

Beyond Academia: Examining the Versatile Career Paths of PhDs

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This dissertation employs a mixed-methods approach to examine the career transitions of Canadian PhDs. Moving beyond dichotomous definitions of PhD outcomes (as “academic” or “non-academic”) this research aims to identify and explore the expansive career opportunities available to PhDs outside of academia. It draws upon the confidential version of Statistics Canada’s 2013 National Graduates Survey as accessed through the South Western Research Data Centre (SWORDC), and national-scale primary data collected between April 2018-April 2019. The results are informed by human capital, credentialist and field theories.

The quantitative analysis of Chapter 2 examined the job quality and experiences associated with PhDs from numerous disciplines in three main employment sectors. Using Statistics Canada’s 2013 National Graduates Survey (NGS), the results showed that PhDs were most strongly represented in the private and academic sectors. Social science and law graduates were most likely to be employed within the public sector. In comparison, those from the physical and life sciences as well as hard sciences were most likely to be employed in the private sector. Relating to job quality, those employed in the public sector were most likely to be employed part time. Furthermore, PhDs employed in non-academic sectors were more likely to be overqualified. This finding suggests that PhDs may be less certain of how to market their skills to a non-academic audience, or it may point to a lack of non-academic opportunities for PhDs.

The quantitative analysis of Chapter 3 considered how measures of technical competency (e.g., publications, funding, research assistantships, sessional positions) may affect candidates’ ability to secure initial employment within academia. Employing primary survey data gathered from social science PhDs across Canada, the results suggested that publications, as a measure of technical competence, are a strong predictor of reporting an initial career within academia. However, certain socio-demographic characteristics (e.g., gender, race, parental education) were better predictors of securing academic employment than measures related to respondents’ technical competency (e.g., research assistantships,

sessional appointments). These results may indicate two things. First, the decreased likelihood of females and certain visible minorities may indicate weaker practices of affirmative action occurring within institutions. Second, that highly-educated parents may provide mentorship that is more aligned with their children's goal of obtaining an academic appointment.

Finally, the qualitative analysis of Chapter 4 draws on field theory to examine the strength of the connections forged between social science PhD programs and employment sectors beyond academia. To determine social science PhDs career preparedness, the research examined: (1) Whether career opportunities presented and promoted to social science PhDs have evolved alongside market demand; and (2) Whether institutional initiatives have promoted stronger academia-industry connections. Drawing on 28 interviews with PhDs from 5 social science disciplines, the results suggested that academic career norms are perpetuated at the department level. Though institutions—more generally—have broadened the career preparation offered to PhDs, ties to industry remain weak. To forge new norms strengthening academia-industry links, some participants reflected on the benefit associated with an internship opportunity during the PhD program. Future research would benefit from examining whether work-integrated learning (WIL) opportunities for PhD students are associated with a greater level of work-readiness in employment sectors beyond academia.

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Chapter 1: The Increasingly Versatile Career Pathways of PhDs

1.1 Introduction

Preparation for versatile career pathways, especially amongst graduates with advanced academic degrees, is a progressively important consideration for educational policymakers. In order to meet the changing needs of the labour market, provincial governments enacted initiatives (e.g. “Reaching Higher” and “Putting Students First”) to expand graduate education beginning in 2005 (Jonker, 2016). As a result of these efforts, PhD enrolments in Canada doubled between 2000 and 2013, from around 10,000 to just over 20,000 students (ibid, p. 5). Graduate education remains a substantial public investment, as \$114 million will be invested in graduate scholarships in Canada over a 5-year period, beginning in 2019-2020 (Department of Finance, 2019). This is in addition to the \$1.7 billion of Canadian grant council funding over a 5-year period that began in 2018, of which a substantial portion was delegated to support graduate students (ibid.).

Though many graduates expect commensurate labour market returns on their educational investments (Macdonald, 2018), increased graduate enrolments have not been met with an increased number of academic appointments (Ball et al., 2015; De Grande et al., 2014; Huisman, Weert, & Bartelse, 2002; Muindi & Keller, 2015). Though 40% of PhD’s obtain careers within academia, only 18.6% are full-time university professors (Edge & Munro, 2015, p. 16). As highlighted by Lee et al. (2010, p. 875), up to a decade after their hiring, over one-third of graduates remained in contractual appointments. Nearly one-third of those who obtained contractual appointments left academia within 7-10 years (Lee et al., 2010, p. 875). Once individuals pursue employment outside of academia, it is highly unlikely they will return (Pedersen, 2014; Schwabe, 2011). This is due in part to natural career progression, but also to sector-specific human and social capital accumulated during their career (Beret et al., 2003; De Grande, 2009; Pedersen, 2014).

With the expansion of graduate education, and the contraction of the academic labour market, it has become increasingly common for PhD’s to pursue employment outside of academia (Babbitt et al., 2008; Edge & Munro, 2015; Monk et al., 2012; Nerad, Aanerud, &

Cerny 2004; Nerad et al. 2007). As indicated by Edge & Munro's (2015, p. 17) report, just over 60% of PhD's obtained employment outside of academia. Existing research often argues that increased participation in careers outside of academia is linked to the surplus of academic labour (Iqbal, 2012; Jaschik, 2010; Mckenna, 2016). However, the decision to pursue employment outside of academia could also include rationale such as: an increasingly critical perception of academic careers, differences in wages between academic careers and those outside of academia, a growing awareness of suitable careers outside of academia, or other organizational factors (Austin & Alberts, 2012; De Grande et al., 2014; Huisman et al., 2002; Pedersen, 2014; Roach & Sauermann, 2010; Rabe & Rugunanan, 2011; Rudd & Nerad, 2015; Waaijer, 2016; Wood & Gurwitz, 2013).

Whether PhD's career aspirations are academic or otherwise, their awareness of and interest in career opportunities outside of academia varies widely by discipline (De Grande et al., 2014; Roach & Sauermann, 2017). Those from STEM fields are most open to and aware of viable career opportunities outside of academia (ibid). In comparison, programs from other disciplines remain heavily oriented towards preparing PhD's for academic employment upon graduation (Edge & Munro, 2015). Students who had no intention of pursuing non-academic careers may have invested little if any time into building industry-specific skills valued by private sector employers (De Grande et al., 2014). Therefore, beyond STEM fields, both employers and graduates are often uncertain of the transferability of a PhD to sectors outside of academia (DiPaolo, 2016; Holloway, 2016; ibid.; Kyvik & Olsen, 2012; Tholen, 2017).

As such, the topic of graduate student career transitions, specifically of those from the liberal arts, has sparked significant interest on behalf of media and policy stakeholders (Chohan, 2016; Edge & Munro, 2015; Jonker, 2016; Kay, 2014; McKenna, 2016). Despite this interest, and market expansion for those with advanced degrees, we know little about how PhDs' careers progress outside of academia (Charbonneau, 2011; Wendler et. al., 2012). Existing research often dichotomizes their career outcomes as "academic" or "non-academic." Doing so disregards the versatility of careers outside of academia, differences in organizational structure, and any differences in their job search and hiring processes (Agarwhal & Ohyama, 2013). Therefore, we lack an understanding of: the careers PhDs

pursue outside of academia, what influenced their career pathway, whether they were prepared to assume these careers, and what the job quality of their careers are. To address these shortcomings, this research uses a mixed-methods approach to examine the influences and experiences that shape the career pathways of (social science) PhDs. I apply human capital and credentialist theories (e.g. job qualifications and quality), as well as field theory, to examine PhDs' career pathways upon graduation.

1.2 Theoretical Framework

The theoretical frameworks applied through the dissertation are discussed below. Though each chapter employs a different theoretical framework, they address the unified concept of PhD career transitions, albeit from different perspectives. Human capital and credentialist theories examine the value of a PhD in employment sectors outside of academia. Human capital is applied in a second way to determine whether the investment into measures of technical competency (funding, research assistantships, publications, sessional appointments) aids employability within the academic sector. Finally, field theory explores the academia-industry connections of social science PhDs (and their departments) to industry sectors, and how to strengthen these links moving forward.

1.2.1 The Value of a PhD on the Labour Market

1.2.1.1 Human Capital

When discussing the outcomes of PhD graduates, human capital has been noted to influence the educational and occupational outcomes of graduates (Balsmeier & Pellens, 2016; Cason, 2016; Clair et al., 2017; Neumann & Tan, 2011; Pedersen, 2014; Pedersen, 2016). Despite the prevalence of recent research on PhD employment outcomes, few measures of human capital that effect PhDs' employment outcomes have been identified to date. Human capital has been defined as the technical competencies acquired through the pursuit of formal educational training (Bourdieu, 1986; Schultz, 1961; Schultz, 1993). Higher levels of formal education are believed to increase an individual's economic value (Pedersen, 2016), lending itself to more favourable labour market outcomes. According to this theoretical lens, PhDs

should be highly competitive on the market given their investment in advanced formal training. However, whether the value of their training translates directly to employment sectors outside of academia is an open question. In order to discover the relevance of human capital theory to PhD career transitions, the current study examines the role of field of study and work experience on PhD's initial employment sector.

1.2.1.2 Credentialism

Proponents of credentialism argue that it is the credential itself, not the technical competencies it imparts, that are valued within the labour market. Formal credentials stratify job candidates according to their associated prestige (Collins, 1979; Collins, 2011; Davies & Guppy, 2013). As the labour market grows increasingly complex and competitive, credential inflation continues to rise (Bills, 2003; Bills & Brown, 2011; Collins, 1979; Collins, 2011). As such, a standard of living that could once be achieved with lower levels of education (e.g., a bachelor's degree) now require higher degrees (e.g., a graduate degree). Credentialist processes have impacted even the highest tiers of education as graduate enrolment continues to rise (Edge & Munro, 2015; Wendler et. al., 2012), whereas tenure-track appointments are limited (Ball et al., 2015; De Grande et al., 2014; Huisman et al., 2002; Muindi & Keller, 2015). As a result, a growing percentage of PhD's have obtained employment outside of academia, yet the value associated with a PhD in employment sectors outside of academia remains largely unexplained. As such, the current research intends to examine PhDs' job quality more broadly (by considering measures of overqualification and employment status) to determine the extent that credentialist processes hold for PhDs employed in sectors outside of academia.

1.2.2 Academia-Industry Connections of Social Science PhDs

Field theory has been aptly defined and applied by Davies and Mehta (2018), who were influenced by work examining the similarities between schools and society in recent decades. It argues that schools and society have a reciprocal influence on one another through the process of "interpenetration." Interpenetration is a product of the continued expansion of (higher) education, and credential inflation. When examining higher educational expansion,

the current research focuses on the impact of horizontal expansion, giving way to what field theory defines an “accommodating logic.” This logic describes the way some institutions ensure their survivability by remaining responsive to student needs, becoming hybrid institutions, and catering their offerings to an increasingly versatile student body. Though this logic is praised by some for attending to student needs, it is critiqued by others for eroding academic standards. Applied in the current context, this research will examine the strength of academia-industry links between PhD programs and various employment sectors beyond academia. Furthermore, it will determine whether the accommodating logic enacted by expanding professional development opportunities offered to PhD students has impacted students’ career transitions.

1.3 Contribution of the Dissertation

The current study contributes to research in the area of PhD career outcomes in three main ways. First, existing literature often employs a dichotomous standpoint, examining whether graduates pursue “academic” or “non-academic” employment (De Grande et al., 2014; Maldonado, Wiggers, & Arnold, 2013; Roach & Sauermann, 2010; Statistics Canada, 2011). As a growing number of PhD’s are obtaining employment outside of academia, it is increasingly important to determine what careers PhDs occupy (e.g. public, private, or alternative-academic sectors) and what institutional processes influence their career transitions (Anders, 2015; Hughes, 2017; Munro, 2015; Neumann & Tan 2011; Olejarz, 2017; Polk, 2017; Sastre, 2016; Sauermann & Roach, 2012). Increasing awareness of these considerations will allow current and future students to broaden the scope of their career development during their program, rather than upon or after graduation.

