Developmental Networks: Enhancing the Science and Practice of Mentoring

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Historically, mentoring has been conceived of as a transformative relationship in which an experienced person helps a less experienced person realize their personal and professional goals (Kram, 1985; Levinson, 1978). It has also been traditionally perceived of as a dyadic relationship between a mentor and a protégé. Yet, research indicates that a single mentor is not sufficient to meet a person's developmental needs, particularly in today's volatile, uncertain and fast-paced work environment (Baugh and Scandura, 1999; Murphy and Kram, 2014). The people who are actively involved in helping others to develop, generally include both formal and informal mentors from a variety of sectors and settings. This suggests that mentoring occurs across multiple developmental relationships in a constellation that has been described as a developmental network (Higgins and Kram, 2001).

In this chapter, we review research on mentoring as a developmental network and provide suggestions for future research. In particular, we examine how research on developmental networks can enhance the understanding of mentoring through a focus on mentoring functions as they occur across multiple developmental relationships. A person's developmental network may include one or more formal mentors and may also include other developmental partners, such as a boss who provides developmental opportunities, a junior colleague or subordinate who has deeper expertise of value to the person, or a family member who provides personal and professional counsel. A particular developmental network is defined by the person who is common to all of the relationships. Defined as the 'focal person', this individual defines members of the developmental network by enlisting and/or acknowledging the help they provide. Those involved in supporting the individual are described as developers and their individual interactions with the focal individual as developmental relationships.

This chapter begins with a review of current research on developmental networks and

its contributions to the mentoring literature. The second section presents a description of methods that scholars and practitioners have used to collect and analyze data on developmental networks. The third section describes organizational applications using a developmental network approach to mentoring. The chapter concludes with recommendations for future research and a discussion on the role of developmental networks within a broader mentoring ecology.

DEVELOPMENTAL NETWORKS AND MENTORING

A significant body of research has established that people learn and develop with the support of multiple developmental relationships (Chandler et al., 2011; Dobrow et al., 2012; Kram, 1985). In her early research on workplace developmental relationships, Kram (1985) found that mentoring functions, such as coaching, sponsorship, and personal counsel, are not exclusive to traditional mentoring, but rather that they can be found in a variety of developmental relationships with peers and developers from different social spheres. The constellation of these developmental relationships are what Higgins and Kram (2001) define as a developmental network: 'people a protégé names as taking an active interest in and action to advance the protégé's career by providing developmental assistance' (Higgins and Kram, 2001: 268).

The characteristics of developmental networks are an extension of Kram's (1985) study of mentoring and developmental relationships in organizations. Grounded in qualitative interviews with managers and their direct reports, Kram found that developmental relationship functions converged into two, broad categories: career and psychosocial functions. Career functions of mentoring include coaching, sponsorship, exposure and visibility, protection, and the provision of challenging assignments. Psychosocial functions involve role modeling, acceptance and confirmation, counseling, and personal friendship. These primary developmental functions have been empirically validated in numerous studies (Noe, 1988; Ragins and McFarlin, 1990; Scandura and Ragins, 1993). In addition, researchers have demonstrated that higher levels of these functions are associated with positive protégé outcomes (Allen et al., 2004; Chandler et al., 2011; Wanberg et al., 2003).

In recent years, another set of functions has been identified as relational functions (Ragins and Verbos, 2007). These go beyond the basic career and psychosocial functions, first defined by Kram (1985), to include a number of functions that enhance the quality and closeness of such developmental relationships. For example, Ragins (2012) developed a relational mentoring index (RMI) that included the following functions: personal learning and growth, inspiration, self-affirmation, reliance on communal norms, shared influence and respect, and trust and commitment (Ragins, 2012). In an in-depth qualitative study of professional developmental networks, Janssen et al. (2013) identified five relational functions occurring within developmental networks: intimacy, self-disclosure, emulation, genuine interest, and caring.

Integrating perspectives from social network research (Burt, 1992; Granovetter, 1973) and two decades of research on dyadic mentoring relationships and associated developmental functions, Higgins and Kram (2001) developed a typology of developmental networks based on two primary dimensions: (1) strength of developmental tie, and (2) diversity of network, which included range (the number of social systems from which relationships stem) and density (degree of connectedness of developers). This typology offered a new lens on how multiple developmental relationships might enhance individual outcomes related to personal and professional development.

