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**A REVIEW OF DEVELOPMENTAL NETWORKS:
INCORPORATING A MUTUALITY PERSPECTIVE**

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ABSTRACT

During the last decade, mentoring research has broadened from its traditional dyadic perspective to examine the support provided by a “developmental network” (Higgins & Kram, 2001; Kram, 1985). This paper reviews the literature on developmental networks—groups of people who take an active interest in and action toward advancing a protégé’s career. Building on Positive Organizational Scholarship (POS) research on high-quality connections and relationships, we propose that a “mutuality perspective,” or taking the viewpoints of all members of the developmental network into account, is a notable gap in developmental network research. We apply this perspective to developmental networks research and discuss implications and avenues for future inquiry. As part of our review, we clarify the boundaries of the developmental network construct. We also identify and discuss four research streams that encompass extant studies of developmental networks. This paper extends previous reviews of the broad field of dyadic mentoring by providing the first systematic review of developmental network research.

**A REVIEW OF DEVELOPMENTAL NETWORKS:
INCORPORATING A MUTUALITY PERSPECTIVE**

During the last decade, mentoring research has broadened from its traditional dyadic focus to examine support provided to individuals by a “constellation” of several people from different life domains—that is, by a “developmental network” (Higgins & Kram, 2001; Kram, 1985). Recent articles and books have thoroughly reviewed the traditional mentoring literature (Allen & Eby, 2007; Allen, Eby, O’Brien & Lentz, 2008; Haggard, Dougherty, Turban & Wilbanks, 2011; Kammeyer-Mueller & Judge, 2008; Ragins & Kram, 2007) and called for increased attention to developmental networks in future research (e.g., Haggard et al., 2011). We extend these reviews by providing the first systematic review of developmental network research. Further, we build on the call for research that incorporates the mentor’s as well as the protégé’s perspectives, rather than one or the other (Allen, 2007; Allen et al., 2008; Haggard et al., 2011; Weinberg & Lankau, Forthcoming). Our review highlights a “mutuality perspective”—by taking into account the viewpoints of all members of the developmental network. Here we apply this mutuality perspective to developmental networks and discuss implications for future research.

Since Higgins and Kram (2001) reconceptualized mentoring as a developmental network, research in this area has flourished. Developmental networks are valuable for achieving a variety of career outcomes ranging from promotion and career advancement (Singh, Ragins & Tharenou, 2009) to clarity of professional identity (Dobrow & Higgins, 2005). Moreover, a person’s support network can account for more variability than a primary mentor in some outcomes (e.g., Higgins & Thomas, 2001), which highlights the importance of developmental networks for understanding how mentoring affects career development (Kammeyer-Mueller & Judge, 2008).

Finally, macro-level trends such as globalization, technological innovations, and changes in organizational structure and organizational demography make securing developmental assistance from a number of people who span various social spheres more necessary than ever for individuals (Higgins & Kram, 2001).

Studies have explored the individual-level antecedents and consequences of developmental network support, as well as the structural characteristics of the networks and their consequences. In addition, research has explored network-related mediating and moderating variables. Although the various angles previous research has examined collectively represent a strength of this literature, no broad framework exists yet for understanding and tying together developmental network research findings. As a result, scholars do not have a clear picture of the strengths or gaps in this literature or an agenda for conducting future research. Moreover, as a relatively new area of inquiry, the developmental network literature includes many areas in need of clarification and further exploration.

The purpose of this article is to apply a new lens—the mutuality perspective—to a systematic review of the developmental network literature. We begin by defining the developmental network construct, including highlighting four fundamental attributes that distinguish it from related constructs. We then put forth the mutuality perspective as it relates to developmental network research. We continue with a review of the developmental network literature in which we identify and discuss four research streams that encompass extant studies of developmental networks. As part of this discussion, we develop a framework that clarifies the relationships among these research streams. We then highlight the variation that exists within conceptualizations and measures of developmental networks and discuss the implications of this variation for future research. Finally, we integrate the mutuality perspective with the four

research streams by proposing future directions for developmental network research.

DEVELOPMENTAL NETWORKS: A DISTINCT CONSTRUCT

Our review focuses on the ten years of research inspired by Higgins and Kram's (2001) foundational definition of developmental networks: egocentric, content-based networks comprised of "people a protégé names as taking an active interest in and action to advance the protégé's career by providing developmental assistance" (p. 268).¹ This view builds on Kram's (1985) original assertion that individuals receive mentoring support from multiple people, and extends that view by applying a social network perspective. Developers can come from different hierarchical positions within the protégé's organization (e.g., senior managers, supervisors, peers, or subordinates) as well from domains outside of work, such as family and community (Murphy & Kram, 2010). These developers can provide two different types of support: *career* (e.g., sponsorship, exposure and visibility, coaching, protection, and challenging assignments) and *psychosocial* (e.g., counseling, role-modeling, acceptance and confirmation, and friendship) (Kram, 1985).

Mentoring and social network researchers often refer to a number of constructs as being almost interchangeable with developmental networks (Molloy, 2005). For developmental network research to flourish and offer meaningful contributions to the broader management literature moving forward, clarifying the construct's boundaries is critical. Therefore, we compare developmental networks to five related constructs—multiple mentors, mentoring networks, intra-organizational networks, core discussion networks, and interpersonal networks—with the aim of clarifying developmental networks' nomological network (Cronbach & Meehl, 1955). In particular, we note variations in definition, social spheres represented by developers, and the type and amount of support provided.

Multiple Mentors

Prior to the introduction of developmental networks into the literature (Higgins & Kram, 2001), scholars had considered the role of multiple mentors in people's work lives. For instance, Baugh and Scandura (1999) found that the number of mentors an individual can identify is positively associated with organizational commitment, job satisfaction, career expectations, and perceptions of alternative employment. This study defined mentors as "influential in your work environment," having "advanced experience" and "providing upward mobility," which, taken together, suggest these multiple mentors are senior-ranking officials within the protégé's organization (Baugh & Scandura, 1999). Thus, Baugh and Scandura's (1999) notion of multiple mentors—a set of "traditional" mentors only—represents a narrower range of people than developmental networks include. Instead, developmental networks can consist of a much broader range of people, from inside, outside, and at multiple levels within the protégé's organization.

In a conceptual study of multiple mentoring among expatriates, Mezias and Scandura (2005) included hierarchical and peer mentors both inside and outside the protégé's organization (e.g., another firm's expatriates, diplomats, chamber of commerce members), thus broadening the conceptualization of multiple mentoring and bringing it closer to being a developmental network. A key factor that distinguishes this view of multiple mentors from developmental networks is the latter's consideration of the relationships among the developers (e.g., network density, range) as well as the type of support provided by the developers.

Mentoring Networks

Studies on mentoring networks vary in their conceptualizations of the types of mentors included in the network. Whereas one study elicited "mentors who take an active interest in and action to advance the protégé's career" (Kim & Kim, 2007: 49), implying that relevant

individuals are “true mentors” who provide high levels of career and psychosocial support, others assert a protégé’s needs are best served by a continuum of relationships that vary in the types of support they provide (e.g., a sponsor who provides career support or a friend who provides psychosocial support) (e.g., Crocitto, Sullivan & Carraher, 2005; de Janasz & Sullivan, 2004; de Janasz, Sullivan & Whiting, 2003) and can come from outside one’s employing organization (Crocitto et al., 2005). The view that mentoring networks can allow for a continuum of mentoring relationships is conceptually close to developmental networks. As with multiple mentors, however, mentoring networks represent a narrower range of people than can be involved in a developmental network. Specifically, studies on mentoring networks do not reference family members or friends, who can play a significant role in developmental networks (Cummings & Higgins, 2005; Murphy & Kram, 2010), or peripheral sources of support, such as role models one has not met or has only imagined (e.g., Cotton, Shen & Livne-Tarandach, 2011). Also, like the multiple mentors concept, mentoring networks do not consider the relationships between developers (e.g., network density and range).

Intra-Organizational Networks and Core Discussion Groups

Intra-organizational networks can provide “instrumental” and “expressive” support, analogous to the career and psychosocial support provided in developmental networks, respectively (Bozionelos, 2003, 2006, 2008). However, intra-organizational networks focus solely on network ties within an organization, whereas developmental networks can include developers from both inside and outside individuals’ employing organizations. Similarly, core discussion networks, which consist of the people with whom individuals discuss important personal matters, typically involve people within an individual’s organization (Carroll & Teo,

1996). Although some of the discussion ties might provide developmental support, as a type of social network, they are conceptualized more broadly than developmental networks.

Interpersonal Networks

The social network literature includes several types of egocentric networks that are similar to developmental networks in some ways yet are conceptually distinct. Typically, each of these interpersonal networks provides a single type of support akin to one of the two types of support provided by developmental networks—and so are narrower in scope than developmental networks in terms of the content they provide. For example, friendship networks provide psychosocial but no career support (Burt, 1992). Their opposite, advice networks, can provide career but no psychosocial support (Krackhardt & Hanson, 1993). Interaction networks (e.g., Ibarra, 1992) can offer instrumental and expressive support, similar to career and psychosocial support, respectively. These networks include only intra-organizational ties, however, in contrast to developmental networks' inclusion of both intra- and extra-organizational ties.

