to leaders with low in-degree. The average in-degree is the same as the average out-degree, since each out-going relationship for one administrator also implies an in-coming relationship for another administrator. The standard deviations of the out- and in-degrees reflect the variability among administrators in the amount of out-going and in-coming relationships, and can therefore be different for the out-degrees and in-degrees. *Ego-reciprocity* reflects the percentage of difficult ties of an administrator that are reciprocated and is calculated as the ratio of reciprocated relationships to the total number of relationships for an individual. Ego-reciprocity ranges from 0 (none of the administrator’s difficult relationships are reciprocated) to 100 (all of the administrator’s difficult relationships are reciprocated).

Descriptive and inferential statistics. We calculated descriptive and inferential statistics for the scales assessing trust, innovative climate (district and principal), and efficacy.

Testing the Hypotheses

Because of the interdependency of the data of the dependent variable (relationships among individuals), the assumption of data independence that underlies “conventional” regression models is violated. Therefore, we conducted *p2* modeling to test the effect of individual and dyadic characteristics on having difficult professional relationships (Baerveldt, Van Duijn, Vermeij, & Van Hemert, 2004; Van Duijn, Snijders, & Zijlstra, 2004). We used the *p2* program within the StOCNET software suite to run the multilevel *p2* models (Van Duijn et al., 2004; Zijlstra, 2008; Zijlstra, Van Duijn, & Snijders 2006).

The *p2* model is similar to a logistic regression model, but is developed to handle dichotomous dyadic outcomes. In contrast to a univariate logistic regression model, the *p2* model controls for the interdependency that resides in social network data. The *p2* model regards sender and receiver effects as latent (i.e., unobserved) random variables that can be explained by sender and receiver characteristics (Veenstra et al., 2007). In the *p2* analyses, the dependent variable is the aggregate of all the nominations a team member sent to or received from others. A positive effect thus indicates that the independent variable (e.g., an administrator’s level of trust) has a positive effect on the likelihood of having a relationship (in this study, a difficult professional relationship). Similar to conventional logistic regression, the regression coefficients (reported as log odds ratios) reflect the expected change in the log of the odds associated with a one-unit change in the independent variable (Pedhazur, 1997). Meaning, a one-unit change in the independent variable will result in a change in

the likelihood of having a relationship that is comparable to the log odds of the reported coefficient with the corresponding standard error.

The current study addressed two levels of analysis: the dyadic (relational) level and the individual level represented by respectively 6006 dyadic relationships (Level 1) and 78 respondents (Level 2). To examine the influence of individual and dyadic variables on the likelihood of having difficult professional relationships, we estimated a single $p2$ model. Individual covariates are characteristics of individuals, such as trust, innovative climate, efficacy, and demographics that may influence the amount of difficult ties that an administrator sends or receives. Individual covariates can be included for the sender of a relationship (sender covariates) and/or the receiver of a relationship (receiver covariates). A relationship covariate yields information on the similarity of two individuals on a given (demographic) characteristic, such as similarity of work level or gender.

How to Interpret $p2$ Estimates

The parameter estimates in $p2$ models can be interpreted in the following way. The main parameters of interest concern the *sender effects* and *receiver effects*, meaning effects that signify the probability of sending or receiving a “difficult relationship” nomination. A positive parameter estimate thus signifies a positive effect on the probability of a difficult relationship (Veenstra et al., 2007). For example, a positive sender effect of work level (dummy coding; district office/school site) would indicate that administrators working at the school sites (represented by the highest dummy code) would have a higher probability of sending difficult professional relationships (i.e., nominating others with whom they have a difficult professional relationship) than administrators working at the district office (represented by the lowest dummy code). As sender and receiver covariates, we include leaders’ perceptions of trust, innovative climate, efficacy, and demographics.

We include work level and gender as relational covariates to assess so-called homophily effects (Moolenaar, 2010, 2012). For the relationship covariates, the $p2$ software constructs dyadic matrices based on the absolute difference between two respondents. For example, the relationship between district office administrators and principals would be coded as a relationship between educators who work at different work levels. To facilitate the interpretation of the model, we labeled the dyadic parameters “different work level” and “different gender.” A negative parameter estimate for “different gender,” for instance, would thus indicate that a difference in gender is related to a lower probability of having a difficult relationship. Meaning, administrators with different genders would be less likely to report having a difficult professional relationship, and conversely, difficult professional relationships would be more likely among same-gender administrators. As such, negative parameters would provide evidence of the hypothesized homophily effects.

In $p2$ models, two parameters are by default included as they “control” for important network effects. The first default parameter is the *overall mean density effect*. A positive estimate for the density effect indicates that in general, the sample networks are rather dense, while a negative density effect reflects that the networks are rather sparse. The second default parameter is the *overall mean reciprocity effect*. A positive estimate for the reciprocity effect suggests that symmetric relationships are more likely to occur than asymmetric relationships, whereas a negative reciprocity effect signifies a higher probability of asymmetric relationships in the networks. Furthermore, $p2$ models include information on differences in nominating (sender variance), in receiving nominations (receiver

variance), and the extent to which people who send more relationships also have a higher probability of receiving relationships (sender-receiver covariance).

Although there is no universally accepted significance test for logistic regression (Long, 1997), we used the Wald statistic that is then compared to the χ^2 distribution with one degree of freedom to calculate the significance of the effects. In addition, to aid interpretation of statistical significance we report quantiles from the distributions of estimation samples, which provide the Bayesian analogue to a confidence interval. The estimate will be statistically significant ($p < .05$) if the quantiles between 2.5 and 97.5 do not include “zero” (cf., Spillane et al., 2012).

RESULTS

Sociograms of Sending and Receiving Difficult Ties

We first provide two network sociograms of difficult ties between the leaders to illustrate the pattern of sending and receiving difficult ties (see Table 3). In this table, nodes represent individual leaders and lines represent a difficult tie between leaders with an arrow indicating the direction of a tie. The nodes are colored by work level, with red representing district leaders and blue principals. Both maps show that the overall network connectedness of difficult ties are relatively sparse, and the network density measure reflects that only 1.9% of all possible ties are present in the network. In addition to the sparse nature of such a difficult professional relationship network, there are a few isolates with 24% of the leaders not sending and/or receiving any difficult tie nominations.

The maps also suggest that the pattern of difficult ties shows variation, with some educational leaders sending many “difficult relationship” nominations (e.g., leader A in the sender map), while other leaders are being seen as more “difficult” (e.g., leader B in the receiver map). In addition, in both the sending and receiving networks, it appears that there is more variation among district leaders in their involvement in difficult ties than among school site leaders, meaning that the degree to which district leaders send and receive difficult ties varies more than principals. Specifically, some of the district leaders tend to either send or receive a large proportion of difficult ties in comparison to other district leaders, whereas the majority of the school site leaders tend to have relatively similar amounts of sending and receiving difficult ties. Finally, district leaders appear to be slightly more “central” (red nodes positioned in the center of both sociograms), thus having a higher likelihood to be involved in a difficult tie. To verify and quantify these visualizations, we draw on additional analysis of the data.

Insert Table 3 about Here

Social Network Descriptives and Correlations

Results from the descriptive analyses (see Table 4) suggest that on average, administrators indicate to have 1.4 difficult professional relationships with others at the district ($M = 1.44$, SD out-degree = 1.68, SD in-degree = 2.74). Administrators reported having a minimum of 0 and a maximum of 8 people with whom they had a difficult professional relationship (out-degree). Administrators received between 0 and 19 nominations as a person with whom others have a difficult professional relationship (in-degree). Findings with regard to ego-reciprocity show that less than 5 % of the administrators’ difficult professional relationships were reciprocated ($M = 4.2\%$, $SD = 11.8\%$). The

overall density of the network was 1.9%, reflecting that of the 6,006 potential difficult relationships between the administrators, only 112 were actually present.

Correlation results (see Table 5) indicate small positive correlations among the social network properties (ranging from $r = .13$, ns to $r = .31$, $p < .05$) with the highest correlation between in-degree and ego-reciprocity, meaning that a leader with a higher in-degree (a leader who receives more difficult relationship nominations) also has a higher probability of reciprocating these difficult professional relationships. Among these social network properties, out-degree is negatively and significantly correlated with trust ($r = -.28$, $p < .05$) and Innovative Climate – District office ($r = -.31$, $p < .05$), meaning that those leaders who report more difficult professional relationships are also more likely to report less trust and innovative climate at the district office level.

Insert Tables 4 & 5 About Here

While the correlation results provide a preliminary understanding of how certain variables are related to the network properties, the $p2$ analysis can help answer our hypotheses by testing the extent to which study variables affect the probability of having difficult professional relationships. The following paragraphs report findings from the $p2$ analysis (see Table 6). First, we present findings of the overall network structure (i.e., density and reciprocity), followed by a series of relationships between the study variables and the formation of difficult relationships. Finally, we close the section by summarizing all the hypotheses and corresponding findings.

Insert Table 6 About Here

Density and Reciprocity of Difficult Ties

Density (H1). Findings indicate a negative overall mean density effect, indicating that the network of difficult professional relationships tends to be sparsely connected, reflecting the previously reported network descriptives and confirming our first hypothesis.

Reciprocity (H2). Findings indicate that, in our sample, difficult professional relationships have a higher tendency to be mutual than unidirectional, as evidenced by the positive overall mean reciprocity effect, confirming our second hypothesis.