The strength of a person's developmental networks has since been found to predict important job outcomes such as career

Table 6.1   Example of a name generator

Think about the people who *currently (in the last year)* have taken an *active interest* and *action* to advance your career by
    assisting you with your personal and professional development. Think broadly, these may be people from your work or
    outside of work (e.g. mentors, coaches, family members, peers, professional contacts, friends, etc.).

In *order of importance*, please list their first names or initials in the space below:

advancement (Murphy and Kram, 2010), number of job offers (Higgins, 2001), optimism (Higgins et al., 2010), job satisfaction (Higgins and Thomas, 2001; Murphy and Kram, 2010), organizational commitment (Higgins and Thomas, 2001), and a strong sense of professional identity (Dobrow and Higgins, 2005). Further, developmental networks have been found to be a stronger predictor of individual's career outcomes than dyadic relationships such as traditional mentoring or coworker relationships (Higgins and Thomas, 2001). This suggests that people will achieve better outcomes when they rely on a small network of developmental relationships, rather than on one strong dyadic relationship such as traditional mentoring or supervisory support.

ASSESSING DEVELOPMENTAL NETWORKS

Developmental networks can be assessed both qualitatively and quantitatively through a network elicitation approach, consistent with methods used in social network analysis (Cummings and Higgins, 2006). The method involves a three step procedure including a *name generation* process, a *name interpretation* process, and a *network structure*. We describe these steps, with examples below. It should be noted that these methods have been useful for both research and educational purposes.

Step 1. Name generator

The first step in collecting data on a person's developmental network is to elicit the names of people within the respondent's developmental network. This is done through a survey or interview with the protégé. It is important to note that developers are those who the protégé considers to be providing developmental support. While this might be perceived as a one-sided approach, it is the protégé's perspective that matters, as he or she is the recipient of developmental support. Table 6.1 presents an example of this approach, commonly used in research on developmental networks (e.g. Dobrow and Higgins, 2005; Higgins and Thomas, 2001; Murphy and Kram, 2010).

Step 2. Name interpreter

The second step of name interpretation involves questions about people within the developmental network and their relationship with the focal respondent. The purpose of this questioning is to obtain both the characteristics of developers and the nature of their developmental relationship with the respondent. This data can be analyzed at the dyadic level for specific relationships, or at an aggregate level as a measure of network content. Table 6.2 provides examples of name interpreter questions. These questions have been used in prior research on developmental networks (Cummings and Higgins, 2006; Higgins, 2001).

Step 3. Network structure

The final step in a developmental network assessment analysis is a move towards understanding the structural properties of a person's developmental networks. This can be done in a visual manner, by asking respondents to draw lines representing relationships

Table 6.2   Example of name interpreter questions

Construct	Question
1. Length of relationship	How many years have you known this person?
2. Social arena (Higgins, 2001)	Please indicate one of the following that best describes your relationship with each person: • Family member • Community member • Friend outside of your organization • Coworker from your organization • Professor/teacher • Someone you worked for • Coworker from a previous employer
3. Frequency of contact	How often do you communicate with this person? • Less than once a month • Once or twice a month • Three to five times per month • A few times a week • Daily
4. Psychological closeness	How close do you feel to this person? • Very close • Close • Less than close • Distant
5. Psychosocial support (Cummings and Higgins, 2006)	Please indicate the extent to which the person does the following: • Is a friend of yours • Cares and shares in ways that extend beyond the requirements of work • Counsels you on work and non-work related matters Items are assessed on a seven-point scale (1, never, not at all, to 7, the maximum extent possible)
6. Career support (Cummings and Higgins, 2006)	Please indicate the extent to which the person does the following: • Provides you with opportunities that stretch you professionally • Creates opportunities for visibility for you • Opens doors for you professionally Items are assessed on a seven-point scale (1, never, not at all, to 7, the maximum extent possible.

between respondents or circles to group respondents who are connected to each other through a shared community (McCarty et al., 2007). A more typical approach would be to ask respondents to fill out a network matrix, a common method in social network research (Burt, 1992). An example of this matrix is provided in Table 6.3.