Second, research that acknowledges the breadth of careers outside of academia is often limited to STEM disciplines (Ewen, Carr, & Reynolds, 2012). This may be due to their close alignment with industry in comparison to other disciplines (Pedersen, 2014). Though a select few reports extend beyond this scope, they focus on the humanities (Wood, 2012; Yachnin, 2016, 2017) or aggregated disciplines (Jonker, 2016). As a result, although market demand for social science PhDs has grown (Ladner, 2011; Shah, 2011), we lack an understanding of

how social science PhDs translate their skillsets beyond academia to meet the needs of these roles. To address this shortcoming, this research identifies where social science PhDs obtain work, and the career development (skills, experiences) that accompanied their transition. By identifying these factors, students are able to alter their career development accordingly, and institutions can revise current initiatives to meet labour market demand.

Finally, the research extends beyond quantitatively-oriented reports examining broad trends such as: attrition, time to degree, employment status, sector of employment (DeClou, 2013; Dever et. al., 2008; Haynes et al., 2007; Rudd & Nerad, 2015; Wendler et. al., 2012). By employing a mixed-methods analysis, this dissertation provides insight into both broad trends and individual lived experiences. Including quantitative components allows some point of comparison between existing reports and this dissertation. However, the most obvious contribution is associated with the inclusion of a qualitative component, as this remains overlooked by existing research. By taking an inductive approach to the qualitative analysis, factors that have yet to be considered in as much detail as those commonly hypothesized and included in quantitative analyses may emerge. For example, graduate student career preparation has come under scrutiny by media and policy stakeholders. However, many institutional reports have yet to identify how they may improve students' career development for employment sectors outside of academia in great detail. As such, this dissertation explores existing institutional processes, and how to strengthen links to industry to prepare PhDs' for careers outside of academia.

1.4 Organization of Chapters

The three phases of this dissertation aim to identify the experiences and opportunities that impacted PhD career transitions, with a particular focus on the social sciences. Though each chapter contributes to this unified concept, the theoretical orientation differs between each chapter. Chapter 2 provides an overview of the employment sectors occupied by PhDs from a broad range of disciplines, whereas Chapters 3 and 4 focus explicitly on the career preparation and outcomes of social science PhDs. Honing in on social science PhD outcomes in Chapter 3 and 4 allows the research to identify whether their career transitions differ

substantially from those in the hard sciences and humanities as identified by previous research.

In Chapter 2, using data from Statistics Canada, I analyze the various career pathways pursued by Canadian PhD graduates within three years of graduation. To accomplish this, I employ multinomial logistic regressions to determine PhDs' representation in each sector, what effect human capital has on their employment outcomes, and what the job quality associated with each sector is. Sequential modelling was used in the multivariate regression analyses in order to introduce variables according to their theoretical underpinning. Models 1 and 2 highlight the focal variables relating to PhDs' stocks of human capital (e.g. field of study, funding via work experience). Models 3 and 4 introduce focal variables pertaining to the job quality of PhDs (e.g. overqualification, employment status). Speaking to human capital theory, the technical competencies associated with various disciplines and funding sources may be related to employment sector. Those from the hard sciences, and those who obtained an alternate source of funding were most likely to obtain employment in the private sector. In relation to credentialist theory, the findings assert that PhDs obtain a reasonable level of job quality within and outside of academia. Although PhDs employed outside of academia are often overqualified for their position, most report securing full-time employment.

In Chapter 3, I collect primary survey data from social science PhDs across Canada to identify whether investing in measures of technical competency (funding, research assistantships, publications, sessional appointments) aids PhDs' employability within academia. To accomplish this, multinomial logistic regressions examine the impact of teaching- and research-oriented measures of technical competency. Participation in each of these measures suggests an understanding of what makes an applicant competitive on the academic market. This chapter found that research-oriented measures were a better predictor of whether PhDs obtained academic employment than teaching-oriented measures were. In particular, publication record was found to increase the likelihood of obtaining an academic career, either as a postdoctoral researcher or as a professor.

Chapter 4 includes semi-structured interviews with participants from Chapter 3, adding depth to their previous survey responses. This chapter aimed to examine the academia-industry links of PhDs upon graduation, and determine their career preparedness for roles outside of academia. The first phase of a two-phase coding strategy is deductive in nature and employs attribute and provisional coding strategies. The second phase is inductive in nature, employing evaluation coding to suggest institutional recommendations based on respondents' reflections on their PhD programs. Relating to field theory, the results indicate that there is a norm-like status associated with pursuing an academic appointment. Beyond government employment, most respondents indicated weak links to industry careers, stating that they felt unprepared to search for and pursue a career outside of academia or government. Though opportunities outside of applied fields (e.g. clinical psychology) were rare, respondents who participated in an experiential learning opportunity during their PhD reported the tightest connections to industry. As such, there is benefit to examining the effect of experiential learning on graduate students' career transitions to a greater extent in future research.

Chapter 5 concludes with policy recommendations informed by each chapter's findings. Overall, the results support the claims of previous research that the majority of PhDs pursue employment outside of academia. However, respondents report that they feel underprepared to pursue these types of careers prior to graduation, as their career development largely surrounds academic employment. As such, this chapter addresses what I believe are best practices to prepare PhDs for a wide range of careers, whether inside or outside of academia.

1.5 Conclusion

The vast majority of institutional research on graduate outcomes has focused on topics such as: students' time to degree (Gravois, 2007; Pitchforth et al., 2012; Stock et al., 2014), attrition rates (DeClou, 2013), career aspirations (Neumann & Tan, 2011; Pitt & Cox, 2010), distance education (Broome et al., 2011; Heinz et al, 2015), and the likelihood of obtaining tenure track positions (Beret, Giret, & Recotillet, 2003; Enders, 2002; Recotillet, 2007; Harman, 2002). Of studies that examine graduates' transitions to careers outside of academia, most focus on the hard sciences (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker,

2015; Clair et al., 2017; Lee et al., 2010; Marshall, 2008). Far less of the existing literature has focused on this same transition amongst other fields (Cason, 2016; De Grande et al., 2014; Monk et al., 2012; Neumann & Tan, 2011; Rabe & Rugunanan, 2011). To my knowledge, the proposed research is the first to examine non-academic career pathways of social science PhD graduates and the transferable skills that aided this transition.

Given the scarcity of related research, significant importance lies in disseminating the findings among those considering a PhD. Graduate students may lack access to this information if it is not readily provided by their advisors or institution. Some institutions have implemented related professional development initiatives, but others have yet to do so. Students' own career awareness is reliant on significant stocks of capital to know where to find relevant resources. This research aims to overcome this by providing the requisite knowledge and skills to prepare students for various career paths. Second, it aims to aid departments in identifying how their programs can best prepare their students for the labour market. Doing so aims to provide the information required to ease the transition of PhD's into their intended sector of employment, whether academic or otherwise.

Chapter 2: Fields Aplenty? The Landscape of PhD Careers in Canada

2.1 Introduction

The pursuit of a PhD, and the training and experiences it imparts, has often been associated with the obtainment of academic employment (Ewen et al., 2012; Huisman, Weert, & Bartelse, 2002; Roach & Sauermann, 2010; Waaijer, 2016). Under this traditional mindset, non-academic employment was viewed by students and faculty as an alternative career or a “backup plan” (Baker, 2015; De Grande et al., 2014). However, this mentality has changed for many PhD students and graduates. Though 43% of respondents in Kyvik and Olsen’s (2012, p. 211) research aspired to an academic career, 21% aspired to a research career outside of academia, and 15% aspired to a career outside of research. Whether due to organizational changes in program structure or otherwise, non-academic careers are not always stigmatized as an alternate “backup” option (Marshall, 2008; Wood & Gurwitz, 2013).

Part of this shift in mindset may be because increased graduate enrolments have not translated into an increase in permanent academic appointments (Ball et al., 2015; De Grande et al., 2014; Huisman et al., 2002; Muindi & Keller, 2015). Less than 20% of PhD graduates report obtaining full-time academic appointments (Edge & Munro, 2015, p. 16).¹ Furthermore, Shauman et al. (2017, p. 10) found that only 10% of graduates did so within two years of graduation. Instead, institutions have become increasingly reliant on contractual positions (Cassuto & Jay, 2015; Cason, 2016; Clair et al., 2017; Huisman et al., 2002). Among graduates who were successful in obtaining permanent academic employment, many initially occupied contractual positions (Rudd & Nerad, 2015). In some cases, it took up to a decade for these graduates to obtain a permanent academic appointment (Waaijer, 2016).

¹ As data for were collected from multiple sources (National Household Survey, 2011; Canadian Association of Postdoctoral Scholars; The Conference Board of Data), the time frame from graduation of this finding varies. The extent of this variation is unclear as methodologies of the reports did not consistently specify this information.

Current students' perceptions of securing academic employment may have changed after seeing the difficulty many before them faced in doing so (Waaiker, 2016). The acknowledgement of limited tenure-track opportunities has led some to become pessimistic about obtaining a coveted position. Only about half of those who identified academic career aspirations felt they would be able to establish a permanent career in this sector (De Grande et al., 2014, p. 555). Specifically, obtaining an academic appointment within a research-oriented institution was viewed as students' least feasible option (Fox & Stephan, 2001). As such, the feasibility of long-term careers in academia have been rated poorly by nearly half of recent graduates, compared to less than 10-15% in non-academic settings (Waaiker, 2016, p. 5).

Given the scarcity of full-time academic appointments, many students pursue non-academic sectors. Approximately 24% of graduates in Neumann & Tan's (2011, p. 607) study were employed within the government sector. Most of the remaining graduates were employed in the private sector, finance, or health. Less than 10% of graduates were either unemployed or not looking for employment. Edge & Munro (2015, p. 20) found that the trend towards non-academic employment has been prevalent for decades, even when controlling for field of study. Within Ontario, health care, government, and scientific or technical services are amongst the most common non-academic sectors pursued by PhD graduates since 2009 (Jonker, 2016, p. 25).

Not only are many graduates pursuing employment outside of academia, but these careers have become a first choice for many graduates. This may be a result of a change in perspective of what an academic career entails, an increasing awareness of non-academic career opportunities (Sauermann & Roach, 2012), or the increasing value associated with a PhD in many sectors (Neumann & Tan, 2011). Despite the potential transferability of a PhD to non-academic sectors, we know little about how graduates' careers progress outside of academia (Charbonneau, 2011; Wendler et. al., 2012). We may find that the general labour market concerns for PhD graduates may not be as bleak as they are often portrayed (Roach & Sauermann, 2017). For example, previous research found that PhD graduates' rates of unemployment are slightly lower than those with bachelor's or master's degrees (Edge &

Munro, 2015, p. 23). DeClou (2014) found that unemployment is even more prevalent among high school graduates. Between 2002-2012, 7-11% of those with a high school diploma were unemployed compared to 3-5% of those with a university degree (DeClou, 2014, p. 17). However, we lack an understanding of the non-academic sectors these graduates pursue, what influences this decision, and what the job quality of their careers in various sectors are.

Drawing on human capital and credentialist theories, the current study has three main goals: (1) to examine the representation of PhD graduates in each sector of employment considered within the current study; (2) to determine what qualifications and experiences are associated with each sector of employment; and (3) to determine the job quality of PhDs in each sector of employment. The results from this study will contribute to deepening our understanding of the non-academic employment outcomes of PhDs across a range of disciplines. In order to address these goals, Statistics Canada's 2013 National Graduates Survey (NGS) will be examined to determine the impact of factors relating to educational background, work experience and job quality. As career aspirations of PhDs may extend beyond the academic sector, and as the academic sector is unable to absorb the number of PhDs it produces, it is increasingly important to examine career pathways available to graduates outside of academia. Much of the existing research has focused on the non-academic career transitions of hard science PhDs. However, the prevalence of non-academic career transitions of the social sciences and humanities, and their competitiveness in these sectors, stands to be determined.

2.2 Theoretical Framework

The current study will review the impact of four focal variables in relation to PhDs employment sector upon graduation. These focal variables are: field of study, funding source (work experience), employment status, and overqualification. The four focal variables were chosen according to their significance in determining graduates' employment outcomes as outlined in past research. Within the current context, field of study and funding source will be examined using the lens of human capital theory, whereas overqualification and employment status will be explained by credentialist theory.

2.2.1 Human Capital

Human capital has been defined as the technical competencies gained from the pursuit of formal credentials (Bourdieu, 1986; Schultz, 1961; Schultz, 1993). Individuals are said to bolster their competencies and stocks of human capital through this pursuit. This in turn allows them to provide the greatest economic value within the labour market (Pedersen, 2016). As such, they are believed to be rewarded in the form of increased earnings. For the purposes of the proposed research, human capital theory situates the role of certain opportunities during the PhD program on graduates' career pathways (Bourdieu, 1986; Schultz, 1961; Schultz, 1993). Past research has examined factors such as credentials received, area(s) of proposed research, and field of study on earnings and employment outcomes (Betts, Ferrall, & Finnie, 2013; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013; Zarifa, Walters, & Seward, 2015).