In sum, this overview of related constructs highlights the distinctiveness—and boundaries—of developmental networks. We propose four fundamental attributes of developmental networks. First, the purpose of developers' involvement in the developmental network is that they *take an active interest in and actions toward advancing the protégé's career*.² Thus developmental networks are the subset of a protégé's larger social network specifically aimed at enhancing the protégé's career growth. Second, developmental networks involve *multiple developers* (usually 4 to 5, as in Higgins, 2001), unlike traditional dyadic mentoring relationships that involve one protégé and one mentor. Third, developmental networks are characterized by their *inclusion of a broad range of social spheres*—people from inside and outside the organization, people from different hierarchical levels (superiors, peers, and

subordinates), and people from a wide range of domains beyond work (e.g., friends, family members, and community groups), whereas related constructs tend to include a narrower range of mentors or developers. Lastly, in comparison to other related constructs, the content of exchange between parties is broader in developmental networks, such that developers can provide *varying amounts* (e.g., high vs. low) *and types* (e.g., career and psychosocial) of *developmental support*.

INCORPORATING MUTUALITY INTO DEVELOPMENTAL NETWORKS

RESEARCH

We propose a novel lens for developmental network research: incorporating the developers' perspectives into our current protégé-centric understanding of developmental networks. This approach—one of mutuality—builds on calls in the dyadic mentoring literature to incorporate the perspectives of both protégés and mentors. With a few notable exceptions (e.g., Allen, 2003, 2007; Lentz & Allen, 2009), dyadic mentoring research predominantly uses only the protégé's perspective (Fletcher & Ragins, 2007). In recognition of the reciprocity that characterizes the conceptual definition of mentoring, recent reviews of the mentoring literature have specifically highlighted the need for mentoring research that also incorporates the mentor's perspective (Allen et al., 2008; Haggard et al., 2011). To understand the costs and benefits of engaging in mentoring relationships for both protégés and mentors, insights from both perspectives are necessary (Allen et al., 2008). Inclusion of the mentor's perspective would also provide insight into why mentors are motivated to form or engage in mentoring relationships, the nature of the interactions between mentor and protégé, and the learning benefits that accrue to mentors through “reverse mentoring” from their protégés (Greengard, 2002; Haggard et al., 2011; Murphy, 2011).

This mutuality approach to developmental networks draws on high-quality connections and relationships research in the Positive Organizational Scholarship (POS) literature (Dutton, 2003; Dutton & Heaphy, 2003). This line of scholarship advocates the importance of high-quality connections—those “marked by mutual positive regard, trust, and active engagement on both sides”—in all workplace relationships (Dutton, 2003: 2). These relationships, which can lead to outcomes such as self-awareness, self-esteem, new skills, zest, and a desire for more connection and well-being, are experienced as mutually beneficial and more enriching than others (Dutton & Heaphy, 2003; Dutton & Ragins, 2007; Fletcher & Ragins, 2007).

More specifically, a high-quality *mentoring* relationship “promotes mutual growth, learning and development within the career context” (Fletcher & Ragins, 2007: 374). Mutuality has four critical dimensions: mutual benefit, influence, expectations, and understanding (Ragins & Verbos, 2007; Roberts, 2007). As such, both parties are “better off” as a result of the relationship, influence each other through learning, agree on roles and boundaries in the relationship, are aware of their impact on each other, and understand one another’s intentions. Thus a mutuality approach necessarily depends on the inclusion of both parties.

In the context of developmental network research, both theoretical and empirical studies have focused on developmental networks solely from the perspective of the person at the network’s center, the protégé. Applying mutuality to developmental networks would thus involve taking into account not only the protégé’s perspective, but also the perspectives of the four to five people who typically comprise the protégé’s developmental network. Here we extend research on high-quality connections in dyads by suggesting mutuality is also important for the multiple people who comprise developmental networks.

In the next section, we review extant developmental network research. This review underscores the fact that although scholars have made progress toward understanding the role of developmental networks in careers and organizations, many important research questions remain within and across the four streams of research we delineate.

DEVELOPMENTAL NETWORKS: STREAMS OF EXTANT LITERATURE

We selected the papers included in this review through a literature search for terms consistent with the notion of developmental networks, including “developmental network,” “mentoring constellation,” “multiple mentors,” and “network and mentor.”³ We analyzed the research focus of each paper and found that studies of developmental networks fall into one or more of the following four streams: (1) individual- and contextual-level *antecedents* of developmental network structure and content; (2) consequences of developmental network *structure*; (3) consequences of developmental network *content*; and (4) *mediators* and *moderators* of the relationships between developmental networks and their antecedents and consequences. Table 1 provides brief summaries of all studies in our review. Figure 1 summarizes the content of each research stream as well as the relationships among them.

[Insert Table 1 and Figure 1 About Here]

Stream 1: Antecedents of Developmental Network Structure and Content

Higgins and Kram (2001) proposed a framework of the antecedents and consequences of developmental networks. There are two categories of antecedents: individual-level and contextual influences. Subsequent research on the antecedents of developmental networks, most of which is conceptual in nature, has stayed close to these two categories. Stream 1 thus consists of two sub-streams. The first examines the effects of individual antecedents, almost exclusively protégé characteristics, on developmental network structure and content. The second examines

the contextual factors—including organizational context and task requirements—that shape developmental network structure and content.

Protégé influences. Several personality characteristics are linked to developmental network structure and content. Extroversion/introversion, self-construal, conscientiousness, and openness to experience may be relevant to the formation of developmental networks such that they predict people's degree of proactivity (or lack thereof) in interactions with diverse others and in seeking close, trusting relationships (Dougherty, Cheung & Florea, 2008). For example, people who are high on the Big Five's openness-to-experience dimension (Costa & McCrae, 1992) are more likely to develop diverse networks due to their inclination toward welcoming new interactions, ideas, and information (Dougherty et al., 2008).

Scholars have examined a range of demographic factors as antecedents of developmental networks. For instance, characteristics of developmental networks including gender composition, number of developers from inside versus outside one's organization, and amount of help provided may depend on the gender of the protégé (Burke, Bristor & Rothstein, 1996). Using homophily arguments, the idea that people are attracted to similar others, Higgins et al. (2007) proposed that socioeconomic status (SES), gender, and age affect the types of developmental networks people are likely to have. For example, high-SES junior employees are particularly attractive to senior-ranking employees, many of whom are also high SES (Blau & Duncan, 1967), because they seek protégés who are similar to themselves. Senior-ranking employees, who can provide a substantial amount of career support by virtue of their position, are also attractive to junior high-SES employees. These junior employees will tend to focus on cultivating developmental relationships with these relatively similar developers, thus creating less diverse networks than more dissimilar junior employees might cultivate. In contrast, in an

expatriate context, individuals may be self-confident, reliant, and open to new experiences. As a consequence, they may reach out to a broad array of people during expatriation, leading to a relatively diverse developmental network (Higgins et al., 2007).

Individuals' developmental stage—"a frame of reference that one uses to structure one's world and from within which one perceives the world" (Gallos, 1989: 114)—likely affects their developmental networks' structure and content (Chandler & Kram, 2005). In Kegan's (1982, 1994) six-stage developmental framework,⁴ individuals in the fifth stage, "institutional," are likely to have networks comprised predominantly of peer relationships. Individuals in the more sophisticated sixth stage, "inter-individual," are likely to have diverse networks comprised of not only peers, but also superiors and subordinates. Moreover, these relationships are characterized by greater mutuality and reciprocity than relationships in other stages (Chandler & Kram, 2005). One's current developmental stage determines the confirmation (i.e., "a sense of safety that is required for recognizing and affirming the evolutionary development of an adult"), contradiction (i.e., "challenges that cause letting go of a stationary balance and drives an adult to view the world differently"), and continuity (i.e., "steadfastness that establishes stability amidst periods of change") provided by his or her developmental networks, which in turn, prepares one to transition to the next stage of development (Ghosh, Hayes & Kram, 2010: 8). In sum, as people become more developed, their developmental networks will likely positively reflect this growth.

Relational competence and other competency-based factors may improve people's ability to form effective developmental networks (Chandler, Hall & Kram, 2010; Shen, 2010). People who are adept with developmental relationships—that is, are relationally savvy—are more likely than less savvy people to develop large, diverse networks (Chandler, 2009; Chandler, Hall & Kram, 2009; Chandler et al., 2010). Relationally savvy people are more developmentally

proactive, which, similar to the proactive personality type described above, results in a tendency to seek out developmental opportunities through relationships. Further, relationally savvy people cultivate their skills for managing interactions. Thus they are prepared for developmental interactions, they know how to apply their efforts toward forming mutually beneficial relationships, and they engage in appropriate levels of follow-up to keep their developers apprised of how helpful their assistance been (Chandler et al., 2010).

Moreover, people vary regarding the types of and amount of support they expect, and ultimately seek out, from each developer (Cotton, 2010). These differing expectations enable people to have greater clarity about their roles and boundaries (Roberts, 2007), which enhances the cultivation and maintenance of developmental networks. Similarly, a contingency-based approach to developmental networks proposes that, in contrast to the notion that “bigger is better,” the most effective network for any protégé is the one that best matches his or her developmental needs (Higgins, 2007).

