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**THE MOBILIZATION OF SOCIAL NETWORKS IN
PROFESSIONAL DEVELOPMENT DECISION-MAKING –
A MIXED-METHODS STUDY IN A TECHNICAL FIELD**

A Dissertation
Presented to
The Academic Faculty

by

Isabel Ruthotto

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in Public Policy in the
School of Public Policy and Andrew Young School of Policy Studies

Georgia Institute of Technology and Georgia State University

December 2022

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**THE MOBILIZATION OF SOCIAL NETWORKS IN
PROFESSIONAL DEVELOPMENT DECISION-MAKING –
A MIXED-METHODS STUDY IN A TECHNICAL FIELD**

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[To my husband Lars, thank you for believing in me and cheering for me when I doubted myself. And to my son Beto, it was difficult to write this dissertation with you, but I could not have done it without you.]

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the generous support from Georgia Tech's College of Computing. I particularly want to thank Dr. Charles Isbell, David White, and Dr. David Joyner for providing financial support, helping with student recruitment, and allowing me to pursue my research interests.

I would like to acknowledge the support, guidance, and mentorship of my committee. Julia, thank you for critiquing the countless drafts of my chapters, helping me communicate my ideas, making me a better 'storyteller', and being a champion for me. Juan, I owe a great deal of gratitude to you for your generous support and intellectual contributions. No matter what questions I had about theory or methods, you always helped me figure out an answer and gave me the confidence to work through the many challenges I faced in this dissertation. Gordon, thank you for pushing me to think more deeply about how to communicate my research to the public policy community and make it more relevant to a wider audience. Ruth, thank you for your mentorship, for providing different perspectives on my research, and always having a joke or insightful story ready when I needed one. Dr. Roch, thank you for sharing your expertise in social network research early on in my work.

I also want to thank my colleagues on the OMSCS research team – Sibley Lyndgaard and Corey Tatel – for providing their feedback on my dissertation ideas and helping me improve my survey questions. Corey, I particularly want to thank you for combating the challenges in merging and cleaning the student data so we could conduct the survey. On a more personal level, I want to thank my peers at Georgia Tech – particularly Quintin, Simone, and Aubrey – for helping me reflect on research ideas and allowing me to vent. Your companionship helped me push my dissertation over the finish line. And to my dear friend Jennifer, I am grateful for your moral support throughout my 3-year dissertation journey.

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LIST OF ABBREVIATIONS

CS	Computer Science
IT	Information Technology
MBA	Master of Business Administration
MOOC	Massive Open Online Course
OMSCS	Online Master of Science in Computer Science
RQ	Research Question
STEM	Science, Technology, Mathematics, and Engineering

SUMMARY

Vast technological innovations have been transforming labor markets and workplaces. Against this background, identifying ways to foster a skilled and resilient technical workforce and determining what role industry, higher education institutions, and policymakers play in this regard has become a core concern of political and societal debates. The dissertation contributes to this discourse by looking at how adults working in tech decided to invest in skill development and professional advancement through the pursuit of an online graduate degree in computer science. The dissertation seeks to understand whether, when, and how social networks influenced this decision process. The focus on networks is important since it addresses a distinct gap as to how decision-making has traditionally been conceptualized. The results support the central argument that the decision to pursue an online graduate degree is seldom an internal, autonomous thought process, but is often shaped by social relationships through consultation, advice, and support. Family members, friends, coworkers, supervisors, and acquaintances all matter in this process – albeit to varying extents and in different capacities. A complex set of individual and contextual factors influence the broad range of social support-seeking during decision-making. The results validate the importance of examining professional development choices in social contexts, offer several theoretical and policy implications, and open avenues for future research.

CHAPTER 1. INTRODUCTION

1.1 Dissertation Overview

This dissertation examines working adults' decision to pursue a graduate degree in a technical field. Why and how adults decide to invest in skill-building has been shaping much of the political discourse on science, technology, engineering, and math (STEM) workforce development (National Academies of Sciences 2017). The core concern has become how public policy, the private sector, and educational institutions can build a highly skilled and resilient technical workforce. A related policy concern is how to build and sustain a learning culture that focuses on skill rather than job transitions and stimulates personal responsibility to acquire those skills to not fall behind. These concerns are driven by the vast technological innovations that have been transforming labor markets and workplaces, leading to an immense demand for higher-level digital, analytical, and technical skills (Autor 2015; Muro et al. 2017; Pew Research Center 2016). In addition, many technical skills have a much shorter shelf-life, requiring professionals from a variety of STEM industries to upskill and reskill at their initiative almost continuously throughout their career (Mirvis and Hall 1996). It is precisely these concerns that this dissertation will speak to.

Importantly, why and how adults who already have considerable work experience decide to invest in professional and skill development is noticeably undertheorized. Research on career and educational decision-making typically focuses on cost-benefit arguments and motivational factors as primary explanations for pursuing professional development later in life (Blossfeld and Von Maurice 2019; Bruch and Feinberg 2017;

Flum 2001; Larrick 2016; Zuluaga 2013). Less understood is whether, when, and how features of the social environment influence this decision process. Thus, the central question in this dissertation is what role social networks play in adults' professional development decision-making. This dissertation will contribute to research on educational decision-making and career advancement by incorporating theories on social capital and support-seeking to explore the influence of social processes and to provide a more holistic understanding of professional development decision-making.

1.2 Background on STEM Careers and Workforce Issues

Technological advancements and digitalization are transforming labor markets and workplaces, leading to a drastic decline in the demand for physical and manual skills and a stark increase in opportunities for people with higher-level digital, analytical, and technical skills (Muro et al. 2017; Pew Research Center 2016). Changing skill requirements do not only have implications for people aspiring careers in STEM, but affect job-seekers in nearly every industry sector, including telecommunications, finance, and health care (U.S. Equal Employment Opportunity Commission 2016). Generally speaking, the quality and quantity of employment opportunities are greater for those who are better prepared and have above-average education, experience, or training (Pew Research Center 2016). However, it is not just education per se that offers better employment opportunities and greater earnings potential, but higher education that prepares people for jobs with high-digital content (Muro et al. 2017), resulting in an expanding market for information technology (IT) professionals with *advanced degrees* (Xue and Larson 2015).

The technological changes that have taken place over the past decade do not just affect the new generation of IT professionals, but also have strong implications for people with established careers in STEM. Given that technical knowledge and skills have a much shorter shelf-life, IT professionals from a variety of industries face the need to upskill and reskill at their initiative almost continuously over their career span (Mirvis and Hall 1996). While professional training used to take place at fixed points in someone's career and usually at the initiative of the employer (Mirvis and Hall 1996), education is becoming a modular and continuous cycle. Against this background, calls have become louder for organizations to provide more financial incentives to employees to invest in professional development (including advanced degrees) and for public policy to subsidize employer investments in employee skill development through tax deductions (National Academies of Sciences 2017). Yet, there is evidence that very few employees actually utilize these incentives (e.g., tuition reimbursement programs) (SHRM 2019), raising additional questions about this low usage rate and what type of organizational support is truly needed to incentivize adults to pursue professional development.

Technological changes are transforming the skills needed to succeed in today's job markets while producing new gender and race/ethnic challenges. Women and racial/ethnic minorities continue to be underrepresented across technological industries and overrepresented in lower-status and lower-pay positions within technological occupations (U.S. Equal Employment Opportunity Commission 2016). Part of the problem has been attributed to the lower diversity of degree holders in technology-related fields, both at the undergraduate and graduate level (United States Government Accountability Office 2017). In the light of these conditions, questions arise on how to facilitate *entry* and transition into

as well as mobility and *advancement* within technical careers for women and underrepresented minorities. Given that a graduate degree can improve both job entry and career mobility (Calitz, Greyling, and Cullen 2017), efforts to incentivize or motivate adults to pursue a graduate degree need to focus even more on women and racial/ethnic minorities. However, data on which demographic groups of the adult population earn graduate degrees show further racial/ethnic inequalities. Black and Hispanic groups are far less likely to go to graduate school than their white and Asian peers (Baum and Steele 2017). Further, there is evidence of a Matthew effect in adult education (Boeren 2009; Boyadjieva and Ilieva-Trichkova 2017): Highly-educated adults participate more in advanced education and training than those with low levels of education.

1.3 Research Motivation and Research Questions

The decision to pursue professional development, including a graduate degree, later in life has predominantly been characterized as a personal cost-benefit analysis using an economic lens (Chapman et al. 2006; Delsen 2007; Peters and Daly 2013; Scanlan and Darkenwald 1984) or as a motivational mechanism using a psychological lens (Baert, De Rick, and Van Valckenborgh 2006; Boeren et al. 2012; Henry and Basile 1994; Pires 2009; Renta Davids et al. 2016). Adults particularly value graduate degrees for their utility in furthering their career goals, followed by a cognitive interest in the field of study (Flynn 2006; Peters and Daly 2013). The costs adults face before enrollment are extensive, including financial expenses, lower self-confidence in their ability to succeed, and time constraints due to work and family responsibilities (Chapman et al. 2006; Mosyjowski et al. 2017; Peters and Daly 2013; Weber, Loumakis, and Bergman 2003). What these prior

theoretical approaches have in common is a strong focus on individual reasoning and agency, in which decisions about professional development are constructed as internal, autonomous thought processes (Blossfeld and Von Maurice 2019; Bruch and Feinberg 2017; Flum 2001; Larrick 2016; Zuluaga 2013).

However, according to Social Capital Theory (Lin 2001), people are embedded in a social context of relationships that can shape individual action through consultation, advice, support, or conflict (Perry and Pescosolido 2010). Social ties may advocate for or against educational choices, may provide information or opinions that allow people to form judgments and reach a particular decision outcome, or give moral or emotional support to follow through on a particular decision. Consequently, there is a wide spectrum on how social ties might influence professional development choices and pathways, which is precisely why some have called for the need to collect more evidence about how social networks facilitate educational opportunities and investments particularly later in life (Hoenig et al. 2016; Knipprath, Heidi; De Rick 2015). This sociosyncratic view sets a focus on studying how social networks shape human action in the context of professional development decisions. Against this background, this dissertation asks three interrelated research questions:

- A. What is the prevalence and nature of social network mobilization in professional development decision-making?**
- B. What factors cause adults to mobilize their social network when making decisions about their professional development?**
- C. How do mobilized networks impact adults' readiness for professional development?**

Decades of research on the educational decisions of high-school and college students have shown that peers, parents, and siblings influence educational choices such as whether to enroll in college (G. D. Sandefur, Meier, and Campbell 2006; Trent 1970), which college to attend (Fletcher 2012; Goodman et al. 2019), and which college major to select (Fletcher 2015). There is, however, a distinct gap: We do not know whether family and peer relationships continue to shape educational and/or career decisions later in life when social networks start to broaden and expand as adults develop relationships at work and within their community (Ajrouch, Antonucci, and Janevic 2001). Social Capital Theory has rarely been applied to study how social relationships influence the professional development decisions of working adults. Further, as the literature review will demonstrate, this research topic is situated at an interdisciplinary intersection between information behavior, career decision-making, organizational behavior, and social support-seeking. Consequently, Social Capital Theory will be insufficient in conceptualizing and testing social network influence on educational decision-making. By reviewing and synthesizing theoretical and empirical work across the different work areas named above, I will draw a more complete picture of human action.

The synthesis will further increase opportunities to make contributions to the social capital literature, which lacks a thorough understanding of the process of resource mobilization, including its antecedents and outcomes. This is problematic since the sole access to social contacts and their resources may have little effect on decision-making if those contacts and resources are not being mobilized (Chua 2012). In addition, there is a strong tendency to conceptualize social capital as a purely positive phenomenon without critically reflecting on negative (or no) social influences (Field 2005). As far as the career

decision-making literature is concerned, there is a need to understand decisions in the social context, including the extent and process of how networks affect decisions (Bruch and Feinberg 2017). Organizational support-seeking studies highlight the role of mentors and coaches in shaping adults' self-perception, identity, work values, professional goals, and, ultimately, personal and career growth (Kram 1996). However, if and how career mentors and job coaches provide input to professional development decisions such as getting a graduate degree and what other types of social relationships outside of work influence those decisions remains unclear (Parker 1996).

1.4 Organization of this Dissertation

This chapter presented an introduction to the public policy issue of professional development and skill-building among adults working in STEM, along with the research motivation and questions for the dissertation. Chapter 2 presents a review of theoretical approaches and empirical evidence to help conceptualize social network mobilization in professional development decision-making. The chapter describes key dimensions typically used to examine social network characteristics and identifies the antecedent factors of network mobilization, offering hypotheses that cause these exact network characteristics to occur. Chapter 3 describes the research setting and the sequential mixed-methods research design, including detailed illustrations of the quantitative and qualitative research strands. Using a large-scale survey of working adults pursuing a graduate degree in a technical field, Chapter 4 reports results from the quantitative methods strand with respect to the prevalence and patterns of network mobilization in professional development decision-making, the factors associated with mobilizing social networks, and outcomes of

network mobilization. Using qualitative interviews with respondents of the survey, Chapter 5 presents the results of the qualitative methods strand to help elucidate the phenomenon of social network mobilization further and follow up on questions raised by the quantitative analysis. Chapter 6 offers a summary and discussion of the results along with a presentation of the theoretical and policy implications of these results.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

The question of why and how working adults mobilize their social networks when making decisions about their professional development is situated at an interdisciplinary intersection between sociology, psychology, and economics. To draw a holistic conceptual framework of network mobilization in the context of professional decision-making, I review and synthesize theoretical approaches and empirical findings on network mobilization from information behavior, career decision-making, organizational behavior, and social support-seeking literature. To that end, this chapter is organized into three sections. Section 2.2 presents the theoretical foundations of social network mobilization in educational and career settings. This section serves the primary purpose of identifying key constructs for the conceptual model of social network mobilization in professional development decision-making. Section 2.3 reviews the empirical evidence with respect to the constructs of social network mobilization identified in the previous section. The main purpose of section 2.3 is to carve out the content of the key constructs and hypothesize conceptual paths by synthesizing different research streams. Section 2.4 summarizes and visualizes the conceptual model of social network mobilization in professional development decision-making.

2.2 Social Network Mobilization: Review of Theoretical Approaches

2.2.1 Social Capital Theory

Social Capital Theory provides the lens and language to examine *how* adults use social contacts during their decision to pursue professional development. Social capital can be defined as the network of social relationships which allow individuals to gain access to resources owned by the members of their network (Lin 2001; Lin and Erickson 2008). Unlike human capital that resides within people, social capital is a relational, network-based concept where resources are only accessible through social ties (Flap 2004; Portes 2000; Robison and Flora 2003).

The social capital concept was originally introduced by Pierre Bourdieu (Bourdieu 1986) and James Coleman (J. Coleman 1988), both of whom influenced the development of Social Capital Theory. Bourdieu and Coleman argue that individuals purposefully invest in social capital with expected returns (Lin 1999). However, the two sociologists differ in their views on what drives or constrains social capital formation; a differentiation that becomes important when evaluating theoretical and empirical work on social capital. For Coleman, the social capital is a reconciliation of two intellectual streams: the economists' rational choice theory and the sociologists' theory of social action (J. Coleman 1988; R. L. Sandefur and Laumann 1998). While rational choice theory describes actions as independent and self-interested, the theory of social action emphasizes that actions are governed by social rules, norms, and obligations. Social capital, in turn, is an expression of social interdependence, where actors have interests in resources that are fully or partially controlled by other actors (J. S. Coleman 1994). For Coleman, norms are an important form of (*positive*) social control, determining access to social resources and, ultimately, individual action (Dika and Singh 2002). In contrast, Bourdieu views social capital through

a critical theory lens, where networks and resources are unequally distributed, socially reproduced, and preserve the position of the dominant class (Bourdieu 1986). He argues,

“the structure of the distribution of [...] capital at a given moment in time represents the immanent structure *of the social world*, i.e., the set of *constraints*, inscribed in the very reality of that world, which govern its functioning in a *durable* way, determining the chances of success for practices” (Bourdieu, 1986:15; emphasis added).

In other words, structural constraints determine people’s ability to access social resources, which, in turn, influence their life chances. In essence, this means that social capital is endowed, i.e., transmitted across generations. With respect to educational attainment and achievement, Coleman’s work concentrates on how parental norms guide their children’s behavior and impact educational success, whereas Bourdieu’s work focuses on unequal access to social resources due to structural constraints based on class, race, and gender (Dika and Singh 2002).

Lin’s Social Capital Theory, which I adopt in this dissertation, is an attempt to reconcile Coleman’s and Bourdieu’s conceptual understandings (Lin 2001). Lin regards social capital acquisition and mobilization as instrumental action within the bounds of structural forces. Specifically, Lin writes,

“the theory of social capital gives primacy to the *propensity to act* in order to gain access and mobilize better resources. However, the effort at investment and mobilization is *constrained by* the extent of resources’ availability and heterogeneity in the social structures in which actors find themselves” (Lin, 2001:53, emphasis added).

This quote illustrates another important element of Lin’s theory, namely, the distinction between resource access and resource use. While access denotes people’s *resource means* regardless of whether they use them or not, mobilization focuses on the *use* of a set of ties and their resources in a particular action (Lin and Erickson 2008). The

significance of this theoretical distinction became clearer in later empirical work showing that network access does not guarantee use (Moerbeek and Flap 2008; S. S. Smith 2008). Further, implicit in the above quote is also the causal order where social capital access comes before use. Therefore, social capital is not just a function of the number of social ties and the resources that those ties possess (Bourdieu 1986), but also a function of the quantity and quality of mobilized (or capitalized) resources.

Social Capital Theory is a powerful tool for conceptualizing *how* adults may use social networks during their decision to pursue formal graduate education. Thus, the theory helps to understand the construct of networks itself, directing attention to distinct network characteristics such as *social resources* and *social tie attributes*. However, the theory lacks a more detailed conceptualization of the network mobilization process, including its antecedents and outcomes. The only antecedent factor that social capital theory provides is *resource access*. This is where social support, decision-making, and information behavior theories add value.

2.2.2 *Decision-Making and Information Behavior Theories*

Decision-making and information behavior theories provide the lens and language to examine *why* adults use social contacts during their decision to pursue professional development. Importantly, the decision to pursue professional development is layered. First, there is the decision about professional development (i.e., graduate education) itself, which generates uncertainty whether the developmental opportunity leads to desired outcomes and is a good course of action. Further, such decisions are not simply individual matters but may affect the lives of people within the decision-maker's social network,

including people at work and within one's family (Edgell and Moen 1999; Greenhaus and Powell 2012; Pescosolido 1992). This generates a second choice to be made, namely the decision about engaging with others to gather information and support in order to reduce uncertainty (Pescosolido 1992). Decision-making and information behavior theories will contribute to the conceptualization of these aspects.

While the literature on decision-making spans an array of different theories and applications (Goldstein and Hogarth 1997), there are assumptions and constructs that are integral to almost any decision-making study. First off, decisions are choices among alternatives where at least two options are available and only one of them may be selected (Case and Given 2016). People evaluate options in terms of their *expected* consequences, which means that they do not know with certainty what will happen if a particular option is chosen. (March 1994). This notion of *uncertainty* about future outcomes of present action is an important concept in decision-making theories (Case and Given 2016; March 1994). Within the educational- and career decision-making domain, uncertainty arises when people do not have enough or too much information about educational and vocational pathways to choose from, unclear or conflicting career preferences and goals, and limited knowledge about career decision outcomes (Gati and Asher 2005; Germeijs and De Boeck 2003).

In an attempt to reduce uncertainty, people will gather *information* to help them compare their available options (Case and Given 2016). Consequently, decision-making theories are closely intertwined with information behavior research (Donohew, Tipton, and Haney 1978), which focuses on how, when, and why people seek information (Case and Given 2016). From the information behavior standpoint, people have a need to gather

information if they experience gaps between current levels of knowledge and desired informational goals (Case and Given 2016). That is, needs are the cause for seeking information which, in turn, helps to reduce uncertainty. As a result, *needs* constitute an important construct of social network mobilization in professional development decision-making.

This nexus of decision-making and information behavior theories contribute to the conceptual understanding of why adults may mobilize their social networks when making decisions about professional development. However, the theories suffer from one major shortcoming: Decision processes are often treated as a rational, logical, and highly individualistic endeavor (Bruch and Feinberg 2017; Larrick 2016) which is problematic since we know that vocational interests and choices are not just the product of an internal thought-process, but also a product of social interactions (Flum 2001). Decision-makers receive information about occupations and jobs as well as their abilities and skills from members of their social network. Significant others may also influence vocational choices more directly by exerting pressure to select a particular option or by discouraging a particular choice.

2.2.3 Social Support Theories

Social support theories provide the lens and language to examine both *whether* and *how* adults use social contacts during their decision whether to pursue professional development. There is a fairly extensive research literature on organizational learning, part of which examines proactive support-seeking in the workplace (Anseel, Lievens, and Levy 2007; Ashford and Cummings 1983; Ashford and Tsui 1991; Bamberger 2009; Borgatti

and Cross 2003; Vancouver and Morrison 1995). These studies employ a wide range of different psychological theories in explaining why and how employees seek support within their organizations. Given the abundance of different theories, these studies contribute to this dissertation by providing concepts more so than a full theoretical mechanism of support-seeking.

First and foremost, the concepts of social support – despite its interpersonal character – has been discussed sparsely in the social capital literature. In the organizational behavior and social psychology research literature, however, James House (1981) and Manuel Barrera (1986) have contributed to a thorough understanding of this concept, including the specific types of behaviors and experiences that amount to social support. At its core, social support describes the various forms of aid and assistance that are provided by social ties (Barrera 1986; Barrera, Sandler, and Ramsay 1981), including instrumental, informational, appraisal, and emotional resources (House 1981). Social support-seeking includes feedback-, advice-, information-, and help-seeking behaviors, which are related but distinct given the varying degrees of interpersonal interaction and social exchange (Bamberger 2009; Dalal and Bonaccio 2010; Lee 2002).

Second, research on social support examines the intensity and frequency with which employees gather help, feedback, advice, or information from their coworkers and supervisors. These studies have shown a conceptual and empirical divide between perceived and received social support, i.e. support that is available versus support that has been enacted (Barrera 1986). The notion of perceived versus received support is closely linked to the distinction between network access and use in Social Capital Theory. However, social support theories help to fill the theoretical gap of Social Capital Theory

regarding what leads people to enact (Anseel, Lievens, and Levy 2007; Ashford and Cummings 1983; Ashford and Tsui 1991; London and Smither 2002) or avoid available support (Lee 2002; Miller and Karakowsky 2005). The theories suggest several individual and environmental factors that shape people's support-seeking willingness and strategies (Bamberger 2009). Thus, another important construct of social network mobilization constitutes support-seeking willingness, which includes both contextual and person-specific attributes.

2.3 Social Network Mobilization in Professional Development Decision-Making: Review of Empirical Evidence

2.3.1 The Prevalence of Social Network Mobilization

The first research question focuses on the construct of network mobilization, asking how prevalent social networks are in the context of professional development decision-making and what mobilization looks like. This question therefore addresses both the extent to which adults mobilize their networks and the characteristics of mobilized networks, including network composition (i.e., structure, tie characteristics) and the "capital" that is derived from networks (i.e., social resources).

A broad set of literatures focus on whether social ties are present in informational searches (Case and Given 2016), job searches (Marsden and Gorman 2001), and decision-making (Heath and Gonzalez 1995). The evidence suggests that mobilizing one's social network to attain career goals (such as finding a new job) is very common, with estimates ranging from as low as 50% to as high as 80% of job seekers using personal contacts (Marsden and Gorman 2001). Studies examining how students make important life

decisions state even higher numbers, showing that as much as 90% of students seek input from members of their social network (Heath and Gonzalez 1995). Further, highly educated adults with graduate degrees appear to be particularly likely to use social networks for professional advancement (Marsden and Gorman 2001). Based on these findings, one would expect that an equally high proportion of adults who decide whether to pursue professional development rely on their social contacts during their decision-making process.

2.3.2 The Nature of Social Network Mobilization

Research question 1 further inquires about the nature of mobilized networks, seeking to understand what network mobilization looks like in the context of professional development decision-making, including which ties and what resources are gathered. To systematically address the phenomenon of mobilized networks, the following sections discuss the key analytical dimensions that were identified in prior research (Perry, Pescosolido, and Borgatti 2018): network structure, tie characteristics, and network function.

2.3.2.1 Network Structure

Network size: Network structure encompasses the architectural components of networks, particularly the presence and patterns of linkages (Perry, Pescosolido, and Borgatti 2018). Particularly network size (i.e., the number of social ties with whom an individual is connected) constitutes an important research theme in social network studies. Conceptually, each tie presents social capital in and of itself by offering a mechanism

through which resources are mobilized (Lin and Erickson 2008). It follows that the more ties an individual has, the greater the amount of social capital of that individual (McPherson, Smith-Lovin, and Brashears 2006a). However, network size is rarely studied in research on social network mobilization. That is, studies on network mobilization seek to understand whether social ties are used at all, not the extent to which they are used. How many social ties people mobilize in career decision-making contexts remains a question.

Network topology: Thinking about the structure of networks more deeply, another important aspect that comes to mind concerns the topology of social networks. A common proposition in social network research is that networks are relatively static and stable across the life course – while the ties themselves may change, the number of ties and the social support that is provided by them does not (Ertel, Glymour, and Berkman 2009; E. B. Smith, Menon, and Thompson 2012). However, opposing research states that networks are fairly dynamic and change when people enter a new social context or face a major life transition like starting graduate school (M.L. Small 2017). It remains an empirical question as to whether the decision to pursue professional development causes individuals to reach out to their core network or seek resources from different or atypical sources.

2.3.2.2 Tie Characteristics

Tie strength: People select ties depending on the type of resource they need. For example, people seek more emotional support from strong ties, i.e. individuals they feel close to such as spouses, family members, and close friends (Feng and Magen 2016; Van Der Gaag and Snijders 2005; Kammrath et al. 2019; Marsden and Campbell 1984; Rostila 2011; Wellman and Wortley 1990). This pattern has been primarily attributed to the high level of

interpersonal trust between ego and alter, which facilitates conversations about delicate or intimate topics (Krackhardt 1992; Levin et al. 2016; Rostila 2011). Contrary evidence suggests that weak ties are used equally often for emotional support as strong ties (Kammrath et al., 2019; Small, 2013), such as people with whom we interact frequently in the workplace (Kidd, Jackson, and Hirsh 2003) or with whom we share values and life experiences (Suitor and Keeton 1997). The difference between these two sides may be explained by the discussion topic under consideration. Recent evidence suggests that people match the topic for which they seek support to different ties (Bearman and Parigi 2004; Brashears 2014; Perry and Pescosolido 2010; M.L. Small 2013, 2017). For example, work- and career-related topics are frequently addressed with coworkers – who may or may not be close – rather than with spouses or friends (Bearman and Parigi 2004; McPherson, Smith-Lovin, and Brashears 2006b; M.L. Small 2013). Education, however, may be more frequently discussed with kinship ties than with coworkers or acquaintances (McPherson, Smith-Lovin, and Brashears 2006b). There also appear to be gender differences where women are more likely to talk about work-related topics with kinship ties than men are (Brashears 2014). These findings are important since the decision to pursue graduate education may be either framed as a career or as an educational decision.

The strength of the relationship also affects support utilization. For example, strong ties prompt individuals to be more receptive to information and advice (Feng and Magen 2016; Higgins and Kram 2001). While weak ties expand access to information by allowing people to gather novel information that is not available within their closest circle of ties (Granovetter 1973), they may not necessarily increase the use of informational resources (Higgins and Kram 2001; Seibert, Kraimer, and Liden 2001).

Tie expertise: Another important characteristic of social ties is the type and amount of information they possess (Perry, Pescosolido, and Borgatti 2018). Overall, people prefer to seek information and feedback that is accurate and useful (Vancouver and Morrison 1995), which is why they mobilize ties whom they perceive to be knowledgeable or to have relevant expertise (Borgatti and Cross 2003; Cross and Borgatti 2004; Kidd, Hirsh, and Jackson 2004; Miller and Karakowsky 2005; Nadler, Ellis, and Bar 2003). Expertise is not so much a label that is associated with a specific group of actors such as career mentors, advisors, or counselors but applies to any tie who is considered to have the experiences, training, ability, or skill relevant to the domain of interest. Thus, whether someone is perceived as knowledgeable depends on the topic for which information or guidance is being provided (Borgatti and Cross 2003). There is some evidence that people frequently seek expertise from people outside their kinship and friendship ties, meaning weak ties who are readily available to them (Small, 2013). Organizational research also suggests that employees seek more feedback and advice from superiors than coworkers because they are thought to provide more job-relevant expertise and constructive help (Nadler, Ellis, and Bar 2003; Van der Rijt et al. 2013). However, this might not be true for women and underrepresented minorities who may either avoid or are being avoided by higher-status ties (McDonald 2011).

Tie expertise can also affect support utilization. Information or guidance coming from expert sources finds easier acceptance (Audia and Locke 2003) while messages from sources who are perceived to lack knowledge get easily discredited or discounted (Bing-You, Paterson, and Levine 1997; Fonteyne et al. 2018). The more knowledgeable or

credible the tie, the higher the perceived (instrumental) value of their feedback or information (Anseel, Lievens, and Levy 2007).

2.3.2.3 Network Function

Using only structural aspects (such as network size) as indicators for mobilized social capital is problematic since several network members may provide the same type of resources (Van Der Gaag and Snijders 2004). To understand the types and levels of advice and support, it is useful to examine the provided resources more closely. Function characterizes the types of resources or supports that are embedded in networks and made accessible through ties. These resources differ in terms of the value they create for individuals and typically fall into four distinct domains (House 1981): instrumental, informational, appraisal, and emotional resources.