2.2.1.1 Field of Study

With the scarcity of full-time academic appointments, an alternative market for PhD graduates has emerged. Fields whose training is most tightly linked to industry reap the greatest economic rewards (Davies & Guppy, 2013). The non-academic market emphasizes innovation and research and development (R&D). Given the hard sciences explicit focus in these areas, they fare well in non-academic sectors as well as the academic sector.

However, the labour market success of those in the hard sciences comes from more than just fostering R&D skills (Cai, 2013). Their programs display “vocational specificity,” tightly linking the curricula to students' intended careers (Davies & Guppy, 2013; Kerckhoff, 2001, p. 5; Kerckhoff, 2002; Pedersen, 2014). This apparent link may influence students' perceptions of careers outside of academia, and influence their likelihood of pursuing them (De Grande et al., 2014; Roach & Sauermann, 2010). Those from engineering and the natural sciences (e.g., STEM fields) are most likely to shift their career preferences away from academia during the PhD program (Roach & Sauermann, 2017). As such, graduates from these disciplines are prepared for academic and non-academic careers, aiding their employability across job sectors.

In support of translating career aspirations to eventual career outcomes, previous research asserted that hard science PhDs are well-represented in non-academic sectors (Jonker, 2016; Kyvik & Olsen, 2012). Jonker (2016, p. 26) found that many graduates from fields such as engineering, science, and health-related fields obtained employment in non-academic sectors. In comparison, she found that those from business, humanities, and the social sciences were more likely to have obtained some form of academic employment. Similarly, Kyvik & Olsen (2012, p. 212) found that approximately 60% of humanities and social science graduates were employed in academia, compared to only 25-40% of those from the hard sciences and health sciences.

Though there is a clear link between the hard and health sciences and employment sectors outside of academia, this link is less clear among the humanities and social sciences. Given the strong representation of PhDs from the humanities and social sciences in the academic sector, it may indicate that they foster competencies that are tailored more explicitly to an academic context. Alternatively, it may suggest that they are less aware of how to translate the competencies they have fostered to a non-academic context. In comparison, the explicit transferability of skills fostered by PhDs from the hard and health sciences may provide these graduates with increased mobility across career sectors and professions (Kyvik & Olsen, 2012; Lee, Miozzo, & Laredo, 2010). As fields most tightly linked to industry often reap the greatest economic rewards (Davies & Guppy, 2013), hard science graduates may benefit to the greatest extent from their increased sector mobility.

2.2.1.2 Funding Source

The type of funding students receive during their PhD may influence their likelihood of attrition, career aspirations, and eventual employment outcomes (Barry, 2013). Yet only recently has the potential effects of these funding sources been acknowledged by related research (Barry, 2013; Blume-Kohout & Adhikari, 2016), largely limited to research based in the United States. Barry (2013) argued that the type of funding source a student pursues can create a snowball effect, influencing not only their experiences during the degree, but their employment outcomes upon completion of the degree. Students' funding source impacts a

substantial amount of the time they spend per week on areas that may extend beyond their dissertation research. Though the amount of funding received may be similar, there may be significant advantages associated with obtaining research assistantships rather than teaching assistantships (Addy & Blanchard, 2010; Austin et. al., 2009; Barry, 2013; Blume-Kohout & Adhikari, 2016).

Research assistantships may provide students with the technical skills and opportunities necessary to prepare for academic and non-academic careers. Students gain experience collaborating with faculty members, and expanding their stocks of capital (Blume-Kohout & Adhikari, 2016). Students' stocks of human and social capital have been noted to influence the educational and occupational outcomes of graduates (Balsmeier & Pellens, 2016; Cason, 2016; Clair et al., 2017; Neumann & Tan, 2011; Pedersen, 2014; Pedersen, 2016). For example, involvement in a research assistantship may have led to students' inclusion on publications arising from the research. As publications are often vital to obtaining tenure-track positions, familiarity with this process provides a significant advantage in students' early career prospects (Barry, 2013).

Furthermore, involvement in academic research projects informs students of the technical skills and competencies required by many research-oriented positions in academia or otherwise. Therefore, participation in these opportunities may steer students in the direction of pursuing a research-oriented career upon graduation (Barry, 2013; Blume-Kohout & Adhikari, 2016). Blume-Kohout & Adhikari (2016, p. 1301) found that those in certain hard science fields who pursued a research assistantship in graduate school were 4.6-11% more likely to pursue research and development (R&D) based positions upon graduation when compared to their counterparts funded by other assistantships or fellowships. It is important to note that this distinction may be contingent on students' involvement with the related aspects of the research project (e.g. research design, analysis, research dissemination, and so forth).

However, not all opportunities to foster stocks of capital within the PhD program are created equal. The human capital provided by teaching assistantships are often less valued

when compared to a research assistantship for a few reasons (Austin et. al., 2009). First, teaching assistantships are often included in PhD students' institutional stipend. As such, they do not often differentiate students in the same way that competing for a research assistantship might, thereby devaluing their prestige. While students may gain experience guest lecturing, teaching assistantships spend much of their time dedicated to marking and/or proctoring. When compared to the collaborative and research-intensive competencies fostered during a research assistantship, the duties associated with a teaching assistantship may be less of a differentiation factor in tenure track job applications. Therefore, these students may need to rely on other opportunities in order to obtain the additional capital of their peers interacting with faculty during research assistantships.

Second, teaching may be seen as a distraction from research, as the duties of these roles are often unrelated to students' dissertation (Addy & Blanchard, 2010). Barry (2013) discussed that this perception may be due to some institutions' research-intensive (rather than teaching-intensive) focus. However, the reprioritization of time may be of benefit to some students, depending on their career goals. Students who pursued a teaching assistantship were less likely to aspire to pursue an industry (rather than education) career upon graduation (Barry, 2013, p. 104). Instead, they were more likely to report a career in teaching after graduation (Barry, 2013, p. 178), supporting their educationally-oriented career aspirations.

Further complicating matters, graduate students are likely to fund their degree through multiple means (Blume-Kohout & Adhikari, 2016). Versatile funding (training) opportunities may provide students with larger stocks of human capital, which may influence the competitiveness of their application once they search for employment. Teaching assistantships are commonly written into students' institutional stipends/contracts, meaning the majority will do so at some point during their degree. Therefore, as applying to internal and external scholarships is encouraged by departments, and many students seek (whether successful or not) research assistantships to add to their academic experience, a fair number may report funding their degree through multiple mechanisms. In turn, gaining experiences in multiple academic pursuits has been shown to influence students' career aspirations. Barry (2013, p. 104) found that those who funded their degree through multiple means were more

likely to aspire to a government or industry career than those who were funded solely through scholarships.

Given the differentiation associated with various forms of funding or work experience, the current study aims to further this discussion. For instance, are graduates who obtained an alternative source of funding more likely to pursue employment outside of academia? Are PhDs who obtain a scholarship or fellowship most likely to pursue academic employment? Finally, what is the most sought after employment sector of students who gain exposure to multiple sources of human capital?

2.2.2 Credentialism

Given the increase in PhD enrolments, credentialist theory will be employed to determine whether this expansion has contributed to a possible overproduction of graduates. Credentialists suggest that competition for labour market opportunities and power encourage credential inflation (Bills, 2003; Bills & Brown, 2011; Collins, 1979; Collins, 2011). In this case, proponents of this theory may suggest that the value of college diplomas and baccalaureate degrees has diminished. Therefore, postsecondary graduates may be prompted to pursue graduate training at increasing rates. If credential inflation is occurring, it could have serious implications for employment transitions of PhD graduates. Within the current context, it may entail the overqualification of PhDs outside of academia, significant rates of unemployment, or part-time employment.

Under this theory, the value of a candidate's credential stems from the prestige and talent it signals, acting as a stratifying or screening process (Collins, 1979; Collins, 2011; Davies & Guppy, 2013). This process places greater emphasis on these signals than it does on the technical competency of a candidate. Though many academic appointments require a PhD, its saturation into the non-academic market remains largely unexplained. Therefore, the job quality of recent PhDs in sectors outside of academia stands to be determined. Within the current context, job quality will be comprised of PhDs' employment status and likelihood of overqualification.

2.2.2.1 Overqualification

The demands of the labour market have advanced in our knowledge-based economy, and so too have the qualifications needed for many positions (Karmel, 2015). As such, a growing number of individuals are pursuing more advanced levels of educational credentials. An implication of this process is the potential for employee overqualification. Overqualification is a process that occurs when an employee's educational credentials exceed those necessary to obtain their current position of employment.² Overqualification has been linked to poorer employment outcomes such as lower wages, lesser job satisfaction, and an underutilization of employee skills (Di Paolo, 2016; Karmel, 2015). To date, much of the existing research on overqualification has focused on graduates who obtained a postsecondary degree, specifically a bachelor's degree or a college diploma (Carroll & Tani, 2013; Edge, Martin, & McKean, 2018; Fenesi & Sana, 2015; Liu, McCloy, & DeClou, 2012; Purcell et al., 2013; Scurry & Blenkinsopp, 2011). In comparison, research examining the potential overqualification of Canadian PhDs is limited, so a global focus provides the necessary perspective on the matter.

In other countries, past research has found significant levels of overqualification occurring among PhDs (Derycke & Van Rossem, 2014; Di Paolo, 2016; Holloway, 2016; Karmel, 2015). Further, it has been suggested that the number of suitable positions decreases as an individual's educational credentials increase, particularly among the most advanced degree holders (Karmel, 2015, p. 41). Di Paolo (2016, p. 438) found that 47% of PhDs were not employed in roles which matched their education. In addition to being overqualified, 26% of respondents also reported their current employment did not make use of the skills garnered during their PhD (Di Paolo, 2016, p. 438). Similarly, Holloway (2016, p. 98) reported that 65% of PhDs from Louisiana were overqualified for their position at the time of their dissertation research. Finally, Derycke & Van Rossem (2014, p. 30) found that a minimum of 39% of PhDs were employed in positions that did not require a PhD, whereas only 54% of respondents held a position that required a PhD or postdoc. Furthermore, only 40% of PhDs employed outside of academia reported a close relation between their employment and their

² Overqualification has been used synonymously in past research with terms such as over-education, underemployment, and so forth.

PhD training, and 36% indicated a partial relation exists (Derycke & Van Rossem, 2014, p. 28).

However, some of these studies acknowledged that the likelihood of overqualification can differ substantially by sector of employment (Derycke & Van Rossem, 2014; Di Paolo, 2016; Holloway, 2016). A PhD has become a requirement for many tenure-track appointments, as well as some other positions within higher education. Derycke & Van Rossem (2014, p. 30) found that 89% of respondents' positions within a university required a PhD, as did 54% of those in other higher educational institutions. In comparison, this requirement has been found to be far less common in other employment sectors (Derycke & Van Rossem, 2014; Di Paolo, 2016). Derycke & Van Rossem (2014, p. 30) reported that between 33-41% of those employed by the private non-profit sector identified the PhD as a job requirement. In comparison, the majority (at least 70%) of those employed within the service sector or educational institutions (outside of higher education) reported the PhD as a job requirement.

Past research has suggested that both employees and employers outside of academia may contribute to the process of overqualification (Di Paolo, 2016; Holloway, 2016). Holloway (2016) argued that PhDs may find themselves overqualified if they are unsure of how to market their skills to a wider audience. PhDs may focus on positions that are overtly linked to their PhD training, whether in substantive area or in required hard skills. As such, they may deem other roles as seemingly unrelated, failing to recognize the transferable skillset they developed during the PhD. DiPaolo (2016) pointed to the role of the employer in perpetuating the overemployment of PhDs. Employers may lack an understanding of PhDs' abilities, given their change in value with the rise of credential inflation (Kyvik & Olsen, 2012; Tholen, 2017). However, Di Paolo (2016) suggests that the issue is larger than this. This lack of understanding may contribute to an underutilization of skills amongst PhDs employed outside of academia.

