

Incorporating Social Networks into Leadership Development:

An Conceptual Model and Evaluation of Research and Practice

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Abstract

Multilevel and relational views of leadership are expanding the focus of *leadership development* beyond individuals' knowledge, skills, and abilities to include the *networked* patterns of social relationships linking members of dyads and larger collectives. In this review, we present a conceptual model explaining how three distinct approaches for *network-enhancing leadership development* can improve the leadership capacity of individuals and collectives. We then present a review of the leadership development literature and the results of a survey of 282 practitioners to assess the extent to which these approaches have been examined in research and implemented in practice. Our review revealed that *leadership research* and *leadership development practice* are outpacing *leadership development research* in terms of incorporating networks. We aim to spur future research by clarifying the targets, objectives, and underlying mechanisms of each network enhancing leadership development approach in our conceptual model. Further, we identify additional literature, not traditionally considered within the realm of leadership development that may help advance empirical examinations of these approaches.

Key words: leadership development, leader development, networks, networking, social capital

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Organizations invest considerable time, energy, and monetary resources in *leadership development* (O'Leonard & Krider, 2014). Despite these immense investments, there is growing concern that developmental efforts are not sufficiently building the leadership capacity required by today's complex and interdependent organizations (e.g., Day & Dragoni, 2015; Kriger & Zhovtobryukh, 2013; Lengel & Larsen, 2012; McCauley & Van Velsor, 2004; Petrie, 2014). Often, leadership development efforts attempt to enhance the general knowledge, skills, and abilities (KSAs) of individual leaders (Day, 2001). Such approaches are grounded in traditional conceptualizations of leadership as the traits or behaviors of individuals (e.g., managers, CEOs) who direct, align, and inspire others in pursuit of collective goals (e.g., Carlyle, 1907; Cowley, 1928; Terman, 1904). Yet, the leadership literature has convincingly demonstrated that leadership, as a phenomenon, is both *relational* and *multilevel*, involving not only leaders, but also followers, and *social relational processes* connecting members of dyads and larger collectives (e.g., Carter, DeChurch, Braun, & Contractor, 2015; Eberly, Johnson, Hernandez, & Avolio, 2013; Dionne et al., 2014; DeRue & Ashford, 2010; Uhl-Bien, 2003; 2006; Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012).

Relational and multilevel views of leadership, which emphasize the social processes connecting individuals, dyads, and collectives, point to the importance of enhancing *social networks* (i.e., patterns of social relationships; Wasserman & Faust, 1994) as an integral part of leadership development. Indeed, leadership development scholars have called for greater inclusion of social networks across organizational levels into leadership development (Chavez & Green, 2010; Colella, 2010; Cross, 2010; Cullen, Palus, Appaneal, & Chrobot-Mason, 2012;

Day, 2001; Day, Fleenor, Atwater, Strum, & McKee, 2014; Day & Harrison, 2007; Day & O'Connor, 2003; O'Connor & Quinn, 2004). Responding to these calls, the purpose of this review is to clarify the intersection between social networks and leadership development, and thus, provide a foundation for future leadership development research and practice that incorporates social networks.

We begin by introducing an overarching conceptual model of network-enhancing leadership development. This model clarifies how efforts designed to impact individuals' and/or collectives' networked relationships can improve individuals' effectiveness in leadership roles and processes and the collectives' ability to produce leadership. As part of this model, we present three approaches for *network-enhancing leadership development* derived from prior theoretical and empirical research examining networks and leadership: (1) *Individuals Developing Social Competence*; (2) *Individuals Shaping Networks*; and (3) *Collectives Co-Creating Networks*. Next, we review and synthesize the leadership development literature, to assess the extent to which networks have been considered. Our review suggests that leadership theory and research, in general, has largely outpaced leadership development research with regard to incorporating networks. Furthermore, findings from a survey of 282 leadership development practitioners reveal that leadership development research is again outpaced, this time in practice. In closing, we identify areas of research which, although not traditionally considered within the realm of leadership development, suggest fruitful directions for addressing the dearth of research on network-enhancing approaches. In sum, we provide a foundation for the leadership development field to pursue future research by identifying explicit ways in which social networks may enhance leadership development and by clarifying the state-of-the-science and the state-of-the-practice regarding networks and leadership development.

Implications of Evolving Views of Leadership for Leadership Development

Views of leadership have evolved over the past century—from role-based authority, to interpersonal influence, to an emergent property of dyads, collectives, or larger social systems (cf. Day & Harrison, 2007; Yammarino, 2013). For example, researchers have defined leadership as involving “multiple individuals assuming (and perhaps divesting themselves) of leadership roles over time in both formal and informal relationships” (Yammarino et al., 2012, p. 382) and as a “social process that involves iterative exchange processes among two (or more) individuals” (Lord & Dinh, 2014, p. 161). Embedded in these definitions is a recognition that leadership is intertwined with *relational processes* among actors across *multiple* organizational levels (e.g., dyads, groups, teams, organizational systems). Multilevel and relational depictions of leadership have led scholars to expand the *targets* of leadership development and suggest the inclusion of *social networks* into leadership development efforts.

For instance, in addition to targeting the general KSAs of individual leaders, scholars have suggested that leadership development efforts should build the *leadership capacity* of dyads and larger collectives, including teams, departments, and entire organizations (e.g., Day, 2001; Day & Dragoni, 2015; Day, Gronn, & Salas, 2004; Day & Harrison, 2007; Day & O’Connor, 2003; Drath, 1998; Drath & Palus, 1994; Reichard & Johnson, 2011; Uhl-Bien, 2003). Such multilevel thinking is apparent in the distinction made between leader development and leadership development (Day, 2001; McCauley, Moxley, & Van Velsor, 1998; McCauley & Van Velsor, 2004). Whereas leader development is the expansion of a person’s capacity to effectively fulfill leadership roles and processes, leadership development is the expansion of a collective’s capacity to produce direction, alignment, and commitment through their interactions (Van Velsor

et al., 2010). Thus, evolving definitions of leadership have broadened the *targets* of leadership development to encompass *leaders, followers, dyads, and larger collectives*.

Further, relational views of leadership have led researchers to recognize the importance of *social networks* to leadership emergence and effectiveness. For example, the effectiveness of individual leaders depends, in part, on their ability to understand, leverage, and improve their relative positions in intraorganizational and interorganizational social networks (e.g., Anand & Conger, 2007; Bartol & Zhang, 2007; Balkundi & Kilduff, 2006; Balkundi, Kilduff, & Harrison, 2011). Likewise, the effectiveness of a team or larger organizational system can hinge on a leader's ability to understand, leverage, and modify a variety of social networks (e.g., communication, trust) both within and external to the group (e.g., Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009; Morgeson, DeRue, & Karam, 2009; Oh, Chung, & Labianca, 2004; Zaccaro, Rittman, & Marks, 2001).

Recent work clarifies that not only do individual leaders participate in and impact the structures of a variety of social networks (e.g., friendship and advice networks), but the phenomenon of leadership itself *is* a type of social network, characterized by influence processes connecting members of dyads and larger collectives (Carter et al., 2015). This view of leadership as a social network is consistent with theories depicting leadership as relational influence (e.g., Graen & Uhl-Bien, 1995) or as a shared or collective process (e.g., Pearce & Conger, 2003). Accordingly, leadership researchers have begun to utilize network analytic approaches to investigate patterns of leadership processes connecting members of dyads and larger groups (e.g., Contractor, DeChurch, Carson, Carter, & Keegan, 2012; Carson, Tesluk, & Marrone, 2007; DeRue, Nahrgang, & Ashford, 2015; D'Innocenzo, Mathieu, & Kukenberger, 2014; Mayo, Meindl, & Pastor, 2003).

This emphasis on social networks has begun to permeate leadership development research and practice. Initial work in this area positions social networks as important outcomes of leadership development. For example, leadership has been defined as “helping people understand how to relate to others, coordinate their efforts, build commitments, and develop extended social networks” (Day, 2001, p. 586) and as “enhancing the social capital in organizations—those networked connections among individuals that promote cooperation, mutual trust, and respect in creating organizational value” (Day & O’Connor, 2003, p. 22). Further, O’Connor and Quinn (2004) argue that the expansion or enrichment of patterns of connectivity among organizational members is a key mechanism of leadership development. Information shared via small conferences (Cullen, Willburn, Chrobot-Mason, & Palus, 2014), perspective articles (Cullen et al., 2012), and case studies (Galli & Müller-Stewens, 2012) suggest that organizations are attempting to improve the leadership capacity of their organizations by impacting members’ connectivity.

However, to date, leadership development research has largely offered practitioners only general recommendations, including that developmental efforts should attempt to improve networking skills, relationship building, empowerment, collaboration, and the ability to work across boundaries (e.g., Day, 2001; Day & Harrison, 2007). The burgeoning area of research at the intersection of leadership and social networks suggests there are *numerous* ways in which social and leadership networks might factor into individuals’ abilities to fulfill leadership roles and dyads and collectives’ abilities to enact leadership. Thus, despite growing recognition that social networks are relevant to leadership, leadership development research and practice has not yet embraced the full potential of social networks for enhancing organizational leadership.

Our goal is to elucidate the ways in which social networks *could* be incorporated into leadership development. To do so, we offer a conceptual model explaining the effects of network-enhancing leadership development. As part of this model, we utilize the existing leadership literature to identify three distinct approaches for network-enhancing leadership development and then examine the extent to which these approaches have been examined in research and implemented in practice.

Theoretical Effects of Network-Enhancing Leadership Development

Although there are many outcomes of leadership development (e.g., leader identity; team learning; psychological safety; Day & Dragoni, 2015), scholars are increasingly bringing attention to the importance of enhancing social networks—the focus of our review. Broadly defined, *network-enhancing leadership development* consists of approaches attempting to impact individuals' and/or collectives' networked relationships in order to enhance the leadership capacity of organizations. In this section, we offer a conceptual model that builds on prior work specifying the multilevel effects leadership development efforts have over time (e.g., Day & Harrison, 2007; Day & Dragoni, 2015) by explaining how the social networks of individuals and collectives may be developed to enhance the leadership capacity of individuals and collectives.

As part of our conceptual model, we identify three distinct approaches for network-enhancing leadership development, grounded in different theoretical conceptualizations of leadership, and specify the target and objective(s) of each approach. These approaches are (1) *Individuals Developing Social Competence* (i.e., targeting individuals with the objective of impacting general competencies needed for participation in social networks); (2) *Individuals Shaping Networks* (i.e., targeting individuals with the objective of enhancing individuals' abilities to impact their own and others' social networks); and (3) *Collectives Co-creating*

Networks (i.e., targeting dyads and larger collectives with the objective of enhancing collectives' abilities to impact social networks).

In general, we conceptualize network-enhancing leadership development as *altering* individuals' and/or collectives' initial capabilities, including their KSAs and the relationships that exist prior to development. Specifically, network-enhancing leadership development impacts individuals' and/or collectives' *awareness* of network connections and their abilities to *leverage and/or modify* networks by changing the ways in which they interact with others (i.e., proximal indicators; Figure 1). By altering individuals' and collectives' interaction patterns, it becomes possible to modify more stable social structures (i.e., intermediate indicators; Hatch, 1997; Uhl-Bien, 2006). Thus, over time, with practice and support, network-enhancing approaches are meant to yield relatively more stable (and hopefully enhanced) patterns of *social* networks (e.g., advice, friendship, trust, communication) as well as patterns of relationships characterized by *influence* (i.e., leadership networks; Carter et al., 2015; DeRue, 2011). As Figure 1 suggests, social and leadership networks *co-evolve* such that there are bidirectional relationships and feedback loops between different social relationships (Carter et al., 2015). Finally, and most distally, individuals' and collectives' social and leadership networks impact individuals' participation in leadership roles and processes and collectives' creation of direction, alignment, and commitment (i.e., leadership).

 Insert Figure 1 About Here

Three Approaches for Network-Enhancing Leadership Development

The three approaches in our conceptual model differ in terms of their target and objectives. As indicated in Figure 1, Approach 1 (Individuals Developing Social Competence) and Approach 2 (Individuals Shaping Networks) directly alter *individuals'* capabilities, whereas Approach 3 (Collectives Co-creating Networks) directly alters *collectives'* capabilities by influencing their awareness and interactions with others. However, as indicated by the arrows in our model connecting the individual effects to effects at collective levels, interventions targeting individuals will also impact the capacity of collectives to understand, leverage, and modify their networks. Thus, these network-enhancing approaches build upon one another so that the distal outcome of development expands from enhancing the ability of individuals to participate in leadership roles and processes to enhancing the leadership capacity of collectives. Viewing leadership as an outcome of multilevel social dynamics, has a long history, but has gained greater traction in recent years (e.g., Day et al., 2004; DeRue, 2011; Drath et al., 2008; Gibbs, 1954; Salancik, Calder, Rowland, Leblebici, & Conway, 1975). Our model advances this line of research by including social and leadership networks as critical components of these dynamics.

In the following, we elaborate the theoretical underpinnings of each network-enhancing leadership development approach. These theoretical perspectives point to how leadership and networks are intertwined, and further, how different techniques within each approach may enhance individuals' and collectives' social and leadership networks. The targets and objectives of each approach are summarized in Figure 2.

 Insert Figure 2 About Here

Individuals Developing Social Competence

The first approach—*Individuals Developing Social Competence*—refers to development efforts targeting *individuals* (e.g., leaders, followers, managers, CEOs, high-potentials, etc.) with

the objective of improving their leadership KSAs (Approach 1a) and social skills (Approach 1b). This approach is consistent with the traditional focus of leadership development: expanding the core competencies individuals need to effectively occupy a leadership role (Day, 2001). The inclusion of efforts intended to improve individuals' social competence in our model of network-enhancing leadership development reflects a recognition that developing individuals' general competencies is a necessary component of building effective networked relationships and processes. Indeed, researchers have suggested that leadership development efforts must begin with a strong foundation of leader development. Initiatives attempting to enhance a collective's capacity for leadership without adequately developing individual skill sets may result in people feeling unprepared or overwhelmed (e.g., Drath, 2001; McCauley & Van Velsor, 2004; O'Connor & Quinn, 2004).

Development opportunities guided by this approach are often offered to individuals who occupy, or are being groomed for, formal positions of leadership (e.g., managers, 'high-potentials'). However, there is growing recognition that leadership is not solely the forte of formal leaders, and organizations often rely on team-based work structures. Thus, it is increasingly important that opportunities to develop leadership KSAs and social skills are provided to other organizational members (e.g., members of self-managed work teams; Manz, 1986; Manz & Sims, 1987; Neck & Houghton, 2006; Pearce & Conger, 2003).

Approach 1a: Developing individuals' KSAs. The development of individuals with the objective of improving general KSAs needed to enact leadership stems primarily from theories that view leadership as a set of individual behaviors (e.g., Bass, 1985; Burns, 1978; Stogdill & Coons, 1957). This approach is driven by a recognition that the behaviors and capabilities related to leadership roles and processes are not fixed, but rather, can be enhanced through interventions,

including programmatic training (Dvir, Eden, Avolio, & Shamir, 2002), feedback (e.g., 360-assessments; citations), mentoring (Lester, Hannah, Harms, Vogelgesang, & Avolio, 2011), and challenging work assignments (Dragoni, Tesluk, Russell, & Oh, 2009). This approach encompasses efforts to improve individuals' views of themselves (e.g., self-efficacy, self-awareness, confidence, emotional intelligence, and leader identity) and to enhance their motivation to lead (Day, 2001). Leaders who continue developing these skill sets, through additional practice and application, are expected to experience more distal and fundamental intrapersonal changes including “different ways of being and interacting with others” (Day & Dragoni, 2015, p. 144).