Contextual influences. A limited number of studies provide insight into the relationship between contextual factors and developmental networks (Chandler, Kram & Yip, Forthcoming; Kram, 1985). The source of the relationships can affect developmental network structure and content. For instance, formally assigned mentors are less likely than informal mentors to evolve into developmental relationships (Shen & Kram, 2011). People in certain industry or professional contexts, such as those with clear hierarchical career paths that place an emphasis on upward mobility (e.g., law), may benefit from having specific types of developmental networks, namely, those with senior-status developers who can provide the protégé with increased visibility and sponsorship (Higgins, 2007; Higgins & Thomas, 2001). Similarly, a study of developmental networks in a doctoral program suggests the optimal support a network provides likely varies by

context (Baker & Griffin, 2010; Baker & Lattuca, 2010). Finally, for expatriates, organizational culture, relocation support, and characteristics of the host country can affect developmental networks' structure and content (Shen, 2010). For example, expatriates whose organizations valued employee development were more likely than those in less supportive organizations to have a high percentage of intra-organizational developers.

Factors related to developers that could shape developmental network structure and content are notably absent from Stream 1. Applying a mutuality perspective enables scholars to address such issues as the extent to which individual-level characteristics of developers (e.g., their own needs and motives) shape the developmental networks of which they are a part, and the extent to which the contextual factors associated with developers, such as the norms of their primary work group or organization, affect the networks of which they are a part.

Stream 2: Consequences of Developmental Network Structure

After Higgins and Kram (2001) published their developmental network typology, researchers began to examine these networks' structural characteristics, primarily *tie strength* and *network diversity*. The examination of tie strength in developmental networks draws on classic mentoring (Kram, 1985) and network research (Granovetter, 1973; Marsden, 1990), which argues that stronger and more emotionally intense developmental relationships provide a variety of career benefits. Inside developmental networks, inner and outer cores emerge over time (Cummings & Higgins, 2005). The inner core, characterized by psychological closeness and more frequent communication, is comprised of more stable relationships that are more likely to be family ties than work ties. Strong ties with developers are related to higher job satisfaction (Higgins, 2000; van Emmerik, 2004) and salary (Kirchmeyer, 2005). Further, developmental

support from parents is associated with higher salaries (Murphy & Kram, 2010), thus highlighting the significance of strong, non-work ties in developmental networks.

Network diversity refers to the amount of variety within the network (Burt, 2000). More diverse networks offer access to novel information or resources, whereas less diverse networks provide access to redundant resources or information (Burt, 1992; Burt & Minor, 1983; Granovetter, 1973). The two types of network diversity typically examined in research are *density* and *range* (Brass, 1995; Burt & Minor, 1983; Higgins & Kram, 2001; Krackhardt, 1994).

Density describes the interconnectedness of ties in a developmental network, or the degree to which developers know one another (Higgins & Kram, 2001; Marsden, 1990). In a high-density developmental network—that is, when the developers are highly interconnected—the developers provide the protégé with access to relatively redundant information. Few studies have explored the effects of developmental network density (see Dobrow & Higgins, 2005 and Higgins, 2001 for exceptions) and only one had significant findings. In a longitudinal study, developmental network density, an indicator of professional identity exploration, was negatively related to clarity of professional identity several years later (Dobrow & Higgins, 2005). Since density reflects one's breadth of professional role models, higher density—or a lack of breadth—indicates fewer opportunities for exploration.

Range refers to the number of different social arenas (e.g., school, work, community) from which one's developers originate (Higgins & Kram, 2001). A broader range of developers exposes the protégé to more and different information. For instance, a variety of relationships within one's developmental network might be important for successfully navigating an academic career (Baker & Lattuca, 2010). This variety is generally beneficial for protégés, yet for the organizations in which these protégés work, the effects can be either beneficial or detrimental.

For protégés, having developers who come from outside their work organizations is linked with positive outcomes such as higher job performance (Kirchmeyer, 2005), intentions to remain in the organization (Higgins & Thomas, 2001), and career and life satisfaction (Murphy & Kram, 2010). Further, the greater the range of developers providing psychosocial assistance, the greater protégés' confidence to overcome career obstacles (Higgins, 2001). On the negative side for organizations, the greater the range of developers providing career support, the greater protégés' number of job offers and likelihood of changing careers (Higgins, 2001).

Research on range in developmental networks has also explored particular types of ties, or subsets of ties, within developmental networks. For example, the hierarchical status of developers affects promotion in law firms (Higgins & Thomas, 2001). In a longitudinal study of MBA alumni, the specific type of developmental network members who provided developmental support mattered: support from one's entire developmental network was positively associated with career-related self-efficacy and perceptions of career success during the 10 years after graduation, yet continuing to receive support from developers from graduate school was negatively related to perceptions of career success (Higgins, Dobrow & Chandler, 2008). Further, non-work developers provide more support overall than do work developers (Murphy & Kram, 2010). This research on the nuances of structural properties within developmental networks moves well beyond the scope of traditional mentoring research.

Note that not only are traditional mentors included in the notion of developmental networks, but their support is often still valuable. For example, above and beyond support from other developers, support from a traditional mentor is positively related to salary, promotions, advancement expectations, and career satisfaction, and negatively related to turnover intentions (Singh et al., 2009). Nonetheless, the more comprehensive developmental network approach

explains greater overall variance in some protégé career outcomes, particularly long-term outcomes such as promotion and organizational retention, than does traditional dyadic mentoring (Higgins & Thomas, 2001).

In addition to tie strength and network diversity, researchers have considered the impact of network size. A person's number of developers is positively related to job, work, and career satisfaction (Higgins, 2000; Higgins & Thomas, 2001; van Emmerik, 2004), job performance (Kirchmeyer, 2005; Peluchette & Jeanquart, 2000), retention (Higgins & Thomas, 2001), rank (Kirchmeyer, 2005), and promotions (Higgins & Thomas, 2001).

Adopting a mutuality perspective would shed light on the complexities of developmental network structure included in Stream 2. By taking both protégé and developer characteristics into account, scholars could develop a deeper understanding of structural differentiation within the network. By considering the needs, motives, competencies, and /or context of each developer, delineating a typology of network structures linked with particular protégé and developer outcomes might be possible. Ultimately, this fine-grained analysis would enable systematic consideration of how best to constitute a developmental network for the purpose of meeting particular protégé and developer needs.

Stream 3: Consequences of Developmental Networks' Content

Developmental network researchers typically consider the same two types of support used in traditional dyadic mentoring research: *psychosocial* and *career* (Kram, 1985).

Psychosocial support is positively related to work satisfaction (Higgins, 2000) and optimism (Higgins, Dobrow & Roloff, 2010). Career support is related to intentions to remain with an organization and organizational retention (Higgins & Thomas, 2001), career-related self-efficacy, perceptions of career success (Higgins et al., 2008), and optimism (Higgins et al.,

2010).⁵ In conceptual work about doctoral students preparing for academic careers, the support a developmental network provides is important for understanding students' professional identity development and learning outcomes (Baker & Lattuca, 2010). Overall, this set of results highlights that psychosocial and career support can affect outcomes for protégés and their organizations.

Developmental support may have more or less impact for individuals at different career stages. In a study involving MBA alumni, psychosocial support, but not career support, was positively associated with optimism from a cross-sectional perspective (Higgins et al., 2010). Yet from a longitudinal perspective, greater amounts of career and psychosocial support during one's early career were associated with greater optimism 10 years later (Higgins et al., 2010). Further, increasing amounts of both types of support over time were associated with greater optimism later in one's career (Higgins et al., 2010). These results underscore the importance of exploring the relationship between types of developmental support and career outcomes over time.

Developmental network scholars have extended work by dyadic mentoring scholars (e.g., Pellegrini & Scandura, 2005; Scandura, 1992; Scandura & Ragins, 1993) to suggest that in addition to career and psychosocial support, role-modeling is a third type of developmental support. Indeed, individuals may expect to receive all three types of support from developers in their networks (Cotton, 2010). Additionally, new sub-functions within the three types of developmental support may exist: freedom-and-opportunity for skill development as a career support sub-function and inspiration-and-motivation as a psychosocial support sub-function (Cotton et al., 2011); cultural guidance, home linkage, and facilitating trans-country/trans-organization transition as psychosocial support sub-functions (Shen, 2010); and career behaviors, work ethics, and values as positive sub-functions of role-modeling and devaluing relationships

and work-life interface failure as negative sub-functions of role-modeling (Murphy & Kram, 2010). Taken together, these studies encourage the continued investigation of existing and new types of developmental support and their relationships to career outcomes as well as the expansion of methodologies, such as quantitative instruments, to capture the full range of support functions provided by developmental networks.

Finally, the concept of multiplexity can describe the overlap in structure and/or content (support) in developmental networks. Multiplexity can characterize roles (e.g., my coworker is also my friend) or exchange in a relationship (e.g., receiving both career and psychosocial support from the same developer) (Burt, 1980; Verbrugge, 1979). A classic example of multiplex exchange ties is true mentors, who provide high amounts of both career and psychosocial support (Higgins, 2007; Kram, 1985). The other possible types of developers in a developmental network also inherently reflect the concept of multiplexity, as they each provide some combination of career and psychosocial support. Sponsors provide high career and low psychosocial support, friends provide low career and high psychosocial support, and allies provide low career and low psychosocial support (Higgins, 2007). Protégés should seek particular combinations of exchange functions—that is, particular types of developers—based on their career goals and professional context (Higgins, 2007).