Within Canada, findings have reported more optimistic employment outcomes for PhDs than other countries. Uppal and LaRochelle-Cote (2014, p. 8) reported that master's and PhD graduates were only half as likely to report being overqualified for their current role when

compared to those who obtained a bachelor's degree. The predicted probability of a master's or PhD graduate being employed in a position requiring a high school education or less was 9%, compared to 17.5% of those without either degree (Uppal and LaRochelle-Cote, 2014, p. 7). Similarly, the predicted probability of a master's or PhD graduate being employed in a position requiring a college education or less was 23%, compared to 42.5% of those without either degree (Uppal and LaRochelle-Cote, 2014, p. 7).

Despite their optimistic results, the authors acknowledge that credentialist processes may be more prominent during times of significant market saturation. During such times, a greater proportion of graduates are competing for a limited number of positions. The current study hypothesizes that during these periods, we may see a greater number of PhDs pursuing employment meant for those with a credential from a previous tier. Furthermore, aggregating master's and PhD degrees fails to account for the potential variation in results by earned degree. Though the master's degree may be associated with favourable employment prospects, the "payoff" of the investment into a PhD is less clear (Iqbal, 2012). Therefore, there is a need to disentangle a PhD from previous degrees to see if these results hold within the Canadian context. Otherwise, we may find results specific to PhDs from other countries holds true for Canadian PhDs as well.

2.2.2.2 Employment Status

Previous research has asserted that rates of unemployment tend to decrease as level of education increases (Ferguson & Wang, 2014; Jonker, 2016; Neumann & Tan, 2011). During 2008-2011, the unemployment rate among those with less than a high school diploma increased to 11.7% (Ferguson & Wang, 2014, p. 4). In comparison, the unemployment rate among those with a postsecondary degree (whether a college diploma or bachelor's degree) was only 5%. Whether this assertion holds for those with advanced degrees, and doctorate holders in particular, is less obvious.

Desjardins & King (2011, p. 27) reported that 7% of Canadian PhDs were unemployed in 2007, after removing graduates who were not in the labour force. They note that unemployment rates differ substantially by field of study, as those from the humanities

reported the highest rates of unemployment (16%) (Desjardins & King, 2011, p. 27). Furthermore, Desjardins (2012, p. 34) found that the national unemployment rate from her previous study remained at 7% when considering Ontario PhDs. Optimistically, she found that unemployment rates in Ontario had decreased slightly over time. The class of 1995 reported an unemployment rate of 8%, compared to 7% among the class of 2000, and 6% among the class of 2005 (Desjardins, 2012, p. 75). Though institution-specific, Miller, Middaugh, & Broniewicz (2014, p. 18) found that 5% of PhDs from Western University were unemployed and seeking employment in 2014. Though Desjardins (2012) indicated that the unemployment rate of Ontario PhDs may be declining, employment rates at the institutional, provincial, and national level mimicked the unemployment rates of postsecondary graduates found by Ferguson & Wang (2014). Therefore, the benefit of an advanced degree, at least in terms of employment rates post-graduation, is unclear.

Among the employed, Desjardins and King (2011, p. 27) found that 8% of Canadian PhDs were employed part-time. However, results can vary by the amount of time that has passed since graduation, and by field of study. Miller et al. (2014) found that part-time employment is most common among recent graduates. Furthermore, the longer the passage of time since graduation, the greater the odds of PhDs obtaining full-time employment. Among those furthest from their graduation (the classes of 2008-2010), only 6% were employed part-time (Miller et al., 2014, p. 24). In comparison, 19% of the class of 2013 reported part-time employment at the time of the survey (Miller et al., 2014, p. 24). In terms of field of study, humanities PhDs reported the highest percentage of part-time employment (18%), whereas engineering reported the lowest (2%) (Desjardins and King, 2011, p. 27). However, when considering Ontario specifically, Desjardins (2012) once again found more optimistic results, as only 10% of humanities PhDs from Ontario reported part-time employment.

Though some PhDs may intentionally seek part-time employment, whether for familial considerations or otherwise, part-time employees may face significant penalties. Beyond financial considerations, previous research has found a correlation between career satisfaction and employment status. Miller et al. (2014, p. 19) found that full-time employees were more satisfied with their careers than those occupying part-time positions. These

findings indicate that there may be a significant discrepancy between the number of PhDs intending to pursue part-time employment versus the number who obtain it. As such, these results may lend support to credentialism's argument regarding the overproduction of graduates with advanced credentials.

Given the concerns of job quality (overqualification and employment status) of PhDs, the question remains as to how greatly credentialist processes have impacted graduates in recent years. This research aims to determine whether graduates are obtaining "ideal" jobs both within and outside of the academic market. In order to do so, it will determine two things: First, whether PhDs are assuming roles they are overqualified for. In non-academic sectors, this would entail pursuing occupations requiring a bachelor's or master's degree, rather than a PhD. Second, it will examine PhDs employment status, whether full-time or otherwise. As many PhDs aim to secure full-time employment, high rates of part-time employment (or unemployment) may lend support to the overproduction of PhDs, questioning the job quality of their careers upon graduation.

2.3 Contribution to the Literature

Media accounts have acknowledged the difficulty obtaining tenure-track employment, and have begun to raise awareness of the non-academic pathways available to PhD graduates (Crago, 2015; Polk, 2015; Polk, 2017; Sastre, 2016). However, little empirical evidence examines what contributes to graduates' competitiveness and success in these sectors, and how common non-academic employment transitions are among those beyond the hard sciences.

Given graduates' representation in the non-academic labour market, it is increasingly important to determine what positions they obtained, and how they did so. Of studies that examine graduates' transitions to non-academic careers, many focus on the hard sciences (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). Far less of the existing literature has focused on this same transition amongst other

fields (Cason, 2016; De Grande et al., 2014; Monk et al., 2012; Neumann & Tan, 2011; Rabe & Rugunanan, 2011).

Wood's (2012) research controlled for a range of important factors influencing graduates' career pathways (e.g. advisor support, campus career services). However, this research differs from the current research in two main ways: First, the population of interest was limited to History PhD students. This allowed the research to acknowledge the importance of preparing History graduates for non-academic pathways. However, it is important to extend the scope to other humanities and social sciences fields to determine whether this finding holds more broadly. Second, data was gathered from those who completed their programs across American institutions. Therefore, it stands to be determined whether these findings hold to the same extent within a Canadian context. Wood's (2018) current research extends the previous scope to include specific fields from the humanities and social sciences. However, it focuses on who obtains tenure-track employment, rather than continuing to examine the non-academic employment pathways of graduates.

Though studies such as Wood's (2012) extend their focus beyond the career pathways of graduates from the hard sciences, research on the career outcomes of graduates in Canada is much more limited. Recent Canadian research on this topic has been undertaken, though the scope of each project differs from the current research. Jonker (2016) examined the career pathways of Canadian PhD graduates across a range of fields. However, a large focus of this research stems from differentiating career pathways within academia. Less attention is paid to what sectors graduates pursue outside of academia, and what factors may have contributed to graduates pursuing these sectors. The Track, Report, Connect, and Exchange (or "TRaCE" project) conducted a one-year pilot project under a similar premise as the current research, though its initial phase consisted primarily of humanities PhD graduates (Yachnin, 2016, 2017). As such, the goals of the research differed greatly from those of the current research. The current research aimed to contextualize the career pathways of Canadian PhDs by including a range of disciplines or faculties. Furthermore, authors of the TRaCE project note that the research is policy-based rather than theoretically-oriented. In comparison, the current

research aims to intertwine the two to appeal to both academic and policy-based stakeholders.

Departments of graduate and postdoctoral studies have begun to track the non-academic career pathways of their PhD graduates as well. The University of Toronto (U of T) conducted the 10,000 PhDs project in order to determine the employment outcomes of those who graduated from their institution between 2000-2015 (University of Toronto, 2018). The University of British Columbia (UBC) created a similar report, tracking the employment outcomes of those who graduated from their institution between 2005-2013 (Porter, et al., 2018). This report extends a step beyond the University of Toronto's by including the job qualification required for graduates' current role, which begins to consider the possible overqualification of their graduates. However, as both reports are institution-specific, they are unable to draw national-level conclusions regarding the academic and non-academic career pathways pursued by Canadian PhD graduates.

Each of the four previous examples considered at least one of the four focal variables examined by the current study, signifying their importance when determining the career pathways of PhD graduates. However, the importance of funding source, as identified by research within a global setting, has not been considered to the same extent within these Canadian-based reports. Further, Canadian-based reports are heavily policy-oriented in nature. The current research further differentiates itself from these reports by providing a comprehensive link from theory to practice. Employing a sociological lens, it will determine the extent that theories of credentialism and human capital hold when determining the career pathways of Canadian PhD graduates.

Past research employing these theoretical lenses have examined factors such as credentials received, area(s) of proposed research, and field of study on earnings and employment outcomes (Betts, Ferrall, & Finnie, 2013; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013). However, the proposed research aims to extend previous theoretical applications in two main ways. First, by adapting the credentialist framework to the highest educational tier. Much of the research explicitly employing a credentialist framework has focused at the

undergraduate level (Boudarbat & Chernoff, 2009; Fenesi & Sana, 2015). Few if any studies, especially within the Canadian context, have linked this framework to the career pathways of PhDs. Second, the current study explores the link between human capital theory and funding source in determining PhD career outcomes. In doing so, the current research can determine whether PhDs with larger stocks of human capital (e.g., obtained multiple sources of funding) are more likely to obtain academic employment.

Using Statistics Canada's 2013 National Graduates Survey (NGS), this research examines the various career pathways pursued by Canadian PhD graduates within three years of their graduation. In order to determine the career pathways of PhD graduates across Canada, the research poses the following research questions: (1) What level of representation among PhD graduates occurs in each job sector? (2) To what extent does graduates' stocks of human capital (e.g. funding source and field of study) influence their sector of employment? (3) What is the quality of careers occupied by graduates in these sectors (according to factors such as employment status and overqualification)?

2.4 Methods

This research employed data from the 2013 National Graduates Survey (NGS), which has been linked with the Survey of Earned Doctorates (SED). Access to the confidential version of this dataset was granted by the South-Western Ontario Research Data Centre (SWORDC). The NGS is a cross-sectional survey of Canadian postsecondary graduates from the class of 2009-2010. The strength of this secondary dataset lies in its ability to examine the career pathways of numerous disciplines, providing an overview of PhDs' career outcomes, regardless of discipline. This broad overview sets the stage for future research that will hone in on more specific fields and occupational influences. The survey employed a stratified random sampling design. Data were collected by computer assisted telephone interviews (CATI) with a response rate of 49.1%.

The NGS reported an original sample size of approximately 39,500 respondents. For this analysis, only those who reported their highest level of education as a PhD were included. In

doing so, the sample size decreased to just under 2,000 respondents.³ Though the reduction of sample size is considerable, it is related to theoretical rationale, not missingness.

According to Little's MCAR test, missing values were found to be missing completely at random (MCAR) (Little, 1988; Tabachnik and Fidell, 2007).⁴ As multiple imputation requires cases are missing at random (MAR), list-wise deletion was employed.

2.4.1 Measures: Outcome Variable

The dependent variable is a nominal-level variable that examines graduates' current career sector. It was created from the approximately 9,191-9,620 classifications included in the National Occupational Classification (NOC). The original NOC classification was adapted to serve the theoretical purpose of the current research. Graduates' responses were coded as: 0=academic; 1=private sector; 2=unknown/public.⁵ The largest percentage of graduates were employed in the private sector within three years of graduation (47%). A similar proportion (39%) of graduates were employed in the academic sector, and the fewest graduates (14%) were employed in the unknown/public sector.

The data vetting agreement requires certain cell counts for the presentation of descriptive and bivariate results; these counts would not be met for each cross tabulation or bivariate analysis if the 'unknown' sector was omitted. For this reason, the 'unknown' and 'public' sectors were combined. To assess the impact of this decision, additional bivariate and multivariate models were estimated without the 'unknown' group (not presented to avoid the risk of deductive disclosure). The results almost entirely match the results presented here.

³ The approximate sample size of the data set was vetted and released by the statistical analyst Pat Newcombe-Welch, SWORDC branch.

⁴ Those in the fine arts and humanities or physical and life sciences, those with a longer time to degree, and non-white respondents were more likely to be missing from the analysis. In comparison, those from Western or Ontario/USA regions, those whose parents received a bachelor's degree, those who were married or common law at the time of the survey were less likely to be missing from the analysis.