Characteristics Associated with Sending Difficult Ties

First, we examine which characteristics of leaders are related to the likelihood of sending difficult professional relationships, meaning the tendency to indicate other leaders with whom one has a difficult professional relationship.

Trust, innovative climate, and efficacy (H3, H4, H5). Our findings show a negative sender effect for trust, meaning that administrators who perceive more trust in the district tend to nominate fewer other leaders with whom they have a difficult professional relationship. In addition, results suggest a negative sender effect for leaders' perceptions of the innovative climate at the district office. In other words, administrators who perceive the district office to be more innovative, tend to send fewer nominations of difficult professional relationships, and thus indicate fewer people with whom they have a difficult professional relationship. In contrast, we find a positive sender effect for

leaders' perceptions of the innovative climate among the principals, meaning that administrators who perceive the principals to be more innovative indicate more people with whom they have a difficult professional relationship. The efficacy results suggest a positive sender effect, meaning that administrators who perceive themselves as having higher efficacy tend to nominate more administrators with whom they have a difficult professional relationship.

Work level, gender, and experience (H6, H7, H8). Findings indicate a significant negative sender effect of work level. This means that on average, leaders who work at the district office (dummy code = 0) have a higher probability of sending difficult professional relationship nominations than leaders at the school sites (dummy code = 1). We found no significant sender effect of either gender or years of experience working at the district on the likelihood of nominating other leaders as having difficult professional relationships.

Characteristics Associated with Receiving Difficult Ties

Second, we analyze which characteristics of leaders are related to the likelihood of receiving difficult professional relationships, meaning the tendency to be nominated by other leaders as a leader with whom one has a difficult professional relationship. In general, we find less receiver effects than sender effects, meaning that the predictors are better suited to explain predictors of nominating others than receiving nominations of difficult professional relationships.

Trust, innovative climate, and efficacy (H3, H4, H5). In regard to the receiver effects, results indicate a positive receiver effect for trust, meaning that people who perceive more trust in the district are also more likely to receive nominations as a person with whom others have a difficult professional relationship. We find no significant receiver effects for leaders' perceptions of innovative climate or efficacy.

Work level, gender, and experience (H6, H7, H8). Results also indicate a significant positive effect of gender. This means that on average, female leaders (dummy code = 0) have a lower probability of receiving difficult professional relationship nominations than male leaders (dummy code = 1). In addition, findings show a positive receiver effect for years of experience in the district, meaning that the longer the leaders work in the district, the more likely they are to be nominated as a person with whom others have a difficult professional relationship. We found no significant receiver effect for leaders' work level.

Dyadic Characteristics Associated with Difficult Ties

Work level and gender (H9, H10). In regard to the relationship covariates, results show no significant homophily effects for either work level or gender, suggesting that administrators are as likely to nominate administrators from the same or opposite work level or gender. However, the effect of work level is close to significant ($p = .06$), suggesting an almost significant trend towards homophily among leaders within the same work level. If this effect were significant, it would mean that leaders in the district office have a higher likelihood of having a difficult professional relationship with other leaders at the district office than with leaders at the site and the same result for site leaders, indicating these leaders would tend to have within-group nominations. However, this effect was only marginally significant.

Finally, it should be noted overall that there is low variation among administrators in the amount of nominations that they make of people with whom they have a difficult professional relationship, as signified by the non-significant sender variance effect. In contrast, there is considerable variation among leaders in the amount of difficult relationship nominations that they receive, as suggested by the significant receiver variance effect. In general, the network is characterized by non-significant sender-receiver covariance parameter, meaning that there is no apparent relationship between the amount of nominations that leaders make, and the amount of nominations they receive; regardless of how many nominations of difficult relationships one makes, there is an equal probability of receiving nominations. In general, these findings reflect and add to results that were derived from the network descriptive statistics.

As we have a number of hypotheses, we have created a table to organize the hypotheses and findings (See Table 7). Our findings fully support three of the hypotheses on the density and reciprocity of difficult professional relationships and the similarity effect of work level (marginally significant). Five of the hypotheses were partially supported for trust, innovative climate, efficacy, work level, and years of experience. Finally, the hypotheses on gender and gender similarity were not supported.

Insert Table 7 About Here

DISCUSSION

The study of social relationships is receiving increased attention in organizational and educational literature for its potential to provide understanding into a wide variety of phenomena (Moolenaar & Daly, 2012; Nahapiet & Ghoshal, 1998; Penuel, Riel, Joshi, Pearlman, Kim, & Frank, 2010; Tsai, 2001). However, most of these studies examine pro-social or at least neutral relationships. There is currently a paucity of research on potential factors affecting the likelihood of developing negative ties between educational leaders. In this unique and exploratory study we examined difficult professional relationships among educational leaders and characteristics that may contribute to the formation of such ties. This work makes a significant methodological and empirical contribution to both the educational leadership literature in general, as well as to the field of social networks specifically, which to date has limited empirical work and modeling regarding negative ties.

Our findings suggest that there are a number of characteristics associated with leaders who are likely to be involved in difficult ties. In short, “senders” of difficult ties tend to be district office leaders who perceive less trust and a less innovative climate among district office leaders, but a more innovative climate among principals, and those who have higher efficacy. The “receivers” of difficult ties, meaning those who tend to be nominated as being “difficult,” are more likely to perceive a more trusting environment, be male, and have been in the district a longer period of time. The results from this unique work provide early insights and theory building into the characteristics that may explain the formation of difficult professional relationships. Furthermore this work may offer hints on how to limit such negative relationships that are likely to derail improvement efforts by district office and school site leaders. We will offer a discussion around major themes that resulted from this study.

The Role of Trust in Difficult Ties

Leaders who perceive limited trust among colleagues were also more likely to report difficult relationships with other leaders in the district. This finding is in line with literature that suggests that leaders who perceive lower levels of trust also tend to have fewer positive professional relationships within their organizations (Troman, 2000). Moreover, this result reflects previous studies on trust among teachers that shows that lower levels of trust in schools are associated with less dense collaboration networks (Daly et al., in press; Moolenaar, 2010; Moolenaar et al., in press). As low trust environments are associated with potential conflicts that may arise from difficulty in reaching shared perspectives, it is not surprising that leaders who perceive less trust may also have a higher likelihood of identifying others with whom they have a difficult professional relationship (Bryk & Schneider, 2002). The finding about the increased likelihood of sending a difficult tie adds to the growing list of significant issues associated with low trust in schools and districts, including reduced outcomes, poor social conditions, and a lack of sharing practices (Moolenaar & Slegers, 2010; Tschannen-Moran, 2003; Van Maele et al., 2013).

In contrast, we also found that leaders who perceive a more trusting environment are more likely to be nominated as “being difficult,” which on the surface seems unusual. One way to interpret this is to combine this finding with the latter one, in which leaders with low trust “send” more difficult ties. In other words, given that those individuals who perceive low trust tend to send difficult ties, it may follow that those who perceive high trust would receive these difficult tie nominations, thus perhaps suggesting a mis-match of trust perceptions among leaders that may result in the formation of difficult ties. In support of this line of argument, Coffin and Leithwood (2000) examined the situated learning of principals and found that while relationships between principals and district office administrators were important for completing their roles, relationships that were trusting augmented principal professional learning. The opposite also held: relationships that were distant or aloof inhibited principal learning. As such, a lack of alignment in regard to trust between site and district not only negatively impacts overall effectiveness and coherence (Davis, 1998), but also inhibits professional learning (Coffin & Leithwood, 2000), which makes improvement within a district that much more difficult. However, this finding would need to be explored in future research, as it points to a more nuanced, less straight-forward role of trust in the formation of social relationships than has been assumed.

In terms of leadership practice, careful consideration must be given to trust. Due to greater feelings of vulnerability, those who are “lower” in the leadership hierarchy tend to be hyper vigilant in their assessments of trust in terms of their bosses, as they are typically in more vulnerable positions in an organization. This can make even minor gestures by “higher-ups” be seen as having greater importance and meaning (Tschannen-Moran, 2004). Those “lower” on the hierarchy seem to recall many more trust-related incidents than their bosses, and violations of that trust tend to take on more importance and serve to “confirm” beliefs about how trustworthiness of those higher-ups in the organization (Kramer, 1996). This suggests the importance of creating alignment and coherence around trust between leaders, particularly at different work levels. Perhaps a more careful unpacking of the identified facets of trust such as benevolence, competence, integrity, respect, and openness (Daly & Chrispeels, 2008) into subcomponents may offer some additional insight and guidance into aligning misperceptions. Overall, while much of the literature has suggested the importance of aligning efforts and structures in support of improvement, perhaps investing effort in the alignment

of the quality of exchanges between leaders appears equally important as it may reduce difficult relationships.

Mismatch in Innovative Climate

The findings in innovative climate were related to some of our trust findings. We found that leaders who perceived the district office to be less innovative were more likely to nominate others with whom they had a difficult professional relationship. This finding suggests the importance of the district office in terms of setting the stage for an innovative climate. If the central office administrators are not nurturing a safe climate for risk taking and the trying out of new ideas, this potentially seeps through the overall system given that individuals who are “higher” in the formal hierarchy (as would be the case for the district office) may have a disproportionate influence over the system (Tschannen-Moran, 2004). This suggests that district office administrators should support an innovative climate particularly for themselves as models of risk taking and exploration of new practices. In contrast, leaders who perceived the principals to have a greater innovative climate were more likely to send more difficult ties. This may indicate that the district was characterized by a norm in which it was expected for district office administrators to be innovative, whereas an innovative climate among principals may have been met with more resistance, resulting in difficult relationships. As such, when principals are being seen as “pushing the innovation agenda” in a district, this may result in more difficult ties among leaders in the district. Again, this finding may signal a mismatch in leaders’ perceptions and expectations around the innovative climate in the district that may result in the formation of difficult relationships. As our exploratory study only provides a limited explanation for why these difficult ties arise in such a way, more research is needed to fully understand the depth of this finding and its implications for district-wide efforts at change.