A developer data matrix such as the example in Table 6.3 allows for subsequent analyses on network structure and patterns of relationships between developers. It complements traditional analyses of mentoring relationships, which generally look at the developmental functions provided in each

relationship, as well as the outcomes to both parties and the organization in which the relationships are embedded. So, for a given individual, each developmental relationship is examined in terms of the functions it provides and the benefits that accrue to the developer and to the protégé. The data matrix offers additional insight by examining the relationships between developers and how these interactions may affect the focal person through coordinated support amongst developers in his or her network. This additional insight might enhance a protégé's actions in relationships with developers. For example, the protégé could grant permission

Table 6.3   Example of a matrix

	a.	b.	c.	d.	e.	f.
a.	██					
b.	██	██				
c.	██	██	██			
d.	██	██	██	██		
e.	██	██	██	██	██	
f.	██	██	██	██	██	██

Use the grid to indicate if, and how well, these people know each other. Indicate 1 if the two individuals know each other and 0 if they do not know each other.

for developers to discuss aspects of his or her career development with each other, or convene a meeting of the group at strategic moments when multiple perspectives would be helpful to decision-making.

Analyzing developmental networks

The data collected through the assessment process described earlier can be used for both developmental and research purposes. For developmental purposes, such as teaching, mentoring, and coaching, protégés can be guided to use the steps outlined above to map out their developmental network and coached to reflect on characteristics of their developmental network based on the dimensions that we describe in this section. While it is possible to follow the outlined steps to reflect on one's developmental network, without the guidance of a coach or mentor, it is more often beneficial to be engaged in a guided reflection with another person.

For research purposes, data collected across multiple individuals can be aggregated and computed through UCINET (Borgatti et al., 2002, 2013) for moderate-to-large samples or compared qualitatively across cases for smaller samples (e.g. Janssen et al., 2013; Richardson and McKenna, 2014; Shen and Kram, 2011). UCINET is a computer program that analyzes the dimensions of networks described below. Whether the analyses are done by individuals, for developmental purposes, or analyzed across individuals for research purposes, the relevant constructs to consider are the same. These constructs include the following.

Network size

The size of a developmental network refers to the number of people who an individual can name as actively supporting them in their personal or professional development. Prior research has identified that the size of a person's developmental network is positively associated with outcomes of job satisfaction (Higgins and Thomas, 2001; van Emmerik, 2004) and performance (Peluchette and Jeanquart, 2000).

However, bigger is not always better. In fact, at some point, it appears that diminishing returns set in. When an individual has many developers, it is difficult to find the time to deepen the quality of multiple relationships (Higgins, 2007; Higgins and Kram, 2001; Murphy and Kram, 2014). There is clearly a balance to achieve between depth of relationships and breadth of relationships. It appears that more often than not, individuals seem to be satisfied if they have three to five close relationships in their developmental network at a given time (van Emmerik, 2004).

Strength of ties

In social network research, the strength of tie refers to a 'combination of the amount of

time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie' (Granovetter, 1973: 1361). In the context of developmental networks, the strength of tie refers to the quality of the developmental relationship between developer and protégé. The strength of tie can be measured along a number of dimensions, including psychological closeness (Cummings and Higgins, 2006; van Emmerik, 2004), frequency of communication (Cummings and Higgins, 2006; van Emmerik, 2004), or levels of career and psychosocial support (Murphy and Kram, 2010).

As with size of network, there is not an ideal number of strong ties and weak ties. Most scholars working in this area have suggested that the ideal balance of strong and weak ties depends on the personal and professional goals of the focal person, as well as their learning style and various personality factors (Higgins, 2007; Yan et al., 2015).

Range and homophily

The concept of range refers to the diverse social identities represented by members within a developmental network. For example, a high range developmental network would consist of members from one's organization, from other organizations, family members, and members of the community. In contrast, a low range, or a homophilous developmental network, is one that might consist of developers from similar communities and backgrounds. Given the nature of today's workforce, an important part of range is diversity in terms of race, gender, ethnicity, national origin, and age (Ragins and Kram, 2007; Shen and Kram, 2011; Trau, 2015; van Emmerik, 2004). A final source contributing to range would be the functional areas within a particular work context that developers come from.