Instrumental resources are comprised of hands-on assistance, including money, time, or labor (Leahy-Warren 2014). Specific examples of instrumental support depend on the context under consideration. Studies on career advancement often highlight the importance of receiving direct career help such as job referrals, promotions, or developmental opportunities from high-status and/or powerful individuals (Bosley, Arnold, and Cohen 2009). In comparison, studies on participation in professional graduate education have found that instrumental support is often provided by a significant other in the form of household help and taking over family responsibilities to allow their spouses to concentrate on educational and work demands (Lysova et al. 2015).

Informational resources can be defined narrowly as the provision of factual and educational aid (Jung 1997) or more broadly as the provision of suggestions and advice

without advocating for a particular point of view (Bosley, Arnold, and Cohen 2009; Leahy-Warren 2014). In the career domain, such resources include information about jobs, vacancies, and the content/requirements of occupations or job roles (Bamberger 2009; Bosley, Arnold, and Cohen 2009). Receiving career-related informational resources contribute to a greater awareness of opportunities and/or alternatives (Sauermann 2005), a knowledge base about jobs/occupations, and more realistic expectations about job/occupational requirements (D. T. Hall and Chandler 2007).

Appraisal resources include information that allows people to evaluate themselves such as constructive feedback and affirmation (Heikkinen, Lämsä, and Hiillos 2014; Leahy-Warren 2014). Unlike informational resources, appraisal support is conceptualized as a direct input on decisions by recommending which course of action to take (Rostila 2011). Consequently, appraisal helpers offer opinions, make suggestions, challenge viewpoints, and communicate their perceptions of people's skills, abilities, strengths, and weaknesses (Bosley, Arnold, and Cohen 2009). As a result, an appraisal can shape views on career self-concepts, identities, self-efficacy beliefs, and, ultimately, career goals, aspirations, and decisions (Bosley, Arnold, and Cohen 2009; Ibarra 1997; Leahy-Warren 2014). A positive appraisal can increase motivation and confidence to take on greater tasks (i.e., pursuing graduate education) while a negative appraisal can function as a deterrent to doing so (Bosley, Arnold, and Cohen 2009).

Emotional resources are acts that provide empathy, caring, sympathy, love, and concern for an individual (Jung 1997; Leahy-Warren 2014; Thoits 1986). Seeking emotional support is typically an attempt to relieve stressors or negative feelings (Thoits 1986) and facilitate the resolution of personal problems relating to psychological well-

being (Bamberger 2009). Emotional helpers may offer non-judgmental listening (Bosley, Arnold, and Cohen 2009), an outlet for venting (Nelson 2019), a confidence-boosting talk (Bamberger 2009), encouragement (Lysova et al. 2015), or comfort (Leahy-Warren 2014).

It is generally assumed that resource mobilization is driven by personal needs and motivations. For example, in the career development context, individuals who aim to advance their career are more likely to seek and value instrumental support (Higgins and Kram 2001; Lysova et al. 2015) while individuals who aim for personal growth are more likely to mobilize psychosocial assistance (Higgins and Kram 2001). This pattern typically falls along gender lines, with men acquiring more instrumental support and women pursuing more emotional resources (Van Emmerik 2006; Wellman and Wortley 1990). Interestingly, however, instrumental support (i.e., childcare) is a more important factor for women than for men in their decision to return to school (Hostetler, Sweet, and Moen 2007).

2.3.3 Antecedents of Network Mobilization

The second research question, which constitutes the focal point of the dissertation, asks what factors cause adults to mobilize their social network when making decisions about their professional development. The following sections address four antecedent factors that may cause the network characteristics and patterns observed in part one to occur. People's resource needs and their opportunities to use social contacts are the two dominant factors hypothesized to influence network mobilization. However, the organizational support-seeking literature highlights two factors that may lead people to avoid social contacts

during their decision-making process, including their support-seeking attitudes and the support climate in which they are embedded.

2.3.3.1 Support-seeking Attitudes

Research on organizational support-seeking suggests that people's support attitudes are a critical factor in explaining the willingness to gather support. This is because most help-seeking activities require social interaction, which imposes psychological or social costs (Bamberger 2009; Lee 2002). Asking others for advice or information may require the individual to admit a lack of ability, a lack of confidence, or a lack of knowledge (Ashford and Cummings 1983; Borgatti and Cross 2003; Levy et al. 1995; Roberson et al. 2003), which can threaten an individual's sense of self-worth (Bamberger 2009) and can quickly lead to feelings of incompetence, dependency, and inferiority to others (Lee 2002). These feelings can become highly prohibitive in mobilizing social ties. Organizational research has shown that employees are very sensitive to the opinions of their coworkers and supervisors and seek to maintain a positive image of themselves and avoid face-loss (Anseel, Lievens, and Levy 2007). Employees may particularly refrain from seeking support when they anticipate feedback to be negative or potentially threatening since they want to protect their ego (Anseel, Lievens, and Levy 2007; Ashford and Cummings 1983; Levy et al. 1995). It has been argued that people evaluate these social costs against the potential benefits prior to seeking support (Bamberger 2009). People who place a higher value on feedback and support are more likely to seek out others (Nadler, Ellis, and Bar 2003). Against this background, I hypothesize that support attitudes impact network mobilization such that:

H1-a: People who perceive social support as more valuable are more likely to mobilize their network than people who perceive such support as less valuable.

2.3.3.2 Support Climate

Workplace climate: Perceptions and beliefs about how supportive social ties are impact people's willingness to seek advice and support from them. From the organizational support-seeking literature we know that organizational practices do not only influence the chance of repeated encounters and opportunities for supportive exchanges and information-sharing but also whether employees think that their coworkers or supervisors are accessible for support (Ashford, Blatt, and VandeWalle 2003; London and Smither 2002; Van der Rijt et al. 2013; Mario L Small 2009). These perceptions are formed through one's experiences at the workplace that shape feelings of belonging and inclusion (Nelson 2019), impact concerns about trust and privacy (Bamberger 2009) and, as a result, influence communication between coworkers and support-seeking overall (Van der Rijt et al. 2012).

While multiple barriers and facilitators have been studied in the context of organizational support-seeking, interpersonal trust appears to be one of the most central constructs that is not just seen as the foundation for cooperation and knowledge exchange (Carmeli, Brueller, and Dutton 2009; Krackhardt 1990; Van der Rijt et al. 2012, 2013; Schoorman et al. 2007) but also as one of the driving forces of social network mobilization (Levin et al. 2016; Lin 2001; Nahapiet and Ghoshal 1998; Rostila 2011).¹ Trust can be defined as the confidence or expectation that the support seeker's interests are taken into consideration (Lin 2001), meaning that the support giver will act benevolently toward the

¹ While interpersonal trust is often seen as the foundation for the activation of social ties, important feedback loops exist where repeated positive exchanges lead to higher levels of trust.

support seeker (Levin et al. 2016; Schoorman et al. 2007). Trust facilitates support-seeking behaviors within organizations because it makes employees willing to be vulnerable (Cross and Borgatti 2004; Kammrath et al. 2019; Van der Rijt et al. 2013). Employees are more likely to speak up, ask for help, and express emotions if they are not concerned about negative interpersonal consequences such as being judged as incompetent or feeling embarrassed (Carmeli, Brueller, and Dutton 2009). Consequently, employees need to experience a certain degree of psychological safety (Borgatti and Cross 2003; Carmeli, Brueller, and Dutton 2009) or privacy (Levy et al. 1995), which, in turn, demands a level of trust among coworkers and between supervisors and subordinates (Van der Rijt et al. 2012). Honesty, frankness, and being non-judgmental have been identified as important attributes in support providers that help to establish interpersonal trust and facilitate career discussions at work (Kidd, Hirsh, and Jackson 2004).

In sum, the social nature of the work environment shapes trust and, in turn, support-seeking behavior, ultimately encouraging (or discouraging) employees to consult with work ties about private matters. This is important given research pointing out informal exclusionary practices within organizations against women and underrepresented minorities (McDonald 2011; Mehra, Kildruff, and Brass 1998; Nelson 2019). In the IT sector, such exclusionary practices include stereotypical judgments and subtle messages such as looks and gestures that make women and racial/ethnic minorities seen as less capable than white men (Ashcraft and Blithe 2009; McGee 2018). These practices have raised concerns that underrepresented groups experience higher levels of distrust toward coworkers, resulting in less feedback- and support-seeking (Roberson et al. 2003) and

restrained access to resource-rich professional networks (Ibarra 1993; McDonald 2011; Mehra, Kildruff, and Brass 1998; Nelson 2019).

Family and Friendship Climate: In contrast to organizations, interpersonal trust is often presumed to exist in kinship and friendship ties, so-called strong ties, due to closer levels of relational distance and more frequent interactions (Kammrath et al. 2019; Krackhardt 1992; Rostila 2011). The proximity of strong ties makes advice and support easily accessible, while emotional bonding makes seeking advice and support psychologically safe. And yet, even though people tend to place greater trust in strong ties, the strength of that tie may be the exact reason to avoid it (Small, 2017). For example, the risk to receive a negative judgement, the fear to feel embarrassed or general discomfort may prevent people to seek advice or support from family member and friends (Small, 2017). Although predominantly studied in medical contexts, the norms, attitudes, and values that family members and friends hold with respect to seeking support and advice also influence such behavior (Barksdale and Molock 2009; Markovic, Manderson, and Warren 2008). Further, perceived social support may be shaped by prior support-seeking experience and the nature of that experience (Bornschlegl, Meldrum, and Caltabiano 2020). For example, people may feel discomfort in asking family members and friends for advice/support if these groups have not been receptive to requests in the past.

Taken together, people's perceptions about how supportive family members, friends, coworkers and supervisors are influence advice- and support-seeking behaviors. A more supportive climate – whether at work or in one's personal life – will ultimately encourage people to consult with others about career matters. Therefore, I hypothesize that support climate impacts network mobilization such that:

H1-b: People who experience more supportive climates are more likely to mobilize their network than people in less supportive climates.

2.3.3.3 Resource Needs

Integral components of any decision-making process are the presence of uncertainty and the *need* of individuals to reduce that uncertainty by gathering information about themselves (e.g., values and preferences) and the environment (e.g., available choices). Consequently, also the decision whether to mobilize social ties or resources presumes uncertainty and needs – a conceptualization that is dominant in the career development (Gati and Asher 2005; Gati and Tal 2008), organizational behavior (Ashford and Cummings 1983; Higgins and Kram 2001; Van der Rijt et al. 2012), and information behavior literature (Case and Given 2016; Rogers 1986). Assessing one’s needs and selecting ties in one’s network who can fulfill those needs has been termed “functionalist specificity hypothesis,” (Perry and Pescosolido 2010) “purposive action approach” (Nelson 2019), or “targeted mobilization” (M.L. Small 2013).

Intensity of resource needs: A person’s need to involve others is determined and shaped by the level of uncertainty about skills, abilities, preferences, performance, or job availability. This also means that people particularly mobilize ties when facing uncertain situations (Anseel, Lievens, and Levy 2007; Ashford, Blatt, and VandeWalle 2003). Reversely, it has been suggested that people refrain from mobilizing ties if they have nothing to talk about (Bearman and Parigi 2004). Further, when issues are not perceived as urgent or immediate, people may opt for online networks instead of interpersonal networks to satisfy their professional and career development needs (Donelan et al. 2009).

Diversity of resource needs: Decreasing uncertainty is largely portrayed as an informational act. People require information about career alternatives (e.g., job and occupational attributes, organizational characteristics), occupational preferences as well as personal abilities (e.g., interests, personality types, work values) (Gati and Asher 2005; Gati and Tal 2008; Sauermann 2005). The focus on informational needs while neglecting instrumental, emotional, and appraisal needs is problematic, particularly when considering working adults seeking professional development (i.e., returning for a graduate degree). Studies on participation barriers highlight that returning adults face a unique set of barriers, including family responsibilities, work responsibilities, educational costs, and lack of confidence (Weber, Loumakis, and Bergman 2003), suggesting the presence of instrumental and emotional needs. For example, securing monetary and practical support with household and childcare duties can be an important precondition to participate in education later in life (Hoenig et al. 2016). From a career developmental perspective, returning adult students face specific needs in exploring careers that relate to their talents and interests and selecting courses that are relevant to their career goals (Brus 2006; Compton, Cox, and Laanan 2006; Francois 2014; Luzzo 2000), suggesting that appraisal support is equally important as informational support. Besides, in times of professional developmental transitions, adults do not only seek to get their interests and competencies validated but also develop a high need to feel understood and appreciated (Flum 2001), suggesting additional emotional support needs.

In sum, the targeted mobilization hypothesis would suggest that a person's need to involve others is determined and shaped by the intensity and diversity of uncertainty about oneself (e.g., values and preferences) and the environment (e.g., available choices). To

reduce uncertainty, people seek support from others who can meet their specific needs. This targeted or need-based pattern of social network mobilization has implications for the mobilization of networks, particularly network size and gathered social resources. Since a social tie generally provides a specific type of resource and potentially limited amount of support (Brashears 2014; Perry and Pescosolido 2010), people may reach out to a higher number and broader set of ties as their uncertainty (or resource need) increases. Put differently, people with greater resource needs reach out to more diverse ties, resulting in larger and resource-rich decision networks. Therefore, I hypothesize that needs stimulate network mobilization in the following two ways:

H2-a: People with more *diverse* resource needs activate larger and resource-rich networks than people with less diverse resource needs.

H2-b: People with more *intense* resource needs activate larger and resource-rich networks than people with less intense resource needs.

2.3.3.4 Network Access

Research suggests that social interaction is not always goal-directed or deliberate, but can simply be a function of a person's opportunity context (Pescosolido, 1992; Small, 2013; Small & Sukhu, 2016). That is, mobilizing social ties depends on the availability of opportunities to interact with others and not just a person's need (Small, 2009). Individuals do not solely target ties that can fulfill their specific needs but engage with ties that happen to be present – a process that has been characterized as “**opportune mobilization**” (Small, 2013).

Opportune mobilization practices have implications for the size of networks and gathered social resources. Since mobilization varies as a function of individual circumstances and not just deliberative practice, people with greater social connections and resource means will have larger and resource-rich discussion networks. This is where network access, one of the core constructs of social capital research (Lin and Erickson 2008), becomes important: People are embedded in different social contexts (or structures) that give access to different kinds of networks and, as a result, different opportunities to mobilize ties and gather resources. There is evidence that, for example, racial minority groups mobilize smaller networks not because of personal preference but structural constraints and, thus, limited opportunity to activate ties (Ibarra 1993; McDonald 2011; McGee 2018; Nelson 2019). Against this background, I hypothesize that network opportunity stimulates network mobilization in the following way:

H3: People with greater access to resources activate larger and resource-rich networks than people with less resource access.

2.3.4 Outcomes of Social Network Mobilization

Analyzing the characteristics of mobilized ties and received resources as well as the antecedents of mobilization are important aspects in understanding *how* and *why* social networks are used in people's decision-making. Yet, it remains unclear what outcomes social networks generate within the context of professional development decision-making, particularly how they affect adults' cognitive and emotional ability to make decisions about their professional development. Research question 3 addresses this issue, asking how mobilized networks impact adults' readiness for professional development. The following

sections define the construct of perceived readiness and hypothesize how social networks influence people's perceptions about their readiness to pursue a graduate degree.

2.3.4.1 Perceived Readiness for Professional Development

Readiness for professional development constitutes an important precursor as to whether adults decide to engage in developmental opportunities (i.e., applying to a graduate degree program). Readiness has traditionally been defined as the level of preparation needed to enter and succeed in college or the workforce (Caballero, C., Walker, A., & Fuller-Tyszkiewicz 2011). Consequently, readiness is often explained by personal attributes such as educational and work experiences (Rubenson 2007; Weber, Loumakis, and Bergman 2003). This traditional conceptualization does not include people's judgment about themselves and whether they feel ready to pursue professional development. Adults who possess the knowledge and skills to successfully engage in professional development may still not decide to do so because they sense a lack of readiness in themselves. Not feeling ready may be the result of cognitive factors such as a lack of knowledge about oneself or unclarity about professional goals (Germeijs and De Boeck 2003). Not feeling ready may also be the result of non-cognitive factors such as negative emotions associated with the choice (Anderson 2003) or a lack of motivation (Kirdök and Harman 2018).

2.3.4.2 Social Network Influence on Perceived Readiness

Adults' beliefs about their readiness may be molded by interactions with their social networks. Social networks may influence adults' perceived readiness by providing feedback, guidance, information, and emotional support. Advice and guidance in school,

community and workplace settings have been linked to increased levels of self-confidence, motivation, and interest in education and training (Hughes et al. 2002). Receiving guidance and advice has also been associated with enhanced levels of career certainty and decidedness (Hughes et al. 2002). For example, a study on interpersonal support at work revealed that career discussions with colleagues and supervisors help employees to develop a clearer view of their future direction, facilitate career planning, promote self-insight about skills and abilities, and leave employees feeling reassured and more motivated about oneself and their career (Kidd, Jackson, and Hirsh 2003).

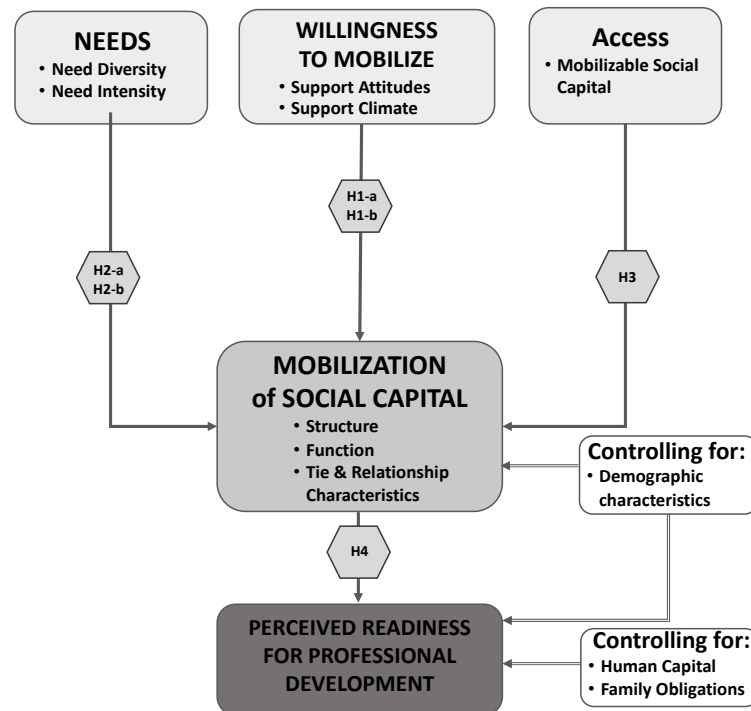
However, decision-making theories highlight the importance of need fulfillment for understanding mobilization outcomes. That is, information and other types of social resources provided by networks only generate effects to the extent that they address people's uncertainties and needs (Case and Given 2016). It has also been suggested that the benefits that accrue from social networks vary as a function of the recipient's goals, where resources are more beneficial or influential if they help actors to attain their goals (R. L. Sandefur and Laumann 1998). That suggests that it is not so much the quantity but the specificity of provided support resources that influence perceptions about perceived readiness. Against this background, I expect that the effects of social network mobilization on adults' perceived readiness for professional development are contingent on the match between *needed* and *gathered* resources. Specifically, I hypothesize the following:

H4: Social network resources increase perceived readiness for professional development to the extent that they meet people's support needs.

2.4 Conceptual Model of Social Network Mobilization in Professional Development Decision-Making

Figure 2.1 illustrates the conceptual model and hypotheses guiding this study.

Figure 2.1 Conceptual Model of Social Network Mobilization in Professional Development Decision-Making



H1-a: People who perceive social support as more valuable are more likely to mobilize their network than people who perceive such support as less valuable.

H1-b: People who experience more supportive climates are more likely to mobilize their network than people in less supportive climates.

H2-a: People with more *diverse* resource needs activate larger and resource-rich networks than people with less diverse resource needs.

H2-b: People with more *intense* resource needs activate larger and resource-rich networks than people with less intense resource needs.

H3: People with greater access to resources activate larger and resource-rich networks than people with less resource access.

H4: Social network resources increase perceived readiness for professional development to the extent that they meet people's support needs.

The model posits that social network mobilization in the context of professional development decision-making varies as a function of people's willingness to mobilize social networks (H1-a, H1-b), their resource needs (H2-a, H2-b), and their network access (H3), controlling for demographic characteristics. More specifically, needs, access, and willingness to mobilize may not just influence *if* and *to what extent* networks are mobilized

(i.e., determining network size and accessed resources) but also *which* ties (i.e., expert or close ties) and resources (i.e., instrumental, informational, appraisal, and emotional resources) are gathered for the purpose of decision-making. Finally, controlling for human capital (i.e., educational background, work experiences) and family obligations (i.e., childcare), people's perceived readiness for professional development varies as a function of their mobilized social capital (H4).

Social network mobilization encompasses the prevalence and size of networks (i.e., structure), accessed resources (i.e., function), and tie characteristics (i.e., tie strength, tie expertise). People's willingness to mobilize social capital is a cross-situational construct that includes their support-seeking practices (i.e., support attitudes) and beliefs about the supportive nature of their kin, friendship, and professional network (i.e., support climate). People's needs to mobilize others are shaped by the level of uncertainty about themselves and the environment, and that uncertainty can generate different need types (i.e., need diversity) and strengths (i.e., need intensity). People's opportunity to involve others is shaped by what resources they can access (i.e., resource access). Finally, perceived readiness is a multi-faceted construct that comprises people's sense of preparedness for engaging in professional development, the level of motivation and enthusiasm for pursuing professional development, and the level of clarity about their future direction.

CHAPTER 3. RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The purpose of this dissertation is to assess social network mobilization in the context of professional development decision-making in a technical field. To answer the research questions and test the conceptual model presented in the previous chapter, this chapter explains the research setting and mixed-methodological design.

3.2 Research Setting and Context

Data come from the Georgia Institute of Technology's Online Master of Science in Computer Science (OMSCS) degree program. Launched in Spring 2014, OMSCS has identical requirements to and confers the same degree as Georgia Tech's residential Computer Science Master's (MSCS) program but is offered in a fully-online format (OMSCS FAQ 2020). The degree requires a minimum of 30 credit hours for completion and students are advised to take three courses per academic year if they wish to graduate within a 3-year timeline. However, since the program targets working adults who typically have greater flexibility needs, students are allowed to enroll for up to six years.

MOOC-type program: With OMSCS, Georgia Tech started a new era of online education by creating a new type of program that had not been envisioned before. The emergence of massive open online courses (MOOCs) was a critical factor in the development of OMSCS. Up to the point of its creation in 2014, online programs had been modeled on existing residential programs, meaning that they were delivered in a very similar fashion to the way that campus programs were. Georgia Tech changed that

dramatically by developing a MOOC-type program that could educate thousands of students at one time. OMSCS was designed to expand access to higher education by promoting affordability (i.e., total tuition under \$7,000), flexibility (i.e., fully-online, asynchronous format), and diversity (i.e., a relaxed admission policy that does not require an undergraduate degree in computer science). Therefore, it is of no surprise that the OMSCS program has much higher application, admission, and enrollment rates than its residential counterpart (Goodman, Melkers, and Pallais 2019). With over 9,500 U.S. citizens enrolled in OMSCS between spring 2014 and fall 2019, the program makes up a significant portion of all domestic CS master's students (46,615 master's degrees in computer science were awarded nationally in 2017 (National Science Board 2019a)).

Student population: The OMSCS program attracts a large proportion of non-traditional students, i.e., working adults over the age of 24. With an average age of 34, the OMSCS student population consists of a considerable number of adults in the mid-career stage returning to college for professional development. The vast majority of students are employed (Goodman, Melkers, and Pallais 2019), but 2017 survey data shows that the full-time employment rate is 17 percentage points higher for men than for women (Kreth et al. 2019). The program also attracts a significant proportion of students without a computer science background. Enrollment data shows that less than half of OMSCS students have a bachelor's in computer science (Goodman, Melkers, and Pallais 2019) and survey data suggest that a CS major is less common among women than men (Kreth et al. 2019). In addition, fewer women than men have gained professional experience in computer science (Kreth et al. 2019). Taken together, a considerable proportion OMSCS students pursue this

degree for professional development purposes such as advancing within careers or transitioning fields and changing careers.

3.3 Mixed-Methods Research Design

Nature of research questions: Classifying the type(s) of research question(s) that a study seeks to answer is fundamental to the development of a research design (Yin 2014). Quantitative methods are best suited to address ‘what’ and ‘how’ questions to the extent that they are explanatory in nature and seek to understand the prevalence of a phenomenon and relationships among variables (Creswell and Plano Clark 2018; Yin 2014). Qualitative methods offer the ability to answer ‘how’ questions that are geared toward exploring a phenomenon and understanding it in more depth (Creswell and Plano Clark 2018; Yin 2014).

This dissertation asks two types of research questions: Describing the prevalence and nature of network mobilization (RQ 1) and determining what factors cause adults to mobilize social capital during professional development decision-making (RQ 2) imply a quantitative explanation and *favor* survey methods. In contrast, determining how mobilized networks impact readiness for professional development (RQ 3) has both an explanatory and exploratory character. Research question 3 is explanatory because it measures the relationship between ‘mobilization’ and ‘perceived readiness;’ and it is exploratory because it provides contextual information as to why a relationship exists (or does not exist). Ergo, this research question cannot be adequately answered by quantitative or qualitative research alone. The combination of quantitative and qualitative approaches into

a mixed-methods research design will help to draw a more complete picture that is both generalizable and meaningful.

Explanatory sequential design: The dissertation prioritizes the collection and analysis of quantitative data to test the model of social network mobilization within the context of professional development decision-making. However, a qualitative component is needed to help *explore* mobilization outcomes in more depth (RQ 3). In addition, qualitative methods are valuable in *explaining* the quantitative results about what factors cause adults to mobilize their network (RQ 2). Therefore, I will use an explanatory sequential design (Creswell and Plano Clark 2018). The research design is illustrated in Figure 3.1.

Figure 3.1 Mixed-Methods Research Design

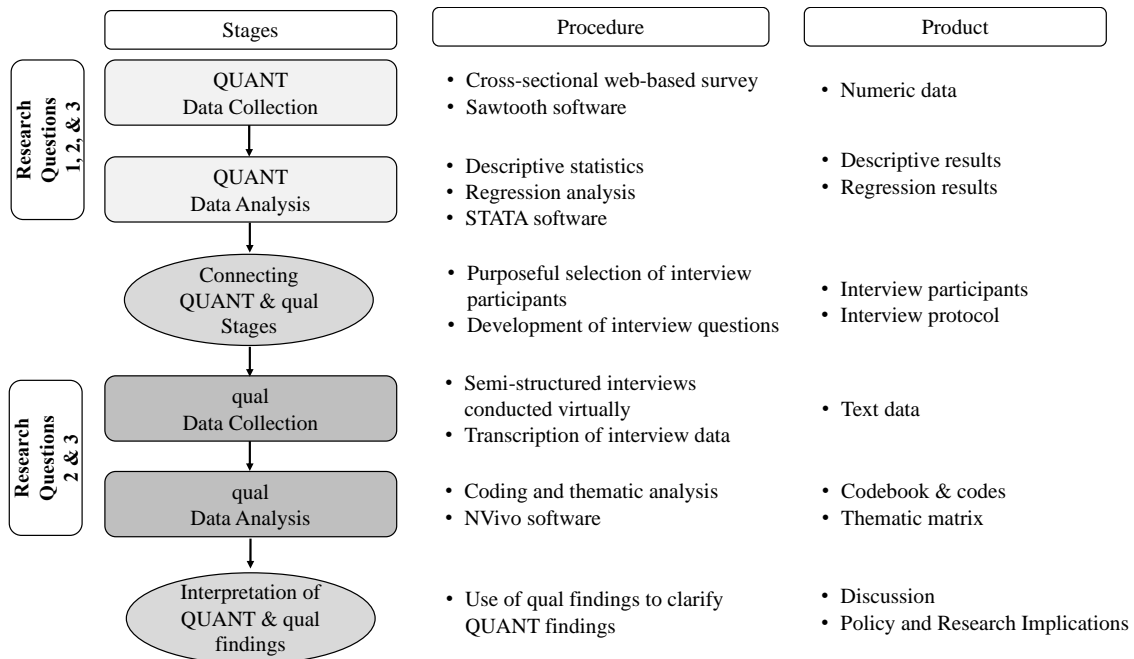


Figure adapted from (James and Slater 2014)

The design consists of two phases. First, quantitative methods are used to describe network mobilization patterns in the context of professional development decision-making and to test the hypotheses presented in Chapter 2. The details of the quantitative methods strand are presented in Section 3.4. Second, qualitative methods are used to explain and expand on the results of the quantitative analysis, particularly nonsignificant results. The details of the qualitative methods strand are presented in Section 3.5.