Fukuyama (1995), in examining economies of scale, offers that a nation’s well-being and its ability to stay competitive is inured by a single, pervasive social characteristic: the level of risk taking and trust inherent in that society. The ability to take risks and trust provides for “spontaneous associations,” novel, and innovative organizational linkages as is suggested in an innovative climate. In an ever-changing system, the most powerful kind of social capital is often not the ability to work under formal authority in established structures, but the capacity to create new interactions and opportunities to develop novel information. Fukuyama (1995) further argues that high trust environments epitomized by risk taking make systems more innovative and reduce transaction costs. Considered in a different vein, if educational systems lack the ability to take risks, there must be an increase in rules, regulations, and sanctions to coerce interaction and performance. This has the potential effect of increasing bureaucracy, inhibiting risk taking, ultimately reducing innovation, which runs counter to change and improvement. Given this it will be increasingly important for districts to also align around what is meant by risk taking and how district climates are organized to create safe environments for risk taking and subsequent failure, even when in a high stakes environment that does not necessarily support innovation (Daly, 2009).

Over-confidence and Difficult ties

We found that leaders with higher sense of efficacy tended to send more difficult ties, suggesting that leaders with a higher confidence to successfully accomplish their tasks are more likely to indicate others with whom they have a difficult professional relationship (e.g., Bandura, 1993;

Leithwood & Jantzi, 2008). In explaining this finding, it could be that high self-efficacy may reduce goal discrepancy, which can lead to a sense of overconfidence in ability, meaning that when individuals believe themselves close to reaching a goal, they may become more complacent and as such reduce effort (Vancouver & Kendall, 2006). In a similar line of inquiry, Vancouver and colleagues (2006) noted that students with higher self-efficacy were less motivated to study and they performed lower on the subsequent tests (Vancouver & Kendall, 2006). As some level of “doubt” about one’s own skills and knowledge may support learning and reflection, the lack of such doubts may result in not only an overestimation of one’s own capacity, but in an underestimation of others’ performance (Vancouver & Kendall, 2006; Wheatley, 2002). This overconfidence/underestimation may actually help reinforce the self perception of highly efficacious individuals in that those highly efficacious leaders might think they are also perceived as efficacious by other leaders, thereby further strengthening their perception of efficacy (Kennedy, Anderson, & Moore, 2011). They might likely also feel confident in pointing out other leaders with whom they have a difficult professional relationship as a way to showcase their perceived ability.

Another possibility is that as highly efficacious individuals tend to work with and through others in accomplishing goals (Kurz & Knight, 2004; MacKenzie, 2000), this increase in the number of relationships associated with higher efficacy also may result in some of these ties becoming negative. Earlier research has suggested that highly efficacious leaders may be more likely to successfully enact reform efforts as they persist longer when they encounter obstacles (Gareis & Tschannen-Moran, 2005; Pitre, 2003; Tschannen-Moran & Gareis, 2004), which may in part suggest that these leaders may be less afraid/more inclined to engage in difficult professional relationships to achieve their goals. Either explanation suggests, as we have for both trust and innovative climate, that better alignment and opportunities to “check” perceptions against reality will be important in preventing the formation of difficult professional relationships. This also suggests the importance of making beliefs transparent as a way to align espoused beliefs with enacted practices.

Difficult Ties between Central Office and School Sites

Finally, results suggest that leaders who work at the central office are on average more likely to indicate others with whom they have a difficult professional relationship. It may be that district office leaders may be involved in more relationships than school site leaders in general given the requirements and affordances of their formal positions, particularly as they have a greater formal reach and broker across the system (Finnigan, Daly, & Che, 2013). This increases the likelihood that these ties become difficult professional relationships. This is a significant challenge in that in a typical workplace setting it may be difficult to cut these difficult ties due to workflow and responsibility (Labianca & Brass, 2006). This finding seems to affirm earlier work that those higher in the formal hierarchy, as would be the case for the district office, are more likely to be under greater scrutiny and the target of a lack of trust than those lower in the formal hierarchy and as such have a greater burden for “fixing” issues related to difficult relationships (Tschannen-Moran, 2004). Our work also suggests the importance of creating learning partnerships between the district office and principals to provide opportunities to learn together, build shared beliefs, team, and a sense of community as a way to reduce negative relationships (Honig, 2006).

Delimiters and Areas for Future Research

There may be at least two major issues that limit this study, and research on difficult ties in general. First, given the sensitive nature of the relationships, leaders may be more or less inclined to report these relationships, and this personal bias may in part be related to leaders' characteristics, such as their formal role in the organization and their perceptions of trust. Second, educational leaders have varying degrees in which they may develop such difficult relationships and experience them as "strong enough" to report them externally as it may not be a "socially" acceptable practice. Moreover, research on social relationships, and negative ties in particular, involves ethical considerations that need to be approached carefully because, although the data is handled confidentially, individuals do have to provide personal information in order to configure the social networks. Each of these areas suggests that this type of data is considered and interpreted with caution and care (Carolan, 2013).

It is also important to note that we examined the likelihood of sending and receiving difficult professional relationships of a group of district office and school site leaders together. As such, we need to take into account that our results only provide limited detail on whether these "senders" and "receivers" of difficult ties are district office or school site leaders. We also found that male leaders were more likely to be found "difficult" in having professional relationships by their colleagues than female leaders, but we don't know whether these nominations were mostly coming from female leaders, or whether these nominations were (un)evenly distributed across the district office and school sites. Future studies that include larger and more varied populations will important to add to our understanding in this arena.

Another fair critique is the question as to how the term "difficult ties" is interpreted by the leaders in our sample. Although we pilot tested and refined the item with a sample of educational leaders, it is also possible that individuals perceive "difficult" ties in very different ways. For instance, the concept of a difficult professional relationship, although further defined in our survey, is ambiguous and open to individual differences in interpretation (Fisher, 1982; Pustejovsky & Spillane, 2009). Additional research using a variety of methods, such as in-depth interviews as a way to further examine these nuances, may be helpful in deepening our understanding of the quantity and quality of difficult ties among leaders in education. Finally, future research may focus on other characteristics that may contribute to the formation of professional relationships. For instance, this and earlier work has focused on how perceptions of the social context (e.g., trust, innovative climate) may contribute to the formation of ties among educators (e.g., Spillane et al., 2012). However, we may also hypothesize that individuals' beliefs may contribute to the formation of social relationships. For example, the way in which educators think about a reform implementation, such as the Common Core State Standards, and potentially the way in which they share similar beliefs (or think very differently) about the impact of such a reform, may affect the extent to which they seek each other for reform related interactions. Also as individuals have a combination of both positive and negative ties, better understanding how the specific pattern of ties surrounding an individual and the effects of positive ties versus negative ties is a rich area of examination. To examine these and related ideas, additional work is needed to elaborate on the concepts that may contribute to the formation of social relationships among educators that may support or constrain educational improvement.

Why so Difficult? The Importance of Exploring Negative Relationships between Educational Leaders

Current reform efforts are increasingly relying on collaboration among district office and site leaders to support alignment and coherence of the reform across multiple settings. While most educational research in this area supports the notion of strong, positive relationships in support of successful reform implementation, recent work also suggests that negative relationships like avoidance and gossip may adversely impact such efforts to the point that such relationships may in fact overshadow the effects of positive ties (Uchino et al., 2012). Coupled with the intensifying accountability context and negative dispositions toward the continuous “reform churn” in education, negative relationships are not likely to go away and may in fact increase with additional large scale changes that are not fully implemented (e.g., Common Core State Standards). Better understanding and theorizing around these relationships as we have attempted in this study may help avoid the potential of deleterious effects on the social environment of educators by inhibiting collaboration, professional interaction, and the exchange of instructional practices. Importantly, creating opportunities to craft alignment and coherence regarding the affective and social elements of change will be critical. Knowing the “why” of difficult ties may help provide early steps as “how” to turn these difficult professional relationships to the benefit of educators and students in intense accountability contexts across the globe.