Approach 1b: Developing individuals' social skills. The development of individuals with the objective of improving their social skills stems from views of leadership as interpersonal influence (Hollander, 1964). Theories emphasizing that leadership involves participating in intelligent, influential, and persuasive exchanges with others, suggest that it is not enough for leaders to develop general intrapersonal competencies, they must also be capable of interacting effectively with others (i.e., they must develop *interpersonal* capabilities; Bass, 1985; Burns, 1978; Day & O'Connor, 2003). For example, development efforts guided by this approach might aim to improve interpersonal capabilities such as empathy, service orientation, political awareness, team orientation, conflict management, collaboration, and relationship building (Day, 2001; Gentry & Leslie, 2007; McCallum & O'Connell, 2009). These skillsets help enable leaders to be more influential and inspiring when interacting with others. Further, more socially adept leaders are better prepared to gain access to resources through their social connections. Development efforts guided by this approach could also target *followers*, or individuals who may eventually occupy an *informal* position of leadership. In fact, interpersonal competence may be

even more crucial for individuals who must influence others without the ability to leverage formal authority (Pielstick, 2000).

Individuals Shaping Networks

As in the first approach, our second approach for network-enhancing leadership development, *Individuals Shaping Networks*, refers to development efforts targeting *individuals*. However, in comparison to Approach 1, which targets the development of individuals' *general* intrapersonal (KSAs) and interpersonal (social) skills in preparation for eventual participation in networks, Approach 2 focuses more directly on impacting individuals' abilities to understand, leverage, and modify their own (2a) and others' (2b) social networks.

Approach 2a: Individuals shaping their own networks. Development efforts targeting individuals with the goal of enhancing their abilities to impact their *own* social network connections have theoretical origins in research recognizing the impact of the *social context* individuals are embedded within on their emergence and effectiveness as leaders. For example, Balkundi and Kilduff (2006) theorize that leaders who are able to perceive and manage their intraorganizational and interorganizational social networks can effectively utilize their social connections to fulfill leadership roles and facilitate collective outcomes. Prior research demonstrates that certain structural positions (e.g., central positions) in a variety of social networks (e.g., advice, friendship, trust) predict eventual occupancy of formal leadership positions (Collier & Kraut, 2012; Parker & Welch, 2013), others' views of a person's leadership qualities (e.g., charisma, Balkundi et al., 2011) and the success of the groups individuals lead (e.g., Balkundi & Harrison, 2006; Balkundi, Barsness, & Michael, 2009; Cummings & Cross, 2003; Mehra, Dixon, Brass, & Robertson, 2006). These perspectives echo research demonstrating that individuals' positions in social networks can yield access to information,

support, and other important resources (Burt, 1992, 1998; Brass, 1985; Krackhardt & Hanson, 1993; Podolny & Baron, 1997).

Further, research shows that formal leaders' positions in the broader social network impact a follower's ability to be influential (Sparrowe & Liden, 1997; 2005). These findings highlight the primary importance of the supervisor-subordinate (leader-follower) relationship as a focus of development, while clarifying that it is but one relationship embedded within a broader network of social relationships. Thus, development efforts within this category may also trace their theoretical origins to relational theories of leadership, including LMX (e.g., Graen & Uhl-Bien, 1995; Sparrowe & Liden, 1997), which have called for the development of high quality relationships between leaders and followers.

For example, researchers have proposed that relationships between leaders and followers develop by means of a role-making process which creates stronger relationships consisting of mutual trust, respect, and obligation when leaders take certain actions, such as delegating responsibilities that are traditionally reserved for the leader to a follower and the follower responds by meeting and exceeding performance expectations (Bauer & Green, 1996; Graen & Scandura 1987; Uhl-Bien, 2003). Through these actions, leaders alter the structure of their own network by developing stronger ties with individuals (e.g., subordinates) who will help them be more effective. Further, followers may invest in developing stronger ties with their leader, including being sponsored or incorporated into the leader's own circle of trusted contacts (Sparrowe & Liden, 1997; 2005).

Approach 2b: Individuals shaping others' networks. Development efforts targeting individuals with the goal of helping them understand, leverage, and modify the social networks of *others* have theoretical roots in research describing leaders as *human resource brokers* who

leverage social connections to identify and coordinate the talents of those they lead (Brass, 2001; Brass & Krackhardt, 1999). For example, Friedrich et al. (2009) suggest that leaders who understand the social structures within their groups are better able to delegate portions of the leadership role in alignment with task demands.

These approaches also have theoretical origins stemming from *functional* views of leadership, which maintain that leadership effectiveness involves helping fulfill collective needs by impacting the affect, cognitions, motivations, and behavioral processes within and external to collectives (e.g., Burke, Stagl, Klein, Goodwin, Salas, & Haplin, 2006; Morgeson et al., 2009; Zaccaro & Klimoski, 2002; Zaccaro et al., 2001). Recent arguments that collective constructs, including team processes (Crawford & LePine, 2013; Marks, Mathieu, & Zaccaro, 2001) or team transactive memory systems (Mell, van Knippenberg, & van Ginkel, 2014; Lewis, 2004) constitute patterned or *networked* social phenomena, suggest that a key functional aspect of leadership is to impact the networks of affective, motivational, cognitive, and behavioral social connections among followers.

In summary, leaders play a critical role in setting conditions that facilitate the emergence of social and leadership connections (e.g., Hackman, 2012; Wenger & Snyder, 2000). For instance, research on shared leadership in teams suggests that individuals can help foster effective patterns of leadership through coaching (Carson et al., 2007) or empowering team members (Margolis & Ziegert, 2016; Vecchio, Justin, & Pearce, 2010; Yammarino et al., 2012). Hazy and Uhl-Bien (2013) propose that organizational leaders can establish and regulate rules that shape the interaction among individuals and evolve those rules in anticipation of changing circumstances. Likewise, Uhl-Bien, Marion, and McKelvey (2007) propose that taking actions to encourage interaction, coordination, and interdependence between people with relevant

knowledge allows leaders to relinquish some of the control typically reserved for top-down, formal leaders and create more adaptive leadership capacity emerging from interactions between people.

Collectives Co-Creating Networks

Researchers have argued that it is important to make a distinction between leadership as an *input* to a collective and leadership as an *outcome* of collective processes among members of dyads and teams (e.g., Boal & Hooijberg, 2000; Day, Gronn & Salas, 2006). While Approach 2b is more consistent with the view of leadership as an input to a collective, the third approach, *Collectives Co-creating Networks*, is more consistent with the view of leadership as an outcome of members' interactions. It consists of efforts targeting *collectives* (e.g., dyads, groups, teams, multiteam systems, organizations, communities) with the objective of developing the group's ability to understand, leverage, and modify the structures of their internal and external social networks.

This approach is firmly grounded in views of leadership as a property of dyads or larger collectives that arises through relational processes (e.g., Day et al., 2004; DeRue, 2011; DeRue & Ashford, 2010; Drath, McCauley, Palus, Van Velsor, O'Connor, & McGuire, 2008; Hiller, Day, & Vance, 2006; Pearce & Sims, 2002) as well as theories acknowledging that different members of a group may assume responsibility for various leadership functions (with or without formal authority) simultaneously or over time (Contractor et al, 2012; Morgeson et al., 2009; Pearce & Conger, 2003; Yammarino et al., 2012). For example, several theories place the genesis of leadership in the dyadic relationship between two individuals. LMX theory (e.g., Bauer & Green, 1996; Graen & Scandura 1987; Graen & Uhl-Bien, 1995) proposes that leadership is a relational process between a leader and a follower through which mutual trust,

respect, and obligation may develop and followers may take on additional responsibility from the leaders. Other relational theories have depicted leadership as socially constructed through communication exchanges (Dachler, 1992, DeRue & Ashford, 2010; Drath et al., 2008; Hosking, 1988; Uhl-Bien, 2006) or as a mutual influence process (e.g., Bedeian & Hunt 2006, Uhl-Bien, Graen, & Scandura, 2000). Indeed, some have claimed that all leadership is collective (Burns, 2003) and shared (Drath, 2001), and multiple theories of leadership in groups and teams emphasize patterns of leading and following interactions (DeRue, 2011) and the distribution and sharing of leadership roles among team members (e.g., Brown & Gioia, 2002, Contractor et al. 2012, Gronn, 2002, Klein, Ziegert, Knight, & Xiao, 2006; Lipman-Blumen, 2000, Pearce & Conger, 2003; Pearce & Sims, 2002). This stream of research suggests that groups possess greater leadership capacity when members adaptively match their participation in leading-following exchanges to changing task demands (e.g., Aime, Humphrey, DeRue, & Paul, 2014; Klein et al., 2006).

This approach also incorporates aspects of theories of group social capital (e.g., Oh, Labianca, & Chung; 2006) and team effectiveness (e.g., Kozlowski & Ilgen, 2006; Hackman, 1983), which acknowledge that social relationships within and external to groups relate to individual and collective outcomes. From these views, leadership development is meant to promote patterns of collective interactions (i.e., networks) that result in greater clarity of direction, alignment of thinking and efforts, and commitment (i.e., leadership).

Evaluation of Network-Enhancing Leadership Development Research and Practice

In the following, we use these three approaches to organize our review and evaluation of network-enhancing leadership development research and practice. We focus our review of the literature on studies considering Individuals Shaping Networks (Approach 2) or Collectives Co-

Creating Networks (Approach 3) in order to reduce redundancies with the high-quality comprehensive reviews of developmental efforts impacting individuals' general KSAs and social skills (i.e., Approach 1) published in recent years (cf. Day et al., 2014; DeRue & Meyers, 2014). Then, we present results from a survey of leadership development practitioners to assess the extent to which network-enhancing leadership development is implemented in current practice.

Network-Enhancing Leadership Development Literature

We conducted a broad survey of the literature on leadership development in order to assess the degree to which academic research has considered network-enhancing leadership development within Approach 2 and Approach 3. We began our literature search by entering keywords into academic search engines (i.e., PsycINFO, Web of Science, and Google Scholar) such as *leadership development*, *leader development*, *leadership developmental interventions*, *leaders and networks*, and *network approaches to leadership development*. We supplemented this search by examining the reference lists of reviews of leadership development (e.g., Day, 2001; Day et al., 2014; Day & Dragoni, 2015; DeRue & Myers, 2014).

Our review covered work published over the past 25 years in journals that regularly include research on leadership and/or leadership development (e.g., *The Leadership Quarterly*, *Human Resource Management Review*, *Journal of Applied Psychology*) as well as edited volumes and practitioner-focused publications. We identified 141 articles in our initial search and retained 66 articles based on an initial review of abstracts. To be retained during this initial screening process, the articles had to include leadership development techniques that could be classified under one or more of the three network-enhancing leadership development approaches proposed in our model. We then coded each article based on the type of study (e.g., theoretical, empirical, case-study) and network-enhancing approach considered. Unsurprisingly, the vast

majority of the leadership development articles fell into Approach 1 ($n = 40$), and thus, were outside of the scope of this review. The final sample for our literature review consisted of empirical evaluations, in-depth and illustrative case studies, and practitioner-oriented perspective articles within Approach 2 and/or 3 ($n = 26$). We provide a synopsis of this research below. Table 1 summarizes additional information for each exemplar study.

Insert Table 1 About Here

Approach 2a: Individuals shaping their own networks. Table 1 summarizes 15 exemplar articles considering development efforts with a proximal objective of enhancing individuals' abilities to understand, leverage, and/or modify their own social network connections. The majority of the studies we identified within this area provided practical recommendations grounded in theory regarding the network structures that benefit individuals (e.g., Anand & Conger, 2007; Uzzi & Dunlap, 2005). Although a few studies described empirical or case-study evaluations of developmental interventions, for the most part, the articles within this area were practice-oriented (e.g., with the intended audience of managers, executives) and relied on illustrative case examples.

Research in this area has offered guidance regarding what constitutes an *effective* network for leaders. For example, researchers have addressed common misconception about networks, including the notion that a bigger network is a better network (Cross & Thomas, 2008), and have conveyed that effective networks provide access to diverse sources of information, consist of trusted connections, and place an individual in a position to transfer and translate that

information between different groups (e.g., Cross & Thomas, 2008; Cullen-Lester, Woehler, & Willburn, 2016; Uzzi & Dunlap, 2005).

To create such a network, Anand and Conger (2007) identify four networking strategies employed by successful, or *consummate*, networkers including developing relationships with respected and trusted people in informal networks, introducing people who would benefit from the connection to each other, purposefully managing who is in one's network, and interacting amicably with others. Further, Ibarra and Hunter (2007) highlight the importance of employing networking strategies when a manager is going through a leadership transition. They explain that building operational, personal, and strategic networks can increase a leader's effectiveness and the speed with which they can succeed in their new role, and offered guidance with regard to how leaders could identify relevant contexts and strategies for developing these relationships. Paralleling this work, Bartol and Zhang (2007) discuss the importance of enabling leaders to build operational, strategic, and personal network connections, especially as they navigate challenging developmental assignments (e.g., job transitions, change implementation). These researchers propose that leaders' abilities to develop and leverage such connections may be contingent on the structure of the broader social networks in which leaders are embedded, individual differences (e.g., gender, personality), and the degree to which interactions are technologically-mediated. Furthermore, they suggest that organizations can facilitate the development of important connections through utilizing feedback, coaching, and mentoring in leadership development while also coordinating conferences, cross-functional meetings, and job rotations for individuals to build effective networks.

Uzzi and Dunlap (2005) point out, however, that people's natural networking tendencies (e.g., connecting to similar others or those who are in close proximity) help to build trust in

relationships, but often at the expense of gaining access to diverse skills and information. They recommend individuals assess the structure of their networks (e.g., using social network analytic approaches) to identify key individuals who act as *brokers* to other groups and to purposefully build networks through activities (e.g., sports teams, community service groups, nonprofit and for-profit boards) that allow them to meet a diverse group of people in settings that require interdependence and present opportunities to develop genuine connections. Similarly, Cross (2010) and Cross and Thomas (2011) elaborate on how executives can evaluate, de-layer, diversify, and leverage their networks to improve their effectiveness, including connecting to people who are diverse sources of expertise, are influential, and offer developmental feedback, personal support, a sense of purpose, and work-life balance. Cullen-Lester et al. (2016) build upon previous work in this area by providing guidance to management educators and leadership development professions in the form of a framework for incorporating networks in leader development efforts and curated resources that can help practitioners address misconceptions about networking, provide instruction to leaders when they assess the current state of their network and its effectiveness, and offer guidance regarding the changes leaders need to make and how to implement strategies to build, manage, leverage, and transition network connections.

Although, developing networks is commonly reported as a benefit of participating in leadership development programs (e.g., Carter & Rudd, 2000, Diem & Nikola, 2005; Fredricks, 2003; Zacharakis & Flora, 2005), whether a causal relationship exists and how those benefits may accrue to participants is not well understood (Van de Valk, 2008). Further, although scholars (e.g., Chavez & Green, 2010; Colella, 2010) have recommended techniques leadership development professionals can use as part of programs to help participants begin to develop and

leverage new network connections, there is a need to assess whether these interventions successfully enable leaders to understand and alter their own network connections.