3.4 Quantitative Methods Strand

A survey of OMSCS students was conducted to assess the prevalence and nature of network mobilization (RQ 1), identify the factors of network mobilization (RQ 2), and determine how mobilized networks impact people's readiness for professional development (RQ 3). The next sections explain the development of the survey instrument, sampling, survey administration, data cleaning, respondent characteristics, variable operationalization, and analytical approach

3.4.1 Survey Design

3.4.1.1 Pilot Survey

The survey instrument was developed on the basis of a comprehensive literature review and semi-structured interviews with 75 OMSCS students in summer 2019. Prior to its full launch, the instrument was piloted with a sample of 300 OMSCS students (68 completed responses) and tested in cognitive interviews with six survey respondents to determine survey length, detect technical glitches, assess question clarity and intelligibility, and inspect for validity and reliability. The data analysis revealed problems with the reliability

of two constructs (i.e., social support attitudes and climate) as indicated by a Cronbach's alpha value below .70. To improve reliability, items with consistently low correlations across the board were either reworded or removed entirely. The analysis of the pilot data also raised some concerns about the feasibility of a factor analysis of one construct (i.e., needs) as some items had low factor loadings (<.40) or were cross-loaded with more than one factor. To address these issues, problematic items were either reworded or replaced with new items. The cognitive interviews did not uncover any major face validity issues of the survey instrument but did raise some concerns about survey length and the number of items in some network questions. To relieve respondent burden, the survey was revised to include only questions and items that were deemed essential to answering the research questions and testing the hypotheses. A final revision of the survey instrument was done after the dissertation proposal to incorporate committee feedback.

3.4.1.2 Survey Instrument

Egocentric network design: The survey employed an egocentric network design to study social network mobilization within the context of professional development decision-making. Distinct from a sociocentric research design that looks at the interconnections between a set of actors, an egocentric network analysis captures the social network of a single actor (Perry, Pescosolido, and Borgatti 2018). A *name generator* is traditionally used to identify members of someone's network and *name interpreters* to collect information about the nature of each social relationship and the characteristics of network members (Perry, Pescosolido, and Borgatti 2018). Put plainly, name generators are questions that ask respondents to list the names of people with whom they have a particular kind of

connection. Name interpreters are questions about *each* person that was named by the respondent and are used to generate detailed social capital descriptions and social resource inventories (Van Der Gaag and Snijders 2005; Perry, Pescosolido, and Borgatti 2018). Importantly, the name generator/interpreter instrument captures social capital that has been accessed for the purpose of professional development decision-making and builds the starting point for subsequent analyses of social resource use. Thus, the instrument constitutes a retrospective examination of *mobilized* social capital, not a measure of mobilizable social capital (Van Der Gaag and Snijders 2005).

Name generator: In this survey, the name generator question formed the basis for generating data on whether respondents mobilized anyone (i.e., mobilization yes/no) and the extent to which they mobilized their network (i.e., network size). In line with prior research on social capital use, this dissertation used a ‘critical episode approach’ (Lin and Erickson 2008) by asking respondents to reflect back on their decision to apply to OMSCS and name those individuals whom they talked to during that process (i.e., “*When you first considered applying to OMSCS, with whom did you talk about possibly applying?*”). The addition “*when you considered applying to OMSCS*” is a ‘boundary specification’ (Perry, Pescosolido, and Borgatti 2018) needed to study social network use in professional development decision-making. Survey respondents could provide up to six names, an upper bound that was determined empirically in the survey pilot.

Name interpreter: Name interpreter questions inquired about specific characteristics of each network tie and were designed to measure network expertise and closeness. Thus, questions were asked about whether the named individual was more advanced in their career than the respondent (i.e., expertise) and close to the respondent

(i.e., closeness). To assess people's experience in mobilizing advice networks for professional development, two name interpreter questions inquired whether the named individual was typically sought for career advice or emotional support.

Resource generator: The survey also employed a *resource generator* (Van Der Gaag and Snijders 2004, 2005) to capture access to social capital. A resource generator question presents respondents with a list of resources, asking whether they know somebody who could give access to this resource and, if selected, whether this person is a family member, friend, or acquaintance. A small number of resource items were developed that a) cover the four different resource domains, b) are relevant to professional development decision-making, and c) vary within the population at hand. The resource items were tested in the survey pilot to ensure item coverage, item relevance, and variance in the data.

Other survey questions: In addition to name generator/interpreter and resource generator questions, the survey included 'traditional' survey questions capturing people's educational and employment background, resource needs upon applying to graduate school, attitudes toward seeking advice and support, perceived support from family/friends and professional networks, prior experience in mobilizing their social networks, and perceived readiness for going back to graduate school. The survey instrument is included in Appendix A.

3.4.2 *Sampling*

To develop the sampling frame, student course enrollment data along with demographic variables (i.e., gender, race/ethnicity, birth date) were gathered from Georgia Tech's Institutional Research Office. The student data was anonymized by creating a random

unique ID for each person. Next, all U.S. citizens who were enrolled in OMSCS courses in the Spring of 2021 were selected, resulting in a sampling frame of 5,789 students. Concerns of a low response rate and an insufficient number of respondents for the statistical analyses prompted the selection of all students from that sampling frame rather than drawing a sample. Hence, all 5,789 students were invited to the survey.

3.4.3 Survey Administration

The survey was administered online using Sawtooth Software. Students were invited to the survey via email and provided with a unique user ID and password together with information about the research study and informed consent. Survey participation was constantly monitored, and multiple reminders were sent out to encourage participation, particularly from female students who are underrepresented in computer science and whose participation was critical for the study. A total of 1,388 respondents (partially) completed the survey, yielding a **response rate of 24 percent**. This response rate seems to be acceptable for current standards. Participation rates for web-based surveys have been exhibiting a downward trend in general and web survey response rates among student populations below 20 percent are not uncommon (Van Mol 2017). The non-response analysis revealed that respondents were more likely to be female and older than non-respondents, but not significantly different with regard to minority status.

3.4.4 Data Cleaning and Missing Values

Data were cleaned using qualitative (visual) techniques, including inspecting and removing blatant response errors and suspicious or malicious responses. For example, 4 observations

were excluded because of questionable comments in open-ended questions or extreme responses in rating scale questions. For the network data, there was no evidence that respondents had provided fictional names or otherwise suspicious responses that would question the integrity of the entire observation. However, seven respondents named online forums rather than single individuals, which defeats the purpose of the question. These responses were recoded to zero, thereby reducing the size of the mobilized network by one. Further, some respondents named groups of individuals (e.g., parents, coworkers) rather than separating them out (e.g., coworker 1, coworker 2), which could result in a more conservative estimate of network mobilization. Yet only 5 percent of the 2,698 names that were provided by survey respondents show this response pattern, which strengthens the confidence in the reliability of the network size measure.

Finally, 179 observations (representing 13 percent of all observations) – were removed due to at least one missing value on any of the key variables used in this study, resulting in a **final sample size of 1,205**. Much of the missingness could be attributed to the name generator (i.e., to whom did the respondent talk about the decision to apply to OMSCS), a question that was asked later in the survey where respondents dropped out. A missing values analysis was conducted to determine whether there are patterns of missing observations and understand whether deleting data for an observation that has (one or more) missing values would disproportionately affect specific demographic groups. The analysis suggests that the probability of being missing is the same for all demographic groups and does not give reason to suspect a missing data mechanism that could bias estimates.

3.4.5 Survey Respondent Characteristics

Table 3.1 presents the demographic, human capital, and household characteristics of the respondents.

Table 3-1 Survey Respondent Characteristics

Characteristic	Mean or Percent	Minimum	Maximum
Gender			
Male	82.1	0	1
Female	17.9	0	1
Age	33.02	18	66
Race/Ethnicity			
White	59.8	0	1
Asian	23.0	0	1
Black or African American	3.3	0	1
Hispanic or Latino	9.1	0	1
American Indian or Alaska Native	.1	0	1
Native Hawaiian or Other Pacific Islander	.3	0	1
Two or more Races	4.4	0	1
Human Capital			
Graduate Degree	22.2	0	1
Employed Full-time or Part-time	90.0	0	1
Years of computer science-related work experience	7.05	0	41
N = 1205			
Household Characteristic			
Living with spouse/partner	65.1	0	1
Living with children	25.3	0	1
N = 1140			

Note: Data on gender, age, and race/ethnicity are institutional student-level data provided by Georgia Tech's Institutional Research Office. Data on human capital and household characteristics are based on survey questions.

Overall, respondents are predominantly white males, reflecting the demographic characteristics of the computer science student and workforce population (National Science Board 2019a). Further, respondents demonstrate the most common characteristics of non-traditional or adult learners, including being older than 24 years, working while enrolled, and having a partner (Francois 2014; Kortesoja 2009). The average respondent is 33 years old, is a full-time or part-time employee, and has 7 years of computer science-related work

experience. Only 10 percent of respondents are not employed. While the majority of respondents (65 percent) live with a partner or spouse, only a quarter indicated having dependent children.

3.4.6 Variables

3.4.6.1 Dependent Variables

Social network mobilization: Network mobilization is the key dependent variable in research question 2 (factors predicting network mobilization), and also the key independent variable in research question 3 (outcomes of network mobilization). Mobilization is measured in three different ways. First, using the network generator question which asked respondents to name individuals they talked to about possibly applying to OMSCS, mobilization is measured as a dichotomous outcome (yes/no), coded 1 if the respondent had talked to at least one person about his/her decision to apply to OMSCS, and 0 otherwise. Second, mobilization is captured in terms of network size. The measurement of network size is based on the name generator question and constitutes the total number of named individuals (i.e., mobilized network ties), which could range anywhere from zero to six (six being the maximum number of text entries in the name generator question). Third, mobilization is captured in terms of its function (i.e., mobilized social resources) and measured as the diversity and intensity of resources provided by social ties. Based on a 0-100 slider question, respondents were asked about the extent to which named individuals had provided any of the 12 listed resource items. To measure resource diversity, responses to each of the 12 items were dichotomized using the mean cutoff point that determined whether a resource was provided (coded 1 if above the cutoff) or not provided

(coded 0 if below the cutoff), and then summed up to obtain a direct count of mobilized resources.² The resulting score was then multiplied by the number of resource types they represented. For example, if a respondent had five resources spread across three different resource categories, the resulting score would be 15. All resource items were summed up and then divided by the number of items to get an average score ranging between 0 and 100.

Perceived readiness for professional development: Perceived readiness is the key dependent variable in research question 3. Respondents were asked to rate their level of agreement with five statements that assessed their readiness for the graduate degree program (i.e., feeling prepared, seeing how the degree fits in the future, having doubts about the ability to succeed, clarity about what to achieve with the degree, having a good feeling about graduate school). The items were designed to measure the construct of readiness with the intention to create a composite variable. Cronbach's alpha test results and inter-item correlations were examined to determine the reliability of the scale. Although one item (i.e., having doubts about the ability to succeed) decreased the alpha coefficient slightly, the item was not removed because it is conceptually meaningful and the Cronbach's alpha value still indicated a satisfactory level of reliability for the construct (alpha = .7051) (DeVellis 2003). Thus, the five items were combined to measure perceived readiness. Details of the Cronbach's alpha analysis, including the average interitem correlations of all items and the interitem correlation matrix, are provided in Appendix C.

3.4.6.2 Key Independent Variables

The key independent variables are resource needs, resource need fulfillment, network access, support-seeking attitudes, and support climate.

Resource needs: Respondents were asked to reflect back on the time of applying to the OMSCS program and rate the importance of 12 different resource items using a 0-100 scale. Conceptually, these 12 items represented four resource types (i.e., instrumental, informational, appraisal, emotional resource needs). Based on this question, resource needs are captured in two ways. First, needs are measured in terms of their diversity. Analogous to the resource diversity variable, responses to each need item were dichotomized using the mean cutoff point that determined whether a need is present (coded 1 if above the cutoff) or absent (coded 0 if below the cutoff), and then summed up to obtain a direct count of needs.³ The resulting score was then multiplied by the number of resource types they represented. Second, needs are measured in terms of their intensity. All need items were summed up and then divided by the number of items to get an average score ranging between 0 and 100.

Resource need fulfillment: Need fulfillment is a constructed variable representing a comparison between resources needed (i.e., needs question) and resources received (i.e., mobilized resources question). During the survey design stage, the need items and mobilized resource items were designed to match conceptually. To construct the need fulfillment variable, each resource need was subtracted from its mobilized resource counterpart (e.g.,) (e.g., MobilizedResources_1 – Needs_1), resulting in a range of values

³ A sensitivity analysis was conducted with three cut-off points (mean, median, 75th percentile). Results did not change meaningfully, which is why I only present results with the mean cut-off.

from -100 to +100 where a negative value indicates unfulfilled needs and a positive value indicates unsolicited resources. A value close to zero indicates good need fulfillment. All 12 need fulfillment variables were added and divided by the number of items to get an average. In addition, the descriptive analysis will present a more detailed breakdown of need fulfillment items.

Network access: The survey used a resource-generator question to capture resource opportunities. Respondents were asked whether they had known anyone who could provide six types of resources. If the respondent selected that they had known someone, their answer was coded as 1. The binary resource items were then summed up to generate a total social capital measure, a measurement approach that has been successfully applied by researchers who initially developed the resource generator (Van Der Gaag and Snijders 2005).

Support-seeking attitudes: Five survey items assessed people's perceived value associated with support-seeking, all of which were adapted from a tested and validated advice-seeking scale (Ng et al. 2020). The five items were combined to create an overall score of advice attitudes. The resulting Cronbach's alpha was .8651, indicating that the scale is reliable (DeVellis 2003). Results of the Cronbach's alpha analysis, including the average interitem correlations of all items and the interitem correlation matrix, are provided in Appendix C.

Support climate: Support climate was measured with items assessing the extent to which people experience psychological safety and support within their kinship/friendship, and (for respondents who were employed at the time of applying to OMSCS) workplace networks. The three items assessing family/friendship support climate were combined into

one scale, demonstrating good reliability with a Cronbach's alpha score of .7874 (DeVellis 2003). The five items assessing workplace advice climate were combined into a second advice scale that also demonstrated good reliability (Cronbach's alpha = .7491). Results of the Cronbach's alpha analysis, including the average interitem correlations of all items and the interitem correlation matrix, are provided in Appendix C.

3.4.6.3 Control Variables

In addition to the independent variables, the analysis includes several control variables for demographics, human capital, and family obligations.

Demographic characteristics: For demographics, the control variables are gender, age, and minority status. Gender was coded 1 if the respondent was female, and 0 otherwise. Age is a continuous variable measured in years. Minority status is coded 1 for respondents whose race or ethnicity is underrepresented in STEM (African American/Black, Hispanic, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or multiracial), and 0 for respondents whose race is dominant in STEM (White, Asian). The variable operationalization deviates from NSF's definition of underrepresented minority in science and engineering which does not include individuals who report two or more races (National Science Foundation 2021). However, this dissertation elected to include people who identify as mixed-race in the minority category, which is consistent with recent studies on underrepresented groups in STEM (Jehangir, Stebleton, and Collins 2022; Louten 2022; Whitcomb and Singh 2021; Wilkins-Yel et al. 2022).

Human capital: For human capital characteristics, the control variables are graduate education, employment, and computer science work experience. Graduate education is a dummy variable coded 1 if respondents entered the OMSCS program with a master's degree, MBA, law degree, or PhD and 0 otherwise. Employment is coded 1 for respondents who were either full-time or part-time employed at the time of applying to the OMSCS program and 0 otherwise. Computer science experience is a continuous variable measuring the respondents' computer science-related work experience in years.

Family obligations: For family obligations, the control variables are having a partner, and having children. Both are dummy variables coded 1 if the respondent is partnered and has children.

3.4.7 Data Analysis Methods

3.4.7.1 Research Question 1: Prevalence and Nature of Network Mobilization

The first research question (i.e., What is the prevalence and nature of social network mobilization is in professional development decision-making?) explores how common social network mobilization is in professional development matters more broadly and the decision to pursue graduate education specifically. To understand the nature of mobilized networks, the analysis focuses on network structure, tie characteristics, and network function, which constitute three key dimensions of social networks (Perry, Pescosolido, and Borgatti 2018).

Descriptive analysis: The analysis is descriptive in nature to outline and highlight the different characteristics of decision networks which we know much too little about. Means and proportions of network characteristics are compared for men and women, and

minority and non-minority students. The focus is on understanding gender and minority differences given that female and minority issues in technical fields are an important policy and research concern.

3.4.7.2 Research Question 2: Factors Predicting Network Mobilization

The second research question (i.e., What factors cause adults to mobilize their social network when making decisions about their professional development?) is the focal question of this dissertation.

Descriptive analysis: The data analysis starts with a comprehensive descriptive analysis of the factors that may cause people to reach out to members of their social network. Particularly people's resource needs and their opportunity to mobilize resources are discussed in more depth to help contextualize empirical findings. Difference of means tests are conducted to compare male versus female, and minority versus non-minority responses.

Regression analysis: The data analysis proceeds with the regression analysis. The empirical models seek to identify the factors that produce the network structure and function observed in part one. All subsequent models estimate the effects of resource needs, network access, support attitudes, and support climate on network mobilization.

$$\text{Social Network Mobilization} = \beta_0 + \beta_1 \text{Resource Needs} + \beta_2 \text{Network Access} + \beta_3 \text{Support Attitudes} + \beta_4 \text{Support Climate} + \beta_5 \text{Demographic Control Variables}$$

Given the different structures of the dependent variable ‘network mobilization,’ different types of regressions are needed. To estimate the probability of reaching out to at least one social tie, logistic regression is used. The logistic regression is the most suitable given the binary nature of this outcome variable (Long 1997). For estimating network size and resource diversity, several count regression models are used and compared (see more details below). Finally, OLS regression is used for estimating resource intensity, which is considered a continuous variable.

Model selection and evaluation: As a general procedure at the beginning of each analysis, several regression models of decreasing complexity were developed, starting with several interactions between the main predictors and demographic control variables and ending without a single interaction term. These models were compared using the corrected Akaike Information Criterion (AICc) for a weight of evidence. Further, all models underwent several robustness tests such as bootstrapping and robust standard error estimation to validate empirical results.

Because of the different ways that count variables can be distributed, several count regression models were developed and compared, including Poisson, Quasi-Poisson, Negative Binomial 1 (constant dispersion), and Negative Binomial 2 (mean dispersion). An analysis of the model fit indicated that the negative binomial 1 model was the best fitting model for both network size and resource diversity (comparison of results shown in Appendix E). Further, since network size demonstrated an excessive number of zeros, the results of the negative binomial regression models were compared to both a zero-inflated Poisson and zero-inflated negative binomial regression (results shown in Appendix E).

3.4.7.3 Research Question 3: Outcomes of Network Mobilization

The third research question (i.e., How do mobilized networks impact adults' readiness for professional development?) addresses the outcomes of network mobilization in professional development decision-making with respect to people's perceived readiness for pursuing a graduate degree.

Descriptive analysis: The data analysis begins with a descriptive analysis of people's perceived readiness for professional development. Difference of means tests are conducted to compare male versus female, and minority versus non-minority responses.

Regression analysis: Since the dependent variable 'perceived readiness' is continuous, OLS regression is used to understand the impact of network mobilization and need fulfillment on readiness.

$$\begin{aligned} \text{Perceived Readiness} = & \beta_0 + \beta_1 \text{Social Network Mobilization} + \beta_2 \text{Need Fulfillment} + \\ & \beta_3 \text{Demographic Control Variables} + \beta_4 \text{Human Capital Control Variables} + \beta_5 \text{Family} \\ & \text{Obligations Control Variables} \end{aligned}$$

Several OLS regression models of decreasing complexity were developed and compared using the AICc for a weight of evidence before settling on the best fitting model. Further, all models underwent several robustness tests such as bootstrapping and robust standard error estimation to validate empirical results (detailed results shown in Appendix E).

Table 3-2 Summary of Variables for Empirical Models

Construct	Survey Question & Items	Measurement
<i>Dependent Variables</i>		
Social Network Mobilization		
Prevalence (mobilization y/n)	When you first considered applying to OMSCS, with whom did you talk about possibly applying? • I did not talk to anyone	[0/1] Coded 1 if the respondent talked to at least 1 person, 0 otherwise
Structure (network size)	When you first considered applying to OMSCS, with whom did you talk about possibly applying? • [Name 1] Respondent to specify	[N] Count of named individuals
Function Resource Diversity Resource Intensity	Thinking about the people you just named, to what extent did they do the following? • Provide information about OMSCS • Inform about program quality • Help cover program costs/expenses • Reflect with you on personal/career goals • Give advice on how to succeed in OMSCS • Offer support at work to accommodate OMSCS • Offer help at home to accommodate OMSCS • Tell you that you would do well in OMSCS • Help you evaluate if the skills learned would be useful • Inform about career prospects • Help you understand how being in the program would affect your life • Provide encouragement to apply	[N] Resource Diversity: total number of provided resources determined by the mean cut-off value multiplied by the number of resource types that the total represents, resource types follow resource typology (informational, instrumental, appraisal, emotional) [N] Resource Intensity: sum of 12 resource items/12
Perceived Readiness for Professional Development	Upon admission to the OMSCS program, I: • Felt prepared to do well in the program • Could see where the degree fits in my future • Had doubts about my ability to succeed • Knew what I wanted to achieve with this degree • Had a good feeling about graduate school	Constructed variable, summation of 5 survey items capturing sense of preparedness, level of enthusiasm, and clarity about future direction

Independent Variables

Resource Needs

Need Diversity
Need Intensity

Before applying to OMSCS, how important was it for you to do each of the following?

- Learning about program content and requirements
- Learning about program quality
- Evaluating if the program would help me achieve my personal/career goals
- Receiving encouragement that I would do well in the program
- Getting my tuition paid for
- Getting support at work (e.g., flexible hours, remote work)
- Learning how to succeed in the program
- Learning about career prospects
- Understanding how being in the program would affect my life
- Getting help at home (e.g., chores)
- Evaluating if the skills learned would be useful for me
- Receiving encouragement to apply

[N] Diversity of needs: total number of resource needs determined by the mean cut-off value multiplied by the number of resource types that the total represents, resource types follow typology (informational, instrumental, appraisal, emotional)

[N] Average intensity of needs: sum of 12 need items/12

Need Fulfillment

See questions on resource needs & network function

[N] Average need fulfillment: sum of 12 need fulfillment items/12, items are calculated by subtracting resource need from corresponding mobilized resource (e.g., MobilizedResources_1 – Needs_1)

Network Access

Think about the people you knew at the time of applying. Did you know someone who could...?

- Provide emotional support whenever needed
- Help cover educational expenses if needed
- Help out in busy times or stressful situations
- Give career advice
- Provide information about graduate school
- Provide information about OMSCS

[N] Total social capital: total number of resources available

Support-seeking Attitudes

In general, seeking advice or support from others about my professional advancement:

- Is useful to me
- Is unusual for me
- Helps me make better choices
- Is necessary for me
- Is important for my decision-making

Constructed measure, summation of 5 survey items

Support Climate

Family Support Climate	In general, my family or friends: <ul style="list-style-type: none"> • Take interest in my career pursuits • Play an important part in my career decisions • Are available to talk about important issues in my life 	Constructed measure, summation of 3 survey items
Work Support Climate	Think about the organization you worked for at the time of enrolling in OMSCS. In general, what was the workplace climate like? <ul style="list-style-type: none"> • My coworkers took a personal interest in me • My supervisor took interest in my advancement • People tended to stereotype me at work • I felt left out of the office environment • I experienced negative sentiments in my organization 	Constructed measure, summation of 5 survey items

Control Variables**Demographic Characteristics**

Gender	<i>institutional data</i>	[0/1] Coded 1 for females
Minority Status	<i>institutional data</i>	[0/1] Coded 1 for minority (Black, Hispanic, American Indian, Pacific Islander, Multiracial)
Age	<i>institutional data</i>	[N] in years

Human Capital

Graduate degree	Do you have any of the following degrees? (Master's Degree (MS or MA); MB; Law degree (JD); PhD)	[0/1] Coded 1 if respondent has a grad degree, 0 otherwise
Employed at time of program application	When you applied to OMSCS, were you? (FT employment, PT employment, self-employed, contingent employment, not employed)	[0/1] Coded 1 if employed, 0 otherwise
CS work experience	How many years of computer science related work experience do you have?	[N] in years

Family Obligations

Living with a spouse/partner	Who do you live with? (Alone, spouse/partner, adult family member, other non-family adults, children)	[0/1] Coded 1 if respondent lives with a spouse/partner, 0 otherwise
Childcare responsibilities		[0/1] Coded 1 if respondent lives with children, 0 otherwise

3.5 Qualitative Methods Strand

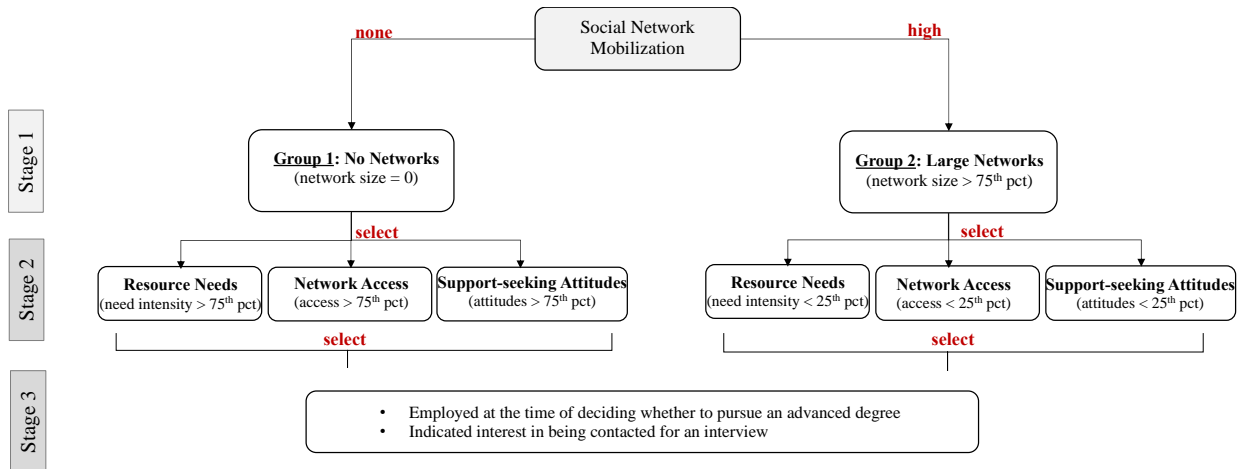
Semi-structured interviews with a purposefully selected group of survey respondents were conducted to clarify the factors of network mobilization (RQ 2) and how mobilized networks impact people's readiness for professional development (RQ 3). The next sections explain the sampling procedure, development of the interview instrument, interview administration, and analytical approach.

3.5.1 Sampling

To test the hypothesized mechanism of social network mobilization in the context of professional development decision-making, a deviant case analysis was employed. Deviant cases are typically extreme or outlier cases on the dependent variable and are useful to find omitted variables and new information about causal pathways (Seawright 2016). To develop the sampling frame, a three-stage deviant case selection process was employed (see Figure 3.2 for details). First, survey respondents were selected who showed extreme social network mobilization patterns by either talking to no one or talking to an above-average number of people about their decision. Second, survey respondents were selected who diverged from the conceptual pathways of social network mobilization by showing an inverse (as opposed to a hypothesized direct) relationship between the dependent variable and the key independent variables, resulting in two main groups. The first group included respondents who did not mobilize anyone but showed high levels of resource needs, network access, or support-seeking attitudes. The second group included respondents who mobilized a large network but reported low levels of resource needs, network access, or support-seeking attitudes. Third, the sampling frame excluded respondents who were not employed at the time of applying to OMSCS and who indicated in the survey that they did

not want to be contacted for an interview. These selection criteria resulted in a final sampling frame of 98 survey respondents. All individuals from the sampling frame were invited to participate in the interview.

Figure 3.2 Interview Sampling Procedure



3.5.2 Interview Protocol Design

A semi-structured interview protocol (included in Appendix B) was designed to meet three aims. First, the interviews were designed to test the hypothesized mechanism of social network mobilization in the context of professional development decision-making and determine the validity of the constructs. Second, the interviews were geared towards understanding the outcomes of network mobilization more deeply, including positive as well as negative impacts. The third and final goal was to better understand the organizational and public policy environment in which decisions about professional development are made.

Several interview questions addressed the key constructs of the conceptual model, including people's uncertainties and support needs during their decision to apply to

OMSCS, the nature of their friendship and professional networks at the time of applying, and their attitudes towards seeking advice and support about professional development more generally. Information about these constructs was then used to probe further and understand the extent to which resource needs, support climate, and support-seeking attitudes influenced social network mobilization actions.

The protocol included one portion that specifically addressed respondents who had not talked to anyone about their decision to apply and one portion that exclusively addressed respondents who had talked to several people. For example, respondents who had not reached out to a single person were asked about the reasons for not doing so and whether they had sought support or advice on other matters relevant to their career in the past. In contrast, respondents who had mobilized relatively large networks were asked about what had led them to reach out to these people. To understand the outcomes of network mobilization more deeply, the protocol also included questions on what respondents had gained from the conversations they had with members of their network and how the conversations shaped how they thought about the degree program.

Finally, the protocol included questions about organizational support structures, asking what incentives their employer had provided to them to pursue a graduate degree.

3.5.3 Interview Administration

The interviews were conducted virtually using Microsoft Teams. Participants received an interview invitation via email and were asked to schedule an interview for a 30-minute timeslot using Calendly. An interview confirmation was sent out along with a Microsoft Teams meeting link. Recruitment of interview participants stopped when data saturation

was achieved because themes began to repeat and no new relevant information could be gained from additional interviews (Saunders et al. 2018). The total sample size was 20, including 10 individuals in each of the two sampling groups. The interviews were recorded with the permission of the interviewees and transcribed using Microsoft Teams' automatic speech recognition service. Finally, transcripts were cleaned manually to ensure data accuracy and quality.

3.5.4 Interview Participant Characteristics

Table 3.3 gives an overview of the demographic, family background, and professional background characteristics of the interviewees. Overall, interview participants were predominantly white males. There was a big range in age and years of professional computer science experience. Further, participants worked in very different industries, spanning from IT to telecommunications, utilities, finance, manufacturing, healthcare, market research, and higher education.