REFERENCES

- Agullard, K., & Goughnour, D. S. (2006). *Central office inquiry: Assessing organization, roles, and actions to support school improvement*. San Francisco, CA: WestEd.
- Aldrich, H., Reese, P. R., & Dubini, P. (1989). Women on the verge of a breakthrough: Networking among entrepreneurs in the United States and Italy. *Journal of Entrepreneurial Regional Development*, 1, 339–356.
- Amabile, T. M. (1998). How to kill creativity. *Harvard Business Review*, 76(5), 76-87.
- Anderson, L. (2010). Embedded, emboldened, and (net)working for change: Support-seeking and teacher agency in urban, high-needs schools. *Harvard Education Review*, 80(4), 541-572.
- Baerveldt, C., Van Duijn, M. A. J., Vermeij, L., & Van Hemert, D. A. (2004). Ethnic boundaries and personal choice. Assessing the influence of individual inclinations to choose intra-ethnic relationships on pupils' networks. *Social Networks*, 26, 55–74.
- Bakkenes, I., de Brabander, C., & Imants, J. (1999). Teacher isolation and communication network analysis in primary schools. *Educational Administration Quarterly*, 35, 166–202.
- Baldwin, T., Bedell, M., & Johnson, J. (1997). The social fabric of a team-based M.B.A. program: Network effects on student satisfaction and performance. *The Academy of Management Journal*, 1369-1397.
- Balkundi, P., & Harrison, D. (2006). Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. *Academy of Management Journal*, 49(1): 49-68.
- Balkundi, P., & Kilduff, M. (2005). The ties that lead: A social network approach to leadership. *Leadership Quarterly*, 16(6), 941-961.
- Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1993). Perceived self efficacy in cognitive development and functioning. *Educational Psychologist*, 28(2), 117-148.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, 88(1), 87-99.
- Bartol, K. M., & Zhang, X. (2007). Networks and leadership development: Building linkages for capacity acquisition and capital accrual. *Human Resource Management Review*, 17(4), 388-401.
- Bielby, W. T., & Baron, J. N. (1986). Men and women at work: Sex segregation and statistical discrimination. *American Journal of Sociology*, 91(4), 759-799.
- Blase, J., & Blase, J. (2002). *Breaking the silence: Overcoming the problem of principal mistreatment of teachers*. Thousand Oaks, CA: Corwin.
- Borgatti, S. P. (2002). *Netdraw network visualization*. Harvard, MA: Analytic Technologies.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *UCINET for Windows: Software for social network analysis*. Harvard, MA: Analytic Technologies.
- Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, 29(6), 991-1013.
- Brass, D. J., & Burkhardt, M. E. (1993). Potential power and power use: An investigation of structure and behavior. *Academy of Management Journal*, 36(3), 441-470.
- Bryk, A. S., Camburn, E., & Louis, K. S. (1999). Professional community in Chicago elementary schools: Facilitating factors and organizational consequences. *Educational Administration Quarterly*, 35, 751-781.

- Bryk, A. S., & Schneider, B. (2002). *Trust in schools: A core resource for school improvement*. New York, NY: Russell Sage Foundation.
- Bryk, A. S., Sebring, P. B., Allensworth, E., Luppescu, S., & Easton, J. Q. (2010). *Organizing schools for improvement: Lessons from Chicago*. Chicago, IL: University of Chicago Press.
- Burt, R. S. (1982). *Toward a structural theory of action*. New York, NY: Academic Press.
- Burt, R. S. (1997). A note on social capital and network content. *Social Networks*, 19, 355-373.
- Card, N. A. (2010). Antipathetic relationships in child and adolescent development: A meta-analytic review and recommendations for an emerging area of study. *Developmental Psychology*, 46, 516-529.
- Carolan, B. V. (2013). *Social network analysis and education. Theory, methods, and applications*. Thousand Oaks, CA: Sage Publications.
- Carr, D. (2008, December). *Being a change agent: What the research says* [PowerPoint presentation]. Charleston, WV: Edvantia. Presentation slides from ARCC Rally.
- Coburn, C. E., & Russell, J. L. (2008). District policy and teachers' social networks. *Education Evaluation and Policy Analysis*, 30(3), 203-235.
- Cohen, S. (2006). Change agents bolster new practices in the workplace. *Nursing Management*, 37(6), 16-17.
- Coffin, G., & Leithwood, K. (2000). District contributions to principals' situated learning. In K. Leithwood (Ed.), *Understanding schools as intelligent systems*. Greenwich, CT: JAI.
- Cole, R. P., & Weinbaum, E. H. (2010). Changes in attitude: Peer influence in high school reform. In A.J. Daly (Ed.), *Social network theory and educational change* (pp. 77-96). Cambridge: Harvard University Press.
- Coleman, J. S. (1990). *Foundations of social theory*. Cambridge, MA: Harvard University Press.
- Consortium on Chicago School Research. (2004). *Public use dataset. 2001 survey of students and teachers*. User's Manual. Chicago, IL: The Consortium on Chicago School Research.
- Copland, M. A., & Knapp, M. S. (2006). *Connecting leadership with learning: A framework for reflection, planning and action*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Cosner, S. (2009). Building organizational capacity through trust. *Educational Administration Quarterly*, 45(2), 248-291.
- Crosby, F. (1982). *Relative deprivation and working women*. New Haven: Yale Univ. Press
- Cross, R., Borgatti, S. P., & Parker, A., 2002. Making invisible work visible: Using social network analysis to support strategic collaboration. *California Management Review*, 44(2), 25-46.
- Cross, R., Cowen, A., Vertucci, L. & Thomas, R. (in press). *Leading in a connected world: How effective leaders drive results through networks*. Organizational Dynamics.
- Cross, R., Ehrlich, K., Dawson, R., & Helferich, J. (2008). Managing collaboration: Improving team effectiveness with a network perspective. *California Management Review*, 50(4), 78-99.
- Cummings, L. L., & Bromiley, P. (1996). The Organizational Trust Inventory (OTI): Development and validation. In Roderick M. Kramer & Tom R. Tyler (Eds.), *Trust in organizations* (pp. 302 - 330). Thousand Oaks, CA: Sage.
- Daly, A. J. (2009). Rigid response in an age of accountability: The potential of leadership and trust. *Educational Administration Quarterly*, 45(2), 168-216.
- Daly, A. J. (2010). *The ties of change: Social network theory and application in education*. Cambridge, MA: Harvard Education Press.
- Daly, A. J., & Chrispeels, J. (2008). A question of trust: Predictive conditions for adaptive and technical leadership in educational contexts. *Leadership and Policy in Schools*, 7(1), 30-63.
- Daly, A. J., & Finnigan, K. (2009). Understanding network structure to understand change strategy. *Journal of Educational Change*.

- Daly, A. J. & Finnigan, K. (2011). The ebb and flow of social network ties between district leaders under high stakes accountability. *American Educational Research Journal*, 48(1), 39 -79.
- Daly, A., & Finnigan, K. (2012). Exploring the space between: Social networks, trust, and urban school district leaders. *Journal of School Leadership*, 22(3), 493-530.
- Daly, A. J., Finnigan, K.S., Jordan, S., Moolenaar, N.M., & Jing, C. (in press). Misalignment and perverse incentives: Examining the role of district leaders as brokers in the use of research evidence. *Educational Policy*.
- Daly, A. J., Liou, Y. H., & Moolenaar, N. M. (in press, 2013). The principal connection: Trust and innovative climate in a network of reform. In D. Van Maele, P. Forsyth, and M. Vanhoutte (Eds.), *Trust relationships and school life*. Dordrecht, The Netherlands: Springer.
- Daly, A. J., Moolenaar, N. M., Bolivar, J. M., & Burke, P. (2010). Relationships in reform: The role of teachers' social networks. *Journal of Educational Administration*, 48(3), 359-391.
- Daly, A. J., Moolenaar, N. M., Der-Martirosian, C. & Liou, Y. H. (in press). Accessing capital resources: Investigating the effects of teacher human and social capital on student achievement. *Teachers College Record*.
- Davis, S. H. (1998). Superintendent's perspective on the involuntary departure of public school principals: The most frequent reasons why principals lose their jobs. *Educational Administration Quarterly*, 34(1), 58–90.
- Degenne, A., & Forsé, M. (1999). *Introducing social networks*. London, UK: Sage.
- Deutsch, M. (1958). Trust and suspicion. *Journal of Conflict Resolution*, 2, 265–279.
- Devos, G., Hulpia, H., Tuytens, M., & Sinnaeve, I. (2013). Self-other agreement as an alternative perspective of school leadership analysis: an exploratory study. *School Effectiveness and School Improvement*, 24(3), 296-315.
- Doerfel, M. L., & Taylor, M., (2011 May). *The evolution of networks that network for change: Organizing in the croatian civil society movement*. Paper presented at the annual meeting of the International Communication Association, Boston, MA.
- Edmondson, A. (2004). Psychological safety, trust, and learning in organizations: A group-level lens. In R. Kramer and K. Cook (Eds.), *Trust and distrust in organizations: Dilemmas and approaches* (pp. 239-272). New York: Russell Sage Foundation.
- Ellis, A. K. (2005). *Research on educational innovations*. Larchmont, NY: Eye on Education.
- Ellwardt, L., Wittek, R., & Wielers, R. (2012). Talking about the boss: Effects of generalized and interpersonal trust on workplace gossip. *Group & Organization Management*, 37(4), 521-549.
- Finnigan, K., Daly, A., & Che, J. (2013). Systemwide reform in districts under pressure: The role of social networks in defining, acquiring, and diffusing research evidence. *Journal of Educational Administration*, 51(4).
- Fisher, C. S. (1982). What do we mean by 'friend'? An inductive study. *Social Networks*, 3, 287-306.
- Forsyth, P. B., Adams, C. M., & Hoy, W. K. (2011). *Collective trust: why schools can't improve without it*. New York, New York: Teachers College Press.
- Frank, K. A. (2009). Quasi-ties: Directing resources to members of a collective. *American Behavioral Scientist*, 52(12), 1613-1645.
- Frank, K. A., Zhao, Y., Penuel, W. R., Ellefson, N., & Porter, S. (2011). Focus, fiddle, and friends: Experiences that transform knowledge for the implementation of innovations. *Sociology of Education*, 84(2), 137-156.
- Frydenberg, E., & Lewis, R. (1993). Boys play sport and girls turn to others: age, gender and ethnicity as determinants of coping. *Journal of Adolescence*, 16, 253-266.
- Fukuyama, F. (1995). *Trust: Social virtues and the creation of prosperity*. NY: Free Press.
- Fullan, M. G. (1992). *Successful school improvement: The implementation perspective and beyond*. *Modern Educational Thought*. Milton Keynes, UK: Open University Press.