A few studies have empirically explored multiplexity, either implicitly or explicitly. For example, just one tie providing high psychosocial assistance, a “friend,” is enough for one to be satisfied at work in a law firm context (Higgins, 2000). In contrast, in a study of professional baseball Hall of Famers, “supplementary” psychosocial support, defined as the same psychosocial support sub-function(s) provided by different developers concurrently, enhances extraordinary career achievement (Cotton et al., 2011). Furthermore, first-ballot Hall of Fame

inductees had larger and more diverse developmental networks with “more multiplex *and* single function” ties than others (Cotton et al., 2011, italics in original). Thus multiplexity holds promise as a useful lens for understanding the connections between developmental networks’ structure and content and, ultimately, career outcomes.

For Stream 3, the key contribution of incorporating the mutuality perspective is the taking into account of the developers’ views of the amount and type of support they provide to protégés. What might be the implications of alignment or misalignment of protégé and developer perceptions of the functions provided? If alignment is associated with more positive outcomes, what strategies can ensure alignment of these expectations? Further, the mutuality perspective would allow for a consideration of the outcomes of providing particular kinds of support for the developers themselves.

Stream 4: Mediating and Moderating Processes

Higgins and Kram (2001) proposed mediators and moderators in the developmental network formation process. The two mediators are “developmental help-seeking behavior” and “constraints and opportunities for cultivating developmental networks,” which are driven by individual-level antecedents and work-environment antecedents. Four developer and protégé factors moderate the links between these mediators and developmental network structure: developmental orientation, emotional competence, interaction style, and positional relationship (Higgins & Kram, 2001: 274). Few scholars have investigated these or other process-oriented variables as they relate to developmental networks. Existing research in this area primarily focuses on variables that mediate the relationship between antecedents (e.g., individual influences such as age or gender) and developmental network structure or content (see the left portion of Figure 1). In contrast, mediators between developmental network structure or content

and outcomes have received limited attention from researchers (see Higgins, 2001 for an exception). We first discuss the role of three mediators identified in the literature—developmental initiation, opportunities and constraints, and protégé-organization and protégé-developer fit—and conclude with a comment on moderators.

The notion of “developmental initiation” elaborates on aspects of networking behaviors described in the dyadic mentoring literature (Blickle, Witzki & Schneider, 2009a) as well as the developmental help-seeking behavior mediator proposed by Higgins and Kram (2001).⁶ Defined as “a set of development-seeking behaviors (i.e., information-seeking, help-seeking, feedback-seeking) undertaken by a protégé that are intended to enhance his or her skills, knowledge, task performance, and/or personal learning” (Higgins et al., 2007: 349), developmental initiation is distinct from networking behaviors in general. It involves individuals seeking career-enhancing relationships that are beneficial to them and to their developers rather than seeking purely instrumental career help. However, this instrumental career help might be included in the overall support received (Murphy, Forthcoming). Individuals who engage in a high level of developmental initiation are more likely to create and capitalize on situations in which they have the potential to form developmental relationships.

The second mediator Higgins and Kram (2001) proposed, constraints and opportunities for cultivating developmental networks, stems from research on constraints and opportunities in the formation of work relationships in general. Specifically, the opportunities and constraints for forming relationships in work organizations are tied to the availability and accessibility of similar others in the organization (i.e., similar demographics, attitudes, values, or goals) (Ibarra, 1992, 1993). For instance, the opportunities and constraints expatriates face might affect the structure of their developmental networks, such as requiring developmental networks that can

provide a particularly high amount of psychosocial support (Shen, 2010). Thus constraints and opportunities in the form of similar others or expatriate status might act as mediators of the relationship between both individual influences and work characteristics with developmental network characteristics.

Protégé-organization fit may also mediate between antecedents and developmental network structure and content. In a qualitative study of the professional identity development of doctoral students, students' fit with the organization—in terms of having congruent or incongruent goals regarding their future careers in academia—influenced the structure of their developmental networks (Sweitzer, 2009). Students who agreed with the goals of their doctoral program cultivated relatively low-range developmental networks comprised of faculty and peer developers within the program. In contrast, students with incongruent goals or who were questioning the program's goals cultivated relatively high-range developmental networks comprised of not only faculty within the program, but also family, friends, and prior business associates not affiliated with the program (Sweitzer, 2009). Thus, the greater the degree of protégé-organization fit, the less diverse one's developmental network in terms of range.

Within developmental networks, protégé-developer similarities and differences may mediate between individual antecedents and developmental network structure and content. Work characteristics and task requirements may influence the extent to which these similarities and differences are beneficial (Blake-Beard, O'Neill & McGowan, 2007). Classic paradigms of similarity attraction (Byrne, 1971) and homophily (McPherson, Smith-Lovin & Cook, 2001) suggest that the more similar protégés and developers are to one another, the more they will be attracted to each other. Indeed, in dyadic mentoring research, actual similarity (e.g., same race or gender) and perceived similarity positively affect relationship quality and satisfaction (Allen &

Eby, 2003; Ensher & Murphy, 1997). Furthermore, the negative effects of differences, such as those found when a mentor and protégé are different genders, dissipate over time in a formal mentoring program context (Weinberg & Lankau, Forthcoming). In developmental networks, similarities and complementarities between protégés and their developers are important for eliciting a high amount of career and psychosocial support (Shen, 2010). However, differences may also present possibilities for learning, growth, and mutuality for both parties (Blake-Beard et al., 2007; Fletcher & Ragins, 2007).

Higgins and Kram (2001) modeled individual characteristics of the protégé and developers as moderators of the relationships between developmental help-seeking behavior and opportunities and constraints with developmental network structure. To our knowledge, empirical studies have not yet tested these moderators. Van Emmerik (2004) proposed and tested a moderator in a different portion of the model: between the structure of developmental networks and outcomes. Among university faculty, gender moderated the relationship between developmental network strength (specifically, emotional intensity) and career satisfaction, such that this relationship is stronger for women (van Emmerik, 2004). Likewise, the relationship between the number of years protégés and developers have been acquainted and intrinsic job satisfaction is stronger for women (van Emmerik, 2004).

Applying a mutuality perspective to Stream 4 would involve incorporating developer perspectives as mediators, such as considering the developmental initiation process from the perspectives of both protégés and developers or considering developer-organization fit in addition to protégé-organization fit. In terms of moderators, a mutuality perspective would include developer characteristics, such as gender, race, and ethnicity, in addition to protégé characteristics.

AN AGENDA FOR DEVELOPMENTAL NETWORK RESEARCH

In this section, we propose an agenda for future research. We first focus on the conceptualization and measurement of developmental networks. Then we describe new avenues that stem directly from the four streams defined in our review. We conclude by discussing how a mutuality approach has the potential to extend developmental network research.

Future Research: Conceptualization and Measurement

Our review of the extant literature on developmental networks suggests a general consensus about the construct's definition, yet variability about particular dimensions of developmental networks and how they are measured is also present. Although nearly all published conceptual and empirical papers utilized Higgins and Kram's (2001) definition—a group of people who take an active interest in and action toward advancing the protégé's career—a recent qualitative study asserted researchers should also include distant, unmet, or imaginary figures (Cotton et al., 2011; see also Gibson, 2003; Gibson, 2004). Put another way, in Higgins and Kram's (2001) conceptualization, developers actively work to further the protégé's career, whereas in Cotton et al.'s (2011) view, developers can be virtual and, indeed, do not even need to know the protégé.

Variability in research methods reflect these conceptual differences, particularly as it relates to identifying the members of a protégé's developmental network. Mirroring the view of developers as being actively engaged with the protégé, research based on Higgins and Kram's (2001) conceptualization uses a name generator—usually on a survey—that asks protégés to name people who take “an active interest in and action to advance your career” and who “may be people with whom [...the protégé...] work[s] or has worked, friends or family members”(Higgins et al., 2008). This process usually elicits four to five people (Higgins, 2001).

In contrast, Cotton and colleagues' (2010; 2011) method of identifying developmental network members did not involve direct contact with either the protégé or the developers. Instead, the researchers identified developers by categorizing baseball Hall of Famers' induction speeches on the basis of 10 career communities, including ideological, project, occupational, and alumni groups (Parker, Arthur & Inkson, 2004).

Given these distinctions, we encourage developmental network researchers to be mindful of aligning their conceptualizations with their measurements. We believe a full construct validity analysis that refines methods of identifying developmental network members, measures of network structure, and scales used to measure developmental support would benefit the developmental network literature. In particular, we proposed four core attributes of developmental networks researchers should incorporate into future methods of identifying developmental network members. A mutuality approach suggests measures and methodologies must take into account the protégé's as well as the developers' perspectives. For instance, future studies can collect data from both types of network members, rather than rely on information from only one of these sources or from external observation. As such, the notion of unmet or imaginary developers (Cotton, 2010; Cotton et al., 2011) is not consistent with our call for the incorporation of the mutuality perspective, as these types of developers do not fit either our conceptualization of developmental networks or its associated measurement involving data collection from all involved parties.

Future Research: Stream 1

Protégé influences. In this category of antecedents, we highlight two key areas for future research that conceptual work has suggested but not yet tested quantitatively. First, quantitative tests of the relationship between such individual characteristics as personality, demographics,

relational expectations, perceived needs for development, and relational savvy would solidify our understanding of the antecedents that shape developmental networks. As the study of individual characteristics has contributed significantly to the dyadic mentoring literature (see Chandler et al., Forthcoming; and Haggard et al., 2011 for reviews), we expect it would also strengthen the developmental network literature. We encourage scholars to consider the ways in which these individual characteristics might behave similarly and differently in the context of multiple, networked developmental relationships, rather than in a single dyad. Moreover, a mutuality approach suggests that understanding the protégé perspective is not sufficient. We suggest that future research also consider developers' individual characteristics and how these relate to developmental network structure and content.

Second, conceptual work on developmental networks advocates for examining developmental position and/or career stage as an antecedent of developmental network structure and content (e.g., Chandler & Kram, 2005; Ghosh et al., 2010; Shen, 2010). Broadly speaking, adult development theory suggests the type or amount of developmental support individuals need may vary across different career stages (Levinson, Darrow, Klein, Levinson & McKee, 1978). More specifically, the two main characteristics of developmental networks—diversity and strength—vary over time (Dobrow & Higgins, 2011). Yet the origins and implications of this variation are unknown. Research on mini-learning cycles suggests people's networks will vary according to their location in the learning cycle regardless of age or stage (Hall & Chandler, 2007). In contrast, age or stage theories suggest that as people get older or more senior in their careers, their developmental needs change (e.g., Kegan, 1982; Levinson et al., 1978). Thus future research could test these competing theories to identify whether developmental network characteristics change according to one's learning needs or according to one's age (Levinson et

al., 1978), career stage (Hall, 2002), or developmental position (Kegan, 1994). Further, using a mutuality lens, future research should consider developers' age, stage, and /or developmental position as well.

Contextual influences. As extant research on developmental networks has paid little attention to contextual influences, we view this area as ripe for future research. First, we encourage scholars to focus on the organizational contexts that surround developmental networks. Scholars often mention the role organizational context plays in fostering developmental relationships (e.g., Dutton, 2003; Dutton & Heaphy, 2003). However, as empirical work in this area has typically not focused on comparing organizational contexts, we know little about which organizational characteristics facilitate or hinder the initiation, effectiveness, or longevity of developmental relationships. In addition to looking at organizational contexts, future research can explore how occupational and professional contexts shape the developmental networks that exist within them. To date, the majority of studies that have considered the embeddedness of multiple mentors (de Janasz & Sullivan, 2004; Kirchmeyer, 2005) or developmental networks within a specific professional context are in academia (Baker & Lattuca, 2010). Extending this approach into other occupational or professional areas would contribute to our understanding of the antecedents of developmental networks. Likewise, as informal relationships are more likely than formal relationships to evolve into developmental relationships and may be more effective in general (Shen & Kram, 2011), future research can delve further into elucidating the conditions under which informal versus formal relationships provide benefits to protégés and developers in developmental networks. Building on research that considers whether developers came from inside or outside the protégé's organization (Higgins & Thomas, 2001; Kirchmeyer, 2005), the mutuality approach

supports considering the organizational contexts that surround developers as well as protégés and how these contexts shape developmental network structure, content, and outcomes.

Next, research can consider the flexible and new types of developmental network relationships that may arise as the modern work context evolves. For instance, as technological advances allow relationships to form and be maintained through electronic media rather than face-to-face contact (Hamilton & Scandura, 2003), future research can explore the extent to which physical proximity (or lack thereof) shapes developmental networks. Physical proximity encourages interaction, which can enable deeper relationships (Monge & Eisenberg, 1987). Further, ties formed and maintained in proximate settings may be stronger and more stable than those formed in more distal settings, thus suggesting scholars explore the implications of these different contextual factors for protégés' careers. Using a mutuality lens, future research can consider how these new contexts shape developers' engagement in developmental networks, including their willingness to participate in and their commitment to the relationship over time.

Lastly, we advocate that future research on developmental networks account for national context. The one developmental network study of which we are aware that considered cross-cultural factors found differences in developmental network structure for expatriates based in two countries, China and Singapore (Shen, 2010). We thus recommend that research on developmental networks expand to non-U.S. contexts and consider cross-national or cross-cultural distinctions. Moreover, to incorporate a mutuality perspective, future research should consider the nationality of both protégés and developers.

Future Research: Stream 2

Our review of the consequences of developmental network structure in Stream 2 suggests future research in this area can grow in two primary ways. First, structural differentiation within

developmental networks can impact outcomes (Cummings & Higgins, 2005; Higgins et al., 2008). We thus encourage future studies that continue to refine the assessment of network diversity and strength. For instance, researchers need a better understanding of the different types of diversity that can exist in developmental networks, such as demographic diversity (e.g., gender and cross-cultural) and intra- versus extra-organizational diversity. The mutuality approach suggests several directions for future research in Stream 2. Individuals' well-documented tendency for homophily may lead them to cultivate networks of developers who are similar to them, and therefore to each other, on particular dimensions (see McPherson et al., 2001 for a review). Future research can explore which dimensions are more and less salient or beneficial to protégés, such as demographic similarity, educational similarity, or deep-level similarity (e.g., similarity of work styles or personal values). As dyadic properties such as perceived similarity between protégés and each developer in their networks are important predictors of the actual support that protégés receive from developers (Shen, 2010), we advocate that researchers attend to properties of both the overall developmental network and the dyads that comprise them. Regarding the strength of ties within developmental networks, we know little about the relationship between symmetry, an important network characteristic considered in the social networks literature, and protégé outcomes (Wasserman & Faust, 1994). For example, are developmental networks characterized by stronger reciprocity associated with more positive outcomes for protégés and/or developers than are developmental networks characterized by weaker reciprocity?

Second, future research can extend the range of consequences of developmental network structure. Most prior research focuses on subjective career outcomes (e.g., professional identity clarity in Dobrow & Higgins, 2005; career and life satisfaction in Murphy & Kram, 2010). We

encourage a continued focus on subjective career outcomes and the addition of more objective outcomes, such as job performance, salary, and promotions, to this literature (Heslin, 2005).

Additionally, scholars have begun to consider the relationship between developmental networks and leadership (e.g., Ghosh et al., 2010) as well as personal learning (Lankau & Scandura, 2007).

To build on this perspective, future research can explore the relationship between developmental network structures and how others perceive the protégé's leadership and personal effectiveness.

Further, the mutuality approach suggests an examination of the relationship between developmental network structures and parallel developer outcomes would be productive.

Future Research: Stream 3

Our review of Stream 3, the consequences of developmental network content, suggests three areas prime for future research. First, recent research adds nuance to our understanding of developmental support through its exploration of the sub-functions of the two traditional types of support, career and psychosocial, as well as its expansion to consider a third type of support, role modeling, along with its sub-functions. As the range of developmental support explored in research grows, we encourage scholars to identify boundary conditions of these new definitions (e.g., in which contexts they are relevant) and work toward a unified definition that ties together the different types of support. Through the lens of mutuality, future research should include developers' perceptions of the amount and type of support they provide to the protégé, as well as how they benefit from offering these types of support. As scholars begin to include developers' perspectives, they may discover additional developmental functions that previous research conducted solely from the protégé's perspective had not identified. Further, research on the proposed new developmental support sub-functions has been conceptual or qualitative. We thus

encourage scholars to refine and extend existing measures of developmental support to quantitatively test these new types of support in relation to one another and to career outcomes.

Second, future research can explore the relationships between different types of developmental support and a broader range of career outcomes than in existing research. For instance, high-quality relationships lead to outcomes such as self-awareness, self-esteem, new skills, zest, a desire for more connection, and well-being (Dutton & Heaphy, 2003; Fletcher & Ragins, 2007). Future research can test the applicability of these findings to the relationships that comprise developmental networks.

Although research on developmental networks has most often focused on the positive affect strong ties provide or the supportive exchanges resulting from career and psychosocial support, scholars recognize that developmental relationships can also be negative or dysfunctional (Eby, Durley, Evans & Ragins, 2008; Eby & McManus, 2004; Ragins & Verbos, 2007). Counterintuitively, negative relationships can yield positive outcomes. For instance, by illustrating damaging or inappropriate behavior, negative role models in dyadic mentoring relationships can help individuals determine how they would like to behave (Murphy & Kram, 2010). Alternatively, seemingly positive relationships (i.e., those that provide a high amount of support) can result in negative consequences. For MBA alumni, continuing to receive developmental support from one's graduate school peers during the years after graduation was related to lower perceptions of career success (Higgins et al., 2008). We thus encourage future research that explores a wider range of both positive and negative outcomes, as well as how these relate to a broad range of types of developmental support. The mutuality approach suggests this wider range should incorporate positive and negative outcomes for developers as well.

Lastly, we suggest methodological advances for Stream 3. Consistent with our recommendation that Stream 1 research consider organizational, occupational, and professional contexts, here we propose that future studies carefully consider the match between the context in which the study is conducted and the variables the study includes. Given the relatively early state of developmental network research, scholars can focus on “extreme” samples in which they are likely to find and easily observe the phenomenon of interest (Eisenhardt, 1989). For example, studies examining the effects of developmental network support on promotability should utilize professional contexts with clear advancement paths (e.g., accounting or law). Additionally, several empirical studies of developmental networks have used longitudinal methods (Cummings & Higgins, 2005; Dobrow & Higgins, 2005, 2011; Higgins et al., 2008; Higgins et al., 2010). As a result, previous research has explored questions about how networks change, the effects of this change, and the connections between early-career developmental networks and later outcomes. As these types of questions are fundamental to understanding developmental networks’ impact over the course of people’s careers, we advocate that more studies attempt the challenging but important endeavor of using a longitudinal approach. To incorporate a mutuality perspective, future research can build on Cummings and Higgins’ (2005) inner-outer core findings to explore the support specific developers provide over time, how this support changes over time, and associated outcomes for both protégés and developers.

Future Research: Stream 4

Higgins and Kram (2001) included mediators and moderators in their conceptual model of the developmental network formation process, yet few subsequent studies have investigated these factors. Moreover, although these proposed mediators and moderators pertained to the relationship between antecedents and developmental network structure (i.e., the left side of

Figure 1), we suggest scholars also explore mediators and moderators associated with the relationship between developmental network structure and outcomes (i.e., the right side of Figure 1). Research in this area would shed light on the processes by which developmental structure and/or content actually shape outcomes for protégés (Langley, 1999). In particular, qualitative studies may suggest some of the mechanisms worth exploring and set the stage for testing in subsequent quantitative studies. Given the interesting ideas conceptual research in this area proposes, we see this area as ripe for investigation. For instance, we encourage studies that explore mediation and moderation between developmental network structure and support and a wider range of temporal outcomes (i.e., short- and long-term outcomes). Further, applying a mutuality approach to questions about mediators and moderators implies researchers must include developer antecedents and consequences in future studies.

Future Research: Extending the Agenda

Incorporating a mutuality perspective into developmental networks research both builds on and extends the areas the four streams of developmental network research considers. In Table 2, we specify research questions that emerge from incorporating the mutuality perspective into developmental network research. These proposed research questions can motivate new research and ultimately extend theory on developmental networks. Here we describe these new directions from three angles: (1) the protégé's perspective, (2) the developers' perspectives, and (3) the connection between the two.

[Insert Table 2 About Here]

A mutuality perspective expands our understanding of protégés in several ways. Actively considering developers' involvement in their developmental network, such as taking into account how this relationship may benefit the developer, can give protégés a deeper understanding of

why their developers take an active interest in their careers—that is, why they choose to serve as developers (Higgins & Kram, 2001). If protégés improve their sense of what developers can gain, they may become more skilled at enlisting new people into their developmental network (Higgins et al., 2007). Moreover, having more empathy for potential developers may enable them to more effectively initiate and build these high-quality connections. Hence, protégé characteristics included in Stream 1 may be related to outcomes for the developers, not just for the protégés, as previous research has suggested. As researchers take into account developers' needs and outcomes, they may discover additional protégé antecedents.

Although research shows that mentors benefit from dyadic mentoring relationships (see Allen, 2007; Lentz & Allen, 2009 for reviews), how well these findings extrapolate to developmental networks is an open question. Scholars are in the dark regarding a critical characteristic of high-quality connections (Dutton, 2003; Dutton & Heaphy, 2003; Fletcher & Ragins, 2007), what individual developers derive from their involvement in one or more developmental networks, as research has not explored this area. Based on their individual characteristics (Stream 1), their positions in the network structure (Stream 2), or the nature of the help they provide (Stream 3), different developers might experience different outcomes related to their involvement in the same developmental network. Thus future research can address whether variation in these outcomes is present among developers in a given network and whether this possible variation leads to different outcomes for each party in this network.

We anticipate that developers experience important outcomes as a result of being part of a developmental network, including the opportunity to connect with other developers in the network. Over time, as members of the network increasingly know and/or connect to one another, the network will become increasingly dense (Brass, 1995; Burt & Minor, 1983; Higgins

& Kram, 2001; Krackhardt, 1994). Although increased density may benefit developers (as described in Stream 2), it may be less advantageous to protégés over time, as it reflects decreased access to diverse information and resources (Dobrow & Higgins, 2005).

Since developmental network surveys typically ask protégés to identify their developers (e.g., Cummings & Higgins, 2005; Dobrow & Higgins, 2005; Higgins et al., 2010), rather than the reverse, some developers likely do not know they are viewed as developers (e.g., "virtual" or "vicarious" developers in Cotton et al., 2011). We propose that developers benefit from knowing they are in the developmental network. As such, they may be able to see more opportunities for their own development, thus highlighting the importance of mutuality in developmental networks (Dutton & Heaphy, 2003). Research on dyadic mentoring relationships suggests several positive reasons for why people engage as mentors, such as prosocial motivation, intrinsic motivation, or self-enhancement (see Haggard et al., 2011 for a review). Future research can explore how the presence of developers who are and are not aware of this role yields differential outcomes for the developers themselves, for other developers in the same network, and for protégés.

Another area for exploration is the effect(s) for developers of not only participating as a developer in one or more developmental networks but also of being the protégé of their own developmental network. Building on this idea, research on developmental networks could extend in a macro direction to consider the relationships among developmental networks—that is, networks of developmental networks. This macro-network approach lends itself to the investigation of structural properties, such as developers' centrality in this broader network and developers' roles as brokers (i.e., bridging structural holes) (Burt, 1992). Finally, research should explore the possibility that developers have multiple protégés and that these protégés may be interconnected. In light of the benefits of being a mentor in dyadic mentoring relationships

(Allen, 2007), particular network configurations of protégés are likely advantageous to developers. For example, a diverse network of protégés may provide more benefits than a diverse developmental network of one's own.

We are not aware of published studies that explore the degree to which protégés and developers agree or disagree about aspects of their involvement in the developmental network, such as the nature or amount of help provided reviewed in Stream 3. Preliminary research has begun to explore the match between protégés and their developers along such dimensions as demographics, whether the protégé's needs are met by their developmental network (Shen, 2010), and developmental stage (Ghosh et al., 2010). Although these studies extend previous developmental network research by taking a more nuanced view of the developers and their connection to the protégés, researchers have not yet included the perspective of the developers themselves or considered the outcomes of their involvement in developmental networks.

In general, accurate self-perceptions are linked with numerous positive career outcomes, including effective job-relevant decisions, appropriate aspirational levels, low turnover, high commitment, and positive job attitudes (Yammarino & Atwater, 1997). The dyadic mentoring literature has shown that protégé-mentor agreement (e.g., overestimation, underestimation, in agreement) about a mentor's transformational leadership behavior is related to the amount of career and psychosocial support received, career satisfaction, protégés' aspirations, and perceived mentoring effectiveness (Godshalk & Sosik, 2000; Sosik & Godshalk, 2004). From a cognitive perspective, "members of [mentoring] relationship[s] may hold congruent or incongruent mentoring schemas, which may influence their expectations, behaviors, and evaluations of the relationship" (Fletcher & Ragins, 2007: 393). For instance, mentoring scholars

have called for studies of the match or mismatch in protégé and mentor motivations for participating in mentoring relationships (Haggard et al., 2011).

Applying these ideas to developmental networks, future research can build on the research reviewed in Stream 2 to explore whether protégés and developers differ in their assessments of the strength of the relationships in the developmental network and whether these possible differences result in different outcomes for network members. In addition, an exploration of the antecedents and consequences of multiplexity from both protégé and developer perspectives, including comparisons of the support provided and received, would advance the field. We acknowledge that adopting a mutuality perspective presents methodological challenges, in that it requires data collection from protégés and their developers. Having both parties' perspectives would make assessing the impact of alignment and misalignment of expectations on protégé and developer outcomes possible. Preliminary evidence suggests collecting these type of data is, indeed, possible (Dobrow & Chandler, 2009). Future studies in this area will likely add valuable insights to the developmental network literature.

CONCLUSION

Our review of the 10 years of research that followed Higgins and Kram's (2001) reconceptualization of mentoring as a developmental network has produced several key insights, including clarifying the boundaries of the developmental network construct, categorizing extant developmental network research into four streams, and identifying new avenues for future research. Of primary importance, we highlighted the need for developmental network research to take the viewpoints of all members of the developmental network into account—that is, to adopt a mutuality perspective. By taking developers' needs, perceptions, and outcomes into account, our understanding of the complexities of developmental networks will deepen. At a minimum,

we will expand the range of possible outcomes of different network structures and content, and consider developers' characteristics among possible antecedents of interest. Perhaps most significantly, however, the stage will be set to investigate how participation in one or more developmental networks influences a wider range of protégé, developer, and organizational outcomes. Hopefully, the ideas discussed in this review inspire scholars to broaden and deepen the future study—and the potential—of developmental networks.

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FOOTNOTES

¹ Developmental networks are considered “egocentric” because the focal individual or ego, instead of the researcher, identifies the developers (Higgins & Kram, 2001). They are considered “content-based” because the relationships that comprise them are based on the type—or content—of support provided (e.g., friendship, advice) as opposed to being based on structural relationships (e.g., supervisor-subordinate) (Podolny & Baron, 1997).

² This attribute is consistent with most developmental network research, but not with studies that consider unmet or imaginary developers as being part of the network. We reconcile this distinction later in the paper.

³ We started our search in the ABI-Inform and Science Direct databases, and in Google Scholar. We also conducted a reverse search on Web of Science for papers that cited Higgins and Kram’s (2001) foundational article. We then examined each study’s references, key concepts, and methods and selected those that were consistent with our intended focus on developmental networks. We included published or forthcoming conceptual and empirical studies from peer-reviewed journals, academic books, and academic conferences (i.e., we did not include working papers). This process resulted in a final set of studies for review.

⁴ The six stages in order of least to most sophisticated are (1) incorporative, (2) impulsive, (3) imperial, (4) interpersonal, (5) institutional, and (6) inter-individual.

⁵ Similarly, in the context of intra-organizational networks, “expressive support” (akin to psychosocial support) is related to subjective career success (Bozionelos, 2006) and affective commitment (feelings of belongingness) (Bozionelos, 2008). “Instrumental support” (akin to career support) is positively related to salary and negatively related to continuance commitment (staying because of necessity or lack of available alternatives) (Bozionelos, 2008).

⁶ Research on the initiation of dyadic, hierarchical mentoring relationships (Blickle et al., 2009a; Blickle, Witzki & Schneider, 2009b; Turban & Dougherty, 1994) provides insights into how developmental initiation may serve as a mediator between antecedents and developmental network structure and content. This research suggests individuals can proactively create supportive workplace relationships. “Networking behaviors”—those behaviors aimed at “increasing the number and quality of social contacts at [one’s] work place” (Blickle et al., 2009a: 95)—mediate the relationship between self-initiated mentoring and mentoring support as well as the relationship between mentoring support and objective career success (Blickle et al., 2009a; Blickle et al., 2009b).

TABLE 1
Developmental Network Research Streams: Extant Studies

Study	Type and Sample	Key Idea (Conceptual) or Variables (Empirical)	Findings/Contributions
<i>Stream 1: Antecedents of Developmental Networks</i>			
Chandler, Hall & Kram (2010)	Conceptual	Key idea: Relative relational savvy predicts size and diversity of network	Relationally savvy protégés tend to have large, fairly diverse networks.
Shen (2010)	Qualitative 64 in-depth interviews with expatriates in Singapore and China	Key variables: Individual, contextual, dyadic, and competency antecedents; type of support needed by an expatriate; person-network fit	Whether developmental networks yielded positive protégé outcomes depended on the fit between their developmental support needs and what they actually received from their developers.
Cotton (2010)	Quantitative and Qualitative 77 Hall of Famers induction speeches, cross industry sample of 425 respondents	Key variables: Relational expectation models, types of developers, and types of support expected	Four types of relational models (e.g., transactional, communal) were associated with particular types of developers and the expected support they provided.
Ghosh, Hayes, & Kram (2010)	Conceptual	Key idea: Developmental stages	Integration of adult learning theory, constructive-developmental theory, and mentoring. Asserted that effective networks for individuals at various stages aid in learning, leadership development, and movement to higher stages of development.
Dougherty, Cheung, & Florea (2008)	Conceptual	Key idea: Big 5 personality characteristics predict network type	Protégés' five personality traits (e.g., openness to experience and introversion/extroversion) predicted their types of networks.

Higgins (2007)	Conceptual	Key idea: Perceived needs for development, organizational and industry context, network type	Used a needs-based approach to developmental networks. Individuals' appropriate network type was contingent upon their developmental needs.
Chandler & Kram (2005)	Conceptual	Key idea: Protégés' developmental stage predicts network type	Applied an adult development perspective to networks; posited that adult development stage predicts individuals' network type.
Burke, Bristor, & Rothstein (1996) ^a	Quantitative Cross-sectional study of 55 male and 57 female professionals	Key variables: Gender, career support, psychosocial support, organizational commitment, integration at work, optimism for future career prospects, aspirations	Women who attached higher value to relationships received more developmental support. Men receiving greater psychosocial support from outside developers had higher organizational commitment, whereas men with greater psychosocial support from inside developers felt more integrated into their organization. Women receiving more support from inside and outside developers had more optimistic future career prospects and aspirations.
<i>Stream 2: Consequences of Developmental Network Structure^b</i>			
Singh, Ragins, & Tharenou (2009)	Quantitative 3-year longitudinal study of 236 workers	Key variables: Human capital, developmental network capital, mentor capital, salary, promotion, advancement expectations, career satisfaction, turnover intentions	Support from a traditional mentor (mentor capital) added value above and beyond support from other developers (developmental network capital) and human capital; positively associated with salary, promotion, advancement expectations, career satisfaction, and negatively associated with turnover intentions.
Kirchmeyer (2005)	Quantitative and Qualitative Study of 143 academics early to mid-career	Key variables: Mentors, other developers, outside developers (professional colleagues in other organizations), promotions, salary, performance, emotionally close developers	In early career, mentors and other developers were both positively associated with promotion and salary. In mid-career, the presence of outside developers was associated with performance, which was then associated with promotion. Additionally, having an emotionally close developer was positively associated with salary.

van Emmerik (2004) ^c	Quantitative Cross-sectional study of university members (416 female; 594 male)	Key variables: Mentoring constellations, career satisfaction, intrinsic job satisfaction, range, size, tie strength, gender	After controlling for having a mentor, network characteristics (i.e., size, emotional intensity, years acquainted) were associated with career satisfaction, while size and frequency of contact were associated with intrinsic job satisfaction. Gender moderated the relationship between mentoring constellations and career success.
<i>Stream 3: Consequences of Developmental Network Content^b</i>			
Baker & Lattuca (2010)	Conceptual	Key ideas: Interdisciplinary approach necessary to understand professional identity development	Combined developmental networks and sociocultural views of learning to explain the interaction of academic learning and identity development in doctoral students.
Higgins, Dobrow, & Roloff (2010)	Quantitative 10-year longitudinal study of 136 MBA graduates	Key variables: career and psychosocial support (from all current developers, from early career developers, rate of change), optimism	The amount of psychosocial, but not career, support was positively associated with optimism. The greater one's early-career support (both types), the greater one's optimism 10 years later. Increasing both types of support over time was associated with greater optimism later in career.
<i>Streams 2 & 3: Consequences of Developmental Network Structure and Content</i>			
Cotton, Shen, & Livne-Tarandach (2011)	Qualitative 62 Hall of Famers' induction speeches	Key variables: Developmental network size, diversity, multiplexity, variety of types/sources of career support and psychosocial support, extraordinary career achievement	First ballot inductees had larger, more diverse developmental networks featuring greater multiplexity, more single-function ties, and greater psychosocial and complementary career support from a wider range of core and periphery communities. Identified two new developmental support sub-functions.
Murphy & Kram (2010)	Quantitative and Qualitative Cross-sectional study of 245 working professionals	Key variables: Work and non-work developers, salary level, career satisfaction, life satisfaction, career and psychosocial support, role-modeling	Support from work developers was positively related to salary level and career satisfaction. Support from non-work developers was positively related to career satisfaction and life satisfaction. Participants received more support overall from non-work developers; discussed both positive and negative role-modeling sub-functions.

Higgins, Dobrow, & Chandler (2008)	Quantitative 10-year, 4-wave longitudinal study of 136 MBA graduates	Key variables: Career support from all developers, career support from graduate school developers, career support from peer developers, career-related self-efficacy, perceptions of career success	Career support received from one's developmental network was positively associated with career-related self-efficacy and perceptions of career success. However, continuing to receive support from developers from graduate school was negatively related to perceptions of career success.
Dobrow & Higgins (2005)	Quantitative 5-year, 3-wave longitudinal study of 136 MBA graduates	Key variables: Network density (early-career, general, and density dynamics), clarity of professional identity	Density, which reflects the professional identity exploration process, was negatively related to clarity of professional identity.
Cummings & Higgins (2005)	Quantitative 5-year, 3-wave longitudinal study of 77 MBA graduates (977 ties)	Key variables: Characteristics of ties: inner vs. outer, type of support (psychosocial, career), strength (length of ties, emotional closeness, communication frequency), workplace affiliation, hierarchical status, relational stability	Developmental networks have an inner-outer core network structure. Ties providing high psychosocial support and low career support populate the inner core. Strong ties tended to be more stable. Stable relationships included more family than work ties as well as more peers than supervisors.
Higgins (2001)	Quantitative Cross-sectional study of 136 graduating MBA students	Key variables: Range, density, diversity, career change, career alternatives	The greater the diversity of instrumental relations, the greater the number of job offers, which was positively related to the likelihood of changing careers. The greater the diversity of psychosocial relations, the greater one's confidence to overcome career obstacles.

Higgins & Thomas (2001)	Quantitative Cross-sectional and longitudinal study of 130 lawyers	Key variables: Primary developer, constellation of developers, career and psychosocial support, developer(s)' hierarchical status, intra-organizational developer(s)	Support from primary developer was associated with work satisfaction and intention to remain. Constellation of developers was associated with retention and promotion. Constellation perspective explained more variance than primary developer perspective.
Higgins (2000)	Quantitative Cross-sectional study of 138 lawyers	Key variables: Developmental network size, work satisfaction, career and psychosocial support	The more developers and the more support received, the greater one's work satisfaction. Receiving a high amount of psychosocial support from just one developer was associated with work satisfaction.
<i>Stream 4: Mediating and Moderating Factors</i>			
Sweitzer (2009)	Qualitative 1-year, 3-wave longitudinal study of 12 doctoral students, their 22 developers, and 15 administrators	Key variables: Perceiving and assessing fit, goal congruence, developmental network structure	Person-organization fit was based on the congruence between the goals of individual doctoral students and their program. Students perceiving fit (higher goal congruence) had networks composed of intra-organizational developers. Students assessing fit (lower goal congruence) had networks with intra- and extra-organizational developers.
Higgins, Chandler, & Kram (2007) ^d	Conceptual	Key ideas: Developmental initiation as mediator between individual differences (age, socioeconomic status, gender, expatriate status) and developmental relationships	Suggested that developmental initiation (i.e., information-seeking, help-seeking, feedback-seeking) is "likely to lead to situations in which developmental relationships begin."

Notes.

Higgins and Kram's (2001) article is not listed in the table as it provides a framework that contributes to all four streams.

^aStudy is also relevant to Streams 2 and 3.

^bStudies that are approximately equally relevant to both Streams 2 and 3 are included in a combined section below.

^cStudy is also relevant to Stream 4.

^dStudy is also relevant to Stream 1.

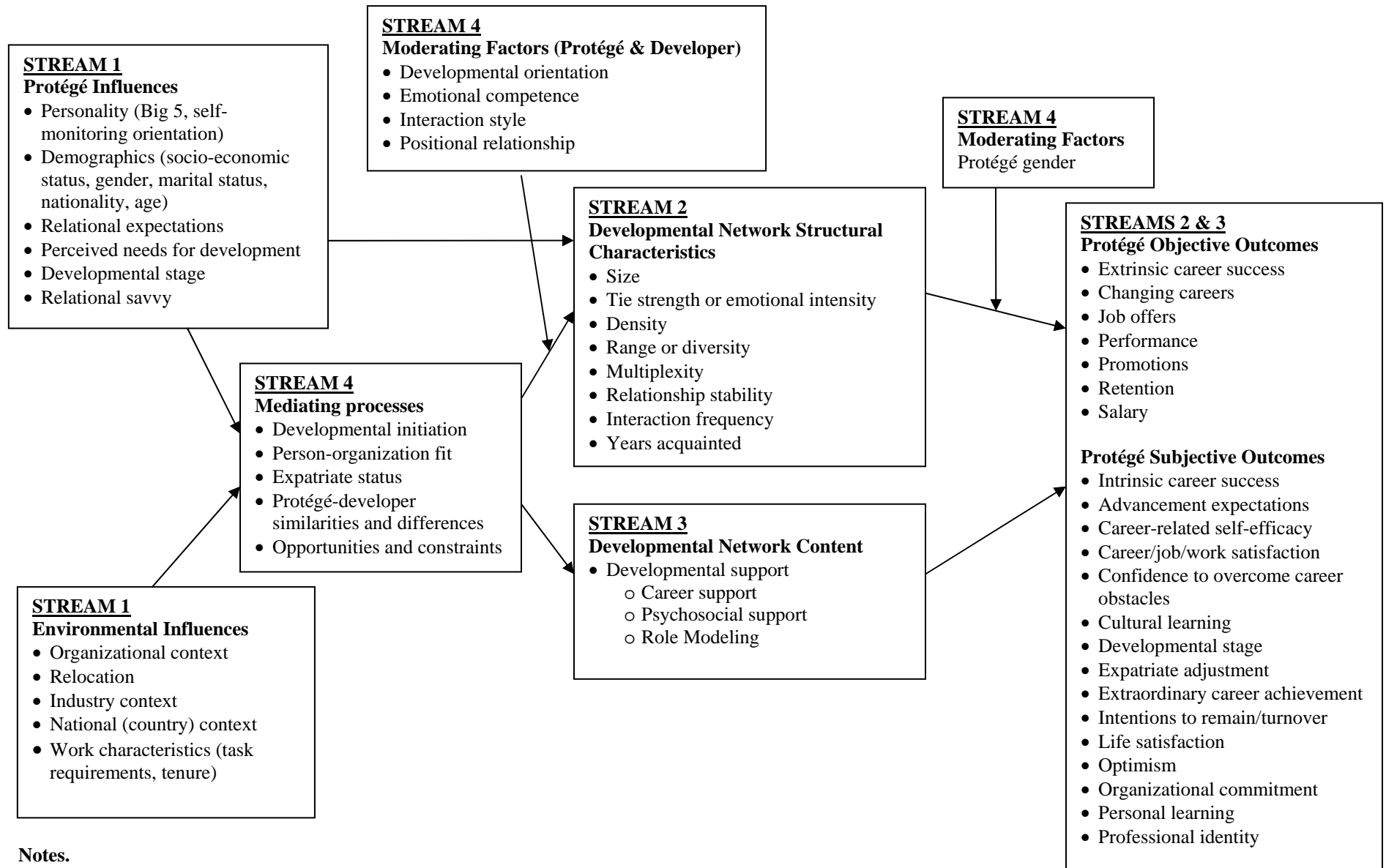
TABLE 2
Agenda for Future Research on Developmental Networks

	Research Questions
<i>Stream 1: Antecedents of Developmental Networks</i>	<p>Individual Influences</p> <ul style="list-style-type: none"> • What role do protégés’ and developers’ demographic characteristics (e.g., gender, nationality, and ethnicity), temporal characteristics (e.g., age, developmental position, and career stage), or psychological characteristics (e.g., personality, relational expectations, perceived needs for development, relational savvy) play in determining network structure and content? <p>Contextual Influences</p> <ul style="list-style-type: none"> • Which organizational characteristics (e.g., extent to which mentoring is rewarded, collaborative versus competitive culture, degree of physical proximity) facilitate or hinder protégés’ and/or developers’ engagement in developmental networks over time (e.g., initiation, effectiveness, or longevity of developmental relationships)? • To what extent do occupational and professional contexts shape the developmental networks that exist within them? • Under what conditions do informal versus formal relationships affect developmental network content and structure as well as outcomes for protégés and developers? • To what extent does national context shape developmental network content and structure?
<i>Stream 2: Consequences of Developmental Network Structure</i>	<p>Structural Characteristics</p> <ul style="list-style-type: none"> • How do different types of structural diversity (e.g., gender, cultural, educational, deep- and surface-level) affect protégé and developer outcomes? • What is the relationship between the degree of reciprocity characterizing the dyads in a developmental network and outcomes for protégés and developers? • What can we learn from examining the relationships among developmental networks—that is, networks of developmental networks (e.g., developer centrality in this broader network, developers’ roles as brokers, benefits to developers of having a diverse network of protégés versus having a diverse developmental network of their own)? <p>Extending Outcomes</p> <ul style="list-style-type: none"> • How does developmental network structure affect subjective (e.g., creativity, work/life balance, personal learning, leadership) and objective (e.g., job performance, salary, and promotions) outcomes for protégés and developers, both positively and negatively? • What are the effects for developers of participating in more than one developmental network?

	<ul style="list-style-type: none"> • What are the effects of developers being the protégés of their own developmental networks (e.g., to what extent do the developmental networks in which an individual is a developer versus the protégé differ from each other—and what are the outcomes of these differences)? • How do networks of developmental networks influence organizational outcomes (including performance, creativity, or sustainability)?
<p><i>Stream 3: Consequences of Developmental Network Content</i></p>	<p>Content Characteristics</p> <ul style="list-style-type: none"> • To what extent does support provided by specific developers evolve over time? • What boundary conditions delineate the contexts in which developmental support functions (e.g., career, psychosocial, role-modeling) are relevant? What are the boundary conditions of newly identified sub-functions of the three main support functions? • As scholars explore a wider and wider range of developmental support functions and sub-functions, can they develop a definition and measure that unify and capture the extent of these functions and sub-functions? <p>Extending Outcomes</p> <ul style="list-style-type: none"> • What are developers’ perceptions of the content of support they provide to the protégé? • What are the costs and benefits for developers from offering different amounts and types of developmental support? • To what extent does developmental network content relate to Positive Organizational Scholarship outcomes for protégés and developers (e.g., self-awareness, self-esteem, new skills, zest, a desire for more connection, well-being)? • What outcomes are associated with receiving support from specific developers for both protégés and developers?
<p><i>Streams 2 & 3: Consequences of Developmental Network Structure and Content</i></p>	<ul style="list-style-type: none"> • What do individual developers derive from their involvement in one or more developmental networks? • Are there outcomes of developmental network structure or content that scholars should consider for developers (e.g., recognition in organizations) that are distinct from those important for protégés? • What are the antecedents and consequences of multiplexity (i.e., overlap in structure and/or content) from both protégés’ and developers’ perspectives?

<p><i>Stream 4: Mediating and Moderating Factors</i></p>	<p>Mediators and Moderators of Relationship between Antecedents and Developmental Network Characteristics</p> <ul style="list-style-type: none"> • Is there an “optimal” level of similarity or differences between protégés and developers? What combinations of protégé-developer similarities and differences facilitate positive developmental network structure, content, and outcomes? • To what extent does developers’ awareness or lack of awareness of being in a developmental network shape developmental network structure and content? Outcomes for themselves? For other developers in the same developmental network? For the protégé? • What aspects of protégés and developers moderate the relationship between individual-level protégé or developer characteristics and developmental network structure and content? <p>Mediators and Moderators of Relationship between Developmental Network Characteristics and Outcomes</p> <ul style="list-style-type: none"> • To what degree do protégés and developers agree or disagree about aspects of their involvement in developmental networks (e.g., the nature or amount of help provided)? How does congruence or incongruence in perceptions affect protégé and developer outcomes? • To what extent does emotional competence buffer the potentially negative effects of protégé-developer differences? • To what extent do individual differences (e.g., gender, race, ethnicity) moderate the relationship between developmental network structure or content and individual outcomes for both protégés and developers? • How do the effects of particular types of support vary based on organizational context (e.g., within contexts emphasizing advancement versus learning and teamwork)? • To what extent do mediators and moderators between developmental network structure and content outcomes relate to short- versus long-term outcomes?
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FIGURE 1
Developmental Network Research Streams: Relationships among Variables



Notes.

- Stream 1: Antecedents of Developmental Networks
- Stream 2: Consequences of Developmental Network Structure
- Stream 3: Consequences of Developmental Network Content
- Streams 2 & 3: Consequences of Developmental Network Structure and Content
- Stream 4: Mediating and Moderating Factors