3.5.5 Data Analysis

Interviews were thematically analyzed using the qualitative data analysis software NVivo. Thematic analysis, which is a systematic, iterative analysis technique that involves identifying, coding, and interpreting a class of phenomena (i.e., thematic patterns) within the data (Miles and Huberman 1994), proceeded in two phases. First, all interviews were coded using several descriptive codes that were created deductively from the conceptual model and interview protocol, and inductively based on the interview text. Second, coded

text was reviewed to identify patterns and themes in the data. The codebook is presented in Table Table 3-4.

Table 3-3 Interview Participant Characteristics

	Survey response patterns	Gender	Minority	Age	Living with partner	Living with children	CS work experience	Occupation	Sector
High Level of Mobilization	low needs	male	no	65	yes	no	41	software architect	telecommunications
	low needs	female	no	25	yes	no	2	support engineer	market research
	low needs	male	no	40	yes	no	19	research scientist	higher education (public)
	low needs	male	no	25	yes	no	4	engineer	manufacturing
	low support attitudes	male	no	45	yes	yes	20	software engineer	telecommunications
	low support attitudes	male	no	27	yes	no	6	machine learning engineer	IT
	low needs & support attitudes	male	yes	57	yes	no	37	manager	financial services
	low needs & support attitudes	male	no	31	yes	no	6	data scientist	healthcare
	low needs & support attitudes	female	no	42	no	yes	20	software developer	manufacturing
low access & support attitudes	male	no	43	yes	no	20	software architect	higher education (private)	
Non-mobilization	high needs	male	no	28	no	no	2	software engineer	IT
	high needs	male	no	56	yes	no	30	software architect	IT
	high access	male	no	27	yes	no	5	software engineer	communication services
	high needs	male	no	37	yes	yes	16	server support contractor	government agency
	high access	male	no	41	yes	yes	17	software engineer	IT
	high support attitudes	male	no	32	no	no	3	engineer	manufacturing
	high support attitudes	male	no	40	yes	yes	7	data scientist	insurance
	high needs & support attitudes	male	no	35	yes	yes	5	software developer	utility
	high needs & support attitudes	male	no	39	yes	yes	7	data scientist	financial services
high needs, access & support attitudes	female	no	30	yes	no	3	programmer	manufacturing	

Table 3-4 Interview Codebook

	Code	Code Type	Definition
Nature of the Decision	1. Decision Gravity		
	1.1 Life Impact	Inductive	Comments about how pursuing the degree impacted the respondent's personal life.
	1.2 Career Impact	Inductive	Comments about how pursuing the degree impacted the respondent's career.
	2. Uncertainties/Needs		
		Deductive	Descriptions on what types of questions and concerns the respondents had before applying to the program (e.g., program-related aspects, ability to success, financial concerns, etc.).
	3. Organizational Incentives		
	3.1 Incentive Types	Deductive	Descriptions about what types of professional development incentives were offered (tuition reimbursement, flexible work arrangements, time to study, promotion, etc.) by the employer.
3.2 Usage	Deductive	Information about whether incentives were used, including reasons for (not) using.	
3.3 Advancement Culture	Inductive	Descriptions of how professional advancements is encouraged and valued at the organization and whether supervisors & coworkers (have) pursued graduate degrees themselves.	
Mobilization Factors	4. Individual-Level Mobilization Factors		
	4.1 Support-Seeking Attitudes	Deductive	Comments about how support from others in career decision is valued and how these values impacted mobilization.
	4.2 Decision-Making Styles	Inductive	Description of behavior that notes how decisions on career matters are generally made.
	5. Situational Mobilization Factors		
	5.1 Decision Gravity	Inductive	Comments about how the perceived gravity of the decision impacted mobilization.
	5.2 Resource Needs	Deductive	Comments about how the questions and concerns the respondents had before applying impacted their decision to seek social support (i.e., targeted mobilization).
	5.3 Resource Access	Deductive	Description of instances where support was sought from ties who happened to be present (i.e., opportune mobilization). Also includes characterization of networks in terms of resources and size.
	5.4 Tie Attributes	Inductive	Comments about how certain tie attributes (e.g., closeness, expertise) impacted mobilization.
	5.5 Work Climate	Deductive	Descriptions about how the climate at work (i.e., feeling embedded/included, having good relationships with coworkers & supervisors) impacted mobilization.
	5.6 Advancement Culture	Inductive	Descriptions about how the professional advancement culture impacted mobilization.
5.6 Family & Friendship Climate	Deductive	Comments about the supportive nature of family members and friends, and how that impacted mobilization.	

Mobilization Impact	6. Organizational Resources	Deductive	Comments about how important organizational incentives were during decision-making.
	7. Network Resources		
	7.1 Emotional Resources	Deductive	Descriptions about how emotional support contributed to the decision to pursue the degree (e.g., confidence in oneself, confidence in the decision).
	7.2 Appraisal Resources	Deductive	Descriptions about how appraisal support helped the respondent during the decision process (e.g., clarity about what impact the degree would have on their personal life and career)
	7.3 Informational Resources	Deductive	Descriptions about whether and how informational resources from ties were used in the decision process. Includes descriptions about what other (non-network) informational sources were used.
	7.4 Instrumental Resources	Deductive	Descriptions about whether and how instrumental support from ties were used in the decision process (e.g., help at home, childcare, financial support).
	7.5 Least helpful resources	Deductive	Descriptions about which social resources (and from which ties) were not helpful during decision-making. Also includes examples of negative or discouraging comments from ties.

CHAPTER 4. QUANTITATIVE RESULTS

4.1 Introduction

The purpose of the quantitative methods strand is to understand what network mobilization in the context of professional development decision-making looks like, why adults would (not) want to mobilize their social networks in this context, and how mobilized networks impact readiness for professional development.

This chapter is organized as follows. Section 4.2 presents a descriptive analysis of the prevalence of social networks in professional development decision-making and the patterns of mobilized networks with respect to their structure, provided resources, and tie characteristics. Section 4.3 focuses on what may produce the network characteristics observed in part one. This section constitutes the focal point of the quantitative analysis by first exploring descriptively the network mobilization factors and then using empirical models to test the influence of these factors on network mobilization. Section 4.4 addresses the outcomes of social network mobilization with a particular focus on people's perceived readiness for professional development. The chapter concludes with a summary of the findings.

4.2 Prevalence and Patterns of Social Network Mobilization in Professional Development Decision-Making

4.2.1 *The Prevalence of Social Networks in Professional Development*

Career advice-seeking norms: To help contextualize the findings and understand people's support-seeking norms, the survey asked about the extent to which respondents rely on

online sources versus interpersonal contacts for career advice. As Table 4-1 shows, respondents seek career advice predominantly online and much less from their social networks. That is, interpersonal contacts provide career advice only to a moderate extent. This is true for men and women, and minority and non-minority groups alike (see Appendix Table D.1 for a detailed breakdown of results). Among interpersonal sources, respondents rely mostly on friendship networks when seeking career advice, followed by professional networks including coworkers and supervisors. In comparison, family networks make up the smallest portion of career advice.

Table 4-1 Career Advice Seeking Patterns

Survey Question: In general, how much do you rely on the following sources for career advice (e.g. job search, professional development)?	
Question Format: Slider, Measurement: 0-100 scale, “Not at all” to “A great deal”	
Online Sources	
Resources I can find online	82.84 (20.61)
Interpersonal Sources	
Friend	52.57 (29.37)
Coworker	50.31 (30.61)
Supervisor	47.24 (31.73)
Family member	43.33 (31.83)
<i>N</i>	1187
mean coefficients; sd in parentheses	

Social support in the context of pursuing a graduate degree: While the results above give a general assessment of support-seeking norms and preferences, they do not speak specifically to people’s behavior when deciding about whether to pursue a graduate degree. Therefore, I examined people’s ego networks to determine whether respondents reached out to anyone to talk about possibly applying to the graduate degree program. Results show that social networks are highly prevalent in this context (Table 4-2). Three-quarters of respondents mobilized their network during their decision-making process.

Respondents who mobilized their networks versus respondents who did not may systematically differ in terms of demographics, education, and work experience. To test this, a logistic regression model was constructed that examined whether any group was more or less likely to reach out to their network during the decision to seek a graduate degree. Results show that women are more than twice as likely to mobilize their network than men (Table 4-3). Further, having a graduate degree lowers the odds of using social networks when deciding whether to pursue a graduate degree. Minority status, age, employment status, and professional experience do not influence the likelihood that people will or will not mobilize their social ties.

Table 4-2 Prevalence of Mobilization When Deciding about Pursuing a Graduate Degree

Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?		
Question Format: Name Generator Measurement: 0/1		
	N	%
Mobilization: respondent talked to at least 1 person	901	74.8
Non-mobilization: respondent did not talk to anyone	304	25.2
	1,205	100.0

Table 4-3: Logistic Regression Results: Prevalence of Mobilization (abbreviated model)

Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?		
Question Format: Name Generator Measurement: 0/1		
	OR	
Demographic characteristics		
Female (0/1)	2.41*** (0.51)	
Human capital characteristics		
Graduate degree (0/1)	0.63** (0.10)	
N	1,205	

Odds ratio (OR), standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05
 Odds ratios specify the odds that the event (i.e., network mobilization) will occur versus the odds that the event will not occur (i.e., non-mobilization). An odds ratio that is greater than one indicates that the event is more likely to happen, and less likely to occur if the ratio below one. Full model is presented in Table E.1 in Appendix E.

4.2.2 *The Characteristics of Mobilized Social Support Networks*

Turning to the specific networks that respondents mobilized for the purpose of professional development decision-making, this section examines the structural, functional, and tie characteristics of these networks. The section begins with an analysis of the number of mobilized ties and the extent to which people use an existing support and advice network. Next, to understand who these social ties are, tie characteristics are examined. The analysis concludes with an assessment of what types of exchanges and support resources these networks provide and whether resources are concentrated in certain areas.

4.2.2.1 Structure

Network size: Respondents' networks specific to the decision to seek a graduate degree tend to be relatively *small* (Table 4-4). On average, respondents gathered support or advice from only two individuals. When restricting the sample to respondents who did mobilize their network, the average network size grows slightly to about 3 social ties. While there is no evidence for differences in network size between minority and nonminority respondents, significant *gender differences* emerge, with women mobilizing larger networks than men (mean: 2.62 vs. 2.03, $p < 0.001$). This result appears to be driven by men who did not mobilize their network at all given that the gender difference disappears once the sample is restricted to respondents who did reach out to at least one person.

Network topology: The network that respondents mobilized for the purpose of their professional development decision is *not entirely different* from their typical support and advice networks. That is, when considering whether to pursue an advanced degree, respondents often mobilize an *existing support and advice network* (Figure 4.1). On

average, roughly half of the network consists of individuals who are part of the respondent's regular emotional support network. In comparison, tapping into existing professional networks is even more common; roughly 60% of the network consists of ties that are typically sought for career advice. However, these numbers also show that part of the mobilized network consists of *atypical ties*, indicating that decision to pursue a graduate degree calls for social ties and resources that are not typically sought.

These patterns are the same for minority and non-minority respondents. However, there are some interesting *gender differences*. In comparison to men, women use more of their regular emotional support network in their professional development decision-making process (mean: 0.60 vs. 0.51, $p < 0.001$). It is also worth noting that women's networks show a *stronger overlap between career advice and emotional support ties* than men's networks. Roughly one-third of the people that women talked to about their plan to pursue a graduate degree are individuals whom they regularly seek out for both career *and* emotional support. This suggests that men have more distinct network ties or divide more strongly between professional and emotional matters than women when seeking support and advice relevant to their decision.

Table 4-4 Size of Mobilized Networks

Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?				
Question Format: Name Generator Measurement: Count				
	Full sample	Women	Men	Gender differences
Network size	2.13 (1.77)	2.62 (1.77)	2.03 (1.75)	***
<i>N</i>	1205	216	989	
<i>For respondents who do mobilize</i>				
Network size	2.85 (1.46)	3.04 (1.53)	2.81 (1.44)	
	901	186	715	

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

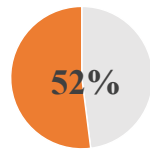
Complete descriptive statistics are included in Table D.2 in Appendix D.

Figure 4.1 Topology of Mobilized Networks

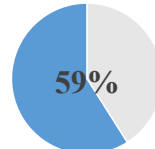
Survey Question: I typically go to this person when I need:... [emotional support, career advice]

Question Format: Name Interpreter **Measurement:** Proportion in NW

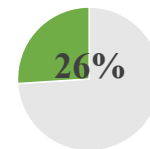
Proportion of ties in network who are regularly sought for...



Emotional support



Career advice



Emotional support &
Career advice

Women: 0.60 (0.31)***

Men: 0.51 (0.34)

Women: 0.34 (0.33)***

Men: 0.24 (0.32)

N = 901, mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

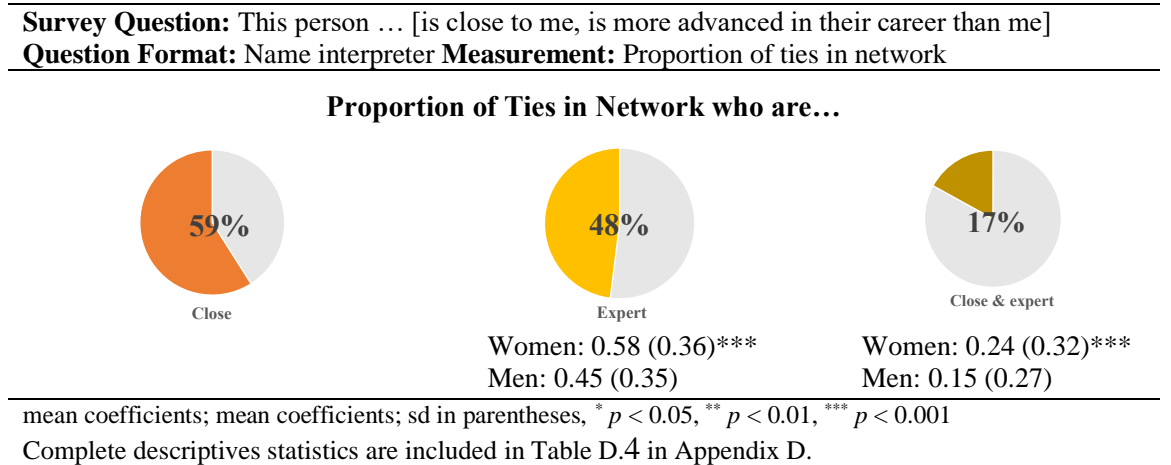
Complete descriptive statistics are included in Table D.3 in Appendix D.

4.2.2.1 Tie Characteristics

Tie strength & expertise: Turning to the question of *who* respondents reached out to about their decision, results show that networks demonstrate a *high proportion of close ties* (mean: 0.59), indicating that respondents seek advice and support predominantly from strong ties. That is true for men and women, and minorities and non-minorities alike. Moreover, nearly half of people's networks are comprised of individuals who are more advanced in their careers than themselves (mean: 0.48). Thus, networks demonstrate a *high degree of professional expertise*, underlining the nature of the decision at hand (i.e., professional development) and the career context within which this decision is made. Interestingly, women more so than men sought advice from people they consider experts (mean: 0.58 vs. 0.45, $p < 0.001$). In addition, women's networks show a higher overlap between tie strength and expertise (mean: 0.24 vs. 0.15, $p < 0.001$). That is, roughly a quarter of women's networks include ties that are considered close *and* expert contacts,

which mirrors the earlier finding that women’s networks are not as divided into emotional and professional matters as men’s networks are.

Figure 4.2 Tie Characteristics



4.2.2.2 Function

Mobilized network resources: Reaching out to others about the decision to pursue a graduate degree raises the question about the types of exchanges and support social ties made available to respondents. Results show that resources are not provided in abundance and tend to be *concentrated in certain resource areas* (see Figure 4.3, detailed breakdown of the results is presented in Table D.5 in Appendix D). Both the intensity and the range of mobilized resources tend to be small, where social support is predominantly a matter of *emotional* and *appraisal* resources. Respondents reported that the people they talked to about their decision provided significant encouragement to apply (mean: 79.29) and helped extensively with goal reflection (mean: 67.15). Instrumental resources such as financial aid and help at work as well as program-specific information were mobilized only to a limited extent. Importantly though, respondents received much less instrumental and informational support but more emotional support than needed (see section 4.3.2.1 for a descriptive

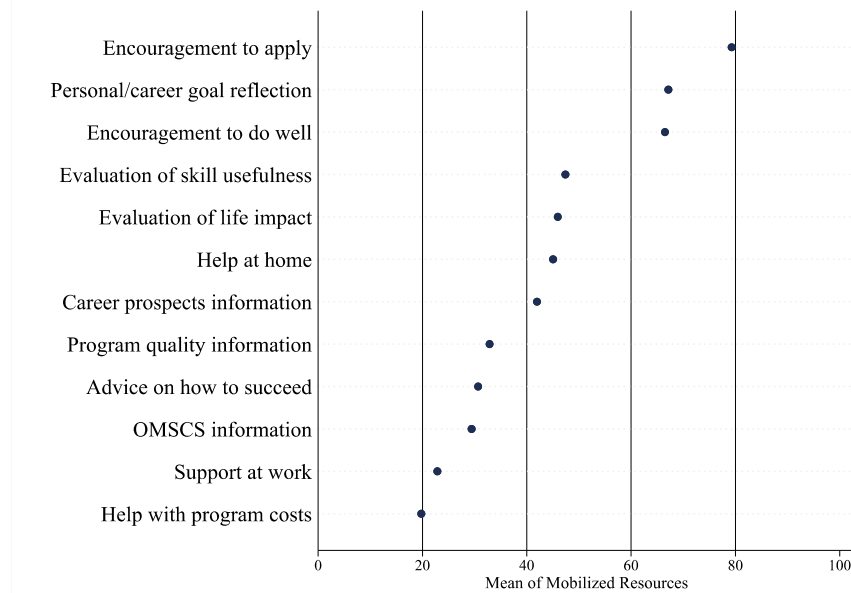
analysis of respondents’ social support needs, descriptive results of how the level of need fulfillment varies across resource types are included in Table D.6 in Appendix D).

While there is no evidence for minority differences, significant *gender differences* exist. Women’s networks are resource-richer than men’s, both in terms of the volume (mean: 47.62 vs. 42.71, $p < 0.01$) and diversity (mean: 22.49 vs. 19.18, $p < 0.01$) of resources. Much of these differences appear to be driven by *career advice-seeking*. That is, women’s networks provide more career information and support on career/personal goal reflection and skill evaluation.

Figure 4.3 Mobilized Social Network Resources

Survey Question: Thinking about the people you just named, to what extent did they do the following?

Question Format: Slider **Measurement:** 0-100 scale, “Not at all” to “A great deal”



Complete descriptive statistics are included in Table D.5 in Appendix D.

Table 4-5 Diversity and Intensity of Mobilized Network Resources

Survey Question: Thinking about the people you just named, to what extent did they do the following?
Question Format: Slider **Measurement:** 0-100 scale, “Not at all” to “A great deal”

	Full sample	Women	Men	Gender differences
Resource Diversity (#)	19.86 (13.05)	22.49 (14.25)	19.18 (12.64)	**
Resource Intensity (%)	43.72 (17.41)	47.62 (19.66)	42.71 (16.65)	**
<i>N</i>	894	186	708	

Resource diversity: total number of resource needs determined by the mean cut-off value multiplied by the number of resource types that the total represents

Resource Intensity: sum of mobilized resources/12

mean coefficients; sd in parentheses mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3 Factors Associated with Social Network Mobilization in Professional Development Decision-Making

This section addresses the second research question (“What factors cause adults to mobilize their social network when making decisions about their professional development?”). As discussed in Chapter 2, three factors are hypothesized to influence whether and how people mobilize their social networks when deciding about pursuing a graduate degree. These three factors are support-seeking willingness, social support needs, and network access. The following sections will examine each factor descriptively and then test its influence on network mobilization.

4.3.1 Willingness to Seek Social Support

Whether social networks are mobilized presumes a *willingness* to seek advice and psychosocial support from others. That willingness includes both person-specific attributes such as attitudes toward seeking support and contextual attributes such as the supportive

nature of people's networks. Thus, this section will first look at how much advice from others is valued and how supportive family, friendship, and professional networks have been in the past in career matters before testing the effect of these two factors on the probability to reach out for support specific to the decision about pursuing a graduate degree.

4.3.1.1 Patterns of Support-Seeking Attitudes and Climate

Attitudes: Research on organizational help- and advice-seeking suggests that people's attitudes regarding the value of such support are a critical factor in explaining the willingness to reach out to others. Results show that, overall, respondents have moderately positive attitudes towards seeking advice and support about their career (mean: 64.39, see Table 4-6). Viewing input from others as useful and helpful for making better choices contributes to positive levels of attitudes while viewing it as unnecessary or unimportant to decision-making tempers these attitudes (see Table D.9 in Appendix D for detailed breakdown of survey items). In comparison to men, women report slightly more positive attitudes towards seeking career advice from their social network (mean: 67.78 vs. 63.65, $p < 0.01$).

Climate: Perceptions and beliefs about how supportive social ties are hypothesized to impact people's willingness to seek advice and support from them. The results here suggest that respondents' kin- and friendship networks are supportive by showing interest in their careers and being available to talk about important issues in life (Table 4-6, see Table D.10 in Appendix D for detailed breakdown of survey items). Women and men as well as minority and non-minority groups experience equally supportive family and

friendship climates. Respondents who were employed at the time of enrolling in OMSCS reported positive work climates. However, women reported slightly more negative work climates (mean: 66.35 vs. 71.15, $p < 0.01$), which is mostly driven by experiencing exclusionary practices at work (more detailed results are provided in Table D.11 in Appendix D).

Table 4-6 Support Attitudes and Support Climate

Survey Questions:				
	[Support Attitudes] In general, seeking advice or support from others about my professional advancement:			
	[Family/Friendship Climate] In general, my family or friends:			
	[Work Climate] In general, what was the workplace climate like?			
	Question Format: Slider Measurement: 0-100, “Strongly Disagree” to “Strongly Agree”			
	Full sample	Women	Men	Gender differences
Support Attitudes	64.39 (19.49)	67.78 (18.28)	63.65 (19.67)	**
Family & Friendship Support Climate	70.62 (21.40)	71.23 (22.01)	70.48 (21.27)	
N	1205	216	989	
Work Support Climate	70.33 (18.70)	66.35 (18.64)	71.15 (18.62)	**
N	1076	185	891	

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Detailed descriptive statistics are included in Table D.9, Table D.10 and Table D.11 in Appendix D.

4.3.1.2 Influence of Support-seeking Attitudes and Climate on Network Mobilization

Prior research has presumed but not tested the influence of support-seeking attitudes and support climate on using social networks. Thus, Hypotheses 1a and 1b stated that positive support-seeking attitudes and support climates (both at the workplace and in personal life) increase the probability that people will activate their social network during the decision-making process (i.e., reach out to at least one social tie). The results here do not support either of the hypotheses.

Mobilization yes/no: The results point to a weak positive relationship between support-seeking attitudes and mobilizing at least one social tie but do not reach significance

(Table 4-9, column 1). Similarly, the relationship between work support climate and network mobilization is positive but insignificant (Table 4-10, column 1). The initial positive effect of family and friendship support climate that appears in the logit model is not robust and disappears in bootstrapped models (shown in Table E.3 in Appendix E). Additional analyses in which data are partitioned sequentially suggest that people's family and friendship climate has, at most, an effect at the margin (regression tree results shown in Figure E.1 in Appendix E).

Other network mobilization results: Social support attitudes have no effect on the size of mobilized networks but on *resource* mobilization. Respondents who view advice on career matters as more valuable gather more support resources from their networks but do not necessarily reach out to more social ties (Table 4-9, columns 3 and 4). However, the effects are small. For example, a one-percentage-point increase in support attitudes increases resource mobilization by .02 percentage points. The regression analyses further suggest that the family and friendship support climate influence *network size* and *mobilized resources* to some extent. Having more supportive personal networks is associated with larger *and* resource-rich networks. Yet again, the effects are relatively weak (e.g., network size OR: 1.00, Beta: 1.14, $p < 0.001$, see Table 4-9 column 2). The insignificant effect of work support climate is consistent throughout all models. That is, how supported people feel at their workplace has no bearing on whether networks are mobilized (Table 4-10 column 1), how many network ties are mobilized, (Table 4-10 column 2), and what network resources are mobilized in this process (Table 4-10 columns 3 and 4).

In sum, support-seeking specific to the decision whether to pursue a graduate degree is only marginally associated with how people feel about the potential value of

career advice in general and how supported they feel from family members and friends in personal and career matters. Further, people's work support climate does not predict social network mobilization in any shape or form.

4.3.2 *Social Support Needs when Deciding about Pursuing a Graduate Degree*

Resource needs are hypothesized to be another driving force of social network mobilization. Conceptually, people have different types and levels of uncertainties prior to applying to graduate school for which they need different types of support. This section will first examine what support needs respondents had prior to pursuing a graduate degree and then test the influence of these needs on network mobilization.

4.3.2.1 Patterns of Support Needs

The presence of uncertainty and the need for individuals to reduce that uncertainty by gathering information about themselves (e.g., values and preferences) and the environment (e.g., available choices) are integral components of any decision-making process (Case and Given 2016). The results from the descriptive analysis suggest that the decision to pursue a graduate degree puts people in a situation with moderate uncertainty. That is, respondents express moderately diverse and intense needs before applying (see Figure 4.4 and Table 4-7). There is a clear demand for two resource areas in particular: *informational and appraisal resources*. Respondents find it most important to learn about program quality and requirements (mean: 85.33 and 82.45, respectively) followed by gathering information that – in a broad sense – would allow them to evaluate themselves and the value that the program holds for their future (mean: 79.20 and 74.74, respectively). Instrumental

resources such as getting financial assistance, help at home, or help at work are far less important to respondents (mean: 47.86, 42.03 and 50.07, respectively). These results suggest that questions about what the degree program can provide are at the top of everyone's mind while questions about how to make the program fit into one's life are secondary. In terms of emotional resource needs, findings are mixed. Respondents do not express a strong need for encouragement to either apply or that they will do well in the program (mean: 48.59 and 47.94, respectively). However, understanding the impact that the program has on one's life (mean: 65.79) is considerably more important and possibly encapsulates both emotional and appraisal support aspects.

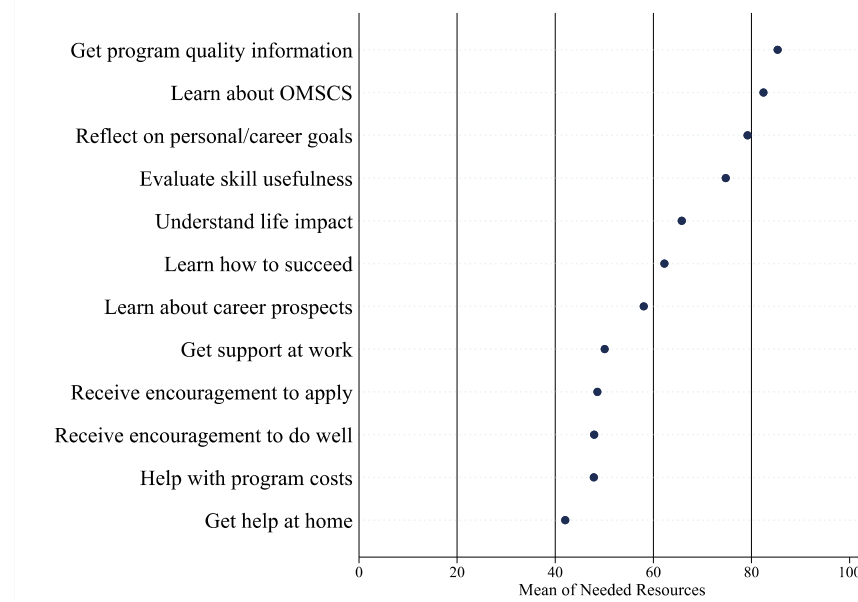
Several significant *demographic differences* exist (see Table 4-7, detailed results shown in Table D.7 in Appendix D). Women indicate both more diverse needs and more intense needs than men. The same pattern holds for minority vs. non-minority groups. These results suggest that the decision to seek a graduate degree presents a greater mix of uncertainties (and potential challenges) for women and minorities. While the magnitudes of these differences are small, they are still meaningful, and it is important to examine the need patterns in more detail to understand where differences are occurring. Women express a much greater need for emotional support resources than men, suggesting lower levels of confidence in themselves and the decision to seek an advanced degree. Further, financial assistance and support at home are more important for women, indicating the degree program is a more profound change in women's than men's personal lives. In comparison to non-minority groups, minority respondents indicate a greater need to learn about career prospects, evaluate the usefulness of skills learned, and how to succeed in the program. This suggests that the decision to pursue a graduate degree has a greater impact or change

on the professional lives of minorities. The most extreme difference between these groups, however, is getting financial assistance, which is dramatically more important for minorities than non-minorities (mean: 55.03 vs. 46.36, $p < 0.001$).

Figure 4.4 Social Support Needs

Survey Question: Before applying to OMSCS, how important was it for you to do each of the following?

Question Format: Slider **Measurement:** 0-100, “Not at all important” to “Extremely Important”



Detailed descriptive statistics are included in Table D.7 in Appendix D.

Table 4-7 Diversity and Intensity of Support Needs

Survey Question: Before applying to OMSCS, how important was it for you to do each of the following?