- Fullan, M. (2002). The change leader. *Educational Leadership*, 59(8), 16-20.
- Fullan, M. (2007). *The new meaning of educational change* (4th ed.). New York: Teachers College Press.
- Gareis, C. R., & Tschannen-Moran, M. (2005, November). *Cultivating principals' sense of efficacy: Supports that matter*. Paper presented at the annual meeting of the University Council for Educational Administration, Nashville, TN.
- Geijsel, F. P. (2001). *Schools and innovations. Conditions fostering the implementation of educational innovations*. Nijmegen, the Netherlands: Nijmegen University Press.
- Gersick, C., Bartunek, J., & Dutton, J. (2000) Learning from academia: The importance of relationships in professional life. *Academy of Management Journal*, 43, 1026-1044.
- Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal*, 37, 479-508.
- Goddard, R. D., Tschannen-Moran, M. & Hoy, W. K. (2001). A multilevel examination of the distribution and effects of teacher trust in students and parents in urban elementary schools. *Elementary School Journal*, 102(1), 3-17.
- Greenhalgh T, Robert G, Macfarlane F, Bate P, & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Q*, 82, 581-629.
- Grosser, T. J., Lopez-Kidwell, V., & Labianca, G. (2010). A social network analysis of positive and negative gossip in organizational life. *Group & Organization Management*, 35(2), 177-212.
- Gulati, R. (1995). Social structure and alliance formation patterns: A longitudinal analysis. *Administrative Science Quarterly*, 40, 619-652.
- Gürhan-Canli, Z & Batra, R (2004). When corporate image affects product evaluations: The moderating role of perceived risk. *Journal of Marketing Research*, 41(2), 197-205.
- Harris, A., & Chrispeels, J. H. (Eds.). (2006). *Improving schools and educational systems: International perspectives*. London: Routledge.
- Heyl, E. (1996). *Het docentennetwerk. Structuur en invloed van collegiale contacten binnen scholen*. Unpublished doctoral dissertation. University of Twente, The Netherlands.
- Hightower, A., Knapp, M. S., Marsh, J., & McLaughlin, M. W. (Eds.) (2002). *School districts and instructional renewal*. New York: Teachers College Press.
- Honig, M. I. (2004). Where's the 'up' in bottom-up reform. *Educational Policy*, 18(4), 527-561.
- Honig, M. (2006). Street-level bureaucracy revisited: Frontline district central-office administrators as boundary spanners in education policy implementation. *Educational Evaluation and Policy Analysis*, 28(4), 357-383.
- Honig, M. I., & Coburn, C. (2008). Evidence-based decision making in school district central offices. *Educational Policy*, 22(4), 578-608.
- Honig, M. I., Copland, M.A., Rainey, L., Lorton, J. A., & Newton, M. (2010, April). *School district central office transformation for teaching and learning improvement*. A report to the Wallace Foundation. Seattle, WA: The Center for the Study of Teaching and Policy.
- Honig, M.I., & Ikemoto, G. (2008). Adaptive assistance for learning improvement efforts: The case of the Institute for Learning. *Peabody Journal of Education*, 83(3), 328-363.
- Hoy, W. K., & Tschannen-Moran, M. (2003). The conceptualization and measurement of faculty trust in schools: The Omnibus T-Scale. In W. K. Hoy & C. G. Miskel (Eds.), *Studies in leading and organizing schools* (pp. 181-208). Greenwich, CT: Information Age.
- Huberman, A. M., & Miles, M. B. (1984). *Innovation up close: How school improvement works*. New York, NY: Plenum.
- Huitsing, G., van Duijn, M. J., Snijders, T. B., Wang, P., Sainio, M., Salmivalli, C., & Veenstra, R. (2012). Univariate and multivariate models of positive and negative networks: Liking, disliking, and bully-victim relationships. *Social Networks*, 34(4), 645-657.

- Ibarra, H. (1993). Personal networks of women and minorities in management - a conceptual-framework. *Academy of Management Review*, 18(1), 56-87.
- Ibarra, H. (1995). Race, opportunity, and diversity of social circles in managerial networks. *Academy of Management Journal*, 38(3), 673-703.
- Joslyn, Mark R. & Allan Cigler. (2001). Group involvement and democratic orientations: Social capital in the post-election context. *Social Science Quarterly*, 82(2), 357-368.
- Kane, G., & Labianca, G. (2005). *Accounting for clergy's socialledgers: Mixed blessings associated with direct and in-direct negative ties in a religious organization*. Paper presented at the Intra-Organizational Network (ION) Conference, Atlanta.
- Katzenbach, J. R., & Smith, D. K. (1993). The discipline of teams. *Harvard Business Review*, 71, 111-120.
- Kennedy, J. A., Anderson, C., & Moore, D. A. (2011). *Social reactions to overconfidence: Do the costs of overconfidence outweigh the benefits?* Manuscript submitted for publication.
- Kensler, L., Caskie, G., Barber, M., & White, G. (2009). The ecology of democratic learning communities: faculty trust and continuous learning in public middle schools. *Journal of School Leadership*, 19(6), 697-735.
- Kilduff, M., & Krackhardt, D. (2008). *Interpersonal networks in organizations: cognition, personality, dynamics, and culture: Structural analysis in the social sciences*. Cambridge, UK: Cambridge University Press.
- Kilduff, M., & Tsai, W. (2003). *Social networks and organizations*. London, UK: Sage Publications.
- Kramer, R. M. (1996). Divergent realities and convergent disappointments in the hierarchical relation: The intuitive auditor at work. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations* (pp. 216-246). Thousand Oaks, CA: Sage.
- Kurz, T. B. & Knight, S. L. (2004). An exploration of the relationship among teacher efficacy, collective teacher efficacy and goal consensus. *Learning Environments Research*, 7, 111-128.
- Labianca, G., & Brass, D.J. (2006). Exploring the social ledger: Negative relationships and negative asymmetry in social networks in organizations. *Academy of Management Review*, 31, 596-614.
- Labianca, G., Brass, D. J., & Gray, B. (1998). Social networks and perceptions of intergroup conflict: The role of negative relationships and third parties. *Academy of Management Journal*, 41, 55-57.
- Lawler, E. E., III, (1992). *The ultimate advantage: Creating the high-involvement organization*. San Francisco, CA: Jossey-Bass.
- Lazega, E. & Van Duijn, M. (1997). Position in formal structure, personal characteristics and choices of advisors in a law firm: A logistic regression model for dyadic network data. *Social Networks*, 19, 375-397.
- Leskovec, J., Huttenlocher, D., & Kleinberg, J. (2010). Predicting positive and negative links in online social networks. In *Proceedings of the 19th international conference on World wide web*, 641-650.
- Leithwood, K., & Jantzi, D. (2005). A review of transformational leadership research 1996- 2005. *Leadership and Policy in Schools*, 4(3), 177-200.
- Leithwood, K., & Jantzi, D. (2008). Linking leadership to student learning: The contributions of leader efficacy. *Educational Administration Quarterly*, 44(4), 496-528.
- Leithwood, K., Mascall, B., Strauss, T., Sacks, R., Memon, N., & Yashkina, A. (2007). Distributing leadership to make schools smarter: taking the ego out of the system. *Leadership and Policy in Schools*, 6(1), 37-67.
- Levine, T. H., & Marcus, A. S. (2010). How the structure and focus of teachers' collaborative activities facilitate and constrain teacher learning. *Teaching & Teacher Education*, 26(3), 389-398.
- Lin, N. (2001). *Social capital: A theory of social structure and action*. New York: Cambridge University Press.