Burt and Ronchi (2007) offer one of the few empirical evaluations of the impact of network-based interventions in their study of executives who were trained on the benefits that can be derived from different types of social structures, including structural holes (i.e., gaps in an individual's network where other people are only connected by the focal person). Relative to a control group of executives, performance was enhanced for those executives who completed the training program—particularly for those who actively, as opposed to passively, participated in training. Active participants were also more likely to be promoted and retained. This study demonstrated that teaching executives about social network structure enhances their effectiveness. However, this evaluation did not assess changes in network structures pre- vs. post-program or investigate the mechanisms through which potential changes in leaders' network structures translate to leader effectiveness.

Roberts (2013) reported the outcomes of the Leadership Education and Development (LEAD) action-learning program which emphasized learning and reflection, dialogue among participants and shared problem solving. These foci resulted in exchanges among program participants which allowed them to strategically build connections across silos, improve mentoring practices, and create stronger ties between leaders of different departments. The impact of this approach was documented qualitatively: “members of both cohorts reported that they had begun using more collaborative approaches” (p. 68). Roberts called for future studies to assess changes in networks empirically by using social network analysis.

Approach 2b: Individuals shaping others' networks. Table 1 also summarizes 13 exemplar articles considering development efforts with a proximal objective of enhancing

individuals' abilities to understand, leverage, and/or modify the social network connections of *others*. Like the research within Approach 2a, the majority of this work is practice-oriented and relies on qualitative or case-study methodologies in order to provide practical advice to leaders with regard to improving overall network structures, and ultimately, team or organizational effectiveness.

Much of this literature offers practical guidance clarifying how leaders can better understand informal networks and take steps to alter their groups' or organizations' network structure. In particular, researchers have suggested that leaders use network analytic approaches to make 'invisible' network structures 'visible' (Cross, Borgatti, & Parker, 2002). As an example, Krackhardt and Hanson (1993) proposed that helping managers understand how social networks function beyond their direct social connections allows them to have more influence and be more effective at addressing organizational problems. Further, they proposed that network analysis is a useful tool for helping leaders gain insight into an organization's informal dynamics, and provided illustrative examples about inaccuracies in managers' understanding of networks, including how those inaccuracies led to problems the leader was able to later remedy with insights from a network analysis.

Cross and Prusak (2002) discuss how certain social network patterns in organizations, such as when certain employees create bottlenecks in information flow decision-making processes, can create collaboration challenges that leaders need to resolve. These researchers describe how leaders can use network analytic methodologies to identify people who hold key structural positions in social networks, diagnose potential bottlenecks and breakdowns in collaboration, and/or promote productive connections between people and groups. Similarly, Cross et al. (2002) asserted that leaders should engage under-utilized experts who are located on

the periphery of the network by helping them form the connections they need to be effective. This process may encourage positive outcomes including information-sharing and collaboration across organizational silos and collaboration within strategically important groups. Further, Cross, Ernst, and Pasmore (2013) identify influential network roles that impact change processes within organizations (i.e., connector, expert, broker, energizer, and resistor) and call for the formation of network connections between groups using boundary spanning leadership practices (Ernst & Chrobot-Mason, 2010) to enhance collaboration that facilitates the spread of change. How the process of boundary spanning leadership can be used to building stronger collaboration networks and greater direction, alignment, and commitment between groups, especially those who may be at an impasse or in conflict, is further explained by Chrobot-Mason, Cullen, and Altman (2013). Specifically, they illustrate with several case examples how leaders must first, counter-intuitively, take time to foster connectivity within each group by reaffirming group-based identity and clarifying the strengths, needs, and goals of the group among its own members. This step is needed before groups can begin moving toward greater collaboration by building personal connections, which make it easier to mobilize collective efforts and potentially discover new ways of working together.

Several of the exemplar articles within this category clarify that there is not a universally ‘good’ or ‘bad’ network structure, but rather, the structure of the network needs to match its purpose (i.e., the goals of the organization; Cross, Ernst, Assimakopoulos, & Ranta, 2015; Cross, Liedtka, & Weiss, 2005; Cross, Laseter, Parker, & Velasquez, 2006; Cross & Velasquez; Krackhardt & Hanson, 1993). For example, Cross et al. (2005) warn executives not to assume that more connectivity is better, and advise leaders to strategically alter connections within the organization by promoting increased connectivity where it adds value and decrease collaboration

demands where it does not. To illustrate this point, they describe how different types of network structures are more or less optimal for enabling collectives to solve ambiguous, complex, or familiar problems, and suggest leaders draw on work processes and management practices to shape networks to align with task demands. Likewise, Cross et al. (2015) describe efforts to improve collaboration that took different approaches based on the goal of the collaboration: innovation versus efficiency. Through two illustrative cases, they show how the leaders of one organization set the conditions for new patterns of cross-boundary interaction to improve dialogue among a diverse set of people, and how the leaders of another organization sought to improve efficiency by improving information sharing, best-practice transfer, and peer-to-peer problem solving across units via result-oriented communities of practice. They concluded that leaders' roles in these efforts are to clarify the strategic purpose of the collaboration, identify where greater collaboration will produce value, and create the appropriate organizational context to help these networks grow.

Approach 3: Collectives co-creating networks. There is a clear distinction between Approach 1 and 2, which target individuals and Approach 3, which targets collectives as a whole with the objective of improving the collective's ability to understand, intervene, and leverage their own internal and/or external social networks. Our review revealed very few articles ($N = 3$) focused on targeting collectives with the specific emphasis of influencing the development of social or leadership networks. This relatively low sample size is somewhat unsurprising given the traditional focus of leadership development efforts on the abilities and behaviors of individual leaders. Interventions targeting dyads or collectives may be more likely to be found outside of the leadership development literature (Day & Dragoni, 2015).

As one example, Galli and Müller-Stewens (2012) provide an in-depth case study of a large multi-business firm that utilized a number of different leadership development techniques targeting both individuals and collectives to improve collaboration across businesses in the firm (e.g., 360-degree feedback, coaching, mentoring, job assignment, leadership training, action learning, and networks/off-sites). They found that different *strength* relationships were more useful for different forms of collaboration (e.g., cross-selling: *weak social relationships*; client referral: *semi-strong social relationships*; joint market/product development: *strong social relationships*); the higher the perceived risk of collaboration, the stronger the relationships needed to be between managers of each business within the firm. Moreover, their results showed that different leadership development techniques promoted the development of relationships at varying strengths, and for this organization, efforts targeting collectives were not necessarily more effective in producing stronger relationships than efforts targeting individuals. For example, networking and off-site events that brought managers from different businesses together were useful for developing initial (weaker) connections, but shared work in the form of short-term job assignments or action learning team projects was required to build stronger connections.

Further, Cross et al. (2015) provided an example of how one organization brought together individuals from different departments, levels, and geographic locations for an event that would foster new types of interaction and ultimately establish relationships that would improve innovation efforts. To achieve these goals, they designed an environment that encouraged employees to break away from their typical ways of working, explore new perspectives (through immersion experiences with their customers), learn to engage experts as resources for problem-solving, and find ways to better integrate the informal work of this group

with the formal work and processes of the organization. A network of people, committed to working on an idea that emerged from this event, took hold and drew in more people with relevant knowledge and expertise. The development team who designed the event used the results of a network analysis to help members of this innovation network identify people in key roles in the informal network that they should connect with and supported the network by preventing formal structure and processes from impeding it.

Cullen, Palus, and Chrobot-Mason (2015) describe how network analysis can be used to help leaders as well as collectives identify barriers that are preventing more effective collaboration. These researchers presented a case study in which they describe how insights from an analysis of the communication network of the R&D division of a pharmaceutical company were presented to all members of the division. The results helped the collective to identify breakdowns in collaboration due to geographic location (i.e. floors in an office) and collaboration practices. The researchers tracked changes in the network over time after moving all employees onto the same floor and providing training on practices for collaborating more effectively across R&D teams, finding that communication network density doubled 18 months after the developmental intervention and better reflected effective team-to-team collaboration.

Summary. Our review of the literature on leadership development found only a small body of research examining network-enhancing leadership development. There was a substantially stronger focus in this literature on how individuals could improve their own network and the network of others in their organizations. Few papers focused specifically on efforts targeting collectives with the proximal goal of improving collectives' ability to understand and manage their internal relationships and connections with other entities. Further, the articles we identified tended to be case-study based or practice-oriented, suggesting a clear

opportunity for future research considering the ways in which individuals' and collectives' capacity for leadership might be developed through network-enhancing development.

Evaluation of Network-Enhancing Leadership Development Practice

To further assess the degree to which network-enhancing approaches are permeating practice, we conducted an online survey of leadership development practitioners. The items in this survey were developed through personal communications with practicing leadership development professionals, observations of leadership development efforts, and the review of the academic and practitioner literature described previously. From these conversations, observations, and readings we generated a list of techniques that exemplify Approach 2 and 3 of our conceptual model. We reviewed this list with leadership development professionals who were actively focusing on improving the networked connections of individuals and groups to ensure we had adequately captured the types of techniques that were being applied in practice. When completing the survey, respondents were asked whether they had used each technique during the past year and their perceptions regarding the effectiveness of those they had used. We also developed several questions to assess the degree to which respondents discussed networks or utilized network-analytic approaches as part of their leadership development efforts.

Study participants. A total of 282 leadership development practitioners, who had facilitated one or more leadership development initiative in the past year, completed the survey. To recruit this sample, we distributed the survey link through multiple channels, including the Center for Creative Leadership's social media outlets (e.g., blog, LinkedIn, email listserv), the International Leadership Association membership list, an Executive Development Roundtable membership list, and directly to leadership scholars and practitioners who were likely to be engaged in leadership development practice. We employed a snowball recruitment technique,

such that each person who received the survey invitation was encouraged to share the invitation with other leadership development practitioners. The number of participants who responded to different demographic questions ranged from 215-280. Based on the participants who reported their demographic information, our sample was 48.35% male, with a mean age of 50.68 years old ($SD = 10.75$), and a mean organizational tenure of 10.44 years ($SD = 8.52$). The majority of the participants were full time employees (89.06%) with advanced degrees (80.22% had a Master's degree or PhD). Participants were from 33 different countries, with 66.06% of the sample living in the United States. They worked for a variety of local (34.77%), national (26.95%), and international (38.28%) organizations which spanned corporate (40.16%), education (21.26%), government (13.78%), or non-profit sectors (18.11%) and varied in size (33.47% organizations with 1-99 employees, 16.12% with 100-499 employees, 9.50% with 500-999 employees, 16.12% with 1000-4999 employees, and 24.79% with more than 5000 employees).

Findings: Perceptions of the importance and effectiveness of developing relationships. The literature has broadened the proximal outcomes of leadership development to include not only the development of individual's KSAs and social skills, but also the relationships that knit people together and provide important resources to individuals, teams, business units, and organizations. Our survey assessed the degree to which leadership development practitioners hold a similar view of the importance of developing individuals' and collectives' social relationships. Specifically, we asked survey respondents about the importance of improving KSAs through leadership development, the emphasis placed on those objectives in leadership development efforts in their organization, and the effectiveness of those efforts. Then,

we posed the same questions with regard to improving the relationships that connect people in the workplace providing resources to individuals, teams, business units, and organizations.

Nearly all practitioners surveyed (98.59%) agreed or strongly agreed that developing individuals' KSAs is important for organizational effectiveness and nearly as many (91.90%) emphasized the development of KSAs in leadership development activities. A smaller percentage of respondents (64.79%) believed their organization was effective in assisting individuals in developing their KSAs. Similarly, nearly all practitioners (99.30%) agreed or strongly agreed that developing relationships within the organizations was important for organizational effectiveness, and that this objective was emphasized (85.61%). Substantially fewer respondents (46.13%) believed their organization was effective at facilitating the development of those relationships. Thus, although leadership development practitioners agree that developing leaders' KSAs and social skills as well as the relationships that knit people together are important objectives for leadership development, they also believed their organizations had room for improvement with regard to effectively addressing both objectives.

Findings: Targets and broad objectives of leadership development efforts. Our model and review advances a need for network-enhancing efforts targeting both individuals as well as dyads and larger collectives. Prior to evaluating the degree to which our survey respondents were engaging in network-enhancing leadership development, we assessed the extent to which these professionals engaged in efforts aimed at: (a) helping *individuals* develop personally; (b) helping *individuals* improve the effectiveness, innovation, or sustainability of the groups they lead (e.g., team, business unit, or entire organization); or (c) helping *collectives* improve themselves (i.e., their own effectiveness, innovation, or sustainability). Our results showed that 96.81% ($N = 273$) of respondents had facilitated workplace development initiatives

designed to help individuals develop personally, whereas 71.99% ($N = 203$) had facilitated workplace development initiatives focused on helping individuals improve the groups they lead. Only 59.93% ($N = 169$) of our respondents had facilitated workplace development initiatives targeting entire groups to improve the group's effectiveness, innovation, or sustainability. Interestingly, these findings reveal that whereas individuals remain the predominant target of development, a majority of the sample did, in fact, engage in efforts targeting collectives.

Further analysis of these questions (see Figure 3), revealed that 19.15% of our respondents had *only* engaged in leadership development efforts aimed at helping individuals to grow personally, whereas 1.77% of our respondents had *only* engaged in efforts aimed at helping individuals improve the effectiveness of their groups and no respondents *only* engaged in efforts aimed at helping collectives improve their effectiveness. Further, 19.15% of our respondents had engaged in efforts aimed at helping individuals to grow personally and had engaged in efforts aimed at helping individuals improve the effectiveness of their groups, whereas 8.87% had helped individuals grow personally and helped collectives improve themselves, and 1.42% had helped individuals improve the groups they lead and collectives improve themselves. Finally, nearly half of our sample, 49.65%, had helped individuals grow personally, helped individuals improve the effectiveness of the groups they lead, *and* helped collectives improve themselves. In sum, these findings reveal that many professionals have expanded their leadership development efforts to include multiple levels of focus. However, when practitioners focused their efforts on one target, they tended to help individuals grow personally.

Insert Figure 3 About Here

Findings: Use of specific network-enhancing techniques. In setting out our model, we suggested that leadership development professionals may not be leveraging the potential of social networks fully in their developmental initiatives. In remainder of this section, we investigate this issue further, by presenting results that provide greater insight into the extent to which leadership development professionals have used techniques that are exemplars of approaches meant to enhance individuals' and collectives' abilities to understand, leverage, and modify social networks.

First, respondents reported whether they had used the term *network* during the developmental efforts they had facilitated, the context(s) within which this term was used (e.g., when discussing the importance of networking), and whether they used network analytic methods in their work. Although, 79.44% of these professionals reported using the term network in their developmental initiatives, only 34.49% reported using network analytic techniques as a part of those initiatives. Thus, although the term networks has largely permeated development efforts, network analytics are not commonly used.

With regard to questions investigating the *reasons* why respondents discussed networks during their development efforts, the most common responses were: when discussing obtaining buy-in from key stakeholders, partners, clients, or influencers (51.04%), to emphasize the importance of individuals engaging in networking behaviors (47.22%), and with regard to breaking down silos (disconnects between groups) by building relationships across boundaries (46.88%).