⁵ The public sector represented approximately 2% of the total sample size, whereas the unknown sector represented approximately 12%.

The few instances where they diverge are noted below where appropriate. The theoretical implications are not altered in any way.

2.4.2 Measures: Independent Variables – Human Capital

Field of study is a nominal variable that was created according to the Classification of Instructional Programs (CIP). Its categories include: 0=Social Sciences and Law; 1=Education; 2=Fine Arts and Humanities; 3=Physical and Life Sciences; 4=STEM (Engineering, Mathematics, Computer science, etc.) 5=Other. The largest percentage of respondents belonged to the physical and life sciences (42%), followed by STEM disciplines (22%). The fewest number of graduates received their PhD in Education (5%). *Funding source* is a nominal variable that indicates the types of common internal and external funding or academic work experience respondents committed to during their program. It is coded as: 0 = Teaching assistantship; 1=Fellowship or scholarship; 2=Other source; 3=Multiple sources; 4=No sources listed.⁶ Most graduates received their funding from multiple sources during their PhD (63%), whereas the fewest reported no source of funding (3%).

2.4.3 Measures: Independent Variables – Credentialism

Employment status is a dichotomous variable examining respondents' type of employment at the time of the survey. It is coded as 0=Full-time and 1=Part-time.⁷ The vast majority of graduates were employed full-time (92%). *Overqualification* is a measure of the credential required for respondents' career at the time of the survey. It is coded as 0=Same credentials as required; 1=More credentials than required; 2=Not stated or not applicable. Additional independent variable definitions and operationalization can be found in Table 1. Just over half (52%) of graduates held the same credential as required for their current career, followed by approximately 34% who were overqualified.

⁶ Given the aggregation of the category “other source” by the NGS, the potential effects specific to research assistantship experiences could not be isolated within the current context.

⁷ When removing missing cases from any of the variables of interest (e.g. the dependent variable, sector of employment) there were no cases categorized as “unemployed” and “not in the labour force.”

2.4.4 Control Variables

The current research includes twelve control variables, which were implemented based upon theoretical relevance. These include: enrolment status, province of PhD institution, time to degree, leave of absence, post-doctoral employment, job mismatch, race, parental education, gender, marital status, dependent children, and province at the time of the survey. Most control variables were chosen according to their implementation and significance in past research which used the NGS to predict employment outcomes (Betts et al., 2013; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013; Zarifa, Walters, & Seward, 2015).

Full-time enrolment status was most commonly reported by graduates (90%), whereas part-time enrolment was least common (3%). The largest percentage of respondents obtained their PhD from an institution in Ontario (34%) and Quebec (36%). The fewest number of graduates obtained their PhD from an institution in Prince Edward Island (0.2%). The average time to degree of respondents was approximately 5.5 years. Most graduates did not take a leave of absence during their degree (86%). Though many graduates did not provide a response regarding whether they obtained a postdoctoral appointment (46%), the majority who responded did not obtain a postdoctoral appointment since graduation three years prior (32%). Interestingly, the majority of graduates reported a mismatch between their intended career path and current occupation (73%).

Just over two-thirds (70%) of the sample identified as white. The highest level of parental education was fairly evenly distributed among all categories, though the fewest number of graduates reported their parents had less than a high school education (8%). It was more common for graduates to have at least one highly educated parent, as most reported a parent with either a bachelor's degree (28%) or a degree above a bachelor's degree (32%). Gender was evenly distributed as half of the sample identified as male, and half identified as female. The majority of graduates were married or in a common-law relationship (78%). The current sample was split evenly between those who had dependent children versus those who did not.

Table 1: Descriptive Statistics (n=1,908)

Variable Name	Percentage/Mean
Employment Sector	

Academic	38.8%
Private	47.4%
Unknown/public	13.9%
Field of Study	
Social Sciences & Law (<i>ref.</i>)	15.6%
Education	5.2%
Fine Arts & Humanities	8.3%
Physical & Life Sciences	42.1%
STEM (Engineering, Math, etc.)	21.5%
Other	7.3%
Funding Source	
Teaching Assistantship (<i>ref.</i>)	3.2%
Fellowship or Scholarship	18.4%
Other Source	12.8%
Multiple Sources	63.0%
No Sources Listed	2.6%
Employment Status	
Full-time Employee (<i>ref.</i>)	91.9%
Part-time Employee	8.1%
Credential Requirements (Overqualification)	
Same Credentials as Required (<i>ref.</i>)	52.4%
More Credentials than Required	33.8%
Not Stated or Not Applicable	13.8%
Province of PhD Institution	
Ontario (<i>ref.</i>)	34.2%
Atlantic Provinces (NFLD, LAB)	.9%
Prince Edward Island	.2%
Nova Scotia	2.4%
New Brunswick	.9%
Manitoba	1.8%
Saskatchewan	2.8%
Alberta	10.1%
British Columbia	10.5%
Quebec	36.1%
Time to Degree – mean (SE)	5.54 (0.054)
Leave of Absence	
No (<i>ref.</i>)	85.6%
Yes	14.4%
Post-doctoral Appointments	
None (<i>ref.</i>)	31.9%
One	12.6%
Multiple	9.4%
Valid Skip or Don't Know	46.1%

Table 1: Descriptive Statistics (n=1,908)

Variable Name	Percentage/Mean
Job Mismatch	

	No (<i>ref.</i>)	27.0%
	Yes	73.0%
Race		
	White (<i>ref.</i>)	69.9%
	Non-White	30.1%
Highest Level of Parental Education		
	Less than High School (<i>ref.</i>)	7.8%
	High School	15.5%
	Trades, College, or Some University	17.4%
	Bachelor's Degree	27.5%
	Degree above Bachelor's	31.8%
Gender		
	Male (<i>ref.</i>)	50.3%
	Female	49.7%
Marital Status		
	Single (<i>ref.</i>)	17.5%
	Married or Common-law	78.2%
	Widowed, Divorced, or Separated	4.4%
Dependent Children		
	No (<i>ref.</i>)	49.7%
	Yes	50.3%
Province at Time of Survey		
	Atlantic Provinces (<i>ref.</i>)	30.9%
	Quebec	33.6%
	Western Provinces or Territories	23.8%
	Ontario/USA	11.8%

Graduates were evenly distributed in their geographical location at the time of the survey, except in the case of Ontario/USA (12%).⁸ USA was aggregated with Ontario to meet minimum cell requirements required for the release of the results. Disaggregating the regions in a supplementary analysis did not reveal any significant differences in the results of the focal variables.

⁸ Three control variables (marital status, number of dependent children, and geographical location) were measured at the time of the survey, rather than during respondents' PhD. To account for the potential effect of measuring these variables after the PhD, a supplementary model was run that removed these variables from consideration. However, the results of the analysis remained largely the same as those included in the analysis. The only variation was that the results for those who reported a PhD in education and a career within the private sector displayed statistical significance in the supplementary model.

2.5 Analysis

In order to determine the career sector of recent PhD graduates, this study employed binary and multivariate multinomial logistic regressions. The descriptive statistics and analyses were weighted to ensure representativeness of the broader population of Canadian PhDs. The bivariate analyses employed multinomial logistic regressions to determine the individual impact of each focal variable (each variable in the analyses) on the career sector of graduates. In order to address the potential effect of each focal variable, the multivariate regression analyses employed a sequential modeling approach in which theoretically distinct variables were entered separately. It extended beyond the bivariate analyses by controlling for additional variables. Model 1 examined the effect of graduates' field of study on their career sector; Model 2 introduced the effect of funding source during the PhD; Model 3 considered the impact of graduates' employment status; Model 4 included whether graduates reported being overqualified for the job they held at the time of the survey. Multicollinearity was not a significant concern as the highest variance inflation factor was less than 5. Model fit was deemed acceptable by the Hosmer & Lemeshow and Pearson-Windmeijer tests (Windmeijer, 1994).

2.6 Results

2.6.1 Bivariate Results

The bivariate analyses begin to shed light on the second and third research questions. The second research question aimed to determine what qualifications and experiences are associated with each sector of employment. Those from the physical and life sciences (RRR=4.67, $p<.001$) and STEM disciplines (RRR=4.59, $p<.001$), relative to Social Sciences and Law, had a greater relative risk of employment in the private sector than the reference group (academic sector). In comparison, all fields of study had a lower relative risk of employment in the unknown/public sector. More specifically, those in STEM disciplines (RRR=.06, $p<.001$) reported had the lowest relative risk of reporting employment in the unknown/public sector. The majority of bivariate relationships that examined funding source were non-significant. However, those who reported a source of funding as "other" reported a

higher relative risk of employment in the private sector (RRR=6.07, $p<.001$) relative to those with a teaching assistantship.

Table 2: Bivariate Analysis: Multinomial Logistic Regression Models Predicting Employment Sector (n=1,908)

	Private		Unknown/public	
	RRR	SE	RRR	SE
Field of Study				
Social Sciences & Law (<i>ref.</i>)	-	-	-	-
Education	1.14	0.35	0.46**	0.13
Fine Arts & Humanities	1.14	0.30	0.19***	0.05
Physical & Life Sciences	4.67***	1.00	0.23***	0.42
STEM (Engineering, Math, etc.)	4.59***	0.93	0.06***	0.02
Other	1.13	0.32	0.18***	0.06
Funding Source				
Teaching Assistantship (<i>ref.</i>)	-	-	-	-
Fellowship or Scholarship	1.31	0.46	0.81	0.32
Other Source	6.07***	2.43	1.78	0.82
Multiple Sources	0.71	0.20	0.70	0.25
No Sources Listed	1.88	0.84	1.86	1.01
Employment Status				
Full-time Employee (<i>ref.</i>)	-	-	-	-
Part-time Employee	0.83	0.28	2.87***	0.63
Credential Requirements (Overqualification)				
Same Credentials as Required (<i>ref.</i>)	-	-	-	-
More Credentials than Required	3.41***	0.56	4.62***	0.72
Not Stated or Not Applicable ^a	1.00		1.00	

*** $p<.001$, ** $p<.01$, * $p<.05$

^a Constrained to null effect to retain cases.

The third research question intended to examine the job quality of graduates according to employment status and rates of overqualification. Part-time employees reported a greater relative risk of employment within the unknown/public sector versus the academic sector (RRR=2.87, $p<.001$) relative to full-time employees. Graduates who reported a mismatch between their intended and current career displayed a lower relative risk of employment in the unknown/public sector (RRR= 0.64, $p<.01$) relative to those who did not report a mismatch. Finally, those with more credentials than required revealed a higher relative risk of employment in the private (RRR=3.41, $p<.001$) and unknown/public sectors (RRR=4.62,

$p < .001$) relative to those with the same credentials as required. The remainder of bivariate relationships, beyond focal variables, can be found in Table 2.

2.6.2 Multivariate Results

The results discussed within this section draw attention to the second research question by examining the job quality of PhDs. They also answer the third research question by examining what role the identified sources of human capital (e.g. field of study and funding source) have on PhDs' sector of employment. The remainder of statistically significant relationships can be found in Table 3.

Models 1 and 2 highlight the focal variables relating to PhDs' stocks of human capital. Model 1 indicates that those with a PhD in the Physical and Life Sciences and those in STEM were more likely to be employed in the private sector than those in Social Sciences and Law, controlling for other variables in the model. Those from the Physical and Life Sciences were 5 times as likely to be employed within the private sector compared to the academic sector. In comparison, those with a PhD in STEM fields were approximately 4.6 times as likely to report employment in the private sector ($RRR=4.56$, $p < .001$). All examined fields of study have lower relative risk ratios of employment in the unknown/public sector than those in the Social Sciences and Law.⁹ These relationships held when introducing the effects of additional focal variables in Models 2-4.

⁹ Respondents with a PhD in Education displayed a greater relative risk ratio (RRR) of reporting employment in the public sector when the unknown sector was omitted from the analyses. However, this difference lessened, but remained significant, when additional focal and control variables were introduced in Models 2-4.