- Liou, Y. H., & Daly, A. J. (in press). Closer to learning: Social networks, trust, and professional communities. *Journal of School Leadership*.
- Liou, Y. H., Daly, A. J., Forbes, C. A., & Moolenaar, N. M., Cornelissen, C., & Hsiao, J., (2013, April). *Investing in the social capital of pre-service teachers: Exploring trust, efficacy, networks, and outcomes*. Paper presented at the meeting of American Educational Research Association, San Francisco, CA.
- Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Thousand Oaks, CA: Sage.
- Louis, K., Leithwood, K., Wahlstrom, K., & Anderson, S. (2010). *Learning from leadership: Investigating the links to improved student learning*. New York: The Wallace Foundation.
- Lunenburg, F., & Ornstein, A. (2008). *Educational administration: Concepts and practices* (5th ed.). Belmont, CA: Wadsworth/Thompson Learning.
- MacKenzie, S. (2000). *Collective efficacy and collaborative climate in Maine high schools*. Unpublished doctoral thesis, University of Maine.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87.
- Marsden, P. V. (1988). Homogeneity in confiding relations. *Social Networks*, 10(1), 57-76.
- Mathieu, J. E., & Zajac, D. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin*, 108, 171–194.
- McCormick, M. J. (2001). Self-efficacy and leadership effectiveness: Applying social cognitive theory to leadership. *Journal of Leadership Studies*, 8(1), 22-33.
- McCullers, J. F. (2009). *Self-efficacy beliefs of Florida school principals regarding federal and state accountability measures*. Unpublished doctoral dissertation, University of Central Florida, Orlando, Florida.
- McCullers, J. F., & Bozeman, W. (2010). Principal self-efficacy: The effects of No Child Left Behind and Florida school grades. *NASSP Bulletin*, 94(1), 53-74.
- McGuire, G. M. (2000). Gender, race, ethnicity, and networks. *Work and Occupations*, 27(4), 500–523.
- McLaughlin, M. W., & Talbert, J. E. (1993). *Contexts that matter for teaching and learning*. Palo Alto, CA: Context Center on Secondary School Teaching.
- McLaughlin, M. W., & Talbert, J. E. (2003). *Reforming districts: How districts support school reform*. Seattle, WA: University of Washington.
- McPherson, J. M., & Smith-Lovin, L. (1986). Sex segregation in voluntary associations. *American Sociological Review*, 51, 61-79.
- McPherson, J. M., & Smith-Lovin, L. (1987). Homophily in voluntary organizations: Status distance and the composition of face to face groups. *American Sociological Review*, 52, 370-379.
- McPherson, J. M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415 – 444.
- Mehra, A., Dixon, A. L., Brass, D. J., & Robertson, B. (2006). The social network ties of group leaders: Implications for group performance and leader reputation. *Organization Science*, 17(1), 64-82.
- Mehra, A., Kilduff, M., & Brass, D. J. (2001). The social networks of high and low self-monitors: Implications for workplace performance. *Administrative Science Quarterly*, 46, 121-146.
- Mintrop, H. (2004). *Schools on probation: How accountability works (and doesn't work)*. New York, NY: Teachers College.
- Mintrop, H., & Trujillo, T. (2005). Corrective action in low performing schools: Lessons for NCLB implementation from first-generation accountability Systems. *Education Policy Analysis Archives*, 13(48), 1-30.
- Mintrop, H., & Trujillo, T. (2007). The practical relevance of accountability systems for school improvement: A descriptive analysis of California schools. *Educational Evaluation and Policy Analysis*, 29(4), 319-352.

- Moolenaar, N. M. (2010). *Ties with potential. Nature, antecedents, and consequences of social networks in school teams*. Unpublished doctoral dissertation. University of Amsterdam, The Netherlands.
- Moolenaar, N. M. (2012). A social network perspective on teacher collaboration in schools: Theory, methodology, and applications. *American Journal of Education*, 119(1), 7-39.
- Moolenaar, N. M., & Daly, A. J. (2012). Social networks in education: Exploring the social side of the reform equation. Editorial to the special issue on Social network theory: Teaching, learning, and change. *American Journal of Education*, 119(1), 1-6.
- Moolenaar, N. M., Daly, A. J., & Slegers, P. J. C. (2010). Occupying the principal position: Examining relationships between transformational leadership, social network position, and schools' innovative climate. *Educational Administration Quarterly*, 46, 623-670.
- Moolenaar, N. M., Daly, A. J., & Slegers, P. J. C. (2011). Ties with potential: Social network structure and innovative climate in Dutch schools. *Teachers College Record*, 113(9), 1983-2017.
- Moolenaar, N. M., Karsten, S., Slegers, P.J.C., & Daly, A. J. (in press). Linking social networks and trust: Examining multilevel trust and social relationships in Dutch elementary schools. In D. Van Maele, P. Forsyth, and M. Vanhoutte (Eds.), *Trust relationships and school life*. Dordrecht, The Netherlands: Springer.
- Moolenaar, N. M., & Slegers, P. J. C. (2010). Social networks, trust, and innovation. How social relationships support trust and innovative climates in Dutch Schools. In A. Daly (Ed.), *Social network theory and educational change* (pp. 97-114). Cambridge, MA: Harvard University Press.
- Moolenaar, N. M., Slegers, P. J., & Daly, A. J. (2011a). Ties with potential: Social network structure and innovative climate in Dutch schools. *Teachers College Record*, 113(9), 1983-2017.
- Moolenaar, N. M., Slegers, P. J., & Daly, A. J. (2011b). Teaming up: Linking collaboration networks, collective efficacy, and student achievement. *Teaching and Teacher Education*, 28(2), 251-262.
- Moolenaar, N. M., Slegers, P.J.C., Karsten, S., & Daly, A.J. (2012). The social fabric of elementary schools: A network typology of social interaction among teachers. *Educational Studies*, 38(4), 355-371. DOI: 10.1080/03055698.2011.643101
- Moore, G. (1990). Structural determinants of men's and women's personal networks. *American Sociological Review*, 55, 726 – 735.
- Moore, T. T., & Chang, J. C. J. (2009). Self-efficacy, overconfidence, and the negative effect on subsequent performance: A field study. *Information & Management*, 46(2), 69-76.
- Nahapiet, J., & Ghoshal, S. (1998), Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23, 242-266.
- Newmann, F., & G. Wehlage. (1995). *Successful School Restructuring*. Madison, WI: Center on Organization and Restructuring of Schools, University of Wisconsin-Madison.
- Nystrom, P. C., Ramamurthy, K., & Wilson, A. L. (2002). Organizational context, climate and innovativeness: Adoption of Imaging Technology. *Journal of Engineering and Technology Management*, 19, 221-247.
- Olsen, B., & Sexton, D. (2009). Threat rigidity, school reform, and how teachers view their work inside current education policy contexts. *American Educational Research Journal*, 46(1), 9-44.
- Ostos, B. E. (2012). *Tapping on the glass: The intersection of leadership and gender in independent school administration*. Unpublished dissertation. University of California, San Diego.
- Padgett, D. K., Henwood, B. F, Abrams, C., Drake, R. E. (2008). Social relationships among persons who have experienced serious mental illness, substance abuse and homelessness: Implications for recovery. *American Journal of Orthopsychiatry*, 78, 333-339.
- Paglis, L. L., & Green, S. G. (2002). Leadership self-efficacy and managers' motivation for leading change. *Journal of Organizational Behavior*, 23, 215-235.
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66, 543-578.

- Pajares, F. (1997). Current directions in self-efficacy research. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 1-49). Greenwich, CT: JAI Press.
- Parker, S., & De Vries, B. (1993). Patterns of friendship for women and men in same and cross-sex relationships. *Journal of Social and Personal Relationships*, 10, 617-626.
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research*. Fort Worth, TX: Harcourt Brace.
- Penuel, W. R., Riel, M., Joshi, A., Pearlman, L., Kim, C. M., & Frank, K. A. (2010). The alignment of the informal and formal organizational supports for reform: Implications for improving teaching in schools. *Educational Administration Quarterly*, 46(1), 57-95.
- Penuel, W. R., Riel, M. R., Krause, A., & Frank, K. A. (2009). Analyzing teachers' professional interactions in a school as social capital: A social network approach. *Teachers College Record*, 111(1), 124-163.
- Pil, F., & Leana, C. (2009). Applying organization research to public school reform. *Academy of Management Journal*, 56(2), 1101-24.
- Pitre, L. (2003). *The Mississippi Student Achievement Improvement Act and the No Child Left Behind Act: Leadership and motivation*. Retrieved from Dissertations & Theses database.
- Pollock, J.C. (2013). Community structure research. In P. Moy (Ed.). *Oxford Bibliographies Online*. New York: Oxford University Press.
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41, 116-145.
- Pugliesi, K. & Shook, S. L. (1998). Gender, ethnicity, and network characteristics: variation in social support resources. *Sex roles*, 38, 215-238.
- Pustejovsky, J. E. & Spillane, J. P. (2009). Question-order effects in social network name generators. *Social Networks*, 31(4), 221-229.
- Reagans, R. E., & Zuckerman, E. W. (2001). Networks, diversity and performance: The social capital of R&D teams. *Organization Science*, 12, 502-518.
- Robbins, S., Judge, T.A., Odendaal, A. & Roodt, G. (2009). *Organisational Behaviour: Global and Southern African Perspectives*. Johannesburg: Pearson Education.
- Rorrer, A., Skrla, L., & Scheurich, J. (2008). Districts as institutional actors in educational reform. *Educational Administration Quarterly*, 44 (3), 307-357.
- Rosseau, D., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *AOM Review*, 23 (3), 393-404.
- Scott, J. (2000). *Social network analysis*. London, UK: Sage Publications.
- Sergiovanni, T. (2005). The virtues of leadership. *The Educational Forum*, 69(2), 112-123.
- Sijtsema, J. J., Ojanen, T., Veenstra, R., Lindenberg, S., Hawley, P. H., & Little, T. D. (2010). Forms and functions of aggression in adolescent friendship selection and influence: A longitudinal social network analysis. *Social Development*, 19(3), 515-534.
- Smith, W., Guarino, A. J., Strom, P., & Reed, C. (2003). Principal self-efficacy and effective teaching and learning environments. *School Leadership and Management*, 23(4), 505-508.
- Spillane, J. P. (2006). *Distributed leadership*. San Francisco, CA: Jossey-Bass.
- Spillane, J. P., Hunt, B., & Healey, K. (2009). Managing and leading elementary schools: Attending to the formal and informal organization. *International Studies in Educational Administration*, 37(1), 5-28.
- Spillane, J. P., Kim, C., & Frank, K. A. (2012). Instructional advice and information providing and receiving behavior in elementary schools: Exploring tie formation as a building block in social capital development. *American Educational Research Journal*, 49(6), 1112-1145.
- Stoll, L., & Louis, K.. (2007). *Professional learning communities*. Milton Keynes, UK: Open University Press.