Survey results for individuals developing social competence (Approach 1). As explained previously, we see the development of individuals' social competencies as a critical foundation for the remaining network-enhancing approaches. To gain a better understanding of the emphasis

in leadership development practice on improving social competence (1b), we asked leadership development professionals if they discussed building or leveraging networks or workplace relationships during mentoring or coaching sessions with individual leaders and whether they debriefed 360-degree or other feedback with their client regarding how effectively a person builds relationships. Of the leadership development professionals surveyed, 80.59% said they discussed these topics during mentoring or coaching sessions and 65.20% said they debriefed feedback on relationship building.

Survey results for individuals shaping their own networks (Approach 2a). Techniques that target individuals with the proximal objective of developing their ability to understand, leverage, and/or modify their social network connections (see Table 2) can be considered a special case of efforts designed to help individuals grow personally. Specific techniques exemplifying this approach include leadership development professionals asking participants to complete assessments of their own (ego) network (i.e., provide a list of their contacts and answer questions about their contacts' characteristics and connections; e.g., Baker, 2000a, 2000b, Gargiulo, 2002, Ibarra, 2002, 2008, Willburn, 2010). Completing these kinds of assessments can help improve participants awareness of their network (a proximal outcome in our model), including gaining a better understanding of their network's strengths and weaknesses, which the existing literature suggests is crucial for leadership effectiveness (e.g., Balkundi & Kilduff, 2006). This same logic underlies techniques in which practitioners ask participants to list or map their key stakeholders or important contacts. Other techniques in Table 2 exemplify this approach by helping participants alter their network connections (i.e., by interacting differently with their existing as well as new contacts; another proximal outcome in our model).

Of the 273 respondents who reported engaging in efforts aimed at helping individuals grow personally, 96.70% ($N = 264$) reported using one or more of the techniques listed in Table 2. On average, practitioners reported using an average of 4.64 techniques ($SD = 2.17$, $mode = 5$, $min = 1$, $max = 10$). 71.06% of practitioners fell in the range of using 2-6 techniques. Thus, our results suggest that the practitioners in our sample *are* leveraging this network-enhancing approach to help individuals grow personally.

However, the respondents' use of the different techniques varied substantially. Whereas the least used development technique was providing training to individuals on using online networking tools (e.g., Facebook, LinkedIn) to build and maintain their relationships (23.81%), the most used was providing individuals with resources including books, articles, or other materials on building and maintaining effective relationships and networks (62.64%). There was much less variability in effectiveness ratings by those who used each technique. For example, 88.75% of respondents indicated it was effective to have individuals list the key stakeholders (highest rated), while 73.43% of respondents indicated that it was effective to encourage individuals to make connections by joining groups based on a common interest/expertise (e.g., peer support group, community of practice) (lowest rated).

 Insert Table 2 About Here

Survey results for individuals shaping others' networks (Approach 2b). Techniques that target individuals with the proximal objective of developing individuals' abilities to understand, leverage, and/or modify the social networks of *others* (see Table 3) can be considered a special case of efforts designed to help individuals impact the effectiveness of their groups. Practitioners

employing this approach recognize informal networks are critical for the effective functioning of organizations and if leaders can effectively understand and engage these networks they will be able to accelerate change efforts, execute strategy more effectively, and improve collaboration across the organization, among other objectives. Thus, practitioners may conduct an assessment of the relationships within and between groups in the organization and use the insights from this network analysis they can help leaders to improve their understanding of the current network structure within the collective as a whole (a proximal objective of our model) and using that understanding take steps to foster greater connectivity, reduce collaborative overload on certain employees, and engage those individuals who occupy key network positions (Cross et al., 2002; Cross & Prusak, 2002, Cullen-Lester & Willburn, 2016; Uzzi & Dunlap, 2005). The latter focus of this work would involve creating opportunities for different ways of interacting among members of the collective (a proximal objective of our model) leading to the formation of different social and leadership network structures overtime. While we argue that the objective assessment of the current network is an important part of this development process, often leaders have predetermined what issues if any exist with the network connections within and beyond their group, thus, practitioners may skip this assessment phase and focus on helping the leader to make changes to those existing network structures.

Of the 203 respondents who reported engaging in efforts aimed at helping individuals improve their collectives, 94.58% ($N = 192$) reported using one or more of the techniques listed in Table 3. On average, practitioners reported using 5.56 of these techniques ($SD = 2.93$, $mode = 4$ $min = 1$, $max = 13$). Again, the use of the different techniques varied substantially. The most used development technique was coaching individuals on ways to increase the effectiveness of the individual's group by leveraging informal networks (56.65%). The least used development

technique was using network analysis to assess the current structure of the individual's group (23.15%). Interestingly, practitioners who had used network analysis to help individuals identify influential people within the group rated it as the most effective developmental technique (93.85%). Helping individuals promote the use networking sites such as Yammer, Facebook, Twitter, LinkedIn, etc. to improve the effectiveness of the individual's group (e.g., training on social media tools/platforms) was considered to be the least effective technique (62.00%).

 Insert Table 3 About Here

Survey results for collectives co-creating networks (Approach 3). Techniques that target collectives with the proximal objective of developing collectives' abilities to understand, leverage, and/or modify their own social structures (see Table 4) are a special case of efforts designed to help entire groups (e.g., teams, business units, or entire organizations) improve the group's effectiveness, innovation, or sustainability. For example, a practitioner may work with a team, having them first complete an assessment of their current network connections, and then using that information facilitate a conversation where the members of team determine if their current network internal and external to their team is facilitating or prohibiting their effectiveness. Such techniques would help to create greater shared awareness regarding the networked patterns of interactions within the collective (a proximal outcome of our model). Practitioners may also create opportunities for individuals within collective (e.g., team, department, organization) to interact differently (another proximal outcome) thereby starting the process through which changes in interactions may over time lead to more permanent changes in network structures.

Of the 203 respondents who reported engaging in efforts aimed at helping collectives improve themselves, 97.04% ($N = 164$) reported using one or more of the techniques listed in Table 4. On average, practitioners reported using 6.35 techniques ($SD = 3.22$, $mode = 6$, $min = 1$, $max = 14$). The use of the different techniques varied substantially. The most commonly used technique was facilitating trust and relationship building activities (64.50%). The least used development technique was using results of a network analysis to help the group gain a shared understanding of the structure of the group's network (19.53%). Of those practitioners who used each technique, using network analysis to help the group understand how the informal dynamics/relationships that exist can impact group outcomes was rated as the most effective (93.48%), whereas providing resources to create strategic, intentional networks to address an important organizational issue was rated as the least effective (82.46%). Thus, again there was much less variability in effectiveness ratings by those who used each technique.

 Insert Table 4 Here

Summary. Overall, our survey results suggest that practitioners are beginning to implement network-enhancing development, which incorporates the different approaches in our model. Our findings confirmed that development efforts in practice are targeted toward individuals with the goals of helping individuals grow personally (i.e., Approaches 1a, 1b, and 2a) and improve the groups they lead (i.e., Approach 2b), as well as collectives with the goal of helping collectives improve themselves (i.e., Approach 3). Moreover, the majority of our respondents strongly agreed that developing *relationships*, which knit people together and provide resources to individuals and collectives, is a critical objective of leadership development

efforts, but also one that deserves greater attention and improved efforts. Further, it is worth noting that, in general, techniques focused on the assessment of networks tended to be less frequently used within each category than techniques that focused on providing opportunities for changing social interactions. These findings may represent a need within practice to incorporate more rigorous assessment into network-enhancing leadership development.

Discussion and Future Directions

Contemporary leadership research emphasizes that leadership emergence and effectiveness are intimately tied to networks of social relational processes among members of dyads, groups, teams, and larger collectives. These multilevel and relational views of leadership call for the enhancement of social networks as a part of leadership development. This review advances research on leadership development by leveraging classic and contemporary theories of leadership, as well as multilevel models of leadership development (e.g., Day & Dragoni, 2015), to establish a conceptual model of network-enhancing leadership development.

We contributed to leadership development theory, which acknowledges the importance of social connections as a medium through which leadership is created (e.g., Day, 2001; Day & Dragoni, 2015; Day et al., 2004; DeRue & Ashford, 2010; DeRue, 2011; Van Velsor, McCauley, & Ruderman, 2010), by clarifying how the networked social connections surrounding individuals and connecting members of collectives are key mechanisms through which developmental efforts impact individuals' abilities to engage in leadership roles and processes and collectives' abilities to produce leadership (see Figure 1). Further our model clarifies how various development approaches, grounded in seemingly disparate leadership theories, might be integrated to impact social networks, and in turn, enhance organizational leadership capacity.

However, our review of leadership development research revealed few empirical examinations of network-enhancing leadership development. The existing, small body of research primarily consists of qualitative case studies rather than more controlled laboratory or field investigations. Thus, an apparent gap exists between what is understood theoretically about leadership and networks and the techniques that have been investigated empirically within leadership development research. Indeed, additional research is needed to identify *which* techniques best enable individuals and collectives to understand, leverage, and modify patterns of leadership and other types of social relationships. Research is also needed that clarifies the *mechanisms* through which various approaches impact social and leadership networks and the proximal and distal *outcomes* of these approaches for individuals and collectives (e.g., leadership emergence; group effectiveness). Moreover, developing an organization's leadership capacity will likely require the incorporation of *multiple* perspectives, methods, and interventions, many of which have not traditionally been applied in this field (e.g., team coaching; intergroup collaboration/conflict interventions, organizational development interventions; Cullen et al., 2012).

Importantly, our survey of practitioners suggests that the *practice* of leadership development is already attempting to enhance the social networks of individuals and collectives. In fact, published work discussing the benefits of utilizing networks in leadership development appears most frequently in practice-oriented outlets (e.g., *Harvard Business Review*, *Organizational Dynamics*, *Journal of Management Education*). Thus, it appears that practice may be “jumping ahead” of science and making use of some approaches which, despite being grounded in theory, have yet to be empirically examined. In the following, we attempt to propel the science of network-enhancing leadership development forward by identifying critical areas

for future research and highlighting literature from other research domains that could be leveraged to inform development efforts.

Suggestions for Future Research on Network-Enhancing Leadership Development

Our model of network-enhancing leadership development highlights three overarching approaches, two of which—*Individuals Shaping Networks* and *Collectives Co-Creating Networks*—have a direct focus on enhancing networks. Our review of the literature and survey of practitioners suggests that these approaches warrant additional research attention in terms of conceptual clarity and empirical evaluation. Below, we provide suggestions for future research within each approach identified in our model.

Future directions for individuals developing social competence. We positioned the development of individuals' general leadership KSAs and social skills as a critical component of network-enhancing techniques. These intrapersonal and interpersonal competencies provide a necessary foundation for individuals' participation in social relationships and leadership processes (Day & Harrison, 2007). Research relevant to this approach has been reviewed extensively by others, and therefore, was not the focus of this review. However, we expect there are several intrapersonal and/or interpersonal capabilities, which are particularly relevant for preparing individuals to participate in social networks (e.g., empathy, self-monitoring, political skill development), that deserve additional research attention.

For example, identity development, a major focus of leadership development efforts (cf. Day & Harrison, 2007), is likely to be important for network participation. The development of leadership identity is proposed to occur through leading-following exchanges (DeRue, 2011, DeRue & Ashford, 2010). Further, Day and Harrison propose that “developing more inclusive conceptualizations of self might also be an important pathway to developing broader leadership

and leadership capacity in teams and organizations” (365). Indeed recent research supports this idea as individuals who identified strongly with the organization were more likely to be granted leadership from others and to grant leadership to others (i.e., be seen as source and see others as a source of leadership; Chrobot-Mason, Gerbasi & Cullen-Lester, 2016).

Beyond leaders’ views of themselves, their understanding of the leadership phenomenon is also likely to be important for preparing individuals to participate in leadership processes as a part of a collective (Day & O’Connor, 2003; Drath, 2001). Day and O’Connor propose that when groups or individuals are limited in their ways of thinking about leadership, they are also limited in the leadership strategies they can employ to adapt to changing situational demands. Further, they propose that differences in the complexity with which individuals view or understand leadership (i.e., role-based authority, influence process between individuals, shared property of a collective, Drath, 2001) may help explain why people differ what they recognize as leadership. For example, some individuals see leadership only in simple behaviors like initiating structure and setting direction (i.e., command and control), whereas others see leadership in dialogue, cooperation, emergent understanding (i.e., more complex forms of collective interaction. These differences are proposed to affect how individuals participate in leadership processes as both a leader and a follower (Drath, 2001; Lord & Maher, 1991). Measuring views of leadership on a continuum from shared to hierarchical and found evidence to suggest shared views of leadership within a group impact the emergence of leadership structure (DeRue et al., 2015).

Future directions for individuals shaping networks. It is important for leaders to understand, leverage, and modify the structures of relationships surrounding themselves and connecting members of the groups they lead in order to meet organizational needs (Balkundi & Kilduff, 2006; Friedrich et al., 2009). However, our review of the literature within the leadership

development domain revealed a need for additional research focused on creating and/or empirically evaluating developmental approaches that enable individuals to better understand, leverage, and shape their own networks and the networks of others.

For example, the majority of the published studies within Approach 2b (*Individuals Shaping Others' Networks*) were focused on examining how leaders can leverage networks to enhance *organizational* effectiveness. We did not identify empirical or case-study evaluations of leadership development efforts specifically targeting individual leaders with the goal of helping them to understand, leverage, or modify social networks within smaller collectives (e.g., dyads, teams). Given that research on dyadic leader-follower relationships (Graen & Uhl-Bien, 1995) and the leadership of teams (Morgeson et al., 2009; Zaccaro et al., 2001) suggests that a key function of leadership is to shape emergent affective (e.g., trust), behavioral (e.g., influence; communication; advice), motivational (e.g., collective efficacy), and cognitive (e.g., transactive memory systems) collective phenomena, and many of these constructs are conceptualized within extant literature as patterned, 'configural' (Kozlowski & Klein, 2000) or 'networked' phenomena (e.g., Crawford & LePine, 2013; Mell et al., 2014; DeRue, 2011), this is an area ripe for future investigation.

Furthermore, research is needed to create and evaluate training interventions that enable individuals (e.g., managers; informal leaders) to improve the accuracy of their network perceptions. Prior research suggests that individuals develop certain schemas about social networks to reduce the complexity and cognitive demands involved in perceiving structures of social relationships (cf. Brands, 2013). However, these schemas often lead people to misperceive social structures and thus, attempt to leverage networks inappropriately (e.g., overly relying on individuals who are perceived to occupy key positions). Evidence also suggests individuals with

more power in their organizations are less accurate in their network perceptions and more likely to view social networks through a hierarchical lens as compared to individuals with less power (Simpson, Markovsky, & Steketee, 2011). Many of the studies reviewed in Table 1 suggest that assessments of individuals direct network connections (i.e., their ego network) as well as analyses of whole group and organizational networks are useful for helping individuals to understand and improve their network structures, however, it is important to note that such interventions should be taken with care and great ethical consideration (Borgatti & Molina, 2003; 2005; Kadushin, 2005).

Further, providing training to individuals explaining the *opportunities* different network structures provide, is thought to help them recognize the opportunities provided by through their own networks (cf. Burt & Ronchi, 2007). However, the ways in which individuals recognize opportunities within their networks or act on these opportunities to use or mobilize appropriate network contacts remains largely unknown (Brands, 2013) as do the means for developing these abilities. Further, despite the existence of popular books and advice about networking, the literature regarding practices for changing one's own network structure is rather limited. A recent review of the networking literature (Porter & Woo, 2015) identified resources as a core mechanism through which networking behaviors help individuals achieve effective outcomes, and Cullen-Lester et al. (2016) provided initial evidence regarding which networking strategies individuals found most effective for achieving different workplace goals. However, more research is needed in order to provide guidance to individuals about which networking strategies are most likely to be effective given different goals and situations, and perhaps more importantly, how individuals can employ such strategies.