Table 3: Multivariate Multinomial Logistic Regression Models Predicting Employment Sector (n=1,908)

	Model 1		Model 2		Model 3		Model 4	
	Private	Unknown	Private	Unknown	Private	Unknown	Private	Unknown
	RRR	RRR	RRR	RRR	RRR	RRR	RRR	RRR
Field of Study								
Social Sciences & Law (ref.)	-	-	-	-	-	-	-	-
Education	1.12	0.43**	0.52	0.36***	0.53	0.36***	0.40*	0.27***
Fine Arts & Humanities	1.23	0.19***	1.45	0.19***	1.45	0.18***	1.29	0.15***
Physical & Life Sciences	5.04***	0.29***	4.25***	0.27***	4.29***	0.29***	4.18***	0.28***
STEM (Engineering, Math, etc.)	4.56***	0.07***	5.34***	0.07***	5.38***	0.08***	4.30***	0.06***
Other	1.03	0.18***	1.04	0.17***	1.05	0.19***	1.05	0.19***
Funding Source								
Teaching Assistantship (ref.)	-	-	-	-	-	-	-	-
Fellowship or Scholarship			1.19	1.03	1.20	1.03	1.14	1.00
Other Source			8.51***	1.61	8.51***	1.63	9.13***	1.85
Multiple Sources			0.63	0.78	0.63	0.79	0.62	0.82
No Sources Listed			3.05*	2.16	3.04*	2.17	2.86*	2.47
Employment Status								
Full-time Employee (ref.)	-	-	-	-	-	-	-	-
Part-time Employee					1.01	1.93**	1.08	2.01*
Credential Requirements (Overqualification)								
Same Credentials as Required (ref.)	-	-	-	-	-	-	-	-
More Credentials than Required							4.11***	4.99***
Not Stated or Not Applicable ^a							-	-

Note: Models control for enrolment status, province of PhD institution, time to degree, leave of absence, post-doctoral appointment(s), job mismatch, race, parental education, gender, marital status, dependent children, and province at time of the survey.

^a Constrained to null effect to retain cases.

*** p<.001, ** p<.01, *p<.05

As found in Model 2, those with an alternative source of funding and those with no reported source of funding were more likely to report employment in the private sector versus the academic sector than PhDs who obtained a teaching assistantship. Those with an alternative source of funding were 8.5 times more likely to report employment within the private sector (RRR=8.51, p<.001). Further, those with no source of funding were over 3 times more likely to report employment in the private sector (RRR=3.05, p<.05,

respectively). As with field of study, these relationships held upon the introduction of additional focal variables in later models.

Models 3 and 4 introduce focal variables pertaining to the job quality of PhDs. As per Model 3, PhDs employed on a part-time were nearly 2 times (RRR=1.93 $p<.01$) more likely to be employed within the unknown/public sector compared to the academic sector. Once again, this relationship held upon introducing the final focal variable in Model 4. In examining the qualifications needed for PhDs' current employment, Model 4 found that PhDs in both the private and unknown/public sector were more likely to be overqualified for their role than those in academia. Those in the private sector were over 4 times more likely to be overqualified (RRR=4.11, $p<.001$), whereas those in the public sector were approximately 5 times as likely to be overqualified (RRR=4.99, $p<.001$). The remainder of statistically significant relationships can be found in Table 3.

2.7 Discussion & Conclusion

Given the shifting career aspirations of PhDs, and the difficulty obtaining a tenure-track appointment, recent accounts have acknowledged the benefit of identifying career pathways available to PhDs outside of academia (Crago, 2015; Polk, 2015; Polk, 2017; Sastre, 2016). However, little existing research had considered what contributes to PhDs' competitiveness and success in these sectors, especially for those outside of the hard sciences (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). As an increasing number of PhDs pursue employment outside of the academic sector, it is of substantial importance to determine their sector of employment, and the opportunities that contribute to this pathway. This consideration, among others such as the role of funding course, allowed the current research to differentiate itself from much of the existing literature. Consistent with past research, all four focal variables included in the current analyses displayed significant relationships with PhDs' employment sector.

Human capital theory asserts that advanced credentials are valued in the labour market for the technical competencies they impart on their bearers (Bourdieu, 1986; Schultz, 1961;

Schultz, 1993). Employees who have inherited these competencies are said to be rewarded by increased labour market access and earnings. Though human capital theory is a lens commonly used by postsecondary education scholars, it is less widely cited to describe the employment outcomes of PhD graduates. Given its relevance to the undergraduate level, human capital theory may provide significant insight into the employment pathways of Canadian PhDs.

To demonstrate the practicality in applying this theory to PhD employment pathways, the current study examined PhDs' field of study and work (funding) experience during their program. Previous research has acknowledged that graduates' competencies can vary greatly based on field of study (Betts, Ferrall, & Finnie, 2013; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013; Zarifa, Walters, & Seward, 2015). In comparison, though existing research has acknowledged the relationship between work (funding) experience and career pathways (Addy & Blanchard, 2010; Austin et. al., 2009; Barry, 2013; Blume-Kohout & Adhikari, 2016), these studies have not explicitly examined this relationship under the lens of human capital theory. However, the current study hypothesized that the technical competencies students gain from various types of employment or funding experiences may impact their sector of employment.

In applying the lens of human capital theory, the current study first determined the relationship between field of study and PhDs' sector of employment. Those in the physical and life sciences as well as STEM fields were more likely to report employment within the private sector than those in the social sciences and law. Furthermore, all fields of study were less likely than the social sciences and law to report employment within the unknown/public sector. In support of human capital theory, these findings may suggest that the competencies of hard science PhDs are more tightly linked to the private sector than those of the social sciences. Similar to undergraduate programs, hard science PhD programs may foster greater "vocational specificity" in aligning their program and experiences with graduates' intended occupational outcomes (Davies & Guppy, 2013; Kerckhoff, 2001, p. 5; Kerckhoff, 2002). In comparison, social sciences PhDs may translate their stocks of human capital more clearly to the unknown/public sector. Whether social science PhDs intend to pursue these sectors,

similar to the non-academic career aspirations of hard science PhDs (Roach & Sauermann, 2017), warrants future consideration.

As a second application of this theoretical lens, the current study examined the relationship between funding source (work experience) and PhDs' sector of employment. Consistent with past research, those with an alternate source of funding were more likely to report employment in the private sector than those with a teaching assistantship (Barry, 2013; Blume-Kohout & Adhikari, 2016). Under the assumptions of human capital theory, this may suggest that the opportunity to foster additional competencies, whether they are associated with traditional academic pursuits or not, are highly valued by employers outside of academia. These opportunities may diversify a candidate's research portfolio, and demonstrate their ability to engage in collaborative research, among other skills resulting in a well-rounded employee. In comparison, the value of the skills obtained during a teaching assistantship may translate less clearly in non-academic settings. However, graduates who reported no sources of funding were also more likely to report employment in the private sector, which questions the relevance of human capital theory in this context. Despite these results, the prior descriptive statistics revealed that the majority of PhDs obtained multiple sources of funding, or work experience, during their program. Supporting the assertions of human capital theory, versatile training may produce graduates with competitive and well-rounded stocks of human capital. However, no statistically significant results emerged among PhDs who reported multiple sources to further test this assertion.

In contrast, credentialist theory asserts that the credential is of greater value on the labour market than the technical competencies obtained throughout the program (Collins, 1979; Collins, 2011; Davies & Guppy, 2013). According to this framework, increased competition for labour market opportunities has spurred credential inflation as a means to stratify job applicants (Bills, 2003; Bills & Brown, 2011; Collins, 1979; Collins, 2011). As market saturation has prompted many to pursue graduate degrees, the extent of credentialism PhDs face in labour market stands to be determined.

To determine how greatly credentialist processes have impacted PhD employment outcomes, the current study considered overqualification and employment status as measures of job quality. Existing research has noted a significant amount of overqualification among PhDs (Derycke & Van Rossem, 2014; Di Paolo, 2016; Holloway, 2016; Karmel, 2015). Under a credentialist lens, this would suggest that the value of an advanced degree has diminished. Other studies have boasted lower unemployment rates as level of education increases (Ferguson & Wang, 2014; Jonker, 2016; Neumann & Tan, 2011), suggesting significant benefit is associated with an advanced degree. As such, the current research considered both factors when operationalizing job quality and the extent of credentialist processes occurring amongst PhDs. Although a PhD is a required credential for many academic positions, its necessity for positions outside of academia was unclear. It was hypothesized that credentialist processes would be more apparent, on average, for PhDs who obtained employment outside of academia.

In applying a credentialist lens, the current study first examined the rate of overqualification of PhDs according to sector of employment. Similar to past research, the current results indicate a moderate level of overqualification among PhD graduates (Derycke & Van Rossem, 2014; Di Paolo, 2016; Holloway, 2016; Karmel, 2015). Approximately 33% of PhDs indicated that they were overqualified, which is less than the percentage reported by Derycke and Van Rossem (2014) and Di Paolo (2016). More specifically, graduates were far more likely to be overqualified in the private and unknown/public sector than the academic sector. Informing credentialist theory, this indicates that the “payoff” of an advanced degree is far less certain, at least initially, among PhDs who pursue employment outside of academia. As an implication, the labour market outside of academia underutilizes the number of advanced graduates it has produced. This may indicate that there may be a lack of suitable positions outside of academia that are tailored to PhDs. Second, PhDs may not recognize the highly transferable nature of their skills, selling themselves short in the employment opportunities they pursue (Holloway, 2016). In doing so, they self-select themselves out of the competition for roles they are qualified for that require their advanced degree.

Alternatively, employers may lack an understanding of the capabilities of PhDs, contributing to their overqualification (DiPaolo, 2016; Kyvik & Olsen, 2012; Tholen, 2017).

As a second application of the credentialist lens, the current study examined the relationship between employment status and sector of employment. In line with previous research, the current findings indicated that the vast majority of graduates were employed full-time (Desjardins & King, 2011; Miller et al, 2014). In comparison, part time employment has remained stable since the time of Desjardins & King's (2011) report, as the current study also found 8% of graduates reported part time employment. In relation to credentialist theory, though PhD's may be overqualified for positions outside of academia, these careers do display a sense of job security. When considering sector of employment, unknown/public sector employees were more likely to work part time. This suggests that more opportunities for PhDs to pursue full time employment exist in the academic and private sectors. Informing credentialist theory, PhDs' employed in the unknown/public sector may accept part-time positions as a stepping stone. Should this be the case, credentialist assertions of overeducation and market saturation may be occurring among PhDs. Accepting a part-time position in the unknown/public sector may allow PhDs to apply for internal (full-time permanent) positions as their career progresses. However, the unknown category of this job sector represents roles such as consultants, who may intentionally seek the flexibility of part-time employment. As such, it may be less of an influence of credentialist processes, and more a consideration of work-life balance. Unfortunately, this could not be disentangled or determined with the current data set and cell count considerations.

As many graduates pursue employment opportunities outside of academia (Edge & Munro, 2015; Neumann & Tan, 2011; Sauermann & Roach, 2012), there is substantial benefit to improving access and opportunities for PhDs in these sectors. The high levels of general job mismatch, and significant levels of overqualification found in the private and public (or other) sectors indicate ample room to improve PhDs' transitions to employment. As such, two methods are suggested to improve the career transitions of PhD graduates. First, there is value in continuing to open the discussion about the careers available to PhDs outside of academia. In doing so, PhDs can be taught what transferable skills they have, and how to

“sell” them to non-academic employers. This may encourage a greater number of PhDs to consider the value of positions outside of academia at an earlier stage in their career. Furthermore, PhD students would benefit from seeking out work and volunteer experiences outside of those mandated by their programs. As indicated by the current study, the pursuit of these experiences or funding sources, is associated with a substantial increase in the likelihood of employment within the private sector. As a result, these PhDs may be able to pivot accordingly during their PhD, preparing them for their intended career at an earlier stage in their program (White, 2018).

Second, there is added value in deepening employers’ understanding of how to utilize PhD skillsets (DiPaolo, 2016; Kyvik & Olsen, 2012; Tholen, 2017), and compensating graduates accordingly. As indicated within the current context, the hard sciences as well as the physical and life sciences display tight links to industry sectors. However, future initiatives would benefit from clarifying and extending this connection to the humanities and social sciences. One possibility is to incorporate work integrated learning (WIL) opportunities into more PhD programs within Canada. Doing so would allow PhD students from the social sciences and humanities to demonstrate relevant skills to employers prior to their entrance to the labour market. In turn, this may foster a greater understanding of their capabilities amongst industry employers, broadening their career prospects and lowering their odds of overqualification upon graduation.