- Stoloff, J. L., Glanville, J. L., & Bienenstock, E. J. (1999). Women's participation in the labor force: The role of social networks. *Social networks*, 21, 91-108.
- Suitor, J. J., & Pillemer, K. (2000). When experience counts most: effects of experiential similarity on men's and women's receipt of support during bereavement. *Social Networks*, 22(4), 299-312.
- Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin*, 110, 67-85.
- Togneri, W., & Anderson, S. E. (2003). *Beyond islands of excellence: What districts can do to improve instruction and achievement in all schools*. Washington, D.C.: The Learning First Alliance and the Association for Supervision and Curriculum Development.
- Troman, G. (2000). Teacher stress in the low-trust society. *British Journal of Sociology of Education*, 21(3), 331-353.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44(5), 996-1004.
- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464-476.
- Tschannen-Moran, M. (2001). Collaboration and the need for trust. *Journal of Educational Administration*, 39(4), 308-31.
- Tschannen-Moran, M. (2003). Fostering organizational citizenship: Transformational leadership and trust. In W.K. Hoy & C.G. Miskel, *Studies in Leading and Organizing Schools* (pp. 157-179). Information Age Publishing: Greenwich: CT.
- Tschannen-Moran, M. (2004). *Trust matters: Leadership for successful schools*. San Francisco, CA: Jossey-Bass.
- Tschannen-Moran, M., & Gareis, C. (2004). Principals' sense of efficacy: Assessing a promising construct. *Journal of Educational Administration*, 42, 573-585.
- Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68, 202-248.
- Tuytens, M., & Devos, G. (2010). The influence of school leadership on teachers' perception of teacher evaluation policy. *Educational Studies*, 36(5), 521-536.
- Uchino, B., Cawthon, R., Smith, T., Light, K., McKenzie, J., Carlisle, M., & ... Bowen, K. (2012). Social relationships and health: is feeling positive, negative, or both (ambivalent) about your social ties related to telomeres? *Health Psychology*, 31(6), 789-796.
- Uzzi, B., & Dunlap, S. (2012). Make your enemies your allies. *CFA Digest*, 42(3), 122-123.
- Vancouver, J. B., & Kendall, L. N. (2006). When self-efficacy negatively relates to motivation and performance in a learning context. *Journal of Applied Psychology*, 91(5), 1146-1153.
- Vancouver, J. B., Thompson, C. M., & Tischner, E. (2002). Two studies examining the negative effect of self-efficacy on performance. *Journal of Applied Psychology*, 87(3), 506-516.
- Vancouver, J. B., Thompson, C. M., & Williams, A. A. (2001). The changing signs in the relationships among self-efficacy, personal goals, and performance. *Journal of Applied Psychology*, 86(4), 605-620.
- Van den Berg, R., & Slegers, P. J. C. (1996). The innovative capacity of schools in secondary education: A qualitative study. *International Journal of Qualitative Studies in Education*, 9(2), 201-223.
- Van der Pompe, G., & De Heus, P. (1993). Work stress, social support, and strains among male and female managers. *Anxiety, Stress, and Coping*, 6, 215-229.
- Van der Vegt, G. S., Van de Vliert, E., & Huang, X. (2005). Location-level links between diversity and innovative climate depend on national power distance. *Academy of Management Journal*, 48(6), 1171-1182.

- Van Duijn, M. A. J., Snijders, T. A. B., & Zijlstra, B. J. H. (2004). p2: A random effects model with covariates for directed graphs. *Statistica Neerlandica*, 58, 234–254.
- Van Maele, D., Moolenaar, N. M., & Daly, A. J. (2013, April). *Welcome to the neighborhood: A social network perspective on the effects of social influence on teacher trust*. Paper presented at the Annual meeting of the American Educational Research Association (AERA). San Francisco, CA.
- Van Maele, D. & Van Houtte, M. (2012). The role of teacher and faculty trust in forming teachers' job satisfaction: Do years of experience make a difference? *Teaching and Teacher Education*, 28(6), 879-889.
- Van Waes, S., Van den Bossche, P., & Van Petegem, P. (August, 2013). *The role of advice and friendship networks in becoming an expert teacher in higher education*. EARLI Junior Researchers (Jure) preconference in München.
- Veenstra, D. R., Lindenberg, S., Zijlstra, B. J. H., De Winter, A. F., Verhulst, F. C., & Ormel, J. (2007). The dyadic nature of bullying and victimization: Testing a dual-perspective theory. *Child Development*, 78(6), 1843-1854.
- Venkataramani, V., Labianca, G., & Grosser, T.J. (in press). Positive and negative workplace relationships, social satisfaction, and organizational attachment. *Journal of Applied Psychology*.
- Violino, B. (2012). Why yell when you can talk?: How to keep union meetings civil and productive. *Community College Journal*, 82(4), 32-35.
- Walker, G., Kogut, B., & Shah, W. (1997). Social capital, structural holes, and the formation of an industry network. *Organizational Science*, 8(2), 109-125.
- Wasserman, S., & Faust, K. (1994). *Social network analysis*. Cambridge: Cambridge University Press.
- Wheatley, K. F. (2002). The potential benefits of teacher efficacy doubts for educational reform. *Teaching & Teacher Education*, 18(1), 5-22.
- Wellman, B., & Berkowitz, S. D. (1998). *Social structures: A network approach*. UK: Emerald Group Publishing Limited.
- Zand, D. E. (1997). *The leadership triad: Knowledge, trust, and power*. New York, NY: Oxford University Press.
- Zijlstra, B. J. H. (2008). *Random effects models for directed graphs with covariates*. Unpublished doctoral dissertation. University of Groningen, The Netherlands.
- Zijlstra, B. J. H., Van Duijn, M. A. J., & Snijders, T. A. B. (2006). The multilevel p2 model: A random effects model for the analysis of multiple social networks. *Methodology*, 2, 42–47.
- Zijlstra, B. J. H., Veenstra, D. R., & Van Duijn, M. A. J. (2008). A multilevel p2 model with covariates for the analysis of binary bully-victim network data in multiple classrooms. In: N. A. Card, J. P. Selig, & T. D. Little (Eds.), *Modeling dyadic and interdependent data in the developmental and behavioural sciences* (pp. 369-386). Mahwah, NJ: Erlbaum.

Tables

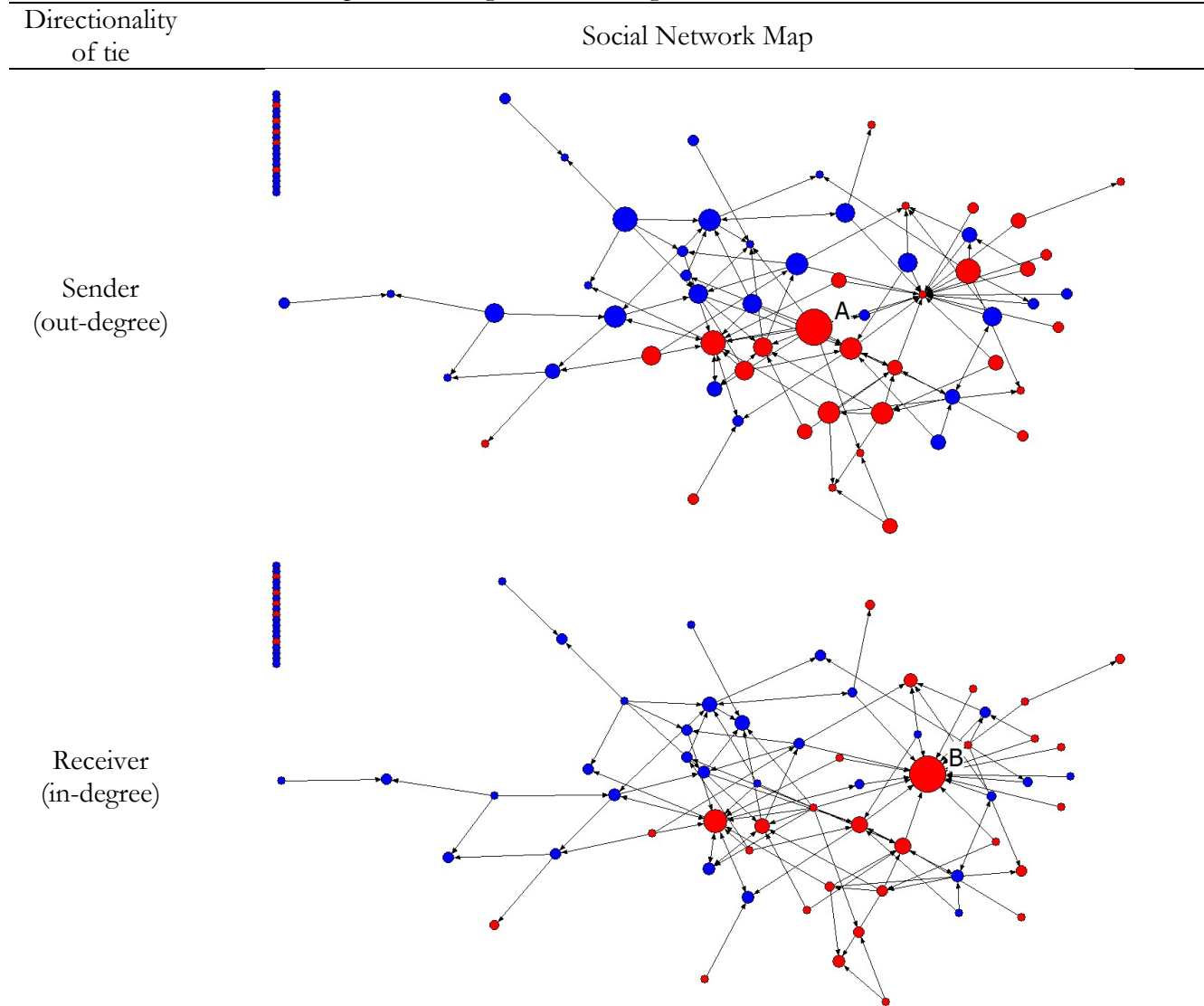
Table 1. Sample Demographics of Educational Leaders

Work level	District administrator	34	(43.6 %)
	Principal	44	(56.4 %)
Gender	Male	29	(37.2 %)
	Female	49	(62.8 %)
Years in district	1-8 years	26	(33.3 %)
	9-14 years	26	(33.3 %)
	15-37 years	26	(33.8 %)

Note: N = 78.