Each type of diversity, including role and cultural diversity, that is represented in a developmental network offers the possibility of new ideas and perspectives that can enhance the focal person's knowledge, understanding, skills development, and preparedness for future opportunities that may appear. When developmental networks are low range, it is possible that the focal individual does not have access to thought provoking ideas that foster learning, risk taking, and other growth-enhancing actions (Higgins, 2007; Shen and Kram, 2011).

Network reachability

The concept of reachability refers to access to high status members within a developmental network and varies by how status is defined within a particular context. For example, in a national study of job seekers in the United States, McDonald et al. (2009) assessed network reachability through the occupational prestige (using the standard international occupational prestige scale) of occupations represented in the job seeker's network. The concept of reachability has not been theorized or examined to date in research on developmental networks. Yet, it is a valid network construct, developed in research on social capital (Lin, 2002).

We propose that the concept of reachability will be particularly useful in examining the role of sponsorship and access to expert knowledge in developmental networks. For example, reachability will be important for the individual who wants to advance to senior executive status within a particular organization. Without such access over time, it is unlikely that the individual will experience sufficient sponsorship at critical moments that would provide access to necessary interim positions and networking opportunities to garner the support for further advancement.

Network density represents the extent to which a network is closely knit. It refers to the interconnectedness of ties within a network and is measured by dividing the total number
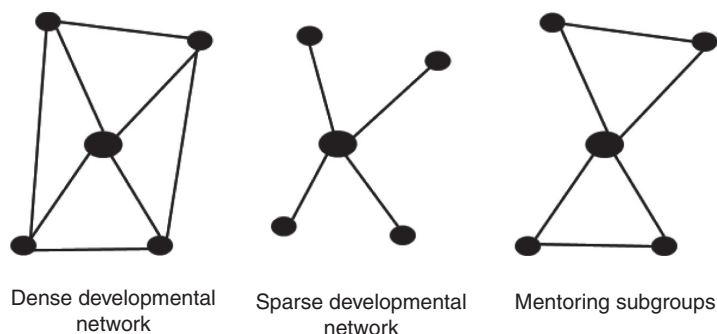
Dense developmental
network

Sparse developmental
network

Mentoring subgroups

Figure 6.1   Differences in network density

of identified relationships between network members by the total possible number of ties (Wasserman and Faust, 1994). In research on elite MBA graduates, Dobrow and Higgins (2005) found a negative association between the density of their developmental network and the outcome of professionally identity exploration. This can be a negative for individuals who aspire to change careers or organizations, as developers who know each other well may have similar perspectives and similar contacts, thus making it difficult to discover new opportunities that are more distant from the current context.

A dense network is one that is characterized by strong connections between developers. While this is characteristic of a strong support network, it can have the unintended consequence of reinforcing similar perspectives. In contrast, a sparse developmental network is one where developers are not connected and are likely to be from different social spheres. One type of network is not better than the other. What matters are the developmental goals of the focal person. This contingency approach suggests that dense networks are preferable for the individual whose goals include advancing within a prescribed context where the developers can coordinate their efforts to help the person succeed (Higgins, 2007). If an individual is seeking to change course—inside or outside a given organization or career—a sparse network is likely to be more helpful, exposing

the individual to new information from multiple perspectives. A hybrid network, that is neither dense nor sparse, is likely to be comprised of one or more mentoring subgroups, where some developers are connected to others. Examples of these subgroups could be developers who are within the same organization, or friends who are part of the same community. The differences by network density in developmental networks is illustrated in Figure 6.1.

Multiplexity

This refers to the extent to which two actors in a network are connected through more than one kind of relationship (Wasserman and Faust, 1994). In the context of developmental networks, multiplexity refers to the occurrence of multiple developmental functions within one relationship. For example, a developmental relationship that involves both sponsorship and coaching from the same person can be referred to as a multiplex relationship. The developer provides both developmental functions to the focal person. In contrast, a non-multiplex relationship is one that is limited to a single developmental function. In research on the developmental networks of Baseball Hall of Fame Members, Cotton et al. (2011) found that baseball professionals with extraordinary career achievements had developmental networks consisting of greater

numbers of multiplex relationships than other players.