Though the current study was able to make a significant contribution to existing research, it is not without limitations. Namely, in order to meet cell count requirements among a relatively small population, the current research was restricted in the extent of its specificity. First, the current research was unable to disaggregate certain fields (e.g. social sciences and law) for this reason. Future research could benefit substantially from a more specific understanding of the outcomes of these disciplines, as this often underutilized by existing research. Further, the current research was unable to separate public and unknown sectors of employment due to cell count requirements. As such, some of the results differed in the additional models which removed the unknown sector from the analyses. However, the vast majority of reported findings remained consistent when grouping the public and unknown

sector together. If cell count considerations are not a concern, future research could disentangle these sectors to determine if the significant results for the aggregate unknown/public sector found in the current study pertain to the public sector exclusively.

Other considerations include variable specificity, representativeness of the variable province of PhD institution to the population of PhDs, and the time point the survey was conducted. Though the current study was able to control for job mismatch, it was unable to determine what mismatched respondents' intended career sectors were. This inclusion could aid future research in determining how prominent of an aspiration careers outside of academia have become for graduates, and whether it differs according to field of study. Furthermore, it could determine whether mismatches within the same field are occurring. As an example, whether graduates in academic employment are obtaining precarious employment (e.g. post-doctoral or sessional appointments), but intended to pursue tenure-track appointments. Second, it is hypothesized that the Atlantic provinces may be overrepresented in the current sample relative to the population of PhD graduates, as it was expected that the majority would have obtained their degree from Ontario and/or Quebec. As Ontario produces a large number of PhD graduates, results may differ when and if those from Ontario are represented to a greater extent in future research. Finally, as the current dataset was cross-sectional in nature, and conducted at a different time point than its predecessors, comparisons between previous cohorts would be problematic. As such, future research would benefit from the ability to determine whether the answers to the research questions of the current study have changed across cohorts.

Chapter 3: The Making of an Academic: How Important is Technical Competency?

3.1 Introduction

When considering the career outcomes of PhD graduates, recent research has emphasized the lack of permanent academic positions relative to the number of graduate enrolments (Ball, Gleason, & Peterson, 2015; De Grande et al., 2014; Huisman, Weert, & Bartelse, 2002; Muindi & Keller, 2015). Fewer than 20% of PhDs are employed full-time within academia (Edge & Munro, 2015, p. 16),¹⁰ and only 10% have secured a full-time academic position within two years of graduation (Shauman et al., 2017, p. 10). Though students' career aspirations have shifted away from academic employment (Roach & Sauermann, 2017), it has become more common for those in the hard sciences to seek employment outside of academia. In comparison, a greater number of those from the social sciences and humanities seek academic employment rather than careers outside of academia (Kyvik & Olsen, 2012; Maldonado, Wiggers, & Arnold, 2013). Therefore, PhDs seeking an academic position apply alongside previous cohorts of graduates, not just their own (Maldonado et al., 2013; McKenna, 2016). As a result, an increased number of PhDs have pursued postdoctoral appointments in hopes that they will act as a stepping stone to an academic career (Pelham, n.d.).

Despite the challenges, many social science PhDs continue in academia (e.g., postdoctoral, sessional, or tenure-track appointments), though empirical evidence that has detailed what eased the initial transition into their intended employment sector is sparse. Previous research has defined the importance of publications in order to secure an academic position (Dijk, Manor, & Carey, 2014; Kim & Kim, 2015; Singhapricha et al., 2018). Yet other potentially relevant factors (e.g., research assistantships, sessional appointments), and the characteristics

¹⁰ This figure was based on multiple reports (National Household Survey, 2011; Canadian Association of Postdoctoral Scholars; The Conference Board of Data), none of which specify the amount of time since graduation that this figure is based on.

of those PhDs who were more successful navigating the academic job market, remain largely absent from the research literature. As such, the current research aims to identify what experiences and characteristics relate to PhDs' likelihood of securing academic employment as intended. Doing so will aid students who wish to pursue academic employment by allowing them to tailor their program experiences accordingly. It will promote an awareness of what contributes to a competitive academic job application, whether students received guidance and mentorship in this area during the program or not.

The current study employs human capital theory to identify its importance in securing initial academic employment. Human capital refers to the skill, knowledge, and ability (or technical competency) gained during the pursuit of formal credentials (Bourdieu, 1986; Schultz, 1961; Schultz, 1993). The technical competencies examined within the current academic context include: research assistantships; funding record; publication record; and sessional appointments. In order to examine the importance of accumulating these sources of human capital during the PhD program, the current study asks: (1) What importance do academic experiences, and the skills (technical competencies) they impart have on the likelihood of securing a career within academia? (2) Does their importance differ according to whether they are research-oriented (e.g., publications, research assistantships) versus teaching-oriented (e.g., sessional)?

3.2 Theory

Human capital theory asserts that individuals invest in formal educational training to boost their technical competency (skills, knowledge, and ability) (Bourdieu, 1986; Pedersen, 2016; Schultz, 1961; Schultz, 1993). As a result, these investments should reward individuals when they enter the labour market, given their economic value. Though rewards may be monetary in nature, they can also relate to a person's employability, which is the focus of the current research. Within the current context, human capital theory is employed to determine whether investing in four measures of technical competency (funding, research assistantships, publications, and sessional employment) increase the likelihood of employability within academia upon graduation. Furthermore, including a measure of socioeconomic status

(parental education) allows the current study to determine whether measures of technical competency operate independently of class background.

3.2.1 What Makes an Academic? The Importance of Technical Competency

Available research on the effect of the included measures of technical competency (e.g., funding, publications) on PhD career outcomes is limited (Barry, 2013; Gemme, 2005; Goldsmith, Presley, & Cooley, 2002; Mendoza, 2007). This point is exacerbated when limiting the scope to a Canadian context (Gopaul, 2011; 2015). However, graduates have acknowledged the significance associated with these measures during the program (Gopaul, 2015). Though many students display a general understanding of their importance (e.g., ‘publish or perish’), they prioritize and develop them in different ways, which has warranted further consideration of their impact on PhD career transitions.

The measures of technical competency considered by the current analyses (e.g., funding, publications, research assistantships, sessional appointments) often exceed program requirements, but remain critical to securing academic employment. Program milestones (e.g. doctoral candidacy) alone do not necessarily demonstrate students’ ability to tailor their professional development in preparation for an academic appointment (Maxwell, 2009). Instead, prioritizing technical competencies like publications and securing funding while completing the PhD signal a deeper understanding of academic career preparation and competitiveness on the academic market (Gopaul, 2011; Pinheiro, Melkers, & Youtie, 2014; Stuber, 2009). An understanding of the importance of these measures, and of their nuances, may be dependent on supervisors and other faculty acting as a cultural guide, promoting students’ investment in these opportunities (Lareau, 2015). Should this be the case, it speaks to the social capital that accompanies the creation of human capital, as argued by Coleman (1988). However, the focus of the current study is on the outcomes associated with these competencies, rather than on the decision and awareness to pursue them. As such, developing this competency is argued to be an indicator of students’ skill and stock of human capital.

3.2.1.1 Funding

Securing funding can benefit PhD students' productivity during the program immensely. Competitive external research awards are often associated with significant prestige (Pasztor & Wakeling, 2018). Securing research funding can act as a signal of future academic potential, and has often been a stepping stone to future grants and awards. Furthermore, they can alleviate some of the financial pressure associated with full-time enrolment, thereby allowing a greater period of the program allocated to writing their dissertation. As a result, securing additional funding (in addition to institutional funding) can have a profound impact on students' career outcomes upon graduation (Barry, 2013; Gemme, 2005). Larger funding packages may allow students to opt out of teaching-oriented pursuits, and the ability to dedicate more time to their studies and research was what students valued most about receiving additional funding (National Research Council, 2005). Furthermore, the ability to emphasize research and publications are crucial to securing an academic appointment (Helmreich, 2013).

3.2.1.2 Research Assistantships

As research is heavily emphasized by many academic appointments, research assistantships provide an opportunity for graduate students to build the skills required for these roles. Research assistantships provide opportunities to collaborate with faculty members, develop research skills, and obtain publications. Drawing upon the skills fostered in this area, those who secure a research assistantship during their graduate program often continue in research-oriented careers within or outside of academia (Barry, 2013; Blume-Kohout & Adhikari, 2016).

3.2.1.3 Publications

Publications have been used as a metric of long-term research productivity, as they may lead to additional research opportunities, funding, and publications. As such, early career publications play a large role in PhDs' competitiveness on the academic market, and whether they obtain an academic appointment (Barry, 2013; Olssen & Peters, 2005; Miller, Glick, & Cardinal, 2005; Laurance et al., 2013; Pinheiro et al., 2014). As such, students' familiarity

with the publishing process may impact where and how they publish in future, as well as their likelihood of obtaining academic employment. For example, previous research has found there is a significant advantage associated with first-author publications and publishing in journals with higher impact factors (Tregellas et al., 2018). Those who demonstrated their understanding of these advantages were more likely to report employment within academia.

3.2.1.4 Sessional Instructor

For those who intend to pursue a tenure-track appointment, especially if research-oriented in nature, teaching may be perceived as a pursuit secondary to research (Addy & Blanchard, 2010; Barry, 2013; Latulippe, 2006; Luft et al., 2004). Luft et al. (2004, p. 214) mentioned that faculty tended not to view teaching as equivalent in prestige or competitiveness in comparison to research. Therefore, teaching has been perceived as something that limits research capabilities, thereby negatively impacting the likelihood of securing a tenure-track appointment (Findlay, 2011). However, teaching during the PhD program was found to benefit students' research and writing capabilities (Feldon et al., 2011). Teaching during a graduate program was associated with stronger hypotheses creation and experiment design, leading to a stronger research proposal. Given conflicting perspectives, it stands to be determined whether teaching during the PhD is viewed as a benefit or a detriment to securing an initial career in academia.

3.3 Contribution to the Literature

Examining the career outcomes of PhDs has been a topic of interest to researchers, media outlets, and policymakers in recent years (Desjardins, 2012; Edge & Munro, 2015; Polk, 2017; Porter, et al., 2018; Reithmeier, 2018; Roach & Sauermann, 2017; Sastre, 2016). Existing research in the area has focused heavily on the lack of tenure track appointments in recent years (Acker & Haque, 2017; Edge & Munro, 2015), the rise of precarious academic labour (Anderson, 2015; Field & Jones, 2016; Findlay, 2011), and graduates shifting their career interests away from academia (Haley, Jaeger, & Levin, 2014; Huisman et al., 2002; Roach & Sauermann, 2017). However, available empirical evidence about what skills and experiences aid graduates in obtaining academic employment is limited.

Kim & Kim's (2015) research identified the time taken to secure academic employment, and the scholarly-focused factors that aided PhDs in securing them. The theoretical framework was focused on examining whether contribution to the field (universalistic) or additional (particularistic) factors had a greater effect. Universalistic factors referred to a scholar's contributions to the scientific community (e.g., publications), whereas particularistic factors referred to anything not encompassed as a universalistic factor (e.g., socio-demographic factors, doctoral department prestige). They found that both universalistic and particularistic factors had a significant impact on PhDs' likelihood of securing academic employment, though particularistic factors were less impactful in the social sciences and humanities. However, they differ from the current study by theoretical framework, as they focused on those who obtained their PhD in Korea, and included a wide range of disciplines (hard sciences, humanities, social sciences). Furthermore, although they focused on academically-oriented determinants, they did not consider other, arguably important, factors such as academic work experience (e.g., teaching or research assistantships) and funding on the competitiveness of applicants. Given the prominence of these factors within academia, it is important to determine whether they have a substantial impact on PhDs' career outcomes, and whether the relationships identified by Kim & Kim (2015) differs within the structure of Canadian universities.

Most reminiscent of the current study, Gopaul's (2011) article discussed how socialization processes during the PhD can promote inequality among students. His study applied Bourdieu's (1977) concept of the "rules of the game" to explain how some PhD students navigated their degree with ease relative to others. Not all students were able to foster the technical competencies associated with presenting at conferences, publishing, and obtaining funding. However, these measures contributed to the competitiveness of applicants on the academic market, and whether they secured other academic rewards (e.g., postdoctoral fellowships). Though Gopaul's (2011) arguments align with the current research, the scope of his work was conceptual in nature. The current study provides an empirical account of whether the technical competencies gained through these and other metrics (e.g., research assistantships) are the most significant factors in obtaining academic employment.