Future directions for collectives co-creating networks. Day and Dragoni (2015) argue that leadership development is a fledgling field of academic study and document that empirical support for development approaches is further advanced with regard to interventions that develop individual leaders than those aiming to develop the leadership capacity of collectives (e.g., dyads, teams, multiteam systems, departments, functions, organizations). Our review of the literature confirms this need for research examining the development of leadership within collectives.

For instance, researchers have begun to model the emergence of dyadic leadership relationships and have specified when those relationships are and are not aligned with the formal hierarchy (e.g., Liden, Wayne, & Stilwell, 1993; Chrobot-Mason et al., 2016; White, Currie, & Lockett, 2014; 2016). However, despite prominent leadership theories (e.g., Graen & Scandura 1987; Graen & Uhl-Bien, 1995; DeRue & Ashford, 2010; Uhl-Bien, 2006; Denis, Langley, & Sergi, 2012) suggesting the need to target the development of dyads with the emphasis of improving their social or leadership relationships, we did not find any leadership development research specifically targeting dyads with the intention of developing their social or leadership relationships. To provide a foundation for research targeting relationships among members of *dyads*, leadership development scholars might draw from relationship-building techniques within family counseling (e.g., efforts targeting couples with the objective of enhancing their relationship as opposed to “fixing” either person) or mentoring research (Allen & Eby, 2011). Potentially, the programs devoted to coaching individuals could be expanded to include coaching for multiple members of dyads or teams to improve leadership relationships.

As others have noted (Day et al., 2004), leadership development research may seek to provide ways to build the leadership capacity of collectives through interventions targeting *teams*

by leveraging research on team training (Marks, Sabella, Burke, & Zaccaro, 2002; Offermann & Spiros, 2001; Salas, 2015). Additionally, work practices that provide structured process that promote the engagement of all team members (e.g., agile work practices or scrum methodologies; Highsmith, 2010; Hoda, Noble, & Marshall, 2013; Lee & Xia, 2010; Melo, Cruzes, Kon, & Conradi, 2013) may help teams shift the structure of their leadership networks as required by changes in task demands. Future team-focused initiatives could integrate insights from research on shared or collective leadership (Contractor et al., 2012; Friedrich et al., 2009; Pearce & Conger, 2003), team boundary management (Ancona & Caldwell, 1988) or group social capital (Cummings & Cross, 2003; Oh et al., 2006), which provide specific recommendations regarding patterns of relationships within and external to groups or teams that predict collective outcomes, to determine appropriate proximal outcomes of leadership development.

Although leadership processes in larger more complex collectives (e.g., multiteam systems; departments; interdependent units; organizations; communities of practice) are likely to differ from leadership processes in teams in important ways (DeChurch & Marks, 2006), existing theory still points to the importance of social connections and the co-creation of leadership through shared work (Day et al., 2004; Day & Dragoni, 2015; DeChurch & Zaccaro, 2010). Indeed, leadership scholars have long recognized leadership is a social process that involves everyone in a community (e.g., Drath & Palus, 1994). The sensemaking and learning that occurs through shared work enables the creation of greater shared direction, alignment, and commitment (i.e., leadership; Drath, 2001; Drath et al., 2008; Drath & Palus, 1994; Van Velsor et al., 2010).

Indeed, leadership development scholars have called for development efforts to expand into areas that can be described as shaping organizational culture, work design, and workplace practices (Cullen et al. 2012; Day, 2001; Day & O'Connor, 2003), including aligning formal

organizational structure with emergent networks to create agile organizations. Future research may examine how organizational structures and work practices can be implemented to foster more effective patterns of social connections, including leadership processes, within and between groups in the organization. For example, organizations are beginning to experiment with more open workplace designs and researchers continue to examine the effect of physical workplace design on social networks (Sailer & McCulloh, 2012). Emerging research suggests certain human resource policies (Collins & Clark, 2003; Hatala, 2006), organizational development interventions (Garcia, 2007), and workplace practices, such as communal eating (i.e., sharing meals; Kniffin, Wansink, Devine, & Sobal, 2015), can promote connectivity and productivity. Further, organizations are applying a variety of technology-based platforms to promote connectivity. However, scholars have warned that implementing such practices can lead to unproductive connectivity and collaborative overload (e.g., Cross, Rebele, & Grant, 2016). Future research is needed to better understand how choices regarding organizational design and workplace policies and practices intersect with leadership development and can be utilized to enhance social networks.

Methodological considerations. Finally, as research on leadership development continues to advance an empirical basis for network-enhancing approaches, we echo other scholars in calling for additional methodological rigor in this pursuit. Specifically, we encourage researchers to carefully address issues related to levels of analysis, the incorporation of time into development studies, and matching construct operationalization with appropriate measures of social networks and associated network analytic techniques.

In a previous annual review issue of *The Leadership Quarterly*, Dionne et al. (2014) found that levels of analysis were only explicitly stated in 17% (1/6) of the conceptual articles

and 21% (3/14) of the empirical leadership development articles published in this journal, pointing to the need to clearly specify levels of analysis in future research. Further, in their recent review, Day and Dragoni (2015) established the need to better incorporate time into leadership development theory and research, which means in addition to requiring the identification of relevant proximal and distal indicators of development, time should be incorporated as another levels of analysis. With our conceptual model, we have attempted to aid future research in this effort by explicitly incorporating individual and collective levels as well as proximal, intermediate, distal indicators. We also refer researchers to recent reviews providing more explicit guidance regarding the multilevel nature of leadership (e.g., Wang, Zhou, & Liu, 2014).

Furthermore, many of the studies we reviewed relied on more *descriptive* approaches to network analysis, focused on describing how patterns of relationships (e.g., information sharing, advice, influence) are structured among organizational members. Although these approaches are beneficial—for example, they can provide important insights (e.g., to leaders) in terms of issues that might arise during collaboration (e.g., bottlenecks in information sharing)—there are many other network analytic approaches that might be harnessed to inform the study of leadership development. For example, researchers interested in validating leadership development approaches may wish to use inferential models of network emergence and development (e.g., Anderson, Wasserman, & Crouch, 1999; Contractor, Wasserman & Faust, 2006; Frank & Strauss, 1986; Snijders, Pattison, Robins, & Handcock, 2006; Snijders, 2005; Wasserman & Robins, 2005) to empirically evaluate their interventions. These models allow researchers to identify the predictors or causal factors that give rise to patterns of social and leadership networks. Additionally, leadership development research might harness more unobtrusive measurement approaches (e.g., traces of digital communications; e.g., DeChurch et al., in press;

Kozlowski, 2015) when evaluating the effects of developmental approaches in order to capture the dynamic interaction processes (e.g., claiming and granting influence; DeRue & Ashford, 2010) that underpin leadership capacity.

Conclusion

In summary, our conceptual model of network-enhancing leadership development clarifies *multiple* ways in which social networks can be integrated into leadership development and suggests the need for interventions that employ network-enhancing techniques targeting both individuals and collectives as part of a comprehensive approach for increasing the leadership capacity of organizations. Our findings reveal critical gaps between the science and practice of network-enhancing leadership development. This gap offers researchers an opportunity and an imperative to develop theoretically-relevant and empirically-validated techniques that enable individuals and collectives to understand, leverage, and modify the structures of social and leadership relationships that underpin organizational leadership.

References

- Aime, F., Humphrey, S., DeRue, D. S., & Paul, J. B. (2014). The riddle of heterarchy: Power transitions in cross-functional teams. *Academy of Management Journal*, *57*, 327-352.
- Allen, T. D., & Eby, L. T. (Eds.). (2011). *The Blackwell handbook of mentoring: A multiple perspectives approach*. John Wiley & Sons.
- Anand, N., & Conger, J. A. (2007). Capabilities of the consummate networker. *Organizational Dynamics*, *36*, 13-27.
- Ancona, D. G., & Caldwell, D. F. (1988). Beyond task and maintenance defining external functions in groups. *Group & Organization Management*, *13*(4), 468-494.
- Anderson, C. J., Wasserman, S., & Crouch, B. (1999). A p* primer: Logit models for social networks. *Social Networks*, *21*, 37-66.
- Baker, W. (2000a). *Achieving success through social capital: Tapping the hidden resources in personal and business networks*. San Francisco, CA: Jossey-Bass.
- Baker, W. (2000b). *Humax assessment*. Retrieved from <https://www.humaxnetworks.com/assessment/scahome.html>
- Balkundi, P., Barsness, Z., & Michael, J. H. (2009). Unlocking the influence of leadership network structures on team conflict and viability. *Small Group Research*, *40*, 301-322.
- Balkundi, P., & Kilduff, M. (2006). The ties that lead: A social network approach to leadership. *The Leadership Quarterly*, *17*, 419-439.
- Balkundi, P., Kilduff, M., & Harrison, D. A. (2011). Centrality and charisma: comparing how leader networks and attributions affect team performance. *Journal of Applied Psychology*, *96*, 1209.

- Bartol, K. M., & Zhang, X. (2007). Networks and leadership development: Building linkages for capacity acquisition and capital accrual. *Human Resource Management Review, 17*, 388-401.
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. Free Press; Collier Macmillan.
- Bauer, T. N., & Green, S. G. (1996). Development of leader-member exchange: A longitudinal test. *Academy of Management Journal, 39*, 1538-1567.
- Burns, J. M. (1978). *Leadership*. New York: Harper & Row
- Bedeian, A. G., & Hunt, J. G. (2006). Academic amnesia and vestigial assumptions of our forefathers. *The Leadership Quarterly, 17*, 190-205.
- Boal, K. B., & Hooijberg, R. (2000). Strategic leadership research: Moving on. *The Leadership Quarterly, 11*, 515-549.
- Borgatti, S. P., & Molina, J. L. (2003). Ethical and strategic issues in organizational social network analysis. *The Journal of Applied Behavioral Science, 39*(3), 337-349.
- Borgatti, S. P., & Molina, J. L. (2005). Toward ethical guidelines for network research in organizations. *Social Networks, 27*(2), 107-117.
- Brands, R. A. (2013). Cognitive social structures in social network research: A review. *Journal of Organizational Behavior, 34*, S82-S103.
- Brass, D. J. (1985). Men's and women's networks: A study of interaction patterns and influence in an organization. *Academy of Management Journal, 28*, 327-343.
- Brass, D. J. 2001. Social capital and organizational leadership. In S. J. Zaccaro & R. J. Klimoski (Eds.), *The nature of organizational leadership*: 132-152. San Francisco: Jossey-Bass.

- Brass, D. J., & Krackhardt, D. 1999. The social capital of 21st century leaders. In J. G. Hunt & R. L. Phillips (Eds.), *Out-of-the-box leadership*: 179–194. Stamford, CT: JAI Press.
- Brown, M. E., & Gioia, D. A. (2002). Making things click: Distributive leadership in an online division of an offline organization. *The Leadership Quarterly*, *13*, 397-419.
- Burke, C. S., Stagl, K. C., Klein, C., Goodwin, G. F., Salas, E., & Halpin, S. M. (2006). What type of leadership behaviors are functional in teams? A meta-analysis. *The Leadership Quarterly*, *17*, 288-307.
- Burns, J. M. (2003). *Transforming leadership: A new pursuit of happiness*. London: Atlantic.
- Burt, R. S. (1992). *Structural hole*. Harvard Business School Press, Cambridge, MA.
- Burt, R. S. (1998). The gender of social capital. *Rationality and Society*, *10*, 5-46.
- Burt, R. S., & Ronchi, D. (2007). Teaching executives to see social capital: Results from a field experiment. *Social Science Research*, *36*, 1156-1183.
- Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. *Academy of Management Journal*, *50*, 1217-1234.
- Carlyle, T. (1907). *On heroes, hero-worship, and the heroic in history*. Boston, MA: Houghton Mifflin.
- Carter, D. R., Asencio, R., Wax, A., DeChurch, L. A., & Contractor, N. S. (2015). Little teams, big data: Big data provides new opportunities for teams theory. *Industrial and Organizational Psychology Perspectives on Science and Practice*, *8*(04), 550-555.
- Carter, D. R., DeChurch, L. A., Braun, M. T., & Contractor, N. (2015). Social network approaches to leadership: An integrative conceptual review. *Journal of Applied Psychology*, *100*, 597-622.

- Carter, H., & Rudd, R. D. (2000). Evaluation of the Florida leadership program for agriculture and natural resources. *Journal of Southern Agricultural Education Research*, 50, 199-205.
- Chavez, M. & Green, M. (2010). Embedding a network perspective into leadership. In R. L. Cross, J. Singer, S. Colella, R. J. Thomas, & Y. Silverstone. *The organizational network fieldbook: Best practices, techniques and exercises to drive organizational innovation and performance*. (pp. 245-263). John Wiley & Sons.
- Chrobot-Mason, D., Cullen, K., & Altman, D. (2013). Leveraging networks through boundary spanning leadership. In J. Nickerson & R. Sanders (Eds.), *Tackling Wicked Government Problems* (101-118). Arlington, VA: Oakland Street Publishing.
- Chrobot-Mason, D., Gerbasi, A., & Cullen-Lester, K. L. (2016). Predicting leadership relationships: The importance of collective identity. *The Leadership Quarterly*, 27, 298-311.
- Colella, S. (2010). Helping leaders uncover hidden assets. In R. L. Cross, J. Singer, S. Colella, R. J. Thomas, & Y. Silverstone. *The organizational network fieldbook: Best practices, techniques and exercises to drive organizational innovation and performance*. (pp. 233-242). John Wiley & Sons.
- Collier, B., & Kraut, R. (2012). Leading the collective: Social capital and the development of leaders in core-periphery organizations. In T. W., Malone & L. von Ahn (Eds.), *Collective intelligence 2012: Proceedings*. Retrieved from: <http://arxiv.org/abs/1204.3682>.

- Collins, C. J., & Clark, K. D. (2003). Strategic human resource practices, top management team social networks, and firm performance: The role of human resource practices in creating organizational competitive advantage. *Academy of Management Journal*, 46(6), 740-751.
- Contractor, N. S., DeChurch, L. A., Carson, J., Carter, D. R., & Keegan, B. (2012). The topology of collective leadership. *The Leadership Quarterly*, 23, 994–1011.
- Contractor, N. S., Wasserman, S., & Faust, K. (2006). Testing multitheoretical, multilevel hypotheses about organizational networks: An analytic framework and empirical example. *Academy of Management Review*, 31, 681–703
- Cowley, W. H. (1928). Three distinctions in the study of leaders. *Journal of Abnormal and Social Psychology*, 23(2), 144–157.
- Crawford, E. R., & Lepine, J. A. (2013). A configural theory of team processes: Accounting for the structure of taskwork and teamwork. *Academy of Management Review*, 38, 32-48.
- Cross, R. (2010). Improving leadership effectiveness through personal network analysis and development. In R. L. Cross, J. Singer, S. Colella, R. J. Thomas, & Y. Silverstone. *The organizational network fieldbook: Best practices, techniques and exercises to drive organizational innovation and performance*. (pp. 264-281). John Wiley & Sons.
- Cross, R., Borgatti, S. P., & Parker, A. (2002). Making invisible work visible: Using social network analysis to support strategic collaboration. *California Management Review*, 44, 25-46.
- Cross, R., Ernst, C., Assimakopoulos, D., & Ranta, D. (2015). Investing in boundary-spanning collaboration to drive efficiency and innovation. *Organizational Dynamics*, 44, 204-216.
- Cross, R., Ernst, C., & Pasmore, B. (2013). A bridge too far?: How boundary spanning networks drive organizational change and effectiveness. *Organizational Dynamics*, 42, 81-91.