Question Format: Slider **Measurement:** 0-100, “Not at all important” to “Extremely Important”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Need Diversity (#)	24.18 (14.39)	26.15 (14.29)	23.75 (14.39)	*	27.12 (14.95)	23.57 (14.21)	**
Need Intensity (%)	62.02 (15.79)	65.75 (15.32)	61.21 (15.78)	***	65.21 (17.02)	61.36 (15.45)	**
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Resource diversity: total number of resource needs determined by the mean cut-off value multiplied by the number of resource types that the total represents, range: 0-48

4.3.2.2 Influence of Support Needs on Network Mobilization

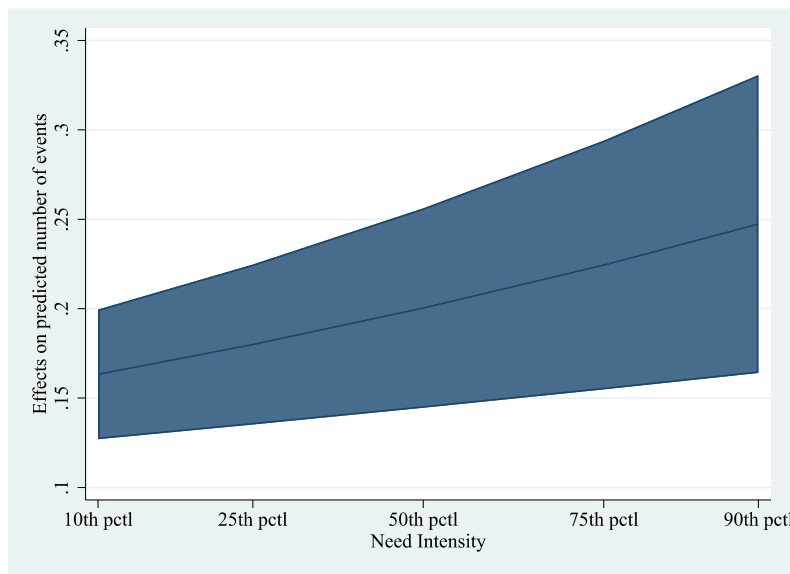
The decision whether to pursue a graduate degree presents various kinds and levels of uncertainties for which people need different types of social support, including informational, appraisal, instrumental, and emotional resources. Hypotheses 2a and 2b stated that people with greater resource needs, both in terms of diversity and intensity, are more likely to mobilize larger networks and gather more social resources. Since need diversity and need intensity are highly correlated and show signs of multicollinearity, the models displayed in Table 4-9 test the influence of these two need variables on network mobilization separately. The results only partially support the hypotheses that greater resource needs result in larger and resource-richer networks.

Network size: Respondents with more diverse or intense social support needs do not mobilize larger networks than comparable respondents with fewer needs (Table 4-9, column 2). These results are robust against numerous sensitivity checks, including different types of count regression models and different samples that either include or exclude respondents who did not mobilize anyone (comparison of count models included in Table E.4 in Appendix E, zero-inflated models are shown in Table E.5).

Network resources: While resource needs do not appear to predict the size of networks, the results show an effect on network resources (Table 4-9, columns 3 and 4). Respondents with greater support needs are more likely to mobilize more social support during their decision-making process, both in terms of a greater volume and greater variety of resources. For example, having more *diverse* resource needs results in networks that also show a greater diversity and intensity of social support (IRR: 1.01 and coeff: 0.32,

respectively). Similarly, experiencing more *intense* resource needs is associated with increasing diversity and intensity of mobilized network resources (IRR: 1.01 and coeff: 0.34, respectively). However, all of these effects are small. Figure 4.5 visualizes the probability of gathering more diverse network resources at various levels of social support needs.

Figure 4.5 Effect of Need Intensity on the Diversity of Mobilized Network Resources



The graph is showing the marginal effect of need intensity at various quantile levels with the 95 % confidence interval. All other variables are held at their means.

In sum, the uncertainties that people face during the decision whether to pursue a graduate degree predict the mobilization of social networks to some extent. Greater demand for social support is associated with significantly higher levels of resource mobilization, but not larger networks. This suggests that smaller networks may provide as much support as larger networks. The results further show that need diversity and intensity operate in the

same way and to the same extent, indicating that they may be conceptually distinct phenomena but not empirically distinguishable.

4.3.3 *Access to Support Resources Relevant for Professional Decision-Making*

The opportunity to gather resources within one's social network is conceptualized as a third driving factor of social network mobilization. This section will first examine what types of accessible resources respondents had before pursuing a graduate degree and then test the influence of these resources on network mobilization.

4.3.3.1 Patterns of Resource Access

Types of accessible resources: Results show that respondents have, on average, access to three out of the six listed resource items that are thought to be relevant during the decision on whether to go back to graduate school (Table 4-8). *Emotional support* is the most readily accessible resource, with 75% of respondents indicating to know someone who could provide emotional support whenever needed. Accessibility to instrumental support varies, with more respondents knowing someone who could help in busy or stressful times than someone who could provide financial assistance (mean 0.61 and 0.45, respectively).

However, as we just saw in the analysis of resource needs, emotional as well as instrumental resources are more tangential to the decision whether to pursue an advanced degree and access may not matter as much to the average respondent. The resources that are more central to the professional development decision at hand (i.e., appraisal and informational resources) are also the resources that are harder to access. Only about half of the respondents have somebody in their network that can provide career advice.

Information about graduate school and the degree program is particularly difficult to access through existing social networks. Yet, important gender differences exist. In comparison to men, women report greater access across nearly all resource types, which is interesting since women also experienced greater resource needs.

Who provides access: Figure 4.6 shows which network types (i.e., family member, friend, colleague/ supervisor, acquaintance) typically provide which of the selected resources. Access to emotional and instrumental support is overwhelmingly provided by strong ties, including family members, and to some extent by friends. The picture is a lot more mixed for career, graduate school, and OMSCS-specific information and advice. While family and friends continue to provide informational and advice resources, co-workers and supervisors become a lot more important. Particularly career advice networks are highly diversified and comprised of professional or industry-specific ties as well as ties people feel close to. Further, given the range of ties who can provide career advice, respondents also have a greater capacity to mobilize this resource as opposed to emotional and instrumental support where the number of potential ties is much smaller. Acquaintances, or weak ties, are most important for information and advice about graduate school and OMSCS, suggesting that resources that tend to be scarce or more limited within a population require a wider circle of social networks.

Table 4-8 Access to Network Resources

Survey Question: Think about the people you knew at the time of applying. Did you know someone who could...?

Question Format: Check all that apply **Measurement:** 0/1

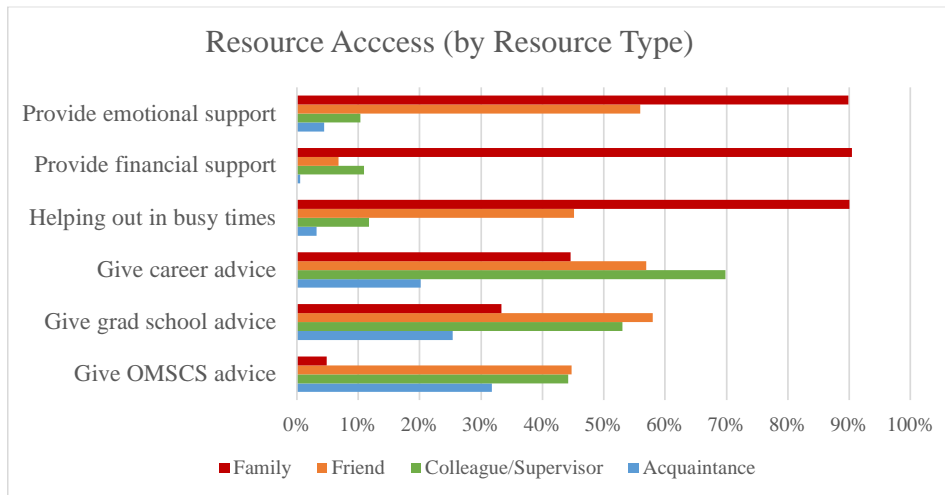
	Full sample	Women	Men	Gender differences
Emotional support	0.76 (0.43)	0.82 (0.39)	0.75 (0.44)	*
Help out in busy/stressful times	0.61 (0.49)	0.69 (0.46)	0.59 (0.49)	**

Career advice	0.56 (0.50)	0.65 (0.48)	0.54 (0.50)	**
Financial support	0.45 (0.50)	0.57 (0.50)	0.43 (0.50)	***
Graduate school information	0.44 (0.50)	0.51 (0.50)	0.43 (0.50)	*
OMSCS information	0.30 (0.46)	0.35 (0.48)	0.29 (0.46)	
Total Social Capital	3.13 (1.79)	3.59 (1.76)	3.03 (1.78)	***
N	1205	216	989	

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Detailed descriptive statistics are included in Table D.8 in Appendix D.

Figure 4.6 Resource Access (by Resource Type)



4.3.3.2 The Influence of Resource Access on Network Mobilization

Knowing people who can give access to resources that are relevant to the decision at hand shapes the opportunity and ability to mobilize social networks. Hypothesis 3 stated that people with greater access to resources activate larger, resource-rich networks than people with fewer network resources. The results here support this hypothesis.

Network size: Respondents with greater access to resources mobilize more social ties than comparable respondents with more limited resources (IRR: 1.15, $p < 0.001$). This result stands up to several count regression model permutations and the use of different samples that either include or exclude respondents who did not mobilize anyone (see Table

E.4 and Table E.5 in Appendix E). Figure 4.7 visualizes the marginal effects of an increase in network access on network size, holding all other variables at their mean values. Figure 4.8 shows that the slopes occur at higher levels for women than for men, indicating that access to resources gives women a leg up in mobilizing social networks in professional development decision-making.

Figure 4.7 Effects of Resource Access on Network Size

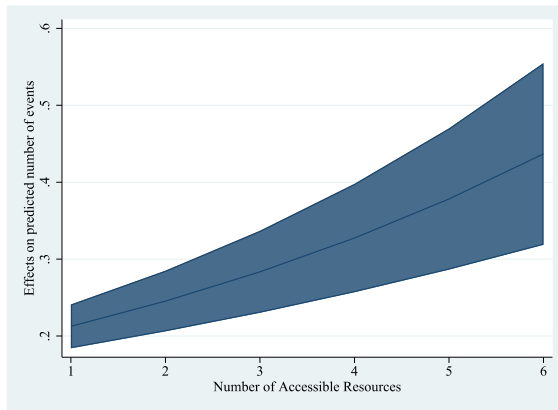
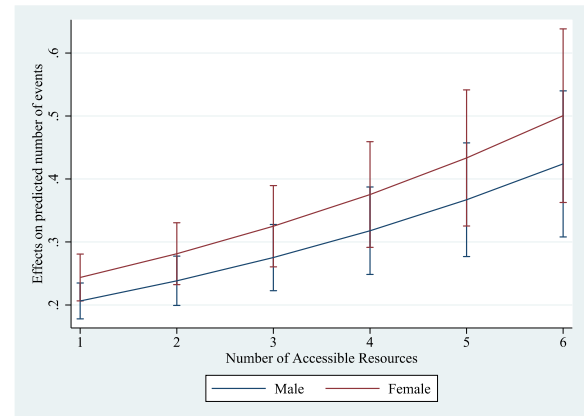


Figure 4.8 Effects of Resource Access on Network Size, Comparison by Gender



The graphs show the marginal effects of resource access at various levels with the 95 % confidence interval. All other variables are held at their means.

Network resources: Access to resources relevant to the decision at hand is also reflected in the diversity and intensity of mobilized resources. Respondents who reported greater access to resources mobilize a greater variety of resource types (IRR: 1.16, $p < 0.00$) and a greater volume of support (coeff: 3.60, $p < 0.001$).

Other findings: While not hypothesized, accessibility to resources that are relevant to professional development decision-making strongly predict whether people mobilize their network during their decision-making process. For example, each additional network resource increases the odds of mobilizing one’s network by 48 percent. This result

remained robust in sensitivity analyses (bootstrapped logistic regression results are shown in Table E.3 in Appendix E).

In sum, access to resources predicts *if* input from social networks is sought and the *extent* to which advice and psychosocial support are gathered. Further, access to resources has the strongest influence on social network mobilization among all key predictors (see Beta coefficients and regression tree analysis in Appendix E).⁴ These patterns indicate that the opportunity to reach out to others about the decision whether to pursue a graduate degree is more important in explaining network mobilization patterns than the uncertainties that people face during this process.

⁴ However, albeit resource access is the most important predictor, it improves the prediction of mobilization only by about 4 percent (results of regression tree analysis shown in Appendix E).

Table 4-9 Regression Analysis Results: Influence of Mobilization Willingness, Resource Needs, and Access on Network Mobilization (Full Sample)

	Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?		Survey Question: Thinking about the people you just named, to what extent did they do the following?	
	Mobilization Y/N (Logit)	Network Size (NB)	Resource Diversity (NB)	Resource Intensity (OLS)
	1	2	3	4
	OR	IRR	IRR	Coeff
Willingness to Mobilize				
Support-seeking Attitudes (%)	1.00 (0.00)	1.00 (0.00)	1.00* (0.00)	0.02*** (0.01)
Family & Friendship Support Climate (%)	1.00* (0.00)	1.00*** (0.00)	1.00** (0.00)	0.02* (0.01)
Resource Access (#)	1.48*** (0.07)	1.15*** (0.02)	1.16*** (0.02)	3.60*** (0.32)
Resource Needs				
Need Diversity (#)	1.01 (0.01)	1.00 (0.02)	1.01*** (0.00)	0.32*** (0.04)
Need Intensity (%)	1.01 (0.01)	1.00 (0.00)	1.01*** (0.00)	0.34*** (0.04)
Control Variables				
Female (0/1)	2.11*** (0.46)	1.18** (0.07)	1.04 (0.05)	2.47* (1.26) 1.84 (1.25)
Minority (0/1)	0.87 (0.16)	0.99 (0.06)	0.97 (0.06)	-1.54 (1.37)
Age (in yrs)	1.02* (0.01)	1.00 (0.00)	1.00 (0.00)	0.02 (0.06)
Observations	1,205		864	

Note: The two resource needs variables are highly correlated and show signs of multicollinearity. Thus, the models test the influence of need diversity and need intensity on network mobilization separately. Unless otherwise noted, the results of the other predictors did not differ meaningfully.

Columns 1 and 2 display odds ratios of the logistic models, columns 3 through 6 display incident rate ratios of the negative binomial models, and columns 7 and 8 show coefficients of the OLS models. Standard errors in parentheses. *** p < 0.001, ** p < 0.01, * p < 0.05

Table 4-10 Regression Analysis Results: Influence of Mobilization Willingness, Resource Needs, Access on Network Mobilization (Employed Respondents)

	Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?		Survey Question: Thinking about the people you just named, to what extent did they do the following?	
	Mobilization Y/N (Logit)	Network Size (NB)	Resource Diversity (NB)	Resource Intensity (OLS)
	1	2	3	4
	OR	IRR	IRR	Coeff
Willingness to Mobilize				
Support-seeking Attitudes (%)	1.00 (0.00)	1.00 (0.00)	1.00* (0.00)	0.02** (0.01)
Family & Friendship Support Climate (%)	1.00 (0.00)	1.00*** (0.00)	1.00** (0.00)	0.02* (0.01)
Work Support Climate (%)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	0.00 (0.01)
Resource Needs				
Need Intensity (%)	1.01 (0.00)	1.00 (0.00)	1.01*** (0.00)	0.33*** (0.04)
Resource Access (#)	1.46*** (0.07)	1.14*** (0.02)	1.17*** (0.02)	3.70*** (0.33)
Control Variables				
Female (0/1)	2.10** (0.51)	1.18** (0.07)	0.98 (0.05)	1.15 (1.34)
Minority (0/1)	0.85 (0.17)	0.99 (0.07)	0.96 (0.06)	-2.40 (1.45)
Age (in yrs)	1.02* (0.01)	1.00 (0.00)	1.00 (0.00)	0.05 (0.06)
Observations	1,076		775	

Note: The two resource needs variables are highly correlated and show signs of multicollinearity. Thus, the models test the influence of need diversity and need intensity on network mobilization separately. Since results did not differ meaningfully with respect to the focal independent variables, only results from models including need intensity are reported here. Columns 1 displays odds ratios of the logistic model, column 2 and 3 display incident rate ratios of the negative binomial models, and column 4 shows coefficients of the OLS models. *** p < 0.001, ** p < 0.01, * p < 0.05

4.4 Outcomes of Social Network Mobilization

This section addresses the third research question (“How do mobilized networks impact adults’ readiness for professional development?”). The purpose is to explore the different ways in which social networks may impact people’s sense of readiness for a graduate degree, including the extent to which networks are used in the decision-making process and the variety and volume of social support that is gathered in this process. The central hypothesis is, however, that social networks impact perceived readiness only in one major way, namely by addressing the uncertainties and needs that people experience prior to deciding to pursue a graduate degree. The following sections will first examine descriptively how ready respondents felt about pursuing a graduate degree before testing the influence of network mobilization on their sense of readiness.

4.4.1 Patterns of Perceived Readiness for Professional Development

Feeling ready for professional development is an important precursor for engaging in such activity. The results show that respondents felt moderately ready for the graduate degree (see Table 4-11). While respondents were fairly clear about their future direction and felt good about graduate school in general, they did show doubts about their ability to succeed in the program. These doubts were much stronger among women than men (mean: 57.56 vs. 46.99, $p < 0.001$). Women also felt less prepared to do well in the graduate program (mean: 60.12 vs. 64.63, $p < 0.001$).

The results suggest that having doubts about succeeding is not just dragging down respondents’ sense of readiness but also appears to touch on a conceptually distinct phenomenon. Thus, while the 5-item scale was designed to measure the latent construct of

perceived readiness (which showed good internal consistency, see Cronbach’s alpha results in Appendix C), it appears to be worthwhile to use the latent constructs and this particular item separately to test the influence of network mobilization on readiness.

Table 4-11 Perceived Readiness for Pursuing a Graduate Degree

Survey Question: Upon admission to the OMSCS program, I:				
Question Format: Slider Measurement: 0-100, “Strongly Disagree” to “Strongly Agree”				
	Full sample	Women	Men	Gender differences
Felt prepared to do well in the program	63.82 (23.85)	60.12 (23.10)	64.63 (23.95)	*
Could see where the degree fits in my future	74.52(20.81)	72.48 (21.52)	74.96 (20.64)	
Had doubts about my ability to succeed	48.89 (29.35)	57.56 (28.96)	46.99 (29.10)	***
Knew what I wanted to achieve with this degree	67.72 (24.11)	66.67 (25.04)	67.95 (23.91)	
Had a good feeling about graduate school	72.11 (21.01)	69.58 (21.32)	72.67 (20.91)	
Readiness Construct ¹	65.86 (16.04)	62.26 (15.99)	66.64 (15.95)	***
N	1205	216	989	

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ¹ item #3 was reverse scored

4.4.2 Influence of Network Mobilization on Perceived readiness for Professional Development

Social networks provide various types of advice and psychosocial support which may impact how confident and prepared people feel about pursuing a graduate degree. Hypothesis 4 posits that social networks increase these feelings of readiness to the extent that they resolve people’s uncertainties and meet their social support needs. The results suggest only weak support for this hypothesis.

Need fulfillment: Need fulfillment, which measures the extent to which mobilized and needed social support match, is not a significant predictor of perceived readiness (Table 4-12, column 4). Neither the coefficient on need fulfillment nor the Wald test is

significant ($\chi^2(1)=3.06$, $\text{Prob} > \chi^2=0.08$). That is, whether social networks help resolve uncertainties by providing needed social support has no impact on people's sense of readiness for pursuing a graduate degree. However, mobilizing support that is needed in this decision is associated with greater confidence levels. Doubts about the ability to succeed in the graduate degree program decrease as social support needs are met (coeff: -0.13 , $p<0.05$, Table 4-12 column 6). This finding also underlines that personal confidence may be a related but somewhat distinct factor in understanding levels of readiness for professional development.

Other results: Whether social networks are mobilized at all or how many ties are mobilized does not influence how ready people feel about pursuing a graduate degree (Table 4-12, columns 1 and 2). However, the more social support people mobilize through their networks, the more ready they feel (coeff: 0.09 , $p<0.01$). This suggests that the volume of social support has a stronger effect on people's sense of readiness than the specificity of social support. Unexpectedly though, gathering more resources is associated with lower confidence levels about succeeding in graduate school (coeff: 0.13 , $p<0.05$), which reinforces the notion that personal confidence is somewhat distinct from perceived readiness.

In summary, social networks impact people's perceptions about their readiness for graduate school only to a very limited extent. Consulting others about the decision whether to pursue a graduate degree does not, by itself, influence readiness. What matters is how much social support is generated in this process. The sheer intensity of support significantly impact people's sense of readiness while the specificity of support (i.e., receiving the type of support for which people had a need) does not. Yet, the intensity of mobilized resources

has the opposite effect on confidence levels: Doubts about being able to succeed in graduate school significantly increase with resource mobilization but significantly decrease as more needs are met. Finally, the finding that network resources generate returns in terms of higher levels of readiness while the number of ties themselves is irrelevant is important because it shows that network size, by itself, may not be a sufficiently good measure of social capital.

Table 4-12 Regression Analysis Results: Influence of Network Mobilization on Perceived Readiness for Professional Development

	DV: Perceived Readiness Construct				DV: Doubts about Succeeding	
	1	2	3	4	5	6
Mobilization (0/1)	-1.49 (1.12)					
Network Size (#)		-0.07 (0.27)	0.25 (0.38)	0.34 (0.38)	-0.49 (0.70)	-0.26 (0.69)
Intensity of Mobilized Resources (in %)			0.09** (0.03)		0.13* (0.06)	
Need Fulfillment ¹ (in %)				0.05 (0.03)		-0.13* (0.06)
Control Variables						
Female (0/1)	-3.97** (1.24)	-4.14*** (1.24)	-4.06** (1.35)	-3.72** (1.35)	7.91** (2.41)	8.58*** (2.42)
Minority (0/1)	1.84 (1.25)	1.88 (1.25)	3.12* (1.45)	3.35* (1.46)	-0.60 (2.59)	-1.21 (2.59)
Age (in yrs)	-0.30*** (0.09)	-0.30*** (0.09)	-0.34** (0.10)	-0.35*** (0.10)	0.68*** (0.19)	0.62** (0.19)
Partnered (0/1)	0.36 (1.10)	0.20 (1.10)	1.45 (1.28)	1.49 (1.29)	0.49 (2.31)	1.06 (2.32)
Children (0/1)	1.19 (1.26)	1.15 (1.27)	2.04 (1.43)	2.38 (1.43)	-1.33 (2.56)	-1.51 (2.56)
Graduate Degree (0/1)	2.66* (1.21)	2.79* (1.21)	1.67 (1.44)	1.57 (1.44)	-5.35* (2.61)	-5.41* (2.59)
Employed (0/1)	-0.52 (1.61)	-0.52 (1.61)	-1.74 (1.88)	-1.75 (1.89)	-0.56 (3.17)	-1.79 (3.14)
Computer Science Work Experience (in yrs)	0.35*** (0.09)	0.36*** (0.09)	0.42*** (0.11)	0.41*** (0.11)	-0.78*** (0.20)	-0.74*** (0.20)
N	1,140			830		

OLS regression coefficients, robust standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

¹ Need fulfillment is a constructed variable measuring the extent to which mobilized and needed social support match. The variable ranges from -100 to +100, where a negative value indicates unfulfilled needs.

4.5 Summary of Main Findings

This chapter addressed the characteristics of social network mobilization in the context of professional development, investigated why adults would (not) want to mobilize their social networks in this context, and looked at how the outcomes of this process. Hypotheses addressed the role of support-seeking willingness, social support needs, and network access in explaining patterns of social network use and how networks, in turn, impact people's perceived readiness for pursuing a graduate degree.

First of all, I find that reaching out to others for advice and support is a common course of action prior to applying to graduate school. Yet, these mobilized networks tend to be small (two to three ties on average) and include a high proportion of close and expert ties. Further, the resources that networks provide tend to be concentrated in certain resource areas (emotional and appraisal support). Turning to the question of the antecedent factors and outcomes of network mobilization, the results of the empirical models, which are summarized in Table 4-13, present only weak support for the theorized mechanism of social support-seeking and its impact on readiness. The factor that is most strongly associated with network mobilization is access to resources. Respondents' resource needs, however, impact network mobilization patterns only to a limited extent. While greater resource needs are associated with resource-richer networks (both in terms of the diversity and intensity of resources gathered), they do not influence whether and how many social ties are mobilized. Further, the results reveal that need diversity and intensity operate in the same way and to the same extent, indicating that they may be conceptually distinct phenomena but not empirically distinguishable. In terms of people's willingness to mobilize, neither the value that people place on reaching out to others (conceptualized as

support-seeking attitudes) nor their work support climate predicts that people will activate their networks. Perceived support from friends and family marginally influences mobilization patterns, where higher levels of perceived support are associated with a greater probability to reach out to others for advice or support. Finally, the volume of social support that networks provide positively contribute to people’s sense of readiness more so than the specificity of social support, i.e., whether social ties provide resources in response to people’s needs. Yet again, receiving more social support has a negative effect on confidence levels, where doubts about being able to succeed in graduate school increase as more support is gathered. Confidence only rises as more needs are met.

Table 4-13 Summary of Hypothesized Relationships and Findings

Hypotheses	Research Question	Support	Evidence
H1-a: People who perceive social support as more valuable are more likely to mobilize their networks than people who perceive such support as less valuable.	2	no	Social support attitudes do not impact whether people mobilize their network during their decision-making process. Unlike hypothesized, people with more positive support attitudes have resource-richer networks, albeit the effect is small.
H1-b: People in highly supportive climates are more likely to mobilize their network than people in less supportive climates.	2	no	Family/friendship and work climate have no effect on the probability of reaching out to at least one social tie. Unlike hypothesized, more supportive family and friendship networks are associated with larger and resource-richer networks, albeit the effect is small.
H2-a: People with more <i>diverse</i> resource needs activate larger and resource-richer networks than people with less diverse resource needs.	2	partial	Need diversity and intensity do not influence network size but contribute to resource-richer networks (both in terms of the diversity and intensity of resources).
H2-b: People with more <i>intense</i> resource needs activate larger and resource-richer networks than people with less intense resource needs.	2	partial	

<p>H3: People with greater access to resources activate larger and resource-rich networks than people with smaller resource access.</p>	2	yes	<p>Access to resources is the strongest, statistically significant predictor of network mobilization among all independent variables. Greater access to resources is associated with bigger and resource-rich networks (both in terms of the diversity and intensity of resources).</p>
<p>H4: Social networks increase perceived readiness for professional development to the extent that they are able to meet people's resource needs.</p>	3	weak	<p>The extent to which networks meet people's resource needs is not a significant factor in explaining perceived readiness. However, having social support needs met increases people's confidence in their ability to succeed. Unlike hypothesized, the sheer volume of social support has a stronger positive impact people's sense of readiness than receiving the type of support for which they had a need for.</p>

The next chapter presents the results of the qualitative methods strand, which was designed to help elucidate why some of the hypothesized effects are small or non-existent and help clarify the mechanism of social network mobilization specific to the decision whether to seek a graduate degree.

CHAPTER 5. QUALITATIVE RESULTS

5.1 Introduction

The main purpose of the qualitative methods strand is to help explain and interpret the findings from the quantitative methods strand, particularly with respect to the individual-level and contextual factors of social network mobilization. As discussed in the previous chapter, the quantitative results raised questions about why people's social support-seeking attitudes and the support climate in which they are embedded do not have an effect on the probability of reaching out to one's social network. Further, the quantitative results deserve more explanation of why social resource needs have a limited impact on network mobilization patterns. Lastly, the goal of the qualitative methods is to provide better insights into the outcomes of social network mobilization in the context of professional development-decision-making.

To that end, 20 semi-structured interviews were conducted with a sub-sample of the survey respondents (interview sampling procedure is described in Section 3.5.1, interview protocol design is presented in Section 3.5.2). Importantly, 10 interviewees reported in the survey that they had not mobilized anyone from their social network but showed high levels of resource needs, network access, or support-seeking attitudes. The other 10 interviewees reported that they had mobilized a large network but showed low levels of resource needs, network access, or support-seeking attitudes.

This chapter presents the results from the qualitative interview analysis (interview codebook is presented shown in Table 3-4 in Section 3.5.5) and is organized as follows. Section 5.2 focuses on what the interviews revealed about individual-level factors shaping

network mobilization patterns, including the relevance of support-seeking attitudes. Sections 5.3 and 5.4 address the situational factors of social network mobilization, including the role of social support needs and personal and workplace support climates. Section 5.5 looks at the impact of social capital resources on the decision of whether to pursue a graduate degree, including both employer-based and social network resources. The chapter concludes with a summary of the findings.

5.2 Individual Factors Explaining Social Support-Seeking Patterns in Professional Development Decision-Making

Support-seeking attitudes were conceptualized as one major factor that would influence social network mobilization. Quantitative results, however, show that people who perceive social support as more valuable are no more or less likely to mobilize their network than others. Interviews help to contextualize these findings and suggest that how valuable advice on professional advancement is thought to be rarely determine how career *decisions* are ultimately going to be made. Rather, seeking input on the decision to pursue a graduate degree is often driven by personal decision-making styles that are somewhat divorced from personal values and beliefs about advice seeking. The theme of support-seeking habits, which is presented in Table 5-1, is evident here. For many, (not) consulting with others is built into professional advancement decision-making. Limited thought is given about whether and from whom to seek career advice. For example, most career decisions are “*bounced off of people*” within one’s network. This habit-driven process can also be observed among interviewees who did not talk to anyone about their decision. For example, interviewees described how they generally “*like to think about things themselves*” or

“*internalize*” career decisions even though advice from others is considered valuable. It is unclear whether and how this habit-driven behavior reflects personality characteristics.