By identifying the importance of certain experiences (e.g., publishing, funding) on obtaining academic employment beyond the PhD, the aforementioned studies justified the inclusion of similar variables within the current analyses. However, the current study extends these (and other related) studies in three ways: First, the current study examines whether the technical competencies associated with these experiences aid in an initial transition to academic employment. This determines the importance of the skills and ability these experiences impart at the time of graduation, rather than determining what makes a competitive applicant mid-career. Second, the employment outcomes of social science PhDs is an underutilized area of research, yet research has acknowledged differences in the career outcomes of various disciplines (e.g., social sciences versus hard sciences) (Desjardins, 2012). Rather than comparing the social sciences to other disciplines as many prior studies have, the current study identifies whether there are differences in the academic experiences prioritized by different fields within the social sciences (e.g., psychology versus sociology). Third, the current study employs primary data to examine factors that are underutilized when discussing academic career transitions within Canada. The most comparable Canadian dataset is the National Graduates Survey (NGS) and the Survey of Earned Doctorates (SED), both available through Statistics Canada. Though these datasets considered research assistantships and funding, the version available at the time of this research did not control for publications at any point during the program. As previous research has defined this as an important factor in securing academic employment (Dijk et al., 2014; Kim & Kim, 2015; Singhapricha et al., 2018), it is an important consideration of the current study.

Using primary data obtained from Canadian social science PhD graduates, the current study will determine whether developing technical competency impacts the likelihood of securing an initial career within academia. The current study therefore poses the following research questions: (1) What importance do academic experiences, and the skills (technical competencies) they impart, have on the likelihood of securing a career within academia? (2) Does their importance differ according to whether they are research-oriented (e.g., publications, research assistantships) versus teaching-oriented (e.g., sessional)?

3.4 Methods

The current study employed a multi-institution cross-sectional web survey. The sample was gathered from April 2018-April 2019, and included a total of 193 respondents (age of respondents ranged from 27-68, mean age of 36.5). For the purpose of the current analysis, only those who indicated an academic career aspiration at the outset of their PhD were included. As such, the sample size was reduced to 120 participants. In total, 20 Canadian PhD granting universities were represented in the sample. An average of 3.39 respondents were affiliated with each of the institutions included in the analysis.

The current study was approved by the Research Ethics Board (REB) at the University of Waterloo. It also received ethics approval from the seven institutions that required internal REB vetting to proceed with recruitment at each of these institutions. No monetary incentive was offered to participants as this is argued to have little to no effect on response rates for web surveys (Fricker, 2016, p. 175).

3.4.1 Sampling Procedure

Data was collected through a non-probability convenience sample.¹¹ Potential respondents were recruited through one of the following methods. First, a list of institutions that offer a PhD in any (or all) of the five most common social science departments was created. These included: Economics, Geography, Psychology, Sociology, and Political Science. Alumni departments of these institutions were contacted to determine their willingness to circulate the recruitment materials to eligible alumni. These materials were then passed onto graduates from one of the five aforementioned departments who completed their PhD within the last decade.

As the current contact information held by alumni departments may be limited to recent graduates, subsequent waves of recruitment were employed. Faculty members within the five

¹¹ As the recruitment method relied on a convenience sample, there is no way to know how many people received the link to the survey. Therefore, a response rate could not be determined.

social science departments considered by the current study were asked to circulate the recruitment materials amongst their networks. Alumni departments and faculty were sent at least one reminder email in hopes of bolstering participation rates. Finally, to encourage participation among PhDs in sectors outside of academia, influential personnel in sectors outside of academia (e.g., government, career transition consulting) were recruited to distribute the recruitment materials across their networks and social media platforms. The data was examined for duplicate responses across socio-demographic variables and no duplicate responses were found. Therefore, it is unlikely that the results were affected in any way by respondents participating in the survey at multiple timepoints.

3.4.2 Measures: Outcome Variable

The dependent variable determined respondents' employment sector at the time they completed the survey. This variable was originally coded as: 0=Professor (tenure track, tenured, or sessional); 1=Postdoctoral researcher; 2=Alternative academic; 3=Government; 4=Private sector; 5=Non-profit; 6=Self-employed; 6=Other. However, as the theoretical purpose of the current study is to determine the effect of technical competence on securing an initial career within academia, and for cell count considerations, the dependent variable was collapsed as follows: 0=Professor; 1= Postdoctoral researcher; 2= Outside academia. Categories 0 ("Professor") and 1 ("Postdoctoral researcher") of the original coding scheme remained consistent in the revised coding, whereas categories 2 through 6 were aggregated into category 2 ("Outside academia"). Alternative academics were included in category 2 as their roles and responsibilities may include some, but not necessarily all, of those associated with more traditional academic settings (e.g., professor or postdoctoral researcher). Examples may include roles such as: grant writing consultant, research ethics advisor, and research coordinator, among others.

3.4.3 Measures: Focal Variables

To examine the relevance of technical competence in obtaining an academic appointment, four focal variables were included in the current analyses: funding, peer-reviewed publications, research assistantships, and sessional appointments. *Funding* was an ordinal

variable that measured the amount of funding received by students throughout their PhD program, coded from 0=\$0 to 8=\$140,000-\$159,000. *Publications* was a count variable that measured the number of peer-reviewed publications accepted at graduation from the PhD. *Research assistantships* and *sessional appointments* were nominal variables that examined whether respondents obtained either of these work experiences during their program. Both were coded as 0=no and 1=yes.

3.4.4 Measures: Control Variables

Seven control variables were considered by the current study: parental education (ranging from 0=less than high school to 7=graduate school), field of study, gender, age, marital status, dependent children, and race. These control variables were chosen based on their implementation in past research (Betts, Ferrall, & Finnie, 2013; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013; Zarifa, Walters, & Seward, 2015), or their hypothesized influence on the current study. Further information regarding variable definitions and operationalization can be found in Table 1.

Table 4: Descriptive Statistics (n=120)

	Percent	SD
Initial Career		
Professor (e.g., tenure-track, lecturer)	34	
Postdoctoral Researcher	43	
Outside of Academia	23	
Peer-Reviewed Publications	3.53 ^a	2.98
Funding	3.85 ^a	2.29
Research Assistantship		
No	25	
Yes	75	
Sessional		
No	22	
Yes	78	
Teaching Assistantship		
No	22	
Yes	78	
Parental Education	4.84 ^a	2.26

Table 4: Descriptive Statistics (n=120)

	Percent	SD
Department		
Psychology	35	
Sociology	23	
Geography	17	
Economics	13	
Political Science	12	
Gender		
Male	51	
Female	49	
Age	36.23 ^a	4.52
Marital Status		
Common law/married	76	
Single	20	
Other	4	
Dependent Children	0.85 ^a	1.01
Race		
White	83	
Non-white	18	
Region of PhD Institution		
Ontario	63	
Alberta	1	
British Columbia	13	
Quebec & New Brunswick	7	
Manitoba & Saskatchewan	7	

^aMean.

3.5 Analyses

In order to identify the effect of technical competency on respondents' ability to obtain an academic appointment, bivariate and multivariate multinomial logistic regressions were employed. The bivariate analyses examined the relationship between each measure of technical competency and the likelihood of securing an initial career within academia. The multivariate analyses extended the approach of the bivariate analyses by accounting for potential confounding effects. Each of the focal variables were examined against the dependent variable in the bivariate analyses, whereas the multivariate model also included

the seven control variables.¹² Multicollinearity was not a significant concern as the highest variance inflation factor was less than 5. Model fit was deemed acceptable by the Hosmer and Lemeshow and Pearson-Windmeijer tests (Windmeijer, 1994). University-based clustering was accounted for in the analysis by using cluster robust standard errors.

3.6 Results

3.6.1 Bivariate Results

The bivariate results (see table 2) addressed the research question by broadly examining whether strengthening measures of technical competency aided in securing an initial career in academia, as intended. Furthermore, it addressed whether the importance of research- versus teaching-oriented measures of technical competency varied. The relative risk ratio (RRR=1.42, $p<.01$) showed that PhDs who graduated with more publications were at greater ‘risk’ of obtaining an initial career as a postdoctoral researcher compared to a career outside of academia. For every one additional publication, the odds of obtaining an initial career as a postdoctoral researcher increased by 42%. Similarly, higher levels of funding were associated with greater odds of obtaining an initial career as a professor (RRR=1.26, $p<.05$) than a career outside of academia. However, sessional employment and participation in a research assistantship during the PhD were found to be non-significant.

¹² A supplementary analysis removing control variables (e.g. marital status, region) was conducted to determine whether model saturation was occurring. No significant differences were observed between the models with and without these variables.

Table 5: Bivariate Analysis: Multinomial Logistic Regression Models Predicting Initial Employment (n=120)

	Professor ^a		Postdoc ^a	
	RRR	SE	RRR	SE
Peer-Reviewed Publications	1.17	0.13	1.42**	0.16
Funding	1.26*	0.13	1.23	0.13
Research Assistantship				
No	-	-	-	-
Yes	1.44	0.88	0.86	0.35
Sessional				
No	-	-	-	-
Yes	2.92	2.00	1.86	0.98

*** p<.001, ** p<.01, *p<.05

^aReference category = “Outside academia.”

3.6.2 Multivariate Results

The multivariate results address both research questions. They provided a broad understanding of the impact that measures of technical competency have on securing an initial career within academia, as outlined by the first research question. These results also addressed the second research question by including a model that controlled for research-oriented and teaching-oriented measures of technical competency simultaneously. Results are displayed in Table 3.

The greater number of publications reported by a respondent, the more likely they were to report an initial career within academia. One additional peer-reviewed publication increased the odds of an initial career as a professor by 39% (RRR=1.39, $p<.05$) and the odds of a postdoctoral position by 62% (RRR= 1.62, $p<.001$) compared to a career outside of academia. However, the statistically significant relationships between amount of funding and the increased likelihood of reporting an academic career (either as a professor or postdoctoral research) disappeared when considering control variables.

Table 6: Multivariate Multinomial Logistic Regression Models Predicting Initial Employment (n=120)

	Professor ^a		Postdoc ^a	
	RRR	SE	RRR	SE
Peer-Reviewed Publications	1.39*	0.21	1.62***	0.18
Funding	1.30	0.21	1.15	0.19
Research Assistantship				
No	-	-	-	-
Yes	0.71	0.49	0.78	0.44
Sessional				
No	-	-	-	-
Yes	2.40	2.07	1.75	1.35
Parental Education	1.52*	0.27	1.45**	0.18
Department				
Psychology	-	-	-	-
Sociology	18.12**	19.36	3.00	2.80
Geography	11.01	13.94	2.24	2.47
Economics	2.44	2.88	0.82	0.89
Political Science	4.04	4.89	0.80	1.17
Gender				
Male	-	-	-	-
Female	0.19*	0.13	0.09**	0.08
Age	0.88	0.08	0.85	0.08
Marital Status				
Common law/married	-	-	-	-
Single	0.70	0.74	1.05	1.11
Other	0.46	0.43	0.71	1.21
Dependent Children	0.78	0.32	0.65	0.23
Race				
White	-	-	-	-
Non-white	0.58	0.46	0.12*	0.12
Region of PhD Institution				
Ontario	-	-	-	-
Other Canadian Provinces	0.53	0.34	0.53	0.31

*** p<.001, ** p<.01, *p<.05

^aReference category = “Outside academia.”

Participants with more highly educated parents were more likely to report an initial career as a professor (RRR=1.52, $p<.05$) or postdoctoral researcher (RRR=1.45, $p<.01$) compared to one outside of academia. Respondents who obtained a PhD in sociology were over 18 times more likely than those in psychology (RRR=18.12, $p<.01$) to report initial employment as a

professor versus a career outside of academia. Females were 81% less likely than males to report initial employment as a professor ($RRR=.19, p<.05$) and 91% less likely to report initial employment as a postdoctoral researcher ($RRR=.09, p<.01$) than a career outside of academia. Finally, non-white respondents were 88% less likely than whites ($RRR= 0.12, p<.05$) to report an initial career as a postdoctoral researcher than a career outside of academia.

3.7 Discussion & Conclusion

As many social science PhDs aspire to pursue an academic career despite few career prospects (Kyvik & Olsen, 2012; Maldonado et al., 2013), it is important to identify whether the investment into certain measures of technical competency aid their efforts. Empirical research has acknowledged the importance of publications in