- Cross, R., Laseter, T., Parker, A., & Velasquez, G. (2006). Using social network analysis to improve communities of practice. *California Management Review*, 49, 32-60.
- Cross, R., Liedtka, J., & Weiss, L. (2005). A practical guide to social networks. *Harvard Business Review*, 83, 124-132.
- Cross, R., & Prusak, L. (2002). The people who make organizations go-or stop. *Harvard Business Review*, 80, 104-112.
- Cross, R., Rebele, R., & Grant, A. (2016). Collaborative overload. *Harvard Business Review*, 94(1), 74-79.
- Cross, R., and Thomas, R. (2008). *Driving results through social networks: How top organizations leverage networks for performance and growth*. New York: Jossey-Bass.
- Cross, R., & Thomas, R. (2011). Managing yourself: A smarter way to network. *Harvard Business Review*, 89, 1-6.
- Cross, R. L., & Velasquez, G. (2010). Driving business results through networked communities of practice. In R. L. Cross, J. Singer, S. Colella, R. J. Thomas, & Y. Silverstone. *The organizational network fieldbook: Best practices, techniques and exercises to drive organizational innovation and performance*. (pp. 22-43). John Wiley & Sons.
- Cullen, K. L., Palus, C. J., Chrobot-Mason, D., & Appaneal, C. (2012). Getting to “we”: Collective leadership development. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, 5, 428–432.
- Cullen, K. L., Willburn, P., Chrobot-Mason, D., Palus, C. (2014). *Networks: How collective leadership really works*. Greensboro, NC: Center for Creative Leadership.
- Cullen, K. L., Palus, C.J., & Chrobot-Mason, D. (2015). *Merrimack Pharmaceuticals: A story of Transformation*. Greensboro, NC: Center for Creative Leadership.

- Cullen-Lester, K. L., & Willburn, P. (2016). *Analytics for change: How networks and data science will revolutionize organizational change*. Greensboro, NC: Center for Creative Leadership.
- Cullen-Lester, K. L., Woehler, M. L., & Willburn, P. (2016). Network-based leadership development a guiding framework and resources for management educators. *Journal of Management Education*, 40, 321-358.
- Cummings, J. N., & Cross, R. (2003). Structural properties of work groups and their consequences for performance. *Social Networks*, 25, 197-210.
- D'Innocenzo, L., Mathieu, J. E., & Kukenberger, M. R. (2014). A meta-analysis of different forms of shared leadership–team performance relations. *Journal of Management*.
Published online before print March 10, 2014, doi: 10.1177/0149206314525205
- Dachler, H. P., & Hosking, D. M. (1995). The primacy of relations in socially constructing organizational realities. In H. P. Dachler & D. Hosking (Eds.), *Management and organization: Relational alternatives to individualism*, (pp. 1-28). Ashgate: Avebury.
- Day, D. V. (2001). Leadership development: A review in context. *The Leadership Quarterly*, 11, 581-613.
- Day, D. V., & Dragoni, L. (2015). Leadership development: An outcome-oriented review based on time and levels of analyses. *Annual Review of Organizational Psychology and Organizational Behavior*, 2, 133-156.
- Day, D. V., Fleenor, J. W., Atwater, L. E., Sturm, R. E., & McKee, R. A. (2014). Advances in leader and leadership development: A review of 25years of research and theory. *The Leadership Quarterly*, 25(1), 63-82.

- Day, D. V., Gronn, P., & Salas, E. (2004). Leadership capacity in teams. *The Leadership Quarterly, 15*, 857-880.
- Day, D. V., Gronn, P., & Salas, E. (2006). Leadership in team-based organizations: On the threshold of a new era. *The Leadership Quarterly, 17*, 211-216.
- Day, D. V., & Harrison, M. M. (2007). A multilevel, identity-based approach to leadership development. *Human Resource Management Review, 17*, 360-373.
- Day, D. V., & O'Connor, P. M. (2003). Leadership development: Understanding the process. *The future of leadership development*, 11-28.
- DeChurch, L. A., Carter, D. R., Asencio, R., Wax, A. Seely, P. W., Dalrymple, K. Vaughn, S., Jones, B., & Plummer, G., Mesmer Magnus, J. R., (forthcoming). From teams in organizations to organizing in teams. In N. Anderson, D. S. Ones, H. K. Sinangil & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychology* (Vol. 1, 2nd ed.). London, UK: Sage.
- DeChurch, L. A., & Marks, M. A. (2006). Leadership in multiteam systems. *Journal of Applied Psychology, 91*, 311.
- DeChurch, L. A., & Zaccaro, S. J. (2010). Perspectives: Teams won't solve this problem. *Human Factors: The Journal of the Human Factors and Ergonomics Society, 52*, 329-334.
- Denis, J. L., Langley, A., & Sergi, V. (2012). Leadership in the plural. *The Academy of Management Annals, 6*, 211-283.
- DeRue, D. S. (2011). Adaptive leadership theory: Leading and following as a complex adaptive process. *Research in Organizational Behavior, 31*, 125-150.

- DeRue, D. S., & Ashford, S. J. (2010). Who will lead and who will follow? A social process of leadership identity construction in organizations. *Academy of Management Review*, 35(4), 627-647.
- DeRue, D. S., Nahrgang, J. D., & Ashford, S. J. (2015). Interpersonal perceptions and the emergence of leadership structures in groups: A network perspective. *Organization Science*, 26, 1192-1209.
- Diem, K. G., & Nikola, M. P. (2005). Evaluating the impact of a community agricultural leadership development program. *Journal of Extension*, 43, 6-13.
- Dionne, S. D., Gupta, A., Sotak, K. L., Shirreffs, K. A., Serban, A., Hao, C., ... & Yammarino, F. J. (2014). A 25-year perspective on levels of analysis in leadership research. *The Leadership Quarterly*, 25, 6-35.
- Dragoni, L., Tesluk, P. E., Russell, J. E., & Oh, I. S. (2009). Understanding managerial development: Integrating developmental assignments, learning orientation, and access to developmental opportunities in predicting managerial competencies. *Academy of Management Journal*, 52, 731-743.
- Drath, W. H. (1998). Approaching the future of leadership development. In the C. D. McCauley, R. S. Moxley, & E. Van Velsor. (Ed.) *The Center for Creative Leadership handbook of leadership development*. (pp. 403-432). San Francisco: Jossey-Bass.
- Drath, W. H. (2001). *The deep blue sea: Rethinking the source of leadership*. San Francisco, CA: Jossey-Bass.
- Drath, W. H., McCauley, C. D., Palus, C. J., Van Velsor, E., O'Connor, P. M., & McGuire, J. B. (2008). Direction, alignment, commitment: Toward a more integrative ontology of leadership. *The Leadership Quarterly*, 19, 635-653.

- Drath, W. H., & Palus, C. J. (1994). *Making common sense: Leadership as meaning-making in a community of practice*. Greensboro: Center for Creative Leadership.
- Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: A field experiment. *Academy of Management Journal, 45*, 735-744.
- Eberly, M. B., Johnson, M. D., Hernandez, M., & Avolio, B. J. (2013). An integrative process model of leadership: Examining loci, mechanisms, and event cycles. *American Psychologist, 68*, 427–443.
- Ernst, C., & Chrobot-Mason, D. (2010). *Boundary spanning leadership: Six practices for solving problems, driving innovation, and transforming organizations*. New York, NY: McGraw-Hill Professional.
- Frank, O., & Strauss, D. (1986). Markov graphs. *Journal of the American Statistical Association, 81*, 832– 842.
- Fredricks, S. M. (2003). Creating and maintaining networks among leaders: An exploratory case study of two leadership training programs. *Journal of Leadership & Organizational Studies, 10*(1), 45-54.
- Friedrich, T. L., Vessey, W. B., Schuelke, M. J., Ruark, G. A., & Mumford, M. D. (2009). A framework for understanding collective leadership: The selective utilization of leader and team expertise within networks. *The Leadership Quarterly, 20*, 933–958.
- Galli, E. B., & Müller-Stewens, G. (2012). How to build social capital with leadership development: Lessons from an explorative case study of a multibusiness firm. *The Leadership Quarterly, 23*, 176-201.

- Garcia, S. K. (2007). Developing social network propositions to explain large-group intervention theory and practice. *Advances in Developing Human Resources*, 9, 341-358.
- Gargiulo, M. (2002). *Social capital: Identifying patterns in your network of relationships*. Retrieved from <https://executive-tools.insead.edu/socialcapital/>
- Gentry, W. A., & Leslie, J. B. (2007). Competencies for leadership development: What's hot and what's not when assessing leadership-implications for organization development. *Organization Development Journal*, 25, 37-46.
- Gibbs, C. A. (1954). Leadership. In G. Lindzey (Ed.), *Handbook of social psychology*, (Vol. 2., pp. 877-920). Reading, MA: Addison-Wesley.
- Graen, G. B., & Scandura, T. A. 1987. Toward and psychology of dyadic organizing. In L. L. Cummings & B. M. Staw (Eds.), *Research in Organizational Behavior* (Vol. 9): 175–208. Greenwich, CT: JAI Press.
- Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly*, 6, 219-247.
- Gronn, P. (2002). Distributed leadership as a unit of analysis. *The Leadership Quarterly*, 13, 423-451.
- Hackman, J. R. (1983). *A normative model of work team effectiveness* (No. TR-2). OFFICE OF NAVAL RESEARCH ARLINGTON VA.
- Hackman, J. R. (2012). From causes to conditions in group research. *Journal of Organizational Behavior*, 33(3), 428-444.
- Hatala, J. P. (2006). Social network analysis in human resource development: A new methodology. *Human Resource Development Review*, 5(1), 45-71.

- Hatch, M. J., (1997). *Organization theory: Modern, symbolic, and postmodern perspectives*, Oxford University Press, Oxford.
- Hazy J.K. & Uhl-Bien, M. (2014). Changing the rules: The implications of complexity science for leadership research and practice. In D. Day (Ed.), *The Oxford Handbook of Leadership and Organizations* (pp. 709-732). Oxford: University Press.
- Highsmith, J. A. (2010). *Adaptive software development: A collaborative approach to managing complex systems*. New York, NY, USA: Dorset House Publishing Co Inc.
- Hoda, R., Noble, J., & Marshall, S. (2013). Self-organizing roles on agile software development teams. *IEEE Transactions on Software Engineering*, 39(3), 422–444.
doi:10.1109/TSE.2012.30c
- Hiller, N. J., Day, D. V., & Vance, R. J. (2006). Collective enactment of leadership roles and team effectiveness: A field study. *The Leadership Quarterly*, 17, 387-397.
- Hollander, E. P. (1964). *Leaders, groups, and influence*. New York: Oxford University Press.
- Hosking, D. M. (1988). Organizing, leadership and skillful process. *Journal of Management Studies*, 25, 147-166.
- Ibarra, H. (2002). *Network assessment exercise: Abridged MBA version 9-497-002*. Boston, MA: Harvard Business School Press.
- Ibarra, H. (2008). *Network assessment exercise: Executive version 9-497-002*. Boston, MA: Harvard Business School Press.
- Ibarra, H., & Hunter, M. (2007). How leaders create and use networks. *Harvard Business Review*, 85, 40.
- Kadushin, C. (2005). Who benefits from network analysis: Ethics of social network research. *Social Networks*, 27(2), 139-153.

- Klein, K. J., Ziegert, J. C., Knight, A. P., & Xiao, Y. (2006). Dynamic delegation: Shared, hierarchical, and deindividualized leadership in extreme action teams. *Administrative Science Quarterly*, *51*, 590-621.
- Kniffin, K. M., Wansink, B., Devine, C. M., & Sobal, J. (2015). Eating together at the firehouse: How workplace commensality relates to the performance of firefighters. *Human Performance*, *28*(4), 281-306.
- Krackhardt, D., & Hanson, J. R. (1993). Informal networks. *Harvard Business Review*, *71*, 104-111.
- Kruger, M., & Zhovtobryukh, Y. (2013). Rethinking strategic leadership: stars, clans, teams and networks. *Journal of Strategy and Management*, *6*, 411-432.
- Kozlowski, S. W. J. (2015). Advancing research on team process dynamics: Theoretical methodological and measurement considerations. *Organizational Psychology Review*, *5*, 270-299.
- Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest*, *7*(3), 77-124.
- Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3–90). San Francisco, CA: Jossey-Bass
- Lee, G., & Xia, W. (2010). Toward Agile: An Integrated Analysis of Quantitative and Qualitative Field Data on Software Development Agility. *MIS Quarterly*, *34*(1), 87–114.
- Lengel, R. H., & Larsen, G. D. (2012). Transcending the follow of leadership development efforts. *Leadership & Organizational Management Journal*, *2012*, *1*, 21-44.

- Lester, P. B., Hannah, S. T., Harms, P. D., Vogelgesang, G. R., & Avolio, B. J. (2011). Mentoring impact on leader efficacy development: A field experiment. *Academy of Management Learning & Education, 10*, 409-429.
- Lewis, K. (2004). Knowledge and performance in knowledge-worker teams: A longitudinal study of transactive memory systems. *Management Science, 50*(11), 1519-1533.
- Liden, R. C., Wayne, S. J., & Stilwell, D. (1993). A longitudinal study on the early development of leader-member exchanges. *Journal of Applied Psychology, 78*, 662.
- Lipman-Blumen, J. (2000). *Connective leadership: Managing in a changing world*. Oxford University Press, New York.
- Lord, R. G., & Dinh, J. E. (2014). What Have We Learned That Is Critical in Understanding Leadership Perceptions and Leader- Performance Relations?. *Industrial and Organizational Psychology, 7*, 158-177.
- Lord, R. G., & Maher, K. J. (1991). Cognitive theory in industrial and organizational psychology. *Handbook of Industrial and Organizational Psychology, 2*, 1-62.
- Manz, C. C. (1986). Self-leadership: Toward an expanded theory of self-influence processes in organizations. *Academy of Management Review, 11*(3), 585-600.
- Manz, C. C., & Sims Jr, H. P. (1987). Leading workers to lead themselves: The external leadership of self-managing work teams. *Administrative Science Quarterly, 32*(1), 106-129.
- Margolis, J. A., & Ziegert, J. C. (2016). Vertical flow of collectivistic leadership: An examination of the cascade of visionary leadership across levels. *The Leadership Quarterly, 27*, 334-348.

- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26, 356-376.
- Marks, M. A., Sabella, M. J., Burke, C. S., & Zaccaro, S. J. (2002). The impact of cross-training on team effectiveness. *Journal of Applied Psychology*, 87(1), 3-13.
- Mayo, M., Meindl, J. R., & Pastor, J. C. (2003). Shared leadership in work teams: A social network approach. In C. L. Pearce & J. A. Conger (Eds.), *Shared leadership: Reframing the hows and whys of leadership*. (pp. 193–214). Thousand Oaks, CA: Sage.
- McCallum, S., & O'Connell, D. (2009). Social capital and leadership development: Building stronger leadership through enhanced relational skills. *Leadership & Organization Development Journal*, 30, 152-166.
- McCauley, C. D., Moxley, R. S., & Van Velsor, E. (1998). *The Center for Creative Leadership handbook of leadership development*. San Francisco: Jossey-Bass.
- McCauley, C. D., & Van Velsor, E. (2004). (2nd Ed.). *The Center for Creative Leadership handbook of leadership development*. San Francisco: Jossey-Bass.
- 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, 64-79.
- Mell, J. N., Van Knippenberg, D., & van Ginkel, W. P. (2014). The catalyst effect: the impact of transactive memory system structure on team performance. *Academy of Management Journal*, 57, 1154-1173.
- Melo, C. D. O., Cruzes, D. S., Kon, F., & Conradi, R. (2013). Interpretative case studies on agile team productivity and management. *Information and Software Technology*, 55(2), 412-427.

- Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2009). Leadership in teams: A functional approach to understanding leadership structures and processes. *Journal of Management*, *36*, 5–39.
- Neck, C. P., & Houghton, J. D. (2006). Two decades of self-leadership theory and research: Past developments, present trends, and future possibilities. *Journal of Managerial Psychology*, *21*(4), 270-295.
- O'Connor, P. M., & Quinn, L. (2004). Organizational capacity for leadership. In C. McCauley & E. Van Velsor (Eds.), *The Center for Creative Leadership handbook of leadership development*, (2nd ed.) (pp. 417-437). San Francisco, CA: Jossey-Bass.
- Offermann, L. R., & Spiros, R. K. (2001). The science and practice of team development: Improving the link. *Academy of Management Journal*, *44*(2), 376-392.
- Oh, H., Chung, M. H., & Labianca, G. (2004). Group social capital and group effectiveness: The role of informal socializing ties. *Academy of Management Journal*, *47*, 860-875.
- Oh, H., Labianca, G., & Chung, M. H. (2006). A multilevel model of group social capital. *Academy of Management Review*, *31*, 569-582.
- O'Leonard, K., & Krider, J. (2014, May). *Leadership development factbook® 2014: Benchmarks and trends in U.S. leadership development*. BERSIN by Deloitte.
- Parker, M., & Welch, E. W. (2013). Professional networks, science ability, and gender determinants of three types of leadership in academic science and engineering. *The Leadership Quarterly*, *24*, 332-348.
- Pearce, C. L., & Conger, J. A. (2003). All those years ago: The historical underpinnings of shared leadership. In C. L. Pearce & J. A. Conger (Eds.), *Shared leadership: Reframing the hows and whys of leadership* (pp. 1–18). Thousand Oaks, CA: Sage.

- Pearce, C. L., & Sims Jr, H. P. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group Dynamics: Theory, Research, and Practice*, 6, 172-197.
- Petrie, N. (2014). *Future trends in leadership development*. Greensboro, NC: Center for Creative Leadership.
- Pielstick, C. D. (2000). Formal vs. informal leading: A comparative analysis. *Journal of Leadership & Organizational Studies*, 7(3), 99-114.
- Podolny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, 62, 673-693.
- Porter, C. M., & Woo, S. E. (2015). Untangling the networking phenomenon a dynamic psychological perspective on how and why people network. *Journal of Management*, 41, 1477-1500.
- Reichard, R. J., & Johnson, S. K. (2011). Leader self-development as organizational strategy. *The Leadership Quarterly*, 22, 33-42.
- Roberts, C. (2013). Building social capital through leadership development. *Journal of Leadership Education*, 12, 54-73.
- Sailer, K., & McCulloh, I. (2012). Social networks and spatial configuration—How office layouts drive social interaction. *Social networks*, 34(1), 47–58.
- Salancik, G. R., Calder, B. J., Rowland, K. M., Leblebici, H., & Conway, M. (1975). Leadership as an outcome of social structure and process: A multidimensional analysis. In G. Hunt and L. Larson (Eds), *Leadership Frontiers* (81-101). Kent, Ohio: Comparative Administration Research Institute.

- Salas, E. (2015). *Team training essentials: A research-based guide*. Routledge.
- Simpson, B., Markovsky, B., & Steketee, M. (2011). Power and the perception of social networks. *Social Networks*, 33, 166-171.
- Sparrowe, R. T., & Liden, R. C. (1997). Process and structure in leader-member exchange. *Academy of management Review*, 22(2), 522-552.
- Sparrowe, R. T., & Liden, R. C. (2005). Two routes to influence: Integrating leader-member exchange and social network perspectives. *Administrative Science Quarterly*, 50(4), 505-535.
- Stogdill, R. M. (1950). Leadership, membership and organization. *Psychological Bulletin*, 47, 1-14.
- Strei, K. & Colella, S. (2010). Developing leaders' networks through a stakeholder mapping and engagement workshop. In R. L. Cross, J. Singer, S. Colella, R. J. Thomas, & Y. Silverstone. *The organizational network fieldbook: Best practices, techniques and exercises to drive organizational innovation and performance*. (pp. 282-290). John Wiley & Sons.
- Snijders, T. A. B., Pattison, P. E., Robins, G. L., & Handcock, M. S. (2006). New specifications for exponential random graph models. *Sociological Methodology*, 36, 99-153.
- Snijders, T. A. B. (2005). Models for longitudinal network data. In P. J. Carrington, J. Scott, & S. Wasserman (Eds.), *Models and methods in social network analysis* (pp. 215-247). New York, NY: Cambridge University Press.
- Terman, L. M. (1904). A preliminary study in the psychology and pedagogy of leadership. *The Journal of Genetic Psychology*, 11, 413-451.

- Uhl-Bien, M. (2003). Relationship development as a key ingredient for leadership development. In S. E. Murphy, & R. E. Riggio, R. E. (Eds.). *The future of leadership development*. (pp. 129-147). Psychology Press.
- Uhl-Bien, M. (2006). Relational leadership theory: Exploring the social processes of leadership and organizing. *The Leadership Quarterly*, 17(6), 654-676.
- Uhl-Bien, M., Graen, G. B., & Scandura, T. A. (2000). Implications of leader-member exchange (LMX) for strategic human resource management systems: Relationships as social capital for competitive advantage. *Research in personnel and human resources management*, 18, 137-185.
- Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era. *The Leadership Quarterly*, 18, 298-318.
- Uzzi, B., & Dunlap, S. (2005). How to build your network. *Harvard Business Review*, 83, 53.
- Van De Valk, L. J. (2008). Leadership development and social capital: Is there a relationship. *Journal of Leadership Education*, 7, 47-64.
- Van Velsor, E., McCauley, C. D., & Ruderman, M. N. (2010). (3rd Ed.). *The Center for Creative Leadership handbook of leadership development*. John Wiley & Sons.
- Vecchio, R. P., Justin, J. E., & Pearce, C. L. (2010). Empowering leadership: An examination of mediating mechanisms within a hierarchical structure. *The Leadership Quarterly*, 21, 530-542.
- Wang, D., Waldman, D. A., & Zhang, Z. (2014). A meta-analysis of shared leadership and team effectiveness. *Journal of Applied Psychology*, 99, 181-198.

- Wasserman, S., & Robins, G. L. (2005). Logit models and logistic regressions for social networks: An introduction to random graphs, dependence graphs, and p^* . In P. Carrington, J. Scott, & S. Wasserman (Eds.), *Models and methods in social network analysis* (pp. 148–161) New York, NY: Cambridge University Press.
- Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review*, 78, 139-146.
- White, L., Currie, G., & Lockett, A. (2014). The enactment of plural leadership in health and social care network: The influence of institutional context. *The Leadership Quarterly*, 25, 730–745.
- White, L., Currie, G., & Lockett, A. (2016). Pluralized leadership in complex organizations: Exploring the cross network effects between leadership influence and informal network relations. *The Leadership Quarterly*, 27(2), 280–297.
- Willburn, P. (2010). *Leader network diagnostic*. Retrieved from leadernetworkdiagnostic.com
- Yammarino, F. (2013). Leadership past, present, and future. *Journal of Leadership & Organizational Studies*, 20, 149–155.
- Yammarino, F. J., Salas, E., Serban, A., Shirreffs, K., & Shuffler, M. (2012). Collectivistic leadership approaches: Putting the “we” in leadership science and practice. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, 5, 382–402.
- Zaccaro, S. J., & Klimoski, R. J. (2002). The nature of organizational leadership. In S. J. Zaccaro, & R. J. Klimoski (Eds.), *The nature of organizational leadership* (pp. 3–41). San Francisco: Jossey Bass.
- Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *The Leadership Quarterly*, 12(4), 451-483.

Zacharakis, J., & Flora, J. (2005). Riverside: A case study of social capital and cultural reproduction and their relationship to leadership development. *Adult Education Quarterly*, 55, 288-30.

Table 1. Exemplar Articles for Individuals Shaping Their Own (Approach 2a) and Others'**(Approach 2b) Networks and Collectives Co-Creating Networks (Approach 3).**

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Anand and Conger (2007) provided guidance to leaders by addressing several networking myths and recommending ways leaders can improve their own network.	An individual's social network connections (defined broadly)	Recommend four strategies individuals (e.g., leaders) can use to modify their network: seeking out connections with informal leaders, actively maintaining social connections, interacting amicably with others, and introducing people with complementary skills who could benefit from collaborating with each other.	X		
Bartol and Zhang (2007) identified the importance of networks for common on-the-job development assignments.	Leaders' operational, personal, and strategic networks	Proposed that aspiring managers can leverage networks to help them accomplish challenging work assignments and that the type of network, the network structure, individual differences, and the means of interacting (i.e., face-to-face or through technology) impacts the ability of individuals to develop and utilize relationships.	X		
Burt and Ronchi (2007) assessed the benefits of educating executives on the potential advantages of different network structures.	Executives' social networks (defined broadly)	Found that executives who actively participated in training on different types of social structures and their benefits had higher performance evaluations and were more likely to be promoted and retained by the organization than a control group who did not participate in the training.	X		
Chavez and Green (2010) proposed that for leaders to effectively leverage networks they need to shift their mindset, skill set, and tool set.	Leaders' and teams' social networks (defined broadly)	Described how leadership development professionals can help individuals learn to build authentic connections, interact with others with a purpose and to solve problems, and lead their team in mapping the network among the team and key stakeholders.	X	X	

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Chrobot-Mason, Cullen, and Altman (2013) propose that leaders often gain important insights regarding siloed groups within their organization by conducting network analysis, but are then unsure how help individuals and groups build the connections needed to support collaboration between groups.	Organizational networks (e.g., communication and collaboration)	Describe a model of boundary spanning leadership, including strategies and practices that leaders can use to foster intergroup collaboration and maximize the potential of organizational networks.		X	
Colella (2010) described the components of a leadership development program in which individuals were provided opportunities to discover hidden assets available to them through other program participants.	Leaders personal network (defined broadly)	Posited that networking in leadership development programs should not be left to chance and provide an example of how an individual network assessment can be combined with activities that help participants understand the resources they need from their network and identify people within the program who may have those resources.		X	
Cross (2010) proposed that leadership development program should combine a facilitated case study approach to teach leaders how to manage the organizational network with a personal network assessment to help leaders identify changes they need to make in their own network.	Individual and organizational networks (broadly defined)	Described a leadership development program in which leaders were taught strategies for managing organizational networks including minimizing collaboration bottlenecks, integrating newcomers and those on the network periphery, selectively bridging organizational silos, developing awareness of expertise among network members, and minimizing insularity as well as helping identify whether they have the right “bridging relationships” (those relationships that reach across hierarchy, functions, and geography) and are engaging in behaviors that create energy when they interact with others.	X		X

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Cross et al. (2002) identified ways network analysis can be used to help assess and support strategically important informal organizational networks.	Organizational networks (e.g., communication, information, problem-solving, expertise awareness, access)	Demonstrated that social network analysis is a useful tool for making “invisible” social networks in organizations “visible” and illustrated actions that can be taken with this information (e.g., reallocate information distribution and decision-making responsibilities from people who are overly central, create assignments that will help integrate people on the periphery, interventions to promote collaboration within and across critical organizational boundaries, including between functions).		X	
Cross et al. (2015) proposed that when attempting to improve collaboration, leaders need to be guided by specific business goals and not a broad strategic imperative.	Organizational networks (e.g., information exchange, collaboration)	Provided illustrative cases demonstrating different approaches to enhance collaboration across organizational boundaries (e.g., different functions, geographies, levels) based on the purpose of the collaboration (e.g., innovation or efficiency).		X	X
Cross et al. (2013) proposed that it is important for leaders to enlist people in a number of key network roles and to build cross-boundary connections when implementing change.	Organizational networks (e.g., information personal support, trust, expertise, energy)	Demonstrated that social network analysis is a useful tool for helping leaders to identify individuals in key network roles and provided recommendations for how formal leaders can implement change through the network as opposed to through the hierarchy.		X	
Cross et al. (2006) and Cross & Velasquez (2010) illustrated how network analysis is a useful tool for leaders of communities of practice (COP) to facilitate productive network connections	Informal networks between members of a COP (e.g., advice, information sharing)	Demonstrated through an illustrative case (based on action research conducted with 15 COPs) in one organization how network analysis can be used network analysis to help ensure COPs deliver business results, including identifying overly relied on individuals, invisible silos, and disconnected individuals and improving information flow by building awareness of expertise, having experts act as information brokers connecting people to others who could also provide required knowledge, and helping the community monitor its success in responding to requests for help.		X	

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Cross et al. (2005) warned against attempting to promote collaboration in a haphazard way or assuming that more connectivity is always better.	Organizational networks (defined broadly)	Provided three illustrative examples of how organizations have shaped their work processes and informal networks to support the goals the organization is trying to achieve.		X	
Cross and Prusak (2002) proposed that executives should use social network analysis to improve their understanding of the informal networks in their organizations and make purposeful investments to develop network structures.	Organizational networks (defined broadly)	Described through illustrative cases four types of positions in organizational networks (<i>central connectors, boundary spanners, information brokers, and peripheral specialists</i>) and the connectivity between different groups as important information for leaders to understand and utilize.		X	
Cross and Thomas (2008) identified important structural, relational, and behavioral characteristics drawing on applied research examining top performers in organizations.	Individuals' social networks (defined broadly)	Reported that top performers craft their networks strategically so that they occupy bridging positions, extend their expertise through diverse connections, and cultivate high quality relationships as opposed to building simply bigger or biased networks (e.g., connect only with people in one area of the organization or people who already agree with them).	X		
Cross and Thomas (2011) proposed a process for improving an individual's network by analyzing, de-layering, diversifying, and capitalizing on network connections.	Executives' social networks (defined broadly)	Reported that many people tend to develop the wrong relationships or build a network that has the wrong structure, and that those who do it right have a network that provides access to diverse information and expertise, powerful people, developmental feedback, and personal support, including looking after their well-being and giving them a sense of purpose.	X		