Table 5-1 Representative Empirical Evidence of Responses on 'Decision-Making Style'

Code	Definition	Representative Empirical Evidence
Decision-Making Style	Description of behavior that notes how respondents generally make decisions on career matters.	<p>“I always reach out to my parents and my partner for advice and to bounce ideas off of them [...] So I think that's just kind of <u>my go to people</u>” (female_mob_5).</p> <p>Yeah, I do I feel like most decision making, I will bounce off of <u>the people around me</u> and at least hear other perspectives. [...] it's not necessarily that I'm indecisive, but I will talk. (male_mob_18)</p> <p>“I really don't kind of seek advice about what I'm doing or stuff like that. OK, I'm just <u>kind of do it on my own.</u>” (non-mob_6)</p> <p>“Sometimes, when it comes to things like this, I tend to think about it a lot in my head and then just make a decision and people are surprised by it, but it's not a snap decision. <u>I like to think about things myself.</u>” (male_non-mob_13)</p> <p>“It's probably a little bit more of my personality. I don't narrate what I'm thinking off two others very often. So, [I] <u>more internalize it.</u>” (male_non-mob_1)</p>
Note: (gender_interview group_ID)		

Interviewees do not diverge from these general support-seeking habits when deciding whether to pursue a graduate degree. Interestingly, even having a partner and/or young kids does not appear to change people’s propensity to mobilize their (family) network (with one exception). Interviewees in the mobilization group explained that they reached out to their significant others because getting their consent to pursue a graduate degree felt important. In comparison, respondents who had not named any discussion partners in the survey exhibited similar characteristics in terms of marital status and children but did not talk to their family. And although some respondents mentioned that their decision would affect their partner, they did not seek their consent and thereby excluded them from their decision process. Thus, the interviews suggest that shared

decision-making is not merely dictated by the nature of the decision (i.e., impact on others) but more of a personal decision-making style.

5.3 The Nature of the Decision for which Social Support is Sought: Pursuing an Online Graduate Degree

5.3.1 Social Resource Needs Associated with Going to Graduate School

Working adults' decision to pursue a graduate degree generates uncertainties about whether the program is a good fit, how to handle schoolwork in addition to personal and professional responsibilities, or how to succeed in graduate school. The need to reduce such uncertainties through social support was conceptualized as one of the drivers of social network mobilization. Survey results only partially supported this hypothesized mechanism, begging the question of why social support needs only have a limited effect on network mobilization. Three key insights are gained from the qualitative interviews.

First, interviews with survey respondents who talked to others about their decision show that having just one concern can be sufficient to stimulate social support-seeking. Thus, network mobilization is not just about the range of different support needs or the combined intensity of various needs but the severity of one specific resource need. For example, respondents only found “*the time commitment very worrying*” and “*just wanted to know how to balance [their] time*”, which initiated support-seeking.

Second, interviews show that uncertainties and resource needs do influence network mobilization to some extent, particularly the selection of some ties and the resources gathered, thereby confirming the results of the survey analysis. Half of the interviewees reported at least one instance where they purposefully selected ties that could

give them needed information, advice, or emotional support. However, these are singular instances that become indistinct among other network mobilization drivers. The interview data includes many examples in which there is a disconnect between the respondent's social support need(s) and selection of the particular network tie as well as the content of the conversation.

Third, resource needs do not explain the phenomenon of non-mobilization. Respondents who expressed a high level of uncertainty in the survey reiterated their questions and concerns in the interviews, but they did not seek advice or support from their social network and, in some cases, did not find other ways to resolve their uncertainty. Simply put, they ignored their uncertainties. The question is why? The next section will discuss why uncertainty did not initiate social support-seeking and did not factor much into the decision to pursue a graduate degree.

5.3.2 Gravity of the Decision to Pursue an Online Graduate Degree

Unlike respondents who consulted with several members of their social network about their decision, respondents who had not talked to anyone made that decision with a certain kind of ease. While they also reported questions and concerns revolving around the nature of online learning, the rigor of the program, the required time commitment, or their ability to succeed, interviewees did not feel that these uncertainties needed to be resolved prior to applying and enrolling. Unlike other career decisions they had made in the past, they felt that this decision was “easy” or a “no brainer”, did not require “a fully-baked plan” and they “rushed through the process a little bit more than with others”. Descriptions like these are entirely absent among respondents who did talk to others about their decision. The

qualitative analysis revealed that respondents who mobilized several network ties and respondents who did not mobilize anyone differ in one important characteristic: The decision to pursue a graduate degree carries a different degree of significance for each group. Two dimensions are important here. The impact that the degree program has on people’s personal life and/or on their career, as illustrated in Table 5-2.

Table 5-2 Representative Empirical Evidence of Responses on “Decision Gravity”

Code	Definition	Representative Empirical Evidence
Life Impact	Comments about how pursuing the online graduate degree impacts the respondent’s personal life.	“I think the most important thing [to know] was the time commitment and actually it was kind of hard to get information on it. How much time am I going to have to devote to this? Every class is going to be this amount of time every week, but also that's going to go on for ten classes. At the time it was hard for me to determine [if] that's going to take me five years or three years or however many.” (female_mob_3)
		“So, going to medical school changes everything. You have to stop what you're doing and start something new. This was like it could not really disrupt my life. [...] It felt like I didn't need to know as much going into it about what to expect, what it would mean, it's sort of like I could try it. And so, for me, <u>that lowered the bar to just do it</u> . It made it a lot easier to just say, ‘I'm gonna try this and see how it goes.’” (male_non-mob_1)
		“I just went for it. [...] In terms of support I needed, I didn't really think about that actually. I just went for it. Yeah. For me it was more like, instead of just thinking about it, ‘just do it first and think about it later’ kind of thing. [...] Since OMSCS was online and the cost was low, I figured the <u>cost of failure would be relatively low</u> . I didn't have to move states, find housing, etc. So, getting to the point of deciding to apply to the program wasn't too stressful. I remember thinking it was low risk high reward with the only major cost being my time.” (male_non-mob_4)
Career Impact	Comments about how pursuing the online graduate degree impacts the respondent’s career.	“I'm so f***** bored. I'm so bored in my job. [...] I've been doing what I do for so long. [...] But now I need a challenge and there aren't really any challenges here. So, I wanna <u>do a new thing</u> ” (male_mob_11)
		“I'm at a point in my career where I'm looking to kind of <u>shift gears</u> , just do something different. [...] I've been at the same place for almost 20 years.” (male_mob_16)
		“This was almost like related to my job, like <u>almost parallel</u> , so finishing the degree or not and the result of the degree wouldn't really change what I was doing” (male_non-mob_1)
		“I felt like I had a goal and I felt like this is something that could augment stuff I was already doing. You know, it <u>wasn't going to completely reorient my career trajectory</u> .” (male_non-mob_17)
Note: (gender_interview_group_ID)		

Personal Life Impact: Respondents who did not mobilize their network emphasized that pursuing a low-cost online program versus a traditional high-cost in-person program involved fewer trade-offs and less risk. There was no need to relocate, find housing, give up a job, or make a considerable financial investment, which meant that the degree “*could not really disrupt life*”. As a result, they had the feeling that they “*could try*” the degree program and “*just went for it*”. In contrast, some respondents who consulted with several people about their decision to pursue a graduate degree emphasized the significant time commitment that the online degree program would bring along. “*How much time am I going to devote to this?*”, one interviewee asked, explaining that this “*was hard to determine*”. These respondents faced new trade-offs between personal life and graduate school, where more time would be dedicated to schoolwork than to parenting or a partner.

Career Impact: Pursuing a master’s degree in computer science also impacts respondents’ professional lives differently. For respondents who had not talked to anyone about their decision, the degree did not feel like a new chapter but was closely aligned with their career. They explained that pursuing the graduate degree was not a transition, but a continuation and expansion of their professional lives, noting that “*it wasn’t going to completely reorient [their] career trajectory*”. In contrast, interviewees who did reach out to members of their social network about their decision showed opposite patterns. Pursuing the graduate degree represented a significant change in the professional lives of many interviewees in this group. They had been in the same job, often with the same employer for many years and the graduate degree presented a departure from what they were doing.

They noted how they wanted to “*do a new thing*” and “*shift gears*”. In short, these respondents felt that the graduate degree disrupted their career – in a good way.

In sum, the gravity of the decision to pursue a graduate degree varied considerably. For some, pursuing a graduate degree symbolized a disruptor in either their personal or professional life, which triggered a deeper thought process and excitement, both of which may have ultimately contributed to social network mobilization. For others, the decision did not feel significant, complex, or risky enough to necessitate gathering information, advice, or psychosocial support.

5.4 The Context within which Social Support is Sought: Networks and Support Climate

5.4.1 Personal Networks and Support Climate

The quantitative analysis revealed that how supported people feel by family members and friends in career matters marginally impacts network mobilization patterns. Having more family and friendship networks was associated with larger and resource-rich networks, albeit to a small extent. Interviews shed more light on the impact of family and friendship support climate on network mobilization, demonstrating that supportive climates can drive mobilization while unsupportive climates can hinder mobilization. For example, respondents explained that they reached out to their family because they had “*a very strong support for education within [their] own family*”. Other respondents did not talk to their family about their decision because they felt “*estranged*” and “*never really had a good support system for professional things*”. The interviews further underlined that trust is a precondition for seeking support for professional development decisions from family

members and friends. Several interviewees described the people they talked to as their “*close circle*” (interviewee 16) or “*inner circle*” or explained that they did not talk to certain people because they did not trust them or feel close to them. Thus, having friends and family members taking interest in one’s professional advancement and time to discuss these matters makes people more willing to seek their support.

However, the interviews clearly showed that the survey measure did not represent all facets of the construct. Other tie characteristics, in addition to closeness, clearly shape how people perceive the quality of their personal support climate. Even though friends or family took interest in personal and professional development, there was little anticipated value or benefit in talking to them about the decision to pursue a graduate degree because they lacked the relevant expertise. Two dimensions are important here: technical and educational expertise (see Table 5-3 for representative empirical evidence).

Technical expertise: Many interviewees explained that their family or friends did not have enough technical expertise to provide meaningful advice because they had different backgrounds, were in different professions, or worked in different roles. For example, interviewees stated that family members and friends did “*not work in the same capacity*” or “*the fields were so different*” that they “*did not really think that there would be much that they could advise of.*”

Educational expertise: Some interviewees did not reach out to family or friends because they had not pursued graduate education themselves and, at times, did not see the value in going back to school for a graduate degree. For example, family members or friends were “*mainly blue collar*”, had not “*pursued as much education*” or had not

“pursued something like OMSCS”. Thus, interviewees questioned the value that the conversations would have had because of lacking educational experience and expertise.

Table 5-3 Representative Empirical Evidence of Responses on ‘Support Climate-Expertise’

Code	Definition	Representative Empirical Evidence
Technical Expertise	Comments about how someone’s background/ expertise in computer science affects support-seeking behavior.	<p>“I value their [parents] support, but I don't think I value their feedback when it comes to professional decisions or educational decisions as much. [...] My dad is a software engineer, but just not in the same capacity that I am. Also, the <u>job market has changed</u> since they entered it. [...] <u>Not</u> a lot of my immediate friends <u>work in the same capacity</u> that I do, so it's hard for me to get meaningful advice or feedback from them.” (interviewee 7)</p> <p>“Because the <u>fields were so different</u> [...] You know, so I didn't really think that there would be much that they could advise me of. You know, in terms of the program? Yes, certainly they would have encouraged me to go for my masters if I had brought it up to him. But that's about where the conversation would have ended.” (interviewee 2)</p>
Educational Expertise	Comments about how someone’s educational background/ expertise in educational & graduate school matters affects support-seeking behavior.	<p>“Most of my family has <u>not pursued as much education</u> as I have, so they don't have a strong background to be able to recommend it. They've been very supportive and have been very happy to see me go to college and get degrees because they weren't able to. But they they're not the type I would lean on for decisions for that.” (interviewee 12)</p> <p>“But the thing is, like the stuff that I'm interested in, that I'm studying now, it's just so outside of what my family has traditionally dealt with that, really, there was no influence about it. You know, they're not people you could really talk to about this. I'm not the first person in my family to go to college, but my family was <u>mainly blue collar</u>. They worked for the city of [city name] fireman or policeman. And, you know, it just wasn't on their radar, you know?” (interviewee 19)</p>

Note: (gender_interview group_ID)

Finally, the interviews revealed another important finding that explains the limited influence of the personal support climate on network mobilization. Family and friendship support structures often, but not always, overlap. There are instances in which friends are perceived to be very supportive and invested in career matters while families are not, and vice versa. Thus, personal support climate cannot be conceptualized as a coherent entity –

like done in this dissertation – but needs to be differentiated between family and friendship climate.

5.4.2 *Workplace Networks and Support Climate*

The quantitative analysis showed that the workplace climate did not impact support-seeking behaviors in any shape or form. That is, feeling included/embedded in the workplace and having coworkers and supervisors take an interest in personal and professional matters is not a precondition for seeking support during the decision to pursue a graduate degree. The interviews support this finding and help clarify why workplace climate is not an important predictor of network mobilization in the way it was originally conceptualized. Results show that the survey measure did not capture the relevant dimensions of the workplace support climate.

Professional advancement culture: Interviews revealed that the professional advancement culture, i.e., how much value coworkers and supervisors attributed to seeking a graduate degree, impacted whether respondents reached out for support during their decision process. That culture is not about whether the organization provides instrumental support for professional development, but whether coworkers and supervisors promote skill development, motivate one another to learn, and (have) pursue(d) advanced degrees themselves. For example, as illustrated in Table 5-4, several interviewees explained how professional development, particularly getting master’s degrees, was ingrained in the organizational culture, stating that “*most people are taking some sort of school*” or “*many of us wound up looking at online master’s degrees through this time in our career*”. In contrast, other interviewees explained that professional development in the form of seeking

an advanced degree was discouraged. One interviewee described an instance where he faced blow-back from organizational leadership over his plan to pursue more professional development because “*they didn't know what kind of worth or what kind of immediate value that would provide to the organization*”.

Table 5-4 Representative Empirical Evidence of Responses on 'Professional Advancement Culture'

Code	Definition	Representative Empirical Evidence
Professional Advancement Culture	Descriptions of whether supervisors and coworkers encourage, value, and pursue graduate degrees.	<p>“I think that kind of culturally everyone at the company knows about it, like they advertise it well or just like demographically the younger employee base largely takes advantage of it. So, it's something that socially, like it seems <u>most people are taking some sort of school, the younger employees kind of promote that internally.</u>” (male_mob_18)</p> <p>“And one of the great things about my work environment is that most of the people in my team came in through a program called the Technology development program for recent graduates. And so, you know, we were, most of us are of a similar age. [...] And then, you know, <u>many of us wound up looking at online masters degrees</u> through this time in our career. And so, I was able to ask some of them about sort of their experiences in the program.” (male_mob_10)</p> <p>“I think that, like <u>there are lots of other, bigger tech companies that will encourage you to do learning outside of work and seek professional development.</u> But this this wasn't the case for me.” (male_mob_7)</p> <p>“The resistance was more from the level of management above my direct supervisor 'cause, you know, they didn't know <u>what kind of worth or what kind of immediate value that would provide to the organization,</u> which to me is silly, right? If someone wants to go on pursue this, it's like, why would you stop them? Right? Why would there be any hesitation?” (male_non-mob_19)</p>
Note: (gender_interview group_ID)		

Within this organizational advancement culture, conversations about pursuing a graduate degree either spark or suffocate. In positive learning cultures, employees will be more inclined to reach out to coworkers and managers about their plan to pursue a master’s degree. For example, one interview explained: “*In the small company environment that we were in, advanced degrees weren't that important. But as we got acquired [...] they did*

seem to show more importance in advancement. So that's why I talked to those guys [new coworkers] as well". Further, the interview data shows how positive learning cultures bring about opportunities for mobilization and unsolicited support, with supervisors or coworkers recommending graduate degrees. In negative learning cultures, however, employees will be hesitant to share much about their professional development goals. For example, one interviewee was concerned that sharing his goal to pursue a master's degree *"gives the impression that I'm probably not going to stay in the team."* Another interviewee described how a former supervisor, who did not have a master's degree himself, discouraged him from pursuing a graduate degree. That experience ultimately discouraged him to talk to present supervisors about his decision: *"I haven't mentioned it to superiors because of the negative response I got from the first one."* These quotes further demonstrate that how much advancement is valued and actively sought in the organization generates a distinct type of interpersonal trust, namely that investing in skill development will be supported. That interpersonal trust is imperative for social support-seeking specific to the decision to pursue a graduate degree.

5.5 The Impact of Organizational and Social Resources on the Decision to Pursue a Graduate Degree

5.5.1 Impact of Organizational Resources for Professional Development

Instrumental support in the form of tuition reimbursement is accessible to nearly all interviewees. Yet, not everybody took advantage of it and many who did, did not see it as an incentive. What explains these patterns? Interviewees who forwent instrumental support disliked the payback agreements or argued that there was too much approval and

paperwork involved. Interviewees who did receive tuition reimbursement did not think of it as an incentive because of the low cost of the degree program and because the organization did not actively promote or advertise it. As one interviewee explained: *“There's no like ‘go get an advanced degree’, nothing that would incentivize me that way, except that they would help”*. Another interviewee stated: *“They don't make a big deal about going back to school. Going back to school for a master's degree – they don't feel it's needed to do the jobs that we do”*.

While two interviewees acknowledged that getting reimbursed *“was definitely a draw”* and *“without it, probably wouldn't have done the master's degree”*, the majority felt that instrumental resources around professional advancement did not impact their decision to pursue a graduate degree much. The bigger impact that organizations had on the decision process was through the interpersonal process of recognition and affirmation. Particularly supervisors played an important role by encouraging learning, recommending a graduate degree, and agreeing that a master's is beneficial for the interviewee and the organization as a whole, all of which made people *“feel like my efforts weren't going to be wasted.”*

5.5.2 Impact of Personal and Professional Network Resources

The qualitative results show that interviewees attributed different meanings to instrumental, informational, appraisal, and emotional resources. Most interviewees emphasized the value of emotional and appraisal resources in the decision process while attributing much less meaning to informational and instrumental support.

Emotional Support and Self-Confidence: Family members, more so than any other group, provided direct emotional support during the decision process. Some respondents did not feel very confident about going to graduate school and their ability to succeed in the program; concerns that they often addressed with their parents and partners. Several respondents explained how encouragement from family members helped them follow through with their decision and how they felt “*more ready*”. One interviewee gave a compelling example of how impactful encouragement from family on the decision to pursue a graduate degree can be: “*If I had to make a decision completely by myself without any external input, I may have talked myself out of it. [...] Having sounding boards and people that support me is important for me, necessary for me actually. Without that, I would still have this desire, but I may have talked myself out of it ‘I don't know if I can handle it. I don't know if I'm good enough, etc.’ So I needed that a little bit of extra encouragement.*”

Yet, encouragement from family could not always eliminate doubts. Some interviewees explained how they continued to be worried about their non-computer science background or lacking math skills. Interestingly though, the online nature of the program which did not require dramatic life changes allowed people to “*just try it*” and not be concerned about “*losing anything*”.

Finally, examples of lacking emotional support were rare. Some friends or coworkers made negative comments, stating that pursuing the degree “*was dumb*” or “*would not make [the interviewee] smarter*”. Interestingly, these comments were quickly discounted or resulted in more self-reflection. For example, one interviewee described how unsupportive comments made her think more deeply about her choice, stating that “*it actually made me think a lot about why I was doing this and what I wanted out of it.*”

Appraisal Resources and Clarity about Future Direction: While family networks mostly gave emotional support, supervisors, coworkers, and friends in the industry predominantly provided appraisal support by making suggestions and communicating their perceptions of respondents' professional strengths and weaknesses. Several interviewees mentioned that conversations with their supervisors and coworkers shaped their decision on whether and what type of graduate degree program to pursue. For example, managers explained what type of professional development "*was better for the long term for me*" or how the degree "*would help me in my particular role, [...] and then kind of move up and become an actual developer.*" Responses like these demonstrate that supervisors helped respondents to reflect on the usefulness of the degree and gain more clarity about their future careers. The value of appraisal support depended on people's technical expertise and experience, which parents or even coworkers in lower-level positions were unable to provide.

Prevalence and Impact of Informational Resources: Information about the graduate program such as degree requirements, class difficulty, or time commitments was often sought online. To the extent that questions about the program and how to make it fit in one's life were addressed with social ties, interviewees felt that the information they received helped them to prepare for the degree program to some extent. For example, the conversations helped them to decide which classes to take, which classes to avoid, and how much time to set aside for graduate school. In short, social ties helped to "*develop strategies and not so much do I want to do this or not*" (interviewee 7). Further, coworkers, supervisors, and friends in the industry occasionally provided information about the labor market value of the degree in terms of future career paths and earnings. Overall, most

program- or labor market-related information was not deemed accurate and useful because social ties had either not completed this particular degree program or had very extreme viewpoints about the program difficulty or career value that did not resonate with the respondent. One interviewee questioned the information she received from one of her friends about the usefulness of the degree, stating that it “*made me take a step back and I did a little bit more research [online].*”

Limited Acknowledgement of Instrumental Support: Requiring and receiving instrumental support that going to graduate school would bring along was rarely mentioned directly but often implicit. That is, interviewees did not mention the need for (and receipt of) more help at home because they would have to step back from household or childcare responsibilities but said that their partners had to be ok with their decision. Similarly, interviewees rarely named examples of instrumental support from supervisors in terms of work flexibility or time to study. Oftentimes, flexibility was already a characteristic of their daily work life and, thus, not identified as a source of support for the decision to pursue a graduate degree.

5.6 Summary of Main Findings

This chapter addressed the factors that cause people to (not) mobilize their social network during professional development decisions by providing context for the quantitative findings and clarifying the mechanism of social support-seeking. The chapter further provided additional insights into outcomes of network mobilization by investigating the impact of organizational and social resources on the decision to pursue a graduate degree.

Turning to the question of the antecedent factors of network mobilization, the theme that dominated social support-seeking descriptions was the gravity of the decision, i.e., the extent to which the decision presents an issue of change in one's personal or professional life. For example, whenever the decision is perceived as insignificant, uncertainties fade and social support-seeking becomes less important. Interviews further clarified the influence of personal and work support climate. Having friends and family members taking interest and time to discuss professional advancement issues is important but not sufficient for explaining support-seeking. Whether family and friends provide an adequate climate for support-seeking is also determined by their level of technical and educational expertise. With respect to work support climate, interviews showed how much value coworkers and supervisors attributed to seeking a graduate degree (conceptualized as professional advancement culture) impacted whether respondents reached out for support during their decision process. Finally, in terms of individual-level factors, seeking input on the decision to pursue a graduate degree is often driven by personal decision-making styles that are somewhat divorced from personal values and beliefs about advice seeking.

Turning to network mobilization outcomes, emotional and appraisal resources were deemed most influential in the decision process while informational and instrumental resources were deemed least influential. Interestingly, both personal networks and workplace networks mostly impacted decisions through recognition and affirmation. Instrumental resources, whether it be at the organizational or family level, were rarely acknowledged.

The next chapter provides a review and interpretation of the mixed-methods results, along with a discussion of policy implications and theoretical contributions.

CHAPTER 6. CONCLUSION

6.1 Introduction

Technological advancements and digitalization continue to transform the skills needed to succeed in today's job market, affecting the career entry and advancement of adults working in big tech as well other industries such as finance and health care where higher-level digital and technical skills gain importance. Against this background, identifying ways to foster a skilled technical workforce and determining what responsibilities industry, higher education institutions, and policymakers have in this regard has become a core concern of much political and societal debate. The dissertation contributes to this discourse by looking at how adults working in STEM – who constitute one target of workforce development efforts – decided to pursue an online graduate degree in computer science and how various organizational and interpersonal network resources factored into this decision.

Questions of why and how adults with substantial work experience and technical expertise decide to invest in professional skill development has been noticeably undertheorized. Particularly questions of whether, when, and how features of the social environment influence this decision process are ripe for answers. Overall, the quantitative and qualitative analyses of this dissertation support the central argument that the decision to pursue an online graduate degree is seldom an internal, autonomous thought process, but is often shaped by social relationships through consultation, advice, and support. Family members, friends, coworkers, supervisors, and acquaintances all matter in this process – albeit to varying extents and in different capacities. A complex set of individual and contextual factors influence the broad range of social support-seeking during professional

development decision-making. This chapter reviews the most central findings of this dissertation (Section 6.2), their contribution to social capital, decision-making, and support-seeking theories (Section 6.3), their implications for policy (Section 6.4), and their limitations (Section 6.5).

6.2 Overview of Core Findings

6.2.1 Returning to Graduate School: A Decision of Varying Significance

Pursuing a college degree later in life is often considered an important life transition or major change for working adults (Compton, Cox, and Laanan 2006; Francois 2014; Hostetler, Sweet, and Moen 2007; Peters and Daly 2013). Surprisingly though, the results of this dissertation suggest otherwise, showing that the gravity of the decision whether to apply to an online graduate degree program *varied* considerably among working adults. For some, pursuing a graduate degree symbolized a disruptor and change in their life. For others, the decision felt relatively mundane because pursuing the degree was a continuation and progression of their path.

The online nature of the graduate programs explains part of why the decision felt insignificant for some. The online format eliminates geographical barriers and lowers financial costs, which substantially improves people's ability to continue living their personal life as they are used to and, thus, lessens the life impact. It almost appears as if the online degree turned a major life decision (i.e., returning to college later in life) into a mundane, less complex decision. Yet, gender differences matter here. The survey results showed that women voiced significantly greater financial and domestic support needs than men, possibly indicating that this degree continues to present a significant life impact on

women. This finding also mirrors prior research showing that working women are a lot more concerned about domestic responsibilities and economic constraints than men when deciding whether to return to college for an on-campus degree (Kimmel, Gaylor, and Hayes 2014).

A different aspect that needs to be taken into consideration is the extent to which the degree program presents a change in one's professional life. As the interviews showed, pursuing a computer science degree represents a professional pivot for some, and a professional continuation and career 'add-on' for others. Interestingly, the survey results showed that minorities indicated a greater need to learn about career prospects and evaluate the usefulness of skills learned than non-minorities, which could mean that seeking a graduate degree symbolizes a greater change in the professional lives of minorities.

6.2.2 Targeted Mobilization: One of Many Network Mobilization Mechanisms

Reducing uncertainties and fulfilling resource needs is commonly thought to stimulate the decision whether and to whom to talk to (Ashford and Cummings 1983; Case and Given 2016; Gati and Asher 2005; Gati and Tal 2008; Higgins and Kram 2001; Van der Rijt et al. 2012; Rogers 1986). However, the findings presented here show that the consultation of network ties in the context of deciding whether to pursue a graduate degree is sometimes but not always a targeted, goal-directed approach. The quantitative results showed that, to a small extent, greater uncertainties or greater demand for social support is associated with higher levels of resource mobilization. The qualitative interviews gave several examples where individuals targeted their network with a very particular concern in mind and

selected those network ties who were thought to be the most valuable or helpful support-giver.

And yet, both quantitative and qualitative results demonstrated that this targeted mechanism is just one of many network mobilization mechanisms. Survey results showed that access to resources is a much stronger predictor of network mobilization. When comparing the effect sizes of resource access and resource needs, results show that the opportunity to reach out to others about the decision whether to pursue a graduate degree is more important in explaining network mobilization patterns than the uncertainties that people face during this process. This finding aligns with prior findings by Small (2013) who stated that people engage with ties who happen to be present and available for discussing important matters. The interviews, in turn, provide context and shed more light on the opportune mobilization mechanism, showing that reaching out for advice and help is also driven by individual-level factors. For example, seeking advice and support on career matters is often driven by habits, where individuals give limited thought to whether, from whom, or even about what to seek social support. This speaks to the career decision-making literature, in which the notion of habits is very prominent (Gati et al. 2010; Scott and Bruce 1995). Research in this area acknowledges the different decision-making styles that individuals have formed that make them react in certain ways in career decision contexts (Gati et al. 2010; Kulcsár, Dobrean, and Gati 2020).

6.2.3 Professional Development Decision-Making: What Resources Matter, and from Whom?

Social network resources matter, albeit in different ways and to different extents than originally hypothesized. Quantitative results showed that the number of ties with whom people engaged during their decision process did not predict their sense of readiness for the graduate degree. What mattered was how much support people derived during their consultations, as higher levels of resource mobilization were associated with higher levels of readiness. Further, results showed that the sheer volume of emotional, appraisal, instrumental, and informational resources positively influenced people's sense of readiness more so than the specificity of social support, i.e., whether social ties provided resources in response to people's needs. The interviews help to contextualize these findings.

Emotional resources: While the decision whether to pursue the degree generated a relatively low need for emotional resources, psychosocial support was provided in abundance. Interviewees confirm these survey results, showing that instances in which social ties withheld emotional support were rare. However, this finding could be due to the characteristics of this particular population of adults who did decide to apply to the degree program since previous findings suggest that discouragement from personal and professional networks is an obstacle to lifelong learning (Field 2005).

Appraisal resources: Appraisal support that would allow people to evaluate themselves and the value that the degree holds for their future was in high demand, and the area where social networks made big strides. Both personal and professional networks provided appraisal support, but to different degrees and with varying impacts. Particularly, supervisors, coworkers, and friends in computer science made suggestions and gave targeted feedback about personal strengths and weaknesses. Unlike prior studies which identified family members as important network influences on the educational choices of

adolescents (Fletcher 2015; G. D. Sandefur, Meier, and Campbell 2006; Trent 1970), the results here clearly show a shift in appraisal support-seeking behaviors as people get older and advance in their career. Family networks do not vanish, but they become a lot less dominant due to lacking relevant technical/educational expertise and experience.