Table 2. Items, Factor Loadings, and Reliability (Cronbach's alpha) of the Scales

	Factor loadings
Trust ($\alpha = .87$)	
1. Administrators typically support each other.	.80
2. Even in difficult situations, administrators can depend on each other.	.81
3. Administrators trust each other.	.88
4. Administrators are open with each other.	.84
5. Administrators have faith in the integrity of their colleagues.	.79
6. Administrators are suspicious of each other. (recoded)	.52
7. When administrators tell you something you can believe it.	.77
Innovative climate – district office ($\alpha = .96$)	
1. Administrators in the district office are continuously learning and seeking new ideas.	.87
2. Administrators in the district office are generally willing to try new ideas.	.89
3. Administrators in the district office are constantly trying to improve their leadership.	.90
4. Administrators in the district office have a positive 'can-do' attitude.	.89
5. Administrators in the district office are willing to take risks to make the district better.	.90
6. Administrators in the district office are encouraged to stretch and grow.	.90
7. Administrators in the district office are continuously developing new approaches to support instruction.	.91
Innovative climate – principals ($\alpha = .96$)	
1. Principals are continuously learning and seeking new ideas.	.82
2. Principals are generally willing to try new ideas.	.85
3. Principals are constantly trying to improve their leadership.	.84
4. Principals have a positive 'can-do' attitude.	.87
5. Principals are willing to take risks to make the district better.	.76
6. Principals are encouraged to stretch and grow.	.70
7. Principals are continuously developing new approaches to support instruction.	.89
Efficacy ($\alpha = .92$)	
<i>In your current role as a leader, to what extent can you...</i>	
1. facilitate learning?	.86
2. generate enthusiasm for a shared vision?	.83
3. improve achievement?	.95
4. improve achievement with English Language Learners?	.95

Table 3: Social Network Maps of Sending and Receiving Difficult Ties between Leaders

Notes: N = 78. For the sender map, nodes are sized by outdegree (sender) and colored by role (red = central office administrator; blue = site principal). The larger the nodes (e.g., node A) the more difficult ties sent. For the receiver map, nodes are sized by indegree (receiver) and colored by role (red = central office administrator; blue = site principal). The larger the nodes (e.g., node B) the more difficult ties received. Nodes listed at the left hand side of the maps are isolates, meaning they did not indicate anyone with whom they have a difficult relationship, nor did anyone identify them as an individual with whom they have a difficult relationship.

Table 4. Survey Descriptive Statistics

	Min.	Max.	M	Sd
<u>Network characteristics</u>				
Out-degree	0	8	1.44	1.68
In-degree	0	19	1.44	2.74
Ego-reciprocity (%)	0	66.7	4.2	11.8
<u>Attributes</u>				
Trust	3	6	4.68	0.68
Innovative climate – district office	1	6	4.96	0.91
Innovative climate – principals	1	6	5.14	0.90
Efficacy	2	9	7.04	1.88

Note: N = 78.

Table 5. Correlations and Reliability (Cronbach's alpha) for the Study Variables

	1a	1b	1c	2	3a	3b	4
1a. Out-degree	--	0.10	0.31*	-0.28*	-0.31*	-0.15	0.06
1b. In-degree		--	0.29*	0.10	-0.02	-0.11	0.08
1c. Ego-reciprocity			--	0.01	-0.10	-0.05	0.17
2. Trust				--	0.27*	0.30**	0.12
3a. Innovative climate – district office					--	0.70**	0.14
3b. Innovative climate – principals						--	0.29**
4. Efficacy							--

Note: N = 78; * $p < 0.05$, ** $p < 0.01$.

Table 6. Parameter Estimates of the $p2$ Model, Displaying the Effect of Individual, Demographic, and Dyadic Characteristics on the Probability of Having a Difficult Professional Relationship.

	Difficult professional relationship		
	Parameter estimate	SE	95 % CI
<u>Overall mean</u>			
Density	-6.21	1.98	
Reciprocity	2.46	0.93	
<u>Sender covariates</u>			
Work level (district/site)	-1.24*	0.35	(-1.87 / -0.52)
Gender (female/male)	-0.39	0.30	(-0.92 / 0.22)
Years of experience at district	-0.21	0.17	(-0.50 / 0.16)
Trust	-0.50*	0.20	(-0.87 / -0.10)
Innovative climate – district office	-0.49*	0.17	(-0.84 / -0.20)
Innovative climate – principals	0.41*	0.18	(0.09 / 0.79)
Efficacy	0.53*	0.19	(0.19 / 0.93)
<u>Receiver covariates</u>			
Work level (district/site)	-0.10	0.41	(-0.97 / 0.57)
Gender (female/male)	0.67*	0.29	(0.07 / 1.25)
Years of experience at district	0.76*	0.35	(0.07 / 1.48)
Trust	0.61*	0.25	(0.22 / 1.19)
Innovative climate – district office	-0.09	0.19	(-0.49 / 0.24)
Innovative climate – principals	-0.21	0.40	(-0.89 / 0.49)
Efficacy	0.25	0.22	(-0.23 / 0.69)
<u>Relationship covariates</u>			
Different gender (male/female)	0.01	0.18	(-0.34 / 0.36)
Different work level (district/site)	-0.35[^]	0.19	(-0.74 / 0.02)
<u>Random effects</u>			
Sender variance	0.50	0.31	
Receiver variance	2.91	1.05	
Sender-receiver covariance	-0.01	0.35	

Notes: Examination of 6006 potential dyadic relations from 78 educational leaders.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, [^] $p = 0.06$

Table 7. Summary of Hypotheses and Findings

Hypothesis	Results	Findings
Hypothesis regarding the density and reciprocity of difficult professional relationships		
H1: The difficult ties network will be sparse.	Supported	Difficult relationships form a sparse network
H2: Difficult professional relationships among educational leaders are likely to be reciprocated .	Supported	Difficult relationships among educational leaders are likely to be reciprocated .
Hypotheses regarding the individual characteristics associated with difficult professional relationships		
H3: Leaders who perceive their environment to be characterized by low trust will have a higher likelihood of sending and receiving difficult professional relationships.	Partially Supported	1. Leaders who perceive more trust tend to send fewer difficult relationships. 2. Leaders who perceive more trust tend to receive more difficult relationships.
H4: Leaders who perceive their environment to be less innovative will have a higher likelihood of sending and receiving difficult professional relationships.	Partially Supported	1. Leaders who perceive the district office to be less innovative tend to send more difficult relationships. 2. Leaders who perceive the principals to be more innovative tend to send more difficult relationships.
H5: Leaders who report higher levels of efficacy will have a higher likelihood of sending and receiving difficult professional relationships.	Partially Supported	Leaders who perceive themselves as having higher efficacy tend to send more difficult relationships.
Hypotheses regarding the demographic characteristics associated with difficult professional relationships		
H6: District office leaders will have a higher likelihood of sending and receiving difficult professional relationships.	Partially Supported	Leaders in the district office tend to send more difficult relationships.
H7: Female leaders due to the nature of having more relationships overall will have a higher likelihood of sending and receiving difficult professional relationships than male leaders.	Not Supported	Male leaders tend to receive more difficult relationships than female leaders.
H8: Educational leaders who have been working in the district for a longer period of time will have had more time and opportunities to build their network, and consequentially, may also have a higher likelihood of sending and receiving difficult professional relationships than educational leaders with fewer years of experience at the district.	Partially supported	Leaders who have been working in the district longer tend to receive more difficult relationships than those with fewer years of experience in the district.
Hypotheses regarding the dyadic characteristics associated with difficult professional relationships		
H9: Leaders who work at the same work level (district office or school site) will have a higher likelihood to form difficult professional relationships than leaders who work at different work levels.	Supported*	Leaders tend to form difficult relationships with leaders working at the same level (district/site).
H10: Leaders will have a higher likelihood to form same-gender difficult professional relationships than relationships with leaders of the opposite gender.	Not Supported	Leaders tend to equally form difficult relationships with leaders of the same and the opposite gender.

Note: *Marginally significant.