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Cullen, Palus, & Chrobot-Mason (2015) demonstrated how network analysis can be used to help leaders identify barriers that are preventing more effective collaboration.	Employees' communication network	Presented a case study in which insights from a network analysis which identified how the spread of members in an R&D division of a pharmaceutical company across three floors stifling collaboration needed among scientific teams in the division and tracked changes in the network (e.g., doubling in network density 18 months later) after all employees were moved to the same floor and began using new collaboration techniques.		X	X
Cullen-Lester and Willburn (2016) proposed an approach by which leaders can utilize information from network analytics to inform change implementation strategies.	Organizational networks (e.g., leadership, sensemaking, advice)	Demonstrated through client examples how network insights can be used to tailor the change implementation strategies to fit natural patterns of work, identify ways to shift existing network patterns toward a structure that will more effectively support the new way of working required by the change, and help change leaders use their own personal network to accelerate adoption of the change.	X	X	
Cullen-Lester et al. (2016) provided a framework for incorporating networks into individual development programs.	Individuals' operational, personal, and strategic networks	Recommended that development efforts begin by addressing misconceptions about networking, then teaching individuals to assess their current network structure and identify changes they want to make, before finally employing strategies to build, maintain, leverage, and transition relationships.	X		
Galli and Müller-Stewens (2012) reported insights from a case study of leadership development efforts within a multi-business organization focused on improving managers' cross-business connections.	Managers' cross-business collaboration networks	Found that relationships of different strengths were needed to engage in different types of cross-business collaboration and that leadership development techniques differed in their ability to help participants build stronger connections (e.g., action learning or job rotation was more effective for building stronger connections, while networking events were more effective for meeting new acquaintances).	X		X

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Ibarra and Hunter (2007) recommended strategies for building and leveraging relationships and highlighted their importance in times of job transitions.	Leaders' operational, personal, and strategic networks	Proposed that leaders must develop operational, personal, and strategic networks and that strategic networks are especially key for individual and organizational effectiveness.	X		
Krackhardt and Hanson (1993) proposed that it is important for leaders to improve their understanding of informal organizational networks because many problems are created when leaders do not accurately perceive the networks that exist outside of the formal hierarchy.	Organizational networks (e.g., advice, trust, communication)	Demonstrated through illustrative cases how network maps (i.e., network analysis) may be used to help leaders make more informed workplace decisions by identifying network structures that do not match the organization's goals (e.g., lack of connections within groups indicating a lack of cohesion or between groups that must work interdependently) and the types of changes that can be made to improve the fit.		X	
Roberts (2013) reported insights from a case study of an action learning-based development program which encouraged participants to engage in problem solving, learning, and info sharing.	Participants' (e.g., hospital managers and executives) social networks (defined broadly)	The action learning design of the leadership development program fostered exchanges between program participants which allowed them to develop their personal network, including building connections to people in other departments.	X		
Strei and Colella (2010) describe a workshop that is aimed at helping leaders identify and develop a plan for managing a change they are leading.	Leaders' social network connections (defined broadly)	Described a process by which individuals (or groups) identify all of the relevant stakeholders for a change initiative, classify those stakeholders using a two-by-two grid based on influence and interest, and create a stakeholder engagement plan in which they tailor their management approach to the stakeholders based on which quadrant they fall into on the grid (e.g., high influence and low interest provide short tailored communication).		X	
Uzzi and Dunlap (2005) proposed a process for assessing and improving individuals' networks.	Executives' social network connections (defined broadly)	Acknowledged that there are paradoxes involved in building effective networks, but proposed that engaging in shared activities with a diverse set of people can allow individuals to develop networks that provide them with access to private information, diverse sets of skills, and informational power.	X		

Paper Description	Networks	Exemplar Findings/Implications	2a	2b	3
Van De Valk (2008) reviewed the leadership development literature to determine the link between leadership development programs and improvement in participants' networks.	Individuals' social networks (defined broadly)	Found that many participants identified improved network connections as an important outcome of leadership development, but the existing literature has not yet determined that there is a causal relationship.	X		

Table 2. Use and Effectiveness of Exemplar Techniques for Individuals Shaping Their Own Networks (Approach 2a).

Example Techniques	Percentage of respondents who have used the technique	Of those who used technique, percentage who found it effective
Provided the individual with resources including books, articles, or other materials on building and maintaining effective relationships and networks	62.64%	75.45%
Had the individual list the key stakeholders involved in a change he/she faces	58.61%	88.75%
Encouraged the individual to join groups of people based on a common interest/expertise (e.g., peer support group, community of practice)	52.75%	73.43%
Provided opportunities to develop a stronger relationship with a sponsor (i.e., someone who will look out for their interests and recommend them for opportunities)	49.08%	83.33%
Assigned the individual projects that provided an opportunity for him or her to develop new connections or strengthen important connections	46.89%	80.95%
Organized formal functions designed to help individuals build connections with others (e.g., networking events, conferences)	46.15%	78.86%
Had the individual make a list of important contacts	42.86%	85.34%
Instructed the individual to make a diagram or map of how their contacts are connected	35.90%	84.69%
Instructed the individual in completing an assessment of their own network structure	30.04%	81.71%
Provided training on using online networking tools (e.g., Facebook, LinkedIn) to build and maintain his or her relationships	23.81%	75.41%

Note. N = 273 survey participants reported facilitating the development of individuals' abilities to understand, leverage, and

alter their own social network connections.

Table 3. Use and Effectiveness of Exemplar Techniques for Individuals Shaping Others' Networks (Approach 2b).

Example Techniques	% who have used the technique	Of those who used % finding it effective
Provided coaching on ways to increase the effectiveness of the individual's group by leveraging informal networks	56.65%	89.47%
Identified break-downs in the communication flow of the group (e.g., people who were bottlenecks, groups that needed to be collaborating more)	56.16%	88.60%
Helped individual use informal connections to gain support for change in their group	51.72%	91.35%
Helped individual identify change agents (people who can help implement an organizational change) by taking into consideration the change agents' relationships	51.72%	86.54%
Helped individual to create a group of people from different parts of organization to improve effectiveness or efficiency (e.g., communities of practice; cross-functional teams)	45.81%	86.96%
Advised the individual to think about a person's relationships (network connections) when recommending them for a new assignment	43.35%	83.91%
Advised the individual on how to restructure work processes or decision-making practices to help individuals who were overburdened in your group, business unit, or organization	41.38%	88.10%
Designed a solution to improve the information flow of the group	37.44%	84.21%
Used network techniques to identify influential people within the group and shared this information with the individual	32.51%	93.85%
Instructed the individual about how to create a map or diagram of how they believed people in his or her group are connected	31.53%	88.89%
Provided formal training on how to better understand and leverage organizational networks	28.57%	82.46%
Promoted the use of networking sites such as Yammer, Facebook, Twitter, LinkedIn, etc. to improve the effectiveness of the individual's group (e.g., training on social media tools)	25.62%	62.00%

Used a network analysis to assess the current structure of the individual's group	23.15%	89.13%
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Note. 203 survey participants reported facilitating the development of individuals' abilities to understand, leverage, and alter others' social network connections.

Table 4. Use and Effectiveness of Techniques for Collectives' Co-Creating Networks (Approach 3).

Example Techniques	% who have used the technique	Of those who used % finding it effective
Facilitated trust and relationship building activities	64.50%	90.74%
Held workshops or meetings to facilitate the interactions between various groups to increase collaboration, innovation, or problem solving	63.31%	90.29%
Helped the group developed a shared understanding of how it is connected to other teams, business units, or organizations	59.17%	88.89%
Facilitated discussions of previous successes and mistakes to generate new strategies for tackling future challenges (e.g., after-action-reviews, guided exploration activities)	58.58%	92.71%
Provided the time and space for idea exchanges to enhance creativity and innovation	54.44%	93.33%
Organized groups that take action to solve real workplace problems (e.g., action learning teams)	52.66%	88.37%
Identified break-downs in the communication flow of the group (e.g., people who were bottlenecks, groups that needed to be collaborating more)	50.89%	91.67%
Helped a group create a map or list of important key stakeholders and facilitated a discussion about how to influence these stakeholders	42.01%	90.14%
Provided resources to create strategic, intentional networks to address an important organizational issue	34.32%	82.46%
Organized forums, conferences, etc. to build stronger connections within a specific group (e.g., gathering the global HR division of an organization)	31.36%	86.54%
Facilitated the creation of a map or diagram by the group of how they believe the members are connected to one another	29.59%	90.00%
Organized or facilitated peer support groups (e.g., single parent support, expatriate support)	28.99%	89.58%
Used networks to help the group understand how the informal dynamics/relationships that exist can	27.22%	93.48%

impact group outcomes

Used the results of a network analysis to help the group gain a shared understanding of the structure of the group's network	19.53%	90.91%
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Note. N = 169 survey participants engaged in the development of entire collectives to understand, leverage, and alter the collective's social network connections.

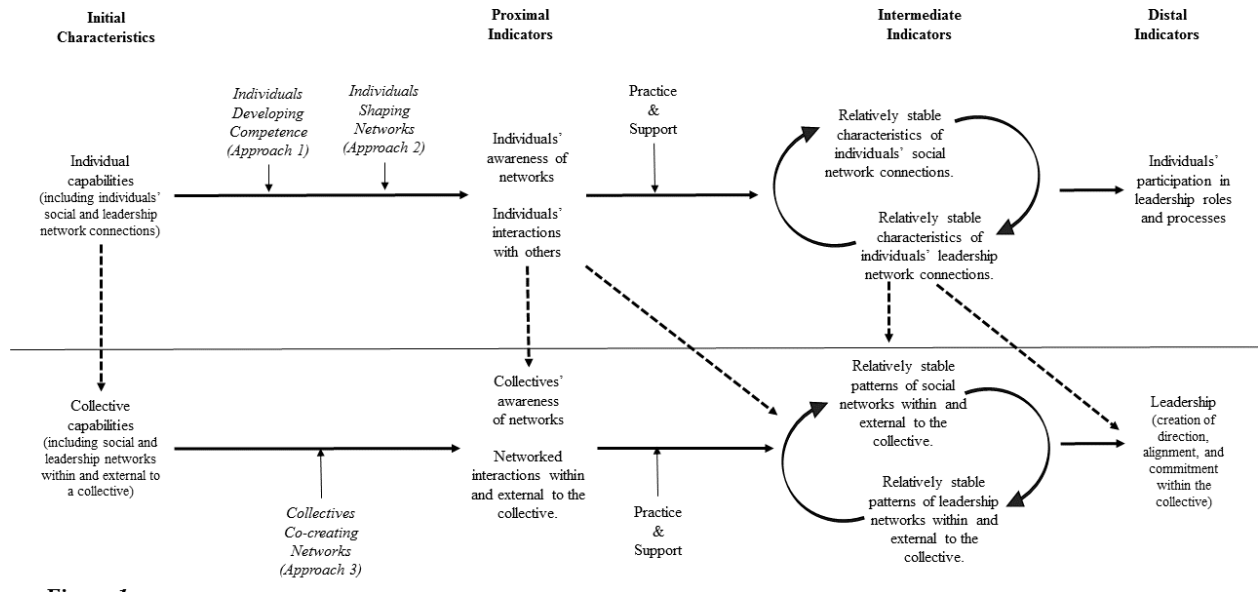


Figure 1.

Theoretical Effects of Network-Enhancing Leadership Development.

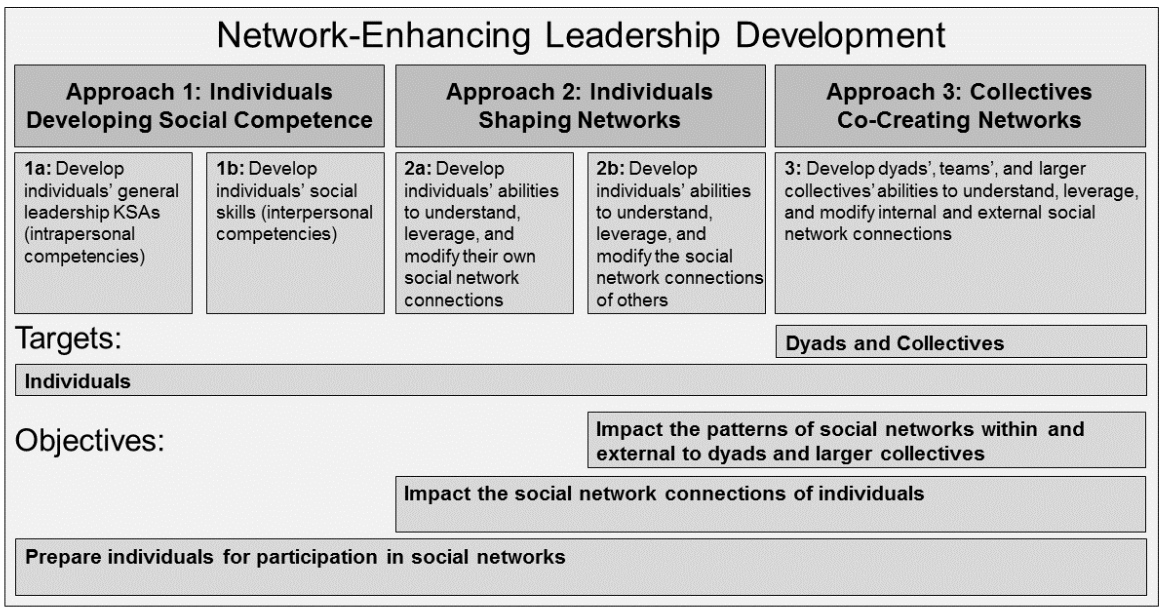


Figure 2.

Targets and objectives of network-enhancing leadership development approaches.

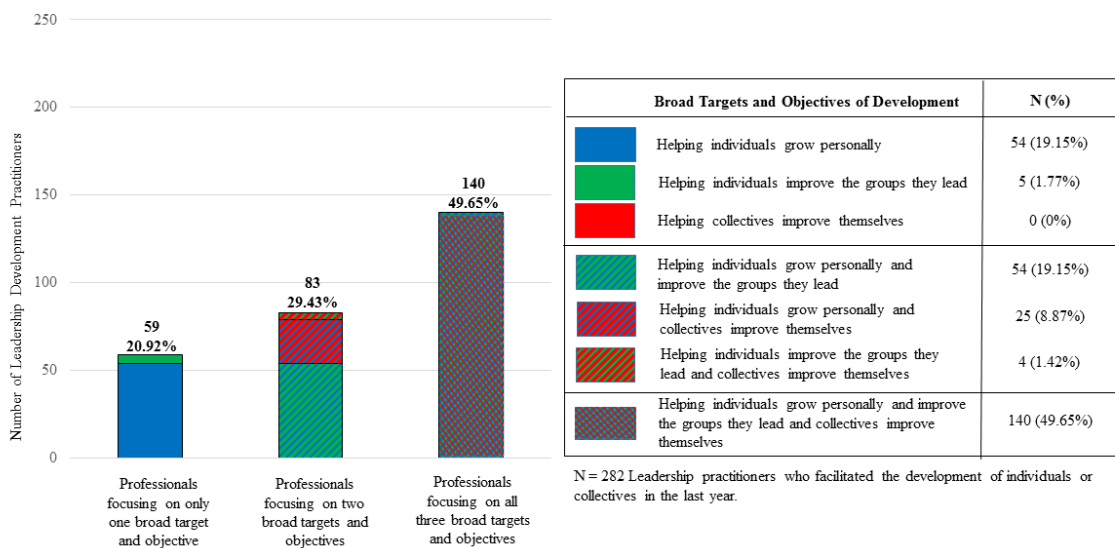


Figure 3.

Focus of Survey Respondents' Leadership Development Efforts.