Informational resources: The decision whether to pursue a graduate degree also generated substantial informational needs about the degree program, and to a lesser extent, about career prospects. Yet, in comparison to other types of support, gathering informational resources is where social networks mattered the least. Survey results suggest that this may be partly due to limited network access, i.e., not knowing people who have the relevant knowledge to answer degree-related or career-related questions. Further, as both the survey and the interviews demonstrated, there was often a personal preference for gathering information online. This is not surprising as several studies highlight the increased importance of social media in postsecondary decision-making processes (Constantinides and Zinck Stagno 2012; Galan, Lawley, and Clements 2015; Le, Robinson, and Dobebe 2020).

Instrumental resources: Securing instrumental support such as financial support, help at home, and support at work played only a subordinate role during people's decision-making process, which can most likely be attributed to the online nature of the degree and the fact that it is offered at low cost. Yet again, gender differences are important here. While women voiced greater financial and domestic support needs than men, they did not pursue these resources as much, despite having the same level of access to these resources. While these results mirror earlier findings on gender differences in social network use with women pursuing fewer instrumental resources than men (Van Emmerik 2006; Wellman

and Wortley 1990), it is not entirely clear why women did not exploit their network to the same extent as men did. Future research could explore this result in more detail.

6.3 Theoretical Implications

6.3.1 Social Capital Theory

As discussed in Chapter 2, Social Capital Theory puts a strong focus on understanding the social resources that are embedded in social networks which actors build, maintain, and exploit through purposive actions (Lin 2001). While the theory helps to understand the construct of networks itself, it lacks a more detailed conceptualization of the network mobilization process itself. Van Der Gaag and Snijders (2004) explained that this gap is not incidental, but due the challenges in accounting for different psychological, psychosocial, and macro-sociological phenomena that are simultaneously at play during social resource mobilization. The researchers note that “the set of measures needed to capture these phenomena will be large, and will risk being confounded by individual needs, styles of personal interaction, and society-specific characteristics” (2004:203-204). This dissertation is a first step to address this significant gap and provides several theoretical insights on the decision to mobilize social capital in the context of professional development decision-making.

First, the mobilization decision is complex as it includes several steps such as whether to consult with social ties, with whom to consult, and what social resources to seek. Quantitative and qualitative analyses reveal many different factors that influence the selection and activation of social ties and resources, including individual-level and situational factors. Having certain social support needs and being embedded in a supportive

family climate influence support-seeking to some extent but having access to resources that are relevant to the professional development decision at hand is even more important. Future research could help refine the meaning and impact of the organizational support climate and individual decision-making styles on network mobilization actions in the professional development decision-making context. The interview results here further show that these mobilization factors are simultaneously at play. Sometimes a person deliberately and purposively reaches out to others for social support, and sometimes that same person consults with other network ties out of convenience or habit. This is important as it shows that an individual rarely makes mobilization decisions in the same way, providing support to Small's finding that there is *not a single cognitive process* at play when confiding in others on important matters (M.L. Small 2017).

Second, Social Capital Theory and decades of research have put a strong focus on the strong-weak tie divide, stating that (psychosocial) support on important matters is primarily sought from people with whom we feel close and have a strong bond while instrumental and information support is more often accessed through weak ties (Granovetter 1973; Lin 2001; McPherson, Smith-Lovin, and Brashears 2006a; Rostila 2011). While more recent research has challenged these propositions by arguing that people frequently confide in others they do not feel close to (Kammrath et al. 2019; M.L. Small 2013, 2017), the survey results here conform to the traditional view. That is, mobilized networks specific to the decision whether to pursue a graduate degree demonstrated a high proportion of strong ties and interviews confirm that feeling close to somebody is *one* factor in the decision to mobilize network ties. Yet, there is also (qualitative) evidence that strong ties are sought for all sorts of social resources, not just psychosocial support. In

addition, contrary to prior findings (M.L. Small 2013), interviews suggest that there is less of a divide between closeness and expertise. That is, people mobilize ties because they feel close to them and because they are knowledgeable. As Adler and Kwon (2000) put it, “social capital is unlikely to arise among people who do not understand each other” and this dissertation suggests that this understanding may be a combination of interpersonal trust and anticipated expertise.

6.3.2 *Decision-Making Theories*

There is an enormous body of empirical work and a multitude of theories on information behavior and decision-making. Despite the variety, the construct of *uncertainty* about future outcomes of present action is a fundamental component of nearly all information-seeking and decision-making theories (Case and Given 2016; Gati and Asher 2005; Germeijs and De Boeck 2003; March 1994; Pescosolido 1992). While the results of this dissertation do not dismiss the construct of uncertainty as irrelevant, they call into question its dominance. Uncertainty is not as central in predicting whether, from whom, and about what people seek social support. Regression results show, and interviews confirm, that uncertainties – operationalized as social resource needs – only marginally influence network mobilization patterns. Interview results propose a different construct – the gravity of the professional development decision – that may have had a stronger impact on the decision whether and from whom to seek support. For people who reached out to others to discuss their decision, pursuing a graduate degree was often associated with a change in their personal and/or professional life. It remains an avenue for future research to examine if and how the constructs of uncertainty and the gravity of the decision share common

characteristics. Further, interview results indicate that not everyone felt that their uncertainties had to be resolved before enrolling in the program. It is plausible that the online nature of the degree program affects people's perceptions about their ability to cope with uncertainty. It is also plausible that people differ in terms of their need for certainty (Bar-Tal 1994). Thus, it is unclear, and a question for future research, whether people's willingness to tolerate uncertainty is a matter of individual or contextual characteristics.

6.3.3 *Social Support-Seeking Theories*

Research on feedback-, help-, and information-seeking in organizational contexts has emphasized the importance support-seeking attitudes and incorporated this construct in theoretical propositions about support-seeking behavior (Bamberger 2009; Borgatti and Cross 2003; Lee 2002; Nadler, Ellis, and Bar 2003). However, the results of this dissertation contradict these theoretical propositions. Attitudes toward seeking support or advice do not influence the decision whether to activate one's network and significantly influence resource mobilization only to a small extent. Interviews confirm that gathering social support is often divorced from personal values and beliefs about advice seeking. Three explanations for the weak influence of support-seeking attitudes on network mobilization seem plausible.

First, the effect of attitudes may be context-dependent. The literature review draws primarily from organizational behavior research which examines people's attitudes toward seeking feedback or advice from coworkers and experts about a *work problem* (Anseel, Lievens, and Levy 2007; Ashford, Blatt, and VandeWalle 2003; Nadler, Ellis, and Bar 2003). These task-related phenomena in organizational settings may be different from more

interpersonal interactions when seeking input on life decisions in organizational and non-organizational settings alike.

Second, most studies rely on the cost-value framework to assess support and advice attitudes (Ashford and Cummings 1983; Bamberger 2009; Fedor, Rensvold, and Adams 1992; Lee 2002), which also informed the operationalization of the construct in this study. However, some researchers have noted the complex layers of social support attitudes and proposed alternative ways to conceptualize this construct by examining ego-based and image-based motives such as protecting one's self-worth and self-esteem (Anseel, Lievens, and Levy 2007). This line of research also suggests that attitudes are not rigid but vary depending on expectations about the feedback message and the type of support-giver.

Finally, upon further review of studies on social support attitudes in the education literature, evidence on the influence of attitudes on social support-seeking behavior is actually relatively weak. A recent review conducted by Bornschlegl and others (2020) concludes that most studies that find a positive relationship between attitudes and behavior measure the *intention* to seek support, rather than – like this dissertation – actual help-seeking behavior. In contrast, research about the effect of attitudes on support-seeking *behavior* is split between finding a positive relationship and no relationship. Future research should expand on this by homing in on the connection between the behavioral intention to seek support and the actual support-seeking pattern.

6.4 Policy Implications

Fostering a highly skilled and resilient technical workforce has often been portrayed as a 'concerted' effort by the government, industry, and higher education institutions (Gonzales

2021; Mason-Draffen 2018; Oleary, Widener, and Agarwal 2018). It is argued that organizations, universities, and policymakers all have a role to play in designing effective ways to motivate or incentivize working adults to pursue professional development. Yet, this discourse rarely specifies the distribution of responsibilities and the varying weight of organizational and policy influences on personal decisions to invest in professional advancement. More importantly, it is unclear what role, if any, federal policy should have in this regard. The dissertation contributes to this discourse by providing insights into which *types* and *sources* of support for professional development are most valued and most strongly felt by adults working in STEM.

STEM workforce development has typically been approached from an instrumental resource perspective where both industry and federal policy need to subsidize professional development and provide financial incentives to working adults in the form of tuition reimbursement (National Academies of Sciences 2017).⁵ However, there is evidence that such incentives are often not utilized (SHRM 2019) and do not increase university enrollment (Vandivier 2020). The results of this dissertation contribute to the mounting evidence that federal tax deductions to employers that provide educational assistance to their employees do not appear to be an effective policy tool for incentivizing professional advancement and maintaining a skilled technical workforce. Survey and interview results show that financial support is not as relevant to working adults' decision whether to pursue an online graduate degree. Two factors are at play here. First, the OMSCS degree program,

⁵ The IRS provides federal income tax exemption to employers who offer educational assistance to their employees. IRC § 127 allows employers to provide up to \$5,250 per year per employee in tax-exempt tuition benefits. IRC § 132 offers educational fringe benefits by excluding educational assistance from an employee's wage if the education or training qualifies as a working condition.

which served as the research setting for this dissertation, is offered at low-cost and was often selected for that reason. Second, people working in tech typically have an adequate income to easily self-fund their education. That being said, results also show that securing financial support is significantly more important to women and racial/ethnic minorities. It remains questionable, and an avenue for future research, if underrepresented groups are eligible for employer-sponsored (and federally subsidized) educational assistance given that they often work in lower-status positions (U.S. Equal Employment Opportunity Commission 2016) where access to assistance could be restricted. In any case, research subjects vividly described how the online degree induced them to invest in their skills, which they would otherwise not have done. Thus, higher education institutions play a critical role here by offering affordable, high-quality programs. Although low-cost online graduate degree programs with industry-relevant and career-focused education are slowly growing in the US credentialing landscape, they still lag behind the strong demand (Gallagher and Palmer 2020).

In comparison to providing instrumental assistance to degree-seekers, the informational resource perspective is much less prominent in the discourse on STEM workforce development. In fact, a report from the National Science Board calls for greater prioritization of data collection and dissemination on post-secondary credentials, technical career pathways, and earnings, stating that more federal funding, coordination across federal statistical agencies, and input from industry is needed (National Science Board 2019b). The results of this dissertation show how this information may also directly feed into working adults' decision to pursue an advanced degree. Findings suggest that online resources more so than social networks provide program- and labor-market relevant

information to degree-seekers. Given the prevalence of seeking information online, individuals who contemplate pursuing technical credentials can only benefit from having access to current and accurate data on programs, schools, and career paths to make informed choices. Further, more data on skilled technical education and careers can help to eliminate misconceptions around different credentials (National Science Board 2019b) and allow supervisors and coworkers to provide more targeted appraisal support. Importantly, companies set the tone for professional advancement and influence career advice-seeking as well as decisions to pursue graduate degrees.

6.5 Limitations

This dissertation has several limitations. First, as with many social network studies that use cross-sectional survey data (Ibarra 1992), the quantitative results can only be interpreted as correlational in nature. Measuring social network mobilization specific to decision to pursue a graduate degree, the factors that initiate support seeking, and the outcomes of that mobilization process at a single point in time is problematic and does not allow statements about causal relationships. Future studies should use longitudinal designs to verify the causal links between the antecedent factors described in this dissertation (i.e., needs, access, support attitudes, and support climate) and social network mobilization.

Second, survey data on network mobilization is self-reported, which may exhibit a deviation from actual behavior. In fact, the interviews illustrated how reporting network mobilization is molded by a desire for autonomy, raising some concerns about the reliability and validity of the survey data. For example, some people who indicated that they had not talked to anyone about their decision clarified in the interview that they did

speak to others before they applied. This was not simply a memory issue – which is often the dominant concern in ego-network research (Perry, Pescosolido, and Borgatti 2018) – it was a conscious and intentional answer. Individuals who had not named any discussion partners in the survey emphasized their autonomy and independence in decision-making and that they had just wanted a “*gut-check*” rather than input or help. Oftentimes, the role that others played in the decision process felt so minimal that it did not warrant reporting. Thus, interviews revealed that autonomy and relatedness – two core psychological needs – interact, which is something that future studies on decision-making in social contexts should be mindful of.

Third, social relationships are very complex and conceptualizing network mobilization as a dichotomous – all or nothing – outcome does not do it justice. The qualitative results make clear that mobilization in the context of professional development decision-making is a matter of degree where seeking advice, help, or psychosocial support from others ranges quite dramatically from minimal to extensive. Further, the number of people to whom people talked about their decision may not be a sufficiently good operationalization for that range, which constitutes an important methodological implication for future ego-network studies on decision-making. In some instances, interviewees had reached out to a large number of network ties without having much of a discussion about anything. In other instances, interviewees had extensive conversations with many social ties about their decision. Additionally, some interviewees had one point-in-time encounters with the people they named while others had repeated conversations with named individuals. Thus, in addition to operationalizing network mobilization in

terms of network size, future studies should consider measuring how frequently and intensely social support was sought.

Fourth, the sample was limited to individuals who enrolled in the graduate degree program. However, to understand the true impact of social network mobilization on the decision whether to pursue an online graduate degree, the sample would need to include individuals who were interested in applying to the program but decided not to do so. One surprising finding of the interviews was that negative comments from social ties about doing a master's were rare and/or dismissed as irrelevant, which raises the question for future studies of how that would be different in a sample of individuals who decided against applying. After all, research on adult lifelong learning suggests that negative social capital such as withheld support or discouraging feedback is common (Field 2005).

Fifth, data for this dissertation is based on a student sample from a single online graduate degree program in a single technical discipline at a single US university. While OMSCS is a large program that draws on a diverse student body from across the US and is comprised of a substantial percentage of the US graduate student body in computer science (National Science Board 2018), it is unclear if the findings are generalizable to other fields and degree programs.

Despite these limitations, the dissertation contributes to a better understanding of working adults' decision to pursue an online graduate degree in a technical field and elucidates how social networks factor into this decision process by synthesizing multi-disciplinary theoretical perspectives and evidence, exploring new measures of highly-complex sociological constructs, and integrating quantitative and qualitative methods. As the policy interest in STEM workforce development continues to grow and the landscape

for post-secondary credentials proliferate, there is a continued need to generate nuanced insights into the professional development choices and pathways of working adults in STEM.

APPENDIX A. SURVEY INSTRUMENT

Note: The following questions were integrated into a larger survey of OMSCS students. Not all questions reflect the exact order in which they appear in the larger survey.

[MobilizationExperience] In general, how much do you rely on the following sources for career advice (e.g. job search, professional development)?

Click on the bar and drag the slider to your preferred position.

	Not at all	A great deal
Resources I can find online		
Family member		
Friend		
Coworker		
Supervisor		

NEW PAGE

First, we would like to know how you generally approach decisions about your professional advancement.

In general, seeking advice or support from others about my professional advancement:

Click on the bar and drag the slider to your preferred position.

[SupportAttitudes] When making decisions about my professional advancement...

	Strongly disagree	Strongly agree
Is useful to me		
Is unusual for me		
Helps me make better choices		
Is necessary for me		
Is important for my decision-making		

NEW PAGE

Think back to the time when you were considering applying to OMSCS.

[Needs] How important was it for you to do any of the following before submitting your OMSCS application?

Click on the bar and drag the slider to your preferred position.

	Not important at all	Very important
Learning about program content and requirements		
Learning about program quality		
Evaluating if the program would help me achieve my personal/career goals		
Receiving encouragement that I would do well in the program		
Getting my tuition paid for		
Getting support at work (e.g., flexible hours, remote work)		
Learning how to succeed in the program		

Learning about career prospects	
Understanding how being in the program would affect my life	
Getting help at home (e.g., chores)	
Evaluating if the skills learned would be useful for me	
Receiving reassurance to apply	

NEW PAGE

[EmployerNeeds] [ask only if employed FT or PT] Before applying to OMSCS, how important was it for you that your employer MIGHT...?

Click on the bar and drag the slider to your preferred position.

	Not important at all	Very important
Provide tuition assistance		
Reward participation in OMSCS (e.g., promotion, raise)		
Need/value employees with graduate degrees		
Need/value employees with new/updated technical skills		

NEW PAGE

OMSCS STUDENT NETWORKS

We are studying the social networks of OMSCS students.

In this section, we ask you first about your social connections, and then some specific questions about the network you reached out to when you were applying to OMSCS.

[Access] Think broadly about the people you knew at the time of applying; did you know someone who could...?

	Yes
Provide emotional support whenever needed	
Help cover educational expenses if needed	
Help out in busy times or stressful situations	
Give career advice	
Provide information about graduate school	
Provide information about OMSCS	

NEW PAGE

[AccessType] [Filter answers from Access] Of the people that you thought about, what is your relationship with them?

	Family Member	Friend	Colleague/ Supervisor	Acquaintance
Provide emotional support whenever needed				
Help cover educational expenses if needed				
Help out in busy times or stressful situations				
Give career advice				

Provide information about graduate school				
Provide information about OMSCS				

NEW PAGE

[NGTalk] When you first considered applying to OMSCS, with whom did you talk about possibly applying? These people could be in or outside your family, your work, or other settings. They should be people you have interacted with in-person, or DIRECTLY online/phone.

You may use initials, full or partial names - they will not know you have named them in a survey. Names that YOU recognize are important because they will then carry into the next few questions, where we will ask some additional details about these individuals you named.

1. I did not talk to anyone.
2. ... *[Respondent to specify]*
- .
- 7 ... *[Respondent to specify]*

NEW PAGE

[MobilizedResources] Thinking about the people you just named, to what extent did they do the following?

Click on the bar and drag the slider to your preferred position.

	Not at all	A great deal
Provide information about OMSCS (e.g., course offerings, requirements)		
Inform about program quality		
Help cover program costs/expenses		
Reflect with you on personal/career goals		
Give advice on how to succeed in OMSCS		
Offer support at work (e.g., flexible hours, remote work)		
Offer help at home to accommodate OMSCS (e.g., chores)		
Tell you that you would do well in OMSCS		
Help you evaluate if the skills learned would be useful		
Inform about career prospects		
Help you understand how being in the program would affect your life		
Provide encouragement to apply		

NEW PAGE

Check all that apply.

[NIResources] I typically go to this person when I need:

	career advice	emotional support
Name 1		
Name 2		

[NIDemo1-Expertise, Closeness] This person is:

	more advanced in their career than me	close to me

Name 1		
Name 2		

[NIDemo-Homophily1] **This person and I have the same:**

	Gender	Race
Name 1		
Name 2		

NEW PAGE

[SupportClimate-Work] **[ask only if employed FT or PT] Think about the organization you worked for at the time of enrolling in OMSCS. In general, what was the workplace climate like?**

Click on the bar and drag the slider to your preferred position.

	Strongly disagree	Strongly agree
My coworkers took a personal interest in me		
My supervisor took interest in my advancement		
People tended to stereotype me at work		
I felt left out of the office environment		
I experienced negative sentiments in my organization		

NEW PAGE

[SupportClimateFamily] **In general, my family or friends:**

Click on the bar and drag the slider to your preferred position.

	Strongly disagree	Strongly agree
Take interest in my career pursuits		
Play an important part in my career decisions		
Are available to talk about important issues in life		

NEW PAGE

[Perceived Readiness] **Upon admission to the OMSCS program, I:**

Click on the bar and drag the slider to your preferred position.

	Strongly Disagree	Strongly Agree
Felt prepared to do well in the program		
Had doubts about my ability to succeed		
Could see where the degree fits in my future		
Knew what I wanted to achieve with this degree		
Had a good feeling about graduate school		

END

APPENDIX B. INTERVIEW PROTOCOL

PREAMBLE (~2 min)

Hello, my name is Isabel. Thank you for taking the time to talk to me today. Before we get started, I just wanted to give you some brief information about this interview.

I've been part of a team that conducted the OMSCS student survey in Spring 2021. I'm working on my dissertation now and I'm following up with a selected group of people who participated in the survey. I designed this interview to help me answer some questions that the survey raised for me, such as what brings people to OMSCS.

I'd like to record this interview to get all the details while at the same time being able to carry out an attentive conversation with you. I assure you that all your comments will remain confidential. Is that okay with you?

1. Your Background (~2 min)

First off, tell me a bit about yourself and what brought you to the OMSCS program.

- What do you do professionally?
- Is this different from what you did at the time of applying to OMSCS? If so, what was your job then? (Did your employer change? Is this the same company you've worked for at the time of applying to OMSCS?)
- Public vs. private sector?
- What term did you apply to OMSCS? Have you graduated yet?

2. Personal and Professional Context (~6 min)

Now, to give me some context, I really would like to learn more about your personal and work environments. Let me start with a few questions about the organization you've worked for at the time of applying to OMSCS.

- Did your organization offer incentives for employees to invest in a graduate degree?
 - *If yes:*
 - What types of incentives did they offer? (*e.g., tuition reimbursement/educational assistance, other forms of recognition or benefits, long term benefits such as promotion or new role/tasks*)
 - Were these incentives important in your decision to apply? Please explain.
 - Did you use any of the incentives offered?
 - *If no:*
 - What incentives you wish your organization had provided to you? And why?
- Did your immediate supervisor at the time know about your plan to pursue OMSCS?
 - *If no:* Was there a reason why you haven't let them know?
 - *If yes:* Did they tell you about OMSCS (or did they suggest that you apply)? Was your immediate supervisor supportive about your decision to pursue OMSCS? How so?
- Let's talk a bit about your support systems. Do you know people who theoretically would or could be helpful as you are making decisions about your career and your future?
 - What kinds of people do you know? (*e.g., who could provide information about professional advancement, help you reflect on your career*)
 - [*If not mentioned*] I did not hear you mention ... [*family, friends, coworkers*]. Why is that?

- What makes the people you just mentioned valuable to you?
- How important is advice and support to you more generally as you are making decisions about your career?

3. Your decision to apply to OMSCS (~5 min)

Now, let's turn to OMSCS in particular and talk about the things that led up to your program application. I want to learn a little bit more about your thinking at that time as you were deciding whether to apply.

- *Ask only if this didn't already come up in #1: What motivated you to do this degree?*
- What was the most important thing you needed to know or discuss before you applied?
 - As you were considering applying, what kinds of questions came up for you? (*e.g., information about the program itself, future career*)
 - Did you have any concerns? (*e.g., whether the program is right for you, how to succeed, support that is more social in nature*)

4. Patterns of Information- and Support-Seeking (~14 min)

a. NON-MOBILIZATION

In the survey, we were interested in understanding people's personal and career networks and so we asked everybody to identify individuals they had talked to about their decision whether to apply to OMSCS. It's common for people to be across the board and this is what we saw – some talked to a lot of people and others – like yourself – talked to none. I'm interested in people who made their decision independently and so I'd like to understand more about your response.

- So again, you appear to have made this decision on your own – explain that process to me. How come that you did not talk to anyone?
 - I'm curious, how come that the questions (or concerns) that you had before applying didn't not motivate you to reach out to anyone?
 - Was there a particular reason for not talking about this with your family or friends? [*specify based on answers above*]
 - Was there some circumstance that prevented you from reaching out to them?
 - Given the place you've worked at before applying to OMSCS, was there a reason for not talking to your coworkers? [*specify based on answers above*]
 - Was there some circumstance that prevented you from reaching out to them?
 - In the past, have you gone for help or advice on other issues relevant to your career or future? (or: Is this the typical way you go about things when making decisions about your future or career or was the decision whether to pursue OMSCS different?)
 - *If yes:* What was different then?
 - *If no:* How come?
 - What makes this decision different from other types of career and professional development decisions you have made (in terms of decision stages and steps involved, and actions you took)?
- Since you didn't talk to anyone, what was your strategy?
 - What other sources did you use to help you find answers to your questions (or to resolve your concerns)?
 - What led you to use these resources?
 - How did this factor into your decision to apply?
 - What concerns or questions did you still have?

b. HIGH MOBILIZATION

In the survey, we were interested in understanding people's personal and career networks and so we asked everybody to identify individuals they had talked to about their decision whether to apply to OMSCS. It's common for people to be across the board and this is what we saw – some talked to none and others – like yourself – talked to a lot of people. I'm interested in people who consulted with others about their decision and so I'd like to understand more about your response.

- What kinds of people did you reach out to? (*e.g., family and friends, coworkers and supervisor, other professional contacts in the field*)
 - [*If not mentioned:*] I did not hear you mention [*family, friends, coworkers, etc.*]. Was there a particular reason or circumstance that prevented you from talking with them?
 - I'm curious, are these the kinds of people you have gone to for help or advice on other issues relevant to your career or future?
 - *If yes:* Can you give me an example?
 - *If no:* What was different then?
 - How important is advice and support to you more generally as you are making decisions about your career and professional development?
- Looking back at the people you talked to, what led you to reach out to them?
 - *Specific question or concern you wanted to address? Person is insightful on the topic you wanted to talk about?*
 - *Person was around/available when you wanted to discuss your decision/OMSCS*
 - *Person is good to talk to about any topic?*
- How would you characterize the conversations you had with these people?
 - What was most helpful?
 - What was not helpful?
 - Was any of the information/advice you got contradictory?
 - How did these conversations shape how you were thinking about OMSCS?
 - How did this factor into your decision to apply to OMSCS?
 - What questions or concerns did you still have?
- Besides talking to these people, what other resource(s) did you use to help you find answers to your questions (or to resolve your concerns)?
 - What led you to use these resource(s)?
 - How did this factor into your decision to apply?

5. Closing (~1 min)

- This was my final question. Is there anything else that we haven't already covered and that you'd like to share about your decision to pursue OMSCS?

POSTAMBLE

This interview has been really helpful. Again, thank you for your time.

APPENDIX C. CRONBACH'S ALPHA ANALYSIS RESULTS

Readiness

Survey question and items:

Upon admission to the OMSCS program, I:

- Felt prepared to do well in the program (Readiness_1)
- Could see where this degree fits in my future (Readiness_2)
- Had doubts about my ability to succeed (Readiness_3RC) – *reverse scored*
- Knew what I wanted to achieve with this degree (Readiness_4)
- Had a good feeling about graduate school (Readiness_5)

Cronbach's alpha test:

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	alpha
Readiness_1	1205	+	0.7129	0.5116	0.3035	0.6354
Readiness_2	1205	+	0.6999	0.4930	0.3108	0.6433
Readiness_~C	1205	+	0.5875	0.3396	0.3743	0.7052
Readiness_4	1205	+	0.6452	0.4164	0.3417	0.6749
Readiness_5	1205	+	0.7413	0.5535	0.2874	0.6174
Test scale					0.3235	0.7051

Interitem correlation matrix:

	Readiness_1	Readiness_2	Readiness_3RC	Readiness_4	Readiness_5
Readiness_1	1.0000				
Readiness_2	0.3056	1.0000			
Readiness_3RC	0.5099	0.0893	1.0000		
Readiness_4	0.1869	0.5489	0.0840	1.0000	
Readiness_5	0.4120	0.4267	0.3065	0.3655	1.0000

Support & Advice Attitudes

Survey question and items:

In general, seeking advice or support from others about my professional advancement:

- Is useful to me (Attitudes_1)
- Is unusual for me (Attitudes_2RC) – *reverse scored*
- Helps me make better choices (Attitudes_3)
- Is necessary for me (Attitudes_4)
- Is important for my decision-making (Attitudes_5)

Cronbach's alpha test:

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	alpha
Attitudes_1	1205	+	0.8423	0.7407	0.5374	0.8229
Attitudes_2RC	1205	+	0.6486	0.4656	0.6674	0.8892
Attitudes_3	1205	+	0.8462	0.7465	0.5348	0.8214
Attitudes_4	1205	+	0.8085	0.6895	0.5601	0.8359
Attitudes_5	1205	+	0.8839	0.8055	0.5095	0.8060
Test scale					0.5618	0.8651

Interitem correlation matrix:

	Attitudes_1	Attitudes_2RC	Attitudes_3	Attitudes_4	Attitudes_5
Attitudes_1	1.0000				
Attitudes_2RC	0.4390	1.0000			
Attitudes_3	0.7336	0.3700	1.0000		
Attitudes_4	0.5614	0.3631	0.5895	1.0000	
Attitudes_5	0.6601	0.4415	0.7164	0.7436	1.0000

Support & Advice Climate – Family

Survey question and items:

In general, my family and friends:

- Take interest in my career pursuits (Climate1_1)
- Play an important part in my career decisions (Climate1_2)
- Are available to talk about important issues in life (Climate1_3)

Cronbach's alpha test:

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	alpha
Climate1_1	1205	+	0.8696	0.6908	0.4722	0.6415
Climate1_2	1205	+	0.8191	0.5919	0.5991	0.7493
Climate1_3	1205	+	0.8242	0.6015	0.5863	0.7392
Test scale					0.5525	0.7874

Interitem correlation matrix:

Interitem correlations (obs=1205 in all pairs)

	Climate1_1	Climate1_2	Climate1_3
Climate1_1	1.0000		
Climate1_2	0.5863	1.0000	
Climate1_3	0.5991	0.4722	1.0000

Support & Advice Climate – Work

Survey question and items:

Think about the organization you worked for at the time of enrolling in OMSCS. In general, what was the workplace climate like?