It is generally the case that multiplex relationships are characterized by greater tie strength than relationships that only provide one developmental function (Cotton et al., 2011; Yan et al., 2015). Accordingly, these stronger ties are characterized by greater intimacy and deeper learning opportunities. They are what positive organizational scholarship scholars define as high quality connections, which lead to increases in self-esteem, sense of empowerment, new knowledge and skills, and the desire for more connection (Dutton and Heaphy, 2003; Dutton and Ragins, 2007). For example, a developer who offers challenging assignments and sponsorship, as well as affirmation, friendship, and/or role modeling, is likely to know the protégé better than if they only provide challenging assignments. When the relationship is deep in familiarity and mutual respect, both individuals have greater opportunities to learn and benefit more fully from the connection (Fletcher and Ragins, 2007).

DEVELOPMENTAL NETWORKS IN PRACTICE

It has been over a decade since the developmental network perspective has been part of the discourse about mentoring (Dobrow et al., 2012; Higgins and Kram, 2001). Yet, we are only beginning to see its application in various settings such as healthcare (DeCastro et al., 2013), public administration (Kim, 2014), higher education (De Janasz and Sullivan, 2004), and with entrepreneurs (Gruber-Mücke and Kailer, 2015). For the most part, the idea of mentoring as a small network of developers, in contrast to a single relationship, is beginning to take hold as part of education and training opportunities on the subject of mentoring. In particular, organizations have begun to experiment with alternatives to formal dyadic mentoring programs,

and initiating programs such as group mentoring and mentoring circles, where developmental networks are formed in support of the development of a target group of employees (Emelo, 2011; Murphy and Kram, 2014).

In essence, initiatives such as group mentoring and mentoring circles facilitate the formation of multiple and overlapping developmental networks, with a group of protégés connected to multiple developers. These mentoring alternatives vary in design: some include a group of peers only, some include one or two senior members who serve as mentors to the group of peers, and some include equal numbers of junior and senior members. The particular design depends on the specific objectives of the initiative and the resources available.

In higher education, for example, in MBA and undergraduate classrooms, faculty have taken a developmental network approach to learning (Burt and Ronchi, 2007; Whiting and de Janasz, 2004). Students are invited to reflect on their experiences with mentors as well as their current developmental networks. Using one of the assessment tools now available (Higgins, 2004; Murphy and Kram, 2014), students have the opportunity to assess whether their current developmental network aligns with their current personal and professional goals. Most often they identify a gap in shared reflection exercises with their classroom peers. The outcome of this work is an action plan for inviting new developers into their developmental network and perhaps letting go of one or more relationships that are no longer vital or relevant to their ongoing learning and development. This same kind of education and training practice has been introduced in leadership education offered within corporate settings, as well as in leadership development programs offered by external centers for leadership development (Bossen and Yost, 2013; George et al., 2011).

In organizational settings and in business education, developmental networks are also referred to as a person's 'personal board of

advisors' (Yan et al., 2015). In doing so, protégés are encouraged to consider potential developers (advisors) both inside and outside their organization. Self-assessment and action planning activities are substantially enhanced by the introduction of material on different types of developmental relationships including mentors, sponsors, coaches, reverse mentors, and mentoring circles (Murphy and Kram, 2014). This information expands individuals' understanding of the alternatives to traditional mentoring relationships and makes it more likely that they will enlist a wider range of developers in to their developmental networks. We have begun to work with executive coaches as well, as when they bring a developmental network perspective to their one-to-one work with clients, they can encourage them to assess their current system of support, and to consciously plan how to enlist others with whom they can develop reciprocally rewarding connections.

In order for individuals to be able to leverage learning about different types of developers, and the developmental network perspective more generally, they will need the relational skills to initiate, nurture, and maintain or transform ongoing relationships (Schein, 2010, 2013). An understanding of the potential of a developmental network that is aligned with personal goals is only a first step. Self-assessment and shared reflection must be combined with skill practice in deep listening, empathy, self-disclosure, giving and receiving constructive feedback, and self-management (Pearce, 2007; Sigetich and Leavitt, 2008). Most recently, such relational skill training has been combined with a diversity lens so that individuals develop the capacity to build relationships that can cross gender, racial, and ethnic boundaries (Holvino, 2010; Wasserman and Blake-Beard, 2010).

Finally, and perhaps most obviously, are the formal mentoring programs that have been around now for several decades. Before concluding our review of developmental networks in practice, it is important to consider mentoring programs that have been incorporated into organizations, associations, and other agencies for several decades. While these have produced some good results in terms of increased satisfaction, commitment, and compensation (Allen et al., 2004) it is our view that the primary focus on matching dyadic relationships may be limiting the impact of these initiatives. Such formal programs have tended to emphasize the one special mentoring relationship, rather than a small network of developers (perhaps including a formally assigned mentor as one of these). However, in recent years, there are several instances of such programs modifying their education and training infrastructure to emphasize the fact that the formally assigned relationship is one of several that participants should cultivate (Blood et al., 2015). Here, the message becomes that the matched relationship is one where participants can practice and develop the relational skills to bring to other relationships that have developmental potential.

Perhaps most importantly, a number of organizations are beginning to conceptualize formal mentoring programs as mentoring circles – groups of eight to 10 participants whose primary purpose is to support the learning and development of its members. Sometimes these groups are comprised of peers, and sometimes they include one or more senior mentors to guide the group in its learning process (Murphy and Kram, 2014). The design is based on the premise that individuals will enhance their developmental networks by participating with peers (and potentially seniors) in an ongoing group characterized by support, confidentiality, positive regard, and effective helping behaviors.

In essence, the mentoring circle program touts the foundational idea of having multiple developers, many of whom may come from this particular mentoring circle. The (usually) year-long experience of monthly meetings provides members with the skills and experiences to continue building developmental relationships, even after the program

ends. Examples of these are evident today at Sodexo, Boston Scientific, and Brigham and Women's hospital in Boston, where physician mentors are meeting in year-long mentoring circles to enhance their skills in developing others, including their peer physicians (Tsen et al., 2012). Other examples include peer-advisory groups, such as those hosted by the Young Presidents Organization, for professionals at similar levels within an organization, and peer coaching groups in business schools (Parker et al., 2014).

DIRECTIONS FOR FUTURE RESEARCH

Developmental networks represent a paradigm shift in the study and practice of mentoring: from mentoring dyads to mentoring as a constellation of developmental relationships. This shift requires new methods and suggests new questions that can be examined by mentoring scholars. The following are some potential areas for future research:

1 *Distributed mentoring.* With a focus on developmental networks, researchers could examine how mentoring occurs as a distributed function across multiple developers. This would enable researchers to examine the distributed and sometimes coordinated characteristics of mentoring occurring in multiple mentor situations, such as developmental networks initiatives in professional education (Johnson, 2014) or group mentoring, often involving multiple peers in a formal mentoring initiative (Hooker et al., 2014; Huizing, 2012). In particular, group mentoring has been found to be more effective than traditional dyadic mentoring medicine in the training of physicians (DeCastro et al., 2013). Research from a developmental network perspective could unpack the mechanisms behind this.

2 *Diversified mentoring.* Issues of social inclusion and diversity are important and longstanding concerns in mentoring research (Clutterbuck and Ragins, 2002; Kochan and Pascarelli, 2012). In particular, findings have established that women face systemic social barriers in access to mentors (Ragins and Cotton, 1991). These dynamics can

be explored further through a developmental network perspective. In particular, the long-standing concern about 'old boys networks' in organizations (Kanter, 1977) could be examined through a closer inspection of gender differences and dynamics in the developmental networks of men and women in management. More broadly, research on social identity dynamics within developmental networks could help advance what Ragins (1997) describes as diversified mentoring – relationships 'comprising mentors and protégés who differ on the basis of race, ethnicity, gender, sexual orientation, class, religion, disability, or other group memberships associated with power in organizations' (Ragins, 1997: 482). We have yet to understand how different patterns of diversity in social group membership amongst developers impact the support and development of a focal individual.

3 *Individual differences and developmental networks.* Prior studies on developmental networks have focused primarily on the consequences of developmental networks for wellbeing and career success (Dobrow et al., 2012; Seibert et al., 2001). Building on these studies, there is need for further research on the antecedents to developmental networks, and in particular, the role of individual differences in predicting the composition and content of a person's developmental network. Individual differences, such as personality, developmental position, gender, and proactivity, have been proposed as important antecedents (Chandler et al., 2010; Dougherty et al., 2008) and have yet to be empirically examined.

4 *Attachment dynamics within developmental networks.* Research on dyadic mentoring processes have drawn substantive insights from attachment theory: a theory that examines how and why people seek (or avoid) close relationships (Bowlby, 1973; Germain, 2011). More specifically, studies have examined the influence of individual attachment styles on mentoring processes such as feedback seeking (Wu et al., 2014), feedback acceptance (Allen et al., 2010), and the willingness to mentor (Wang et al., 2009). Attachment styles refer to a person's internal working models of relationships and comprise three different categories: anxious, avoidant, and secure attachment (Bowlby, 1973; Fraley, 2002). By focusing on the context of developmental networks, researchers interested in attachment

dynamics could study the conditions where con-vergence (or divergence) of attachment styles, across multiple relationships, could be devel-opmentally beneficial. For example, one could examine the strength of attachment security within a developmental network by considering not only individual differences in attachment style, but by looking at levels of agreement in the attachment styles of developers within the network.

5   *Organizational interventions*. With this relatively new understanding of mentoring as a develop-mental network, it seems critical to bring this in to organizational settings where dyadic mentor-ing has been a significant tool for employee and leadership development for at least two decades (Allen et al., 2009). Rather than encouraging individuals to form a single dyadic relation-ship (often assigned through a formal program sponsored by the human resource HRM or talent management function), a new mindset on men-toring encourages individuals to look at their current developmental networks and consider how these could be strengthened through pro-active planning and action designed to invite potential developers to take an interest in their learning and development. Such initiatives might be initiated in the context of a leadership devel-opment program, a mentoring training program, or as part of a mentoring circle initiative in which every member of the circle is encouraged to examine and strengthen their development networks. Accordingly, this opens up opportuni-ties for research into the effectiveness of such interventions.

6   *Organizational cultures and developmental net-works*. An organization's culture can shape the career orientation of its employees, with conse-quences on developmental relationships (Hall and Yip, 2014). Developmental networks can be a unique window to examine this dynamic. For example, we hypothesize that the effectiveness of developmental network interventions would be moderated by an organization's career culture. More specifically, in cultures that value relation-ship building, learning, and reflection as part of the everyday work of organizational members, the idea of periodically examining and re-building developmental networks will be considered an important and valued activity. In contrast, this same idea will be viewed less favorably (and as a distraction from the work itself) in a highly results oriented, hierarchical culture, in which learn-ing, and relational learning in particular, are not valued (Murphy and Kram, 2014).

7   *Evaluation of mentoring programs*. The methodo-logical tools of network analysis could be used to strengthen the understanding and evaluation of mentoring programs. In particular, a promis-ing avenue of research would be to examine how dyadic mentoring relationships influence the broader composition of a protégé's devel-opmental network. This could elucidate how the benefits of traditional mentoring extend beyond the dyad. For example, in a longitudinal quasi-experimental study, Srivastava (2015) found changes in the network composition of par-ticipants in a traditional mentoring program and gender differences in the benefits that partici-pants derive from these changes.

SITUATING DEVELOPMENTAL NETWORKS IN A MENTORING ECOLOGY

Mentoring relationships do not occur in a vacuum, but rather in a relational ecosystem comprised of multiple relationships, shaped by broader cultural norms and beliefs about mentoring. Developmental networks are sit-uated within this ecosystem, comprised of dyadic mentoring relationships, and nested within a broader ecology of beliefs and practices about mentoring. The dynamic nature of these nested relationships suggests an ecological systems perspective on men-toring (Chandler et al., 2011) – a perspective that proposes that traditional dyadic mentor-ing and developmental networks are not exclusive, but rather co-existing relational systems.

In contrast to an input-output model of mentoring, an ecological perspective sug-gests a consideration of mentoring as a property of a whole system, rather than an exchange that occurs between individuals. For example, a person may be engaged in a formal mentoring relationship, but may also be receiving mentoring support from peers
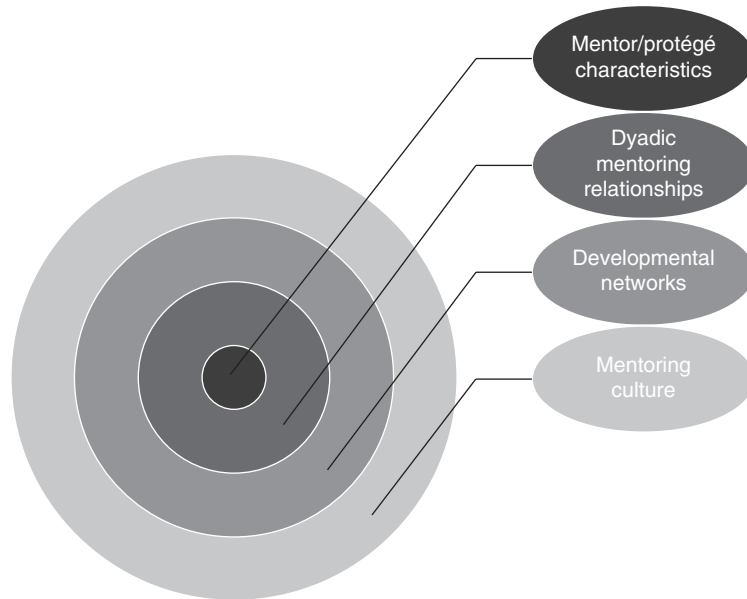
Figure 6.2   Levels of analysis in mentoring research

and family members, whose mentoring may be influenced by their role and the social context that they are nested within. At one level, these relationships are nested within a person's developmental network; at another level, these developmental relationships are nested within a broader social and cultural ecology. Figure 6.2 illustrates these broad nested systems in context.

Figure 6.2 illustrates our proposed framework for understanding the role of developmental networks within a mentoring ecology. As represented in the model, mentoring relationships are nested within developmental networks, which, in turn, are nested in broader cultural beliefs and practices about mentoring. This model is an extension of Bronfenbrenner's (1979) ecological systems theory: a theory that suggests that human development and relationships are not isolated, but rather occur within multiple reciprocal systems. As Bronfenbrenner notes, 'The understanding of human development demands more than the direct observation of behavior on the part of one or two persons

in the same place; it requires examination of multi-person systems of interaction not limited to a single setting and must take into account multiple setting' (Bronfenbrenner, 1979: 21).

Research on developmental networks can inform and open up new ways of examining mentoring as an ecological system. In particular, developmental networks provide a link to examine how macrosystems (such as culture) can influence the composition, structure, and interaction across developers within a developmental network. This dynamics offers promise for future research in mentoring. For example, through research on developmental networks, it is possible to examine how people are shaped by diverse cultural influences, represented by relationships with developers from different cultures. Research by Mao and Shen (2015), for example, examines the process of cultural identity change in expatriates through the lens of expatriate developmental networks. At a broader level, research on developmental networks has also revealed how macro-level institutional

logics influence the composition of developmental networks within particular industries (Cotton, 2013).

In practice, an ecological approach to mentoring requires more than the selection, training, and assignment of competent mentors in a formal mentoring program – this is a common practice in organizations. Instead, an ecological approach to mentoring is about creating environments for developmental networks to thrive – where people are engaged in multiple and diverse developmental relationships, in addition to relationships with formal mentors. As prior research has shown, informal mentoring is a stronger predictor of mentoring outcomes over formal mentoring (Eby et al., 2013; Ragins and Cotton, 1999). Further, organizational support for mentoring has been found across studies to be an important predictor of mentoring success (Ghosh, 2014).

CONCLUSION

In conclusion, our chapter has described how research on developmental networks can enhance the science and practice of mentoring beyond traditional dyadic relationships. Research on formal mentoring relationships suggests that a single mentor is not sufficient to meet a person's developmental needs (Baugh and Scandura, 1999; Higgins and Thomas, 2001; De Janasz and Sullivan, 2004). As a complement to research on formal and dyadic mentoring relationships, a developmental network perspective offers an expanded understanding of how mentoring functions occur across multiple developmental relationships and how the composition and structure of these relationships influence outcomes related to learning and performance. By considering mentoring as a relational system involving multiple developers, a developmental network perspective opens up new approaches to further the science and practice of mentoring.

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