- My coworkers took a personal interest in me (Climate2_1)
- My supervisor took interest in my advancement (Climate2_2)
- People tended to stereotype me at work (Climate2_3RC) – *reverse scored*
- I felt left out of the office environment (Climate2_4RC) – *reverse scored*
- I experienced negative sentiments in my organization (Climate2_5RC) – *reverse scored*

Cronbach's alpha test:

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	alpha
Climate2_1	1083	+	0.6819	0.4785	0.3886	0.7177
Climate2_2	1080	+	0.7038	0.5095	0.3757	0.7065
Climate2_3RC	1080	+	0.6568	0.4441	0.4031	0.7298
Climate2_4RC	1081	+	0.7373	0.5579	0.3559	0.6884
Climate2_5RC	1082	+	0.7535	0.5815	0.3463	0.6794
Test scale					0.3739	0.7491

Interitem correlation matrix:

	Climate2_1	Climate2_2	Climate2_3RC	Climate2_4RC
Climate2_5RC				
Climate2_1	1.0000			
Climate2_2	0.6010	1.0000		
Climate2_3RC	0.1629	0.2253	1.0000	
Climate2_4RC	0.3341	0.2910	0.4631	1.0000
Climate2_5RC	0.3096	0.3668	0.4693	0.5156

APPENDIX D. ADDITIONAL DESCRIPTIVE STATISTICS

Table D.1 Career Advice Seeking Patterns, full sample and group differences

Survey Question: In general, how much do you rely on the following sources for career advice (e.g. job search, professional development)?

Question Format: Slider, **Measurement:** 0-100 scale, “Not at all” to “A great deal”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Online Sources							
Resources I can find online	82.84 (20.61)	81.86 (21.19)	83.05 (20.49)		84.00 (21.60)	82.59 (20.40)	
Interpersonal Sources							
Friend	52.57 (29.37)	54.44 (28.03)	52.16 (29.65)		50.34 (29.94)	53.04 (29.24)	
Coworker	50.31 (30.61)	52.13 (30.82)	49.91 (30.56)		46.45 (30.35)	51.12 (30.61)	*
Supervisor	47.24 (31.73)	49.71 (33.08)	46.68 (31.41)		43.03 (32.70)	48.12 (31.46)	*
Family member	43.33 (31.83)	46.92 (32.53)	42.54 (31.63)		40.16 (32.29)	43.99 (31.71)	
<i>N</i>	1187	215	972	1187	206	981	1187

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D.2 Network Size, full sample and group differences

Survey Question: When you first considered applying to OMSCS, with whom did you talk about possibly applying?

Question Format: Name Generator **Measurement:** Count

Network Size of respondents who...							
	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Mobilized their network	2.13 (1.77)	2.62 (1.77)	2.03 (1.75)	***	2.11 (1.85)	2.14 (1.75)	
<i>N</i>	1205	216	989	1205	208	997	1205
Did not mobilize their network	2.85 (1.46)	3.04 (1.53)	2.81 (1.44)		2.93 (1.53)	2.84 (1.45)	
<i>N</i>	901	186	715	901	150	751	901

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D.3 Network Topology, full sample and group differences

Survey Question: I typically go to this person when I need... [emotional support, career advice]
Question Format: Name Interpreter **Measurement:** Proportion in NW

Network ties who regularly give...							
	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Emotional support	0.52 (0.33)	0.60 (0.31)	0.51 (0.34)	***	0.51 (0.34)	0.53 (0.33)	
Career advice	0.59 (0.36)	0.62 (0.34)	0.58 (0.36)		0.59 (0.36)	0.59 (0.35)	
Career advice & emotional support	0.26 (0.32)	0.34 (0.33)	0.24 (0.32)	***	0.26 (0.31)	0.26 (0.32)	
N	896	186	710	896	149	747	896

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Table D.4 Network Tie Characteristics, full sample and group differences

Survey Question: This person ... [is close to me, same gender, same race, is more advanced in their career than me]
Question Format: Name Interpreter **Measurement:** Proportion of ties in network

Proportion of ties in network who are...							
	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Close ties	0.59 (0.34)	0.59 (0.32)	0.60 (0.35)		0.60 (0.34)	0.59 (0.34)	
Expert ties	0.48 (0.36)	0.58 (0.36)	0.45 (0.35)	***	0.48 (0.34)	0.48 (0.36)	
Close & expert ties	0.17 (0.28)	0.24 (0.32)	0.15 (0.27)	***	0.17 (0.27)	0.17 (0.28)	
N	896	186	710	896	149	747	896

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Table D.5 Mobilized Resources, full sample and group differences

Survey Question: Thinking about the people you just named, to what extent did they do the following?
Question Format: Slider **Measurement:** 0-100 scale, “Not at all” to “A great deal”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Informational Resources							
Information about career prospects	41.95 (33.75)	47.27 (34.96)	40.57 (33.31)	*	44.15 (32.82)	41.51 (33.94)	
Information about program quality	32.87 (35.61)	36.34 (36.35)	31.96 (35.38)		35.19 (36.03)	32.40 (35.53)	
Information about OMSCS	29.42 (34.58)	32.91 (35.58)	28.50 (34.28)		29.73 (33.67)	29.36 (34.78)	
Appraisal Resources							
Personal/ career goal reflection	67.15 (26.32)	70.48 (24.54)	66.27 (26.71)	*	66.14 (28.12)	67.35 (25.96)	
Advice on how to succeed	30.67 (32.09)	37.32 (34.75)	28.93 (31.15)	**	31.27 (31.70)	30.55 (32.19)	
Evaluate skill usefulness	47.40 (33.88)	52.87 (34.66)	45.97 (33.56)	*	46.74 (34.41)	47.53 (33.80)	
Emotional Resources							
Encouragement to apply	79.29 (22.03)	81.08 (23.35)	78.82 (21.67)		81.99 (20.08)	78.75 (22.38)	
Encouragement to do well	66.50 (30.92)	72.43 (28.67)	64.96 (31.31)	**	65.14 (31.60)	66.77 (30.80)	
Understand life impact	45.94 (32.24)	48.73 (33.60)	45.22 (31.87)		49.41 (32.17)	45.24 (32.24)	
Instrumental Resources							
Help at home	45.03 (37.45)	43.99 (36.97)	45.30 (37.60)		43.67 (37.24)	45.31 (37.51)	
Support at work	22.85 (31.29)	24.45 (32.92)	22.44 (30.86)		25.67 (32.82)	22.29 (30.97)	
Financial support	19.77 (31.94)	25.79 (34.79)	18.22 (31.00)	**	19.74 (32.87)	19.77 (31.77)	
Resource Diversity (#)	19.86 (13.05)	22.49 (14.25)	19.18 (12.64)	**	20.07 (12.46)	19.82 (13.16)	
Resource Intensity (%)	43.72 (17.41)	47.62 (19.66)	42.71 (16.65)	**	43.99 (16.32)	43.67 (17.62)	
N	894	186	708	894	149	745	894

Resource diversity: total number of resource needs determined by the mean cut-off value multiplied by the number of resource types that the total represents

Resource Intensity: sum of mobilized resources/12

mean coefficients; sd in parentheses mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D.6 Need Fulfilment, full sample and group differences

Survey Questions: 1. Thinking about the people you just named, to what extent did they do the following?
 2. Before applying to OMSCS, how important was it for you to do each of the following?
Question Format: Slider **Measurement:** Sum of 12 need fulfilment items/12, items are calculated by subtracting resource need from corresponding mobilized resource (e.g., MobilizedResources1 – Needs1)

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Informational Resources							
Information about career prospects	-15.70 (37.08)	-11.75 (36.68)	-16.73 (37.15)		-18.96 (35.15)	-15.04 (37.45)	
Information about program quality	-52.92 (38.74)	-49.27 (38.98)	-53.87 (38.65)		-53.18 (38.70)	-52.86 (38.78)	
Information about OMSCS	-53.34 (39.07)	-49.92 (39.57)	-54.23 (38.92)		-56.77 (38.10)	-52.65 (39.25)	
Appraisal Resources							
Personal/career goal reflection	-13.10 (29.69)	-11.29 (27.66)	-13.57 (30.20)		-15.82 (30.16)	-12.56 (29.58)	
Advice on how to succeed	-32.75 (38.24)	-27.29 (40.06)	-34.18 (37.65)	*	-38.09 (39.50)	-31.68 (37.91)	
Evaluate skill usefulness	-28.17 (35.29)	-24.41 (36.24)	-29.15 (34.99)		-33.22 (32.72)	-27.16 (35.71)	*
Emotional Resources							
Encouragement to apply	28.18 (33.22)	23.22 (34.64)	29.49 (32.74)	*	29.73 (34.36)	27.87 (33.00)	
Encouragement to do well	17.17 (39.42)	14.93 (38.56)	17.75 (39.64)		14.41 (41.38)	17.72 (39.01)	
Understand life impact	-20.51 (34.48)	-20.89 (32.03)	-20.42 (35.11)		-20.60 (34.84)	-20.50 (34.43)	
Instrumental Resources							
Help at home	1.39 (37.37)	-7.39 (38.75)	3.68 (36.69)	***	-2.28 (34.39)	2.13 (37.92)	
Support at work	-27.80 (36.66)	-26.86 (38.87)	-28.04 (36.09)		-30.37 (37.12)	-27.28 (36.57)	
Financial support	-28.35 (43.32)	-27.29 (44.80)	-28.62 (42.96)		-36.16 (43.63)	-26.82 (43.12)	*
Average Need Fulfilment (%)	-18.90 (18.18)	-18.16 (19.38)	-19.09 (17.86)		-22.01 (17.49)	-18.29 (18.26)	*
N	894	186	708	894	149	745	894

The level of need fulfilment is situated along a continuum ranging from none (-100) to excessive (+100). The closer that score is to zero, the higher the level of need fulfilment.
 mean coefficients; mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D.7 Resource Needs, full sample and group differences

Survey Question: Before applying to OMSCS, how important was it for you to do each of the following?
Question Format: Slider **Measurement:** 0-100, “Not at all important” to “Extremely Important”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Informational Resources							
Information about career prospects	58.03 (30.12)	59.65 (29.29)	57.68 (30.30)		62.93 (28.86)	57.01 (30.29)	**
Information about program quality	85.33 (16.24)	85.21 (14.88)	85.35 (16.53)		85.91 (16.61)	85.20 (16.17)	
Information about OMSCS	82.45 (17.79)	82.26 (16.00)	82.49 (18.17)		83.96 (17.46)	82.13 (17.86)	
Appraisal Resources							
Personal/career goal reflection	79.20 (20.08)	81.38 (18.40)	78.72 (20.41)		80.11 (21.67)	79.01 (19.74)	
Advice on how to succeed	62.24 (27.43)	63.91 (25.89)	61.88 (27.76)		66.95 (27.23)	61.26 (27.39)	**
Evaluate skill usefulness	74.74 (22.20)	77.19 (20.30)	74.21 (22.57)		78.80 (19.95)	73.89 (22.56)	**
Emotional Resources							
Encouragement to apply	48.59 (31.17)	56.24 (30.47)	46.92 (31.08)	***	50.13 (32.14)	48.27 (30.97)	
Encouragement to do well	47.94 (29.76)	57.88 (30.03)	45.77 (29.27)	***	49.65 (31.07)	47.59 (29.48)	
Understand life impact	65.79 (25.43)	69.93 (21.86)	64.88 (26.07)	**	68.76 (26.44)	65.16 (25.18)	
Instrumental Resources							
Help at home	42.03 (31.06)	50.41 (32.21)	40.20 (30.51)	***	45.38 (31.42)	41.33 (30.95)	
Support at work	50.07 (31.98)	51.70 (32.75)	49.72 (31.82)		54.91 (32.56)	49.07 (31.78)	*
Financial support	47.86 (34.19)	53.31 (33.43)	46.67 (34.26)	**	55.03 (34.09)	46.36 (34.04)	***
Need Diversity (#)	24.18 (14.39)	26.15 (14.29)	23.75 (14.39)	*	27.12 (14.95)	23.57 (14.21)	**
Need Intensity (%)	62.02 (15.79)	65.75 (15.32)	61.21 (15.78)	***	65.21 (17.02)	61.36 (15.45)	**
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Resource diversity: total number of resource needs determined by the mean cut-off value multiplied by the number of resource types that the total represents, range: 0-48

Resource Intensity: sum of mobilized resources/12, range: 0-100

Table D.8 Resource Access, full sample and group differences

Survey Question: Think about the people you knew at the time of applying. Did you know someone who could...?
Question Format: Check all that apply **Measurement:** 0/1

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Emotional support	0.76 (0.43)	0.82 (0.39)	0.75 (0.44)	*	0.73 (0.44)	0.76 (0.42)	
Help out in busy/stressful times	0.61 (0.49)	0.69 (0.46)	0.59 (0.49)	**	0.56 (0.50)	0.62 (0.49)	
Career advice	0.56 (0.50)	0.65 (0.48)	0.54 (0.50)	**	0.56 (0.50)	0.56 (0.50)	
Financial assistance	0.45 (0.50)	0.57 (0.50)	0.43 (0.50)	***	0.40 (0.49)	0.46 (0.50)	
Graduate school information	0.44 (0.50)	0.51 (0.50)	0.43 (0.50)	*	0.47 (0.50)	0.44 (0.50)	
OMSCS information	0.30 (0.46)	0.35 (0.48)	0.29 (0.46)		0.32 (0.47)	0.30 (0.46)	
Total Social Capital	3.13 (1.79)	3.59 (1.76)	3.03 (1.78)	***	3.05 (1.81)	3.14 (1.79)	
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D.9 Support-Seeking Attitudes, full sample and group differences

Survey Question: In general, seeking advice or support from others about my professional advancement:
Question Format: Slider **Measurement:** 0-100, “Strongly Disagree” to “Strongly Agree”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Unusual for me	41.43 (29.02)	36.20 (28.77)	42.57 (28.96)	**	39.50 (29.57)	41.83 (28.90)	
Useful to me	75.21 (21.15)	78.24 (17.87)	74.54 (21.75)	**	76.10 (21.35)	75.02 (21.11)	
Helps make better choices	72.23 (19.76)	72.44 (19.79)	72.18 (19.76)		73.87 (20.04)	71.89 (19.69)	
Is important for my decision-making	63.31 (24.69)	65.93 (23.97)	62.74 (24.82)		64.00 (24.79)	63.17 (24.68)	
Necessary for me	52.65 (27.31)	58.51 (26.12)	51.38 (27.41)	***	54.36 (27.94)	52.30 (27.18)	
Support Attitudes Construct¹	64.39 (19.49)	67.78 (18.28)	63.65 (19.67)		65.77 (19.15)	64.11 (19.56)	
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ¹ item #1 was reverse scored to compute the average

Table D.10 Family & Friendship Support Climate, full sample and group differences

Survey Question: In general, my family or friends:
Question Format: Slider **Measurement:** 0-100, “Strongly Disagree” to “Strongly Agree”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Play an important part in career decisions	62.16 (29.01)	61.63 (28.92)	62.28 (29.05)		60.18 (30.44)	62.58 (28.71)	
Take interest in career pursuits	72.37 (24.90)	73.94 (24.12)	72.03 (25.06)		72.35 (26.49)	72.37 (24.57)	
Are available to talk about important issues in life	77.31 (22.69)	78.11 (23.58)	77.14 (22.49)		76.95 (22.32)	77.39 (22.77)	
Family & Friendship Support Climate Construct	70.62 (21.40)	71.23 (22.01)	70.48 (21.27)		69.83 (22.94)	70.78 (21.07)	
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$,

Table D.11 Work Support Climate, full sample and group differences

Survey Question: In general, seeking advice or support from others about my professional advancement:
Question Format: Slider **Measurement:** 0-100, “Strongly Disagree” to “Strongly Agree”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
My coworkers took a personal interest in me	68.40 (24.19)	69.35 (24.70)	68.20 (24.09)		67.33 (25.06)	68.61 (24.02)	
My supervisor took interest in my advancement	68.23 (27.40)	67.92 (27.94)	68.29 (27.30)		68.02 (28.84)	68.27 (27.12)	
People tended to stereotype me at work	31.76 (27.47)	42.27 (28.89)	29.56 (26.66)	***	28.98 (25.37)	32.32 (27.85)	
I felt left out of the office environment	26.51 (25.83)	31.76 (26.40)	25.41 (25.59)	**	26.65 (25.18)	26.48 (25.98)	
I experienced negative sentiments	26.71 (27.34)	31.53 (28.66)	25.70 (26.97)	*	24.84 (25.66)	27.08 (27.67)	
Work Support Climate Construct¹	70.33 (18.70)	66.35 (18.64)	71.15 (18.62)	**	70.92 (18.56)	70.21 (18.74)	
N	1076	185	891	1076	180	896	1076

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ¹ items #3-5 were reverse scored

Table D.12 Perceived Readiness, full sample and group differences

Survey Question: Upon admission to the OMSCS program, I:
Question Format: Slider **Measurement:** 0-100, “Strongly Disagree” to “Strongly Agree”

	Full sample	Women	Men	Gender differences	Minority	Non-Minority	Minority differences
Felt prepared to do well in the program	63.82 (23.85)	60.12 (23.10)	64.63 (23.95)	*	64.52 (25.33)	63.68 (23.54)	
Could see where the degree fits in my future	74.52 (20.81)	72.48 (21.52)	74.96 (20.64)		76.86 (20.70)	74.03 (20.81)	
Had doubts about my ability to succeed	51.11 (29.35)	42.44 (28.96)	53.01 (29.10)	***	49.03 (28.93)	51.55 (29.43)	
Knew what I wanted to achieve with this degree	67.72 (24.11)	66.67 (25.04)	67.95 (23.91)		70.94 (24.19)	67.05 (24.05)	*
Had a good feeling about graduate school	72.11 (21.01)	69.58 (21.32)	72.67 (20.91)		74.14 (21.59)	71.69 (20.87)	
Readiness Construct¹	65.86 (16.04)	62.26 (15.99)	66.64 (15.95)	***	67.10 (15.84)	65.60 (16.08)	
N	1205	216	989	1205	208	997	1205

mean coefficients; sd in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ¹ items #3 was reverse scored

APPENDIX E. FULL MODELS

E.1 Prevalence of Network Mobilization (Mobilization 0/1)

Table E.1 Logistic Regression: Impact of Demographic and Human Capital Factors on the Prevalence of Mobilization, OR

	OR
Demographic characteristics	
Female (0/1)	2.41*** (0.51)
Minority (0/1)	0.86 (0.15)
Age (yrs)	1.01 (0.01)
Human capital characteristics	
CS work experience (yrs)	1.00 (0.01)
Employed (0/1)	0.99 (0.23)
Graduate degree (0/1)	0.63** (0.10)
N	1,205

Odds ratio (OR), seEform in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table E.2 Logistic Regression: Impact of Needs, Network Access, Support Attitudes Support Climate, and Demographics on the Prevalence of Mobilization, OR and Beta coeff.

	Full Sample				Employed Respondents Only			
	1		2		3		4	
	OR	Beta	OR	Beta	OR	Beta	OR	Beta
Need Diversity (#)	1.01 (0.01)	1.10			1.01 (0.01)	1.16		
Need Intensity (%)			1.01 (0.01)	1.15			1.01* (0.01)	1.22
Access (#)	1.48*** (0.07)	2.01	1.48*** (0.07)	2.02	1.45*** (0.07)	1.96	1.46*** (0.07)	2.00
Support Attitudes (%)	1.00 (0.00)	1.06	1.00 (0.00)	1.04	1.00 (0.00)	1.08	1.00 (0.00)	1.07
Family & Friendship Support Climate (%)	1.00* (0.00)	1.10	1.00* (0.00)	1.18	1.00* (0.00)	1.18	1.00 (0.00)	1.17
Work Support Climate (%)					1.00 (0.00)	0.91	1.00 (0.00)	0.92
Female (0/1)	2.11*** (0.46)	1.33	2.06*** (0.45)	1.32	2.16*** (0.52)	1.34	2.10*** (0.50)	1.32
Minority Status (0/1)	0.87 (0.16)	0.95	0.86 (0.16)	0.95	0.86 (0.17)	0.94	0.85 (0.17)	0.94
Age (in yrs)	1.02* (0.01)	1.19	1.02* (0.01)	1.19	1.02* (0.01)	1.20	1.02* (0.01)	1.20
Observations	1,205				1,076			

Odds ratios (OR) and standardized OR (beta), seEform in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table E.3 Bootstrapped Logistic Regression: Impact of Needs, Network Access, Support Attitudes, Support Climate, and Demographics on the Prevalence of Mobilization, OR

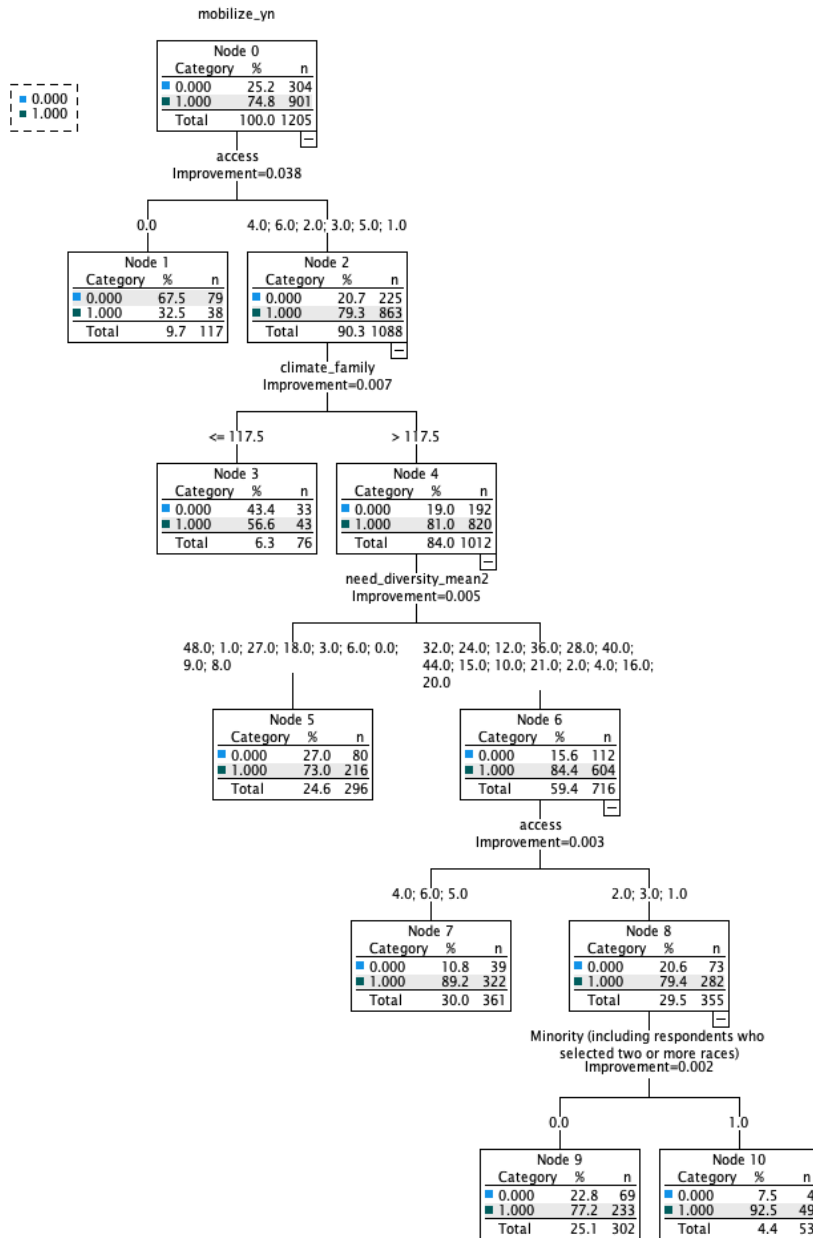
	Full Sample		Employed Respondents Only	
	1	2	3	4
	Need Diversity	Need Intensity	Need Diversity	Need Intensity
	OR	OR	OR	OR
Need Diversity (#)	1.01 (0.01)		1.01 (0.01)	
Need Intensity (%)		1.01 (0.01)		
Access (#)		1.48*** (0.10)	1.45*** (0.10)	1.46*** (0.10)
Support Attitudes (%)	1.00 (0.00)		1.00 (0.00)	
Family & Friendship Support Climate (%)	1.00 (0.00)		1.00 (0.00)	
Work Support Climate (%)			1.00 (0.00)	
Female (0/1)	2.11* (0.70)	2.06* (0.70)	2.16* (0.73)	2.10* (0.71)
Minority Status (0/1)	0.87 (0.25)	0.86 (0.26)	0.86 (0.26)	0.85 (0.25)
Age (in yrs)		1.02 (0.01)		1.02 (0.01)
Observations	1,205		1,076	

Odds ratios (OR), bootstrapped SE in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Models were bootstrapped by repeatedly creating random samples of the same size for each respondent group (i.e., 200 respondents with mobilization = 0; 200 respondents with mobilization = 1) and re-running the regression models 1000 times.

Due to multicollinearity, models tested the impact of need diversity and intensity on network size separately. However, results on the other predictors are the same unless otherwise noted.

Figure E.1 Regression Tree: Effect of Need Diversity, Network Access, Support Attitudes, Support Climate, and Demographics



Analysis was performed with SPSS, using the following specifications:

Growing method: CRT (CART algorithm)

Dependent variable: Mobilization 0/1

Independent variables: need diversity, resource access, support-seeking attitudes, family & friendship support climate, gender, minority, age

Minimum cases in parent node: 100

Minimum cases in child node: 50

Results are nearly identical in the sample restricted to employed respondents and are thus not shown.

E.2 Network Size (count)

Table E.4 Count Regression Comparisons: Effect of Needs, Access, Attitudes, Climate and Demographics on Network Size

	Poisson	Quasi-Poisson	Poisson – robust SE	Poisson - bootstrapped	NB1	NB2
Need Diversity¹						
Coefficient	0.0003	0.0003	0.0003	0.0003	0.0005	0.0004
Std. error	0.0015	0.0017	0.0017	0.0017	0.0018	0.0018
Need Intensity¹						
Coefficient	0.0012	0.0012	0.0012	0.0012	0.0015	0.0014
Std. error	0.0014	0.0016	0.0016	0.0016	0.0016	0.0016
Resource Access						
Coefficient	0.1373***	0.1373***	0.1373***	0.1373***	0.1440***	0.1425***
Std. error	0.0124	0.0141	0.0137	0.0130	0.0144	0.0146
Support-seeking Attitudes						
Coefficient	0.0005*	0.0005	0.0005	0.0005	0.0005	0.0005*
Std. error	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Family & Friendship Support Climate						
Coefficient	0.0021***	0.0021***	0.0021***	0.0021***	0.0021***	0.0021***
Std. error	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Work Support Climate²						
Coefficient	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
Std. error	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Female						
Coefficient	0.1594*	0.1594**	0.1594**	0.1594**	0.1662**	0.1723**
Std. error	0.0483	0.0551	0.0536	0.0520	0.0567	0.0576
Minority						
Coefficient	-0.0018	-0.0018	-0.0018	-0.0018	-0.0095	-0.0074
Std. error	0.0527	0.0601	0.0605	0.0594	0.0622	0.0617
Age						
Coefficient	-0.0022	-0.0022	-0.0022	-0.0022	-0.0012	-0.0020
Std. error	0.0024	0.0028	0.0027	0.0027	0.0029	0.0028

*** p<0.001, ** p<0.01, * p<0.05; ¹ Models tested the impact of need diversity and intensity on network size separately. ² Testing the impact of work support climate reduced the sample to employed respondents. However, the results of the other predictors did not differ meaningfully between the samples.

Table E.5 Zero-Inflated Model: Effect of Needs, Access, Attitudes, Climate and Demographics on Network Size

	Full Sample		Employed Respondents Only	
	1 Need Diversity	2 Need Intensity	3 Need Diversity	4 Need Intensity
Need Diversity (#)	0.00 (0.00)		0.00 (0.00)	
Need Intensity (%)		0.00 (0.00)		0.00 (0.00)
Access (#)	0.07*** (0.01)		0.06*** (0.01)	
Support Attitudes (%)	0.00 (0.00)		0.00 (0.00)	
Family & Friendship Support Climate (%)	0.00*** (0.00)		0.00** (0.00)	
Work Support Climate (%)	NA		0.00 (0.00)	
Female (0/1)	0.06 (0.05)		0.06* (0.05)	
Minority Status (0/1)	0.03 (0.05)		0.04 (0.06)	
Age (yrs)	-0.01** (0.00)		-0.01** (0.00)	
Inflate				
Need Diversity (#)	-0.01 (0.01)		-0.01 (0.01)	
Need Intensity (%)		-0.01 (0.01)		-0.02 (0.01)
Access (#)	-0.47*** (0.08)		-0.44*** (0.08)	
Support Attitudes (%)	0.00 (0.00)		0.00 (0.00)	
Family & Friendship Support Climate (%)	0.00 (0.00)		0.00 (0.00)	
Work Support Climate (%)	NA	NA	0.00 (0.00)	
Female (0/1)	-0.92** (0.35)	-0.89* (0.35)	-0.97* (0.40)	-0.94* (0.41)
Minority Status (0/1)	0.28 (0.24)	0.29 (0.24)	0.30 (0.26)	0.31 (0.26)
Age	-0.03** (0.01)		-0.03** (0.01)	
Observations	1,205		1,076	

Coefficients, robust SE in parentheses; *** p<0.001, ** p<0.01, * p<0.05

Due to multicollinearity, models tested the impact of need diversity and intensity on network size separately. However, results on the other predictors are the same unless otherwise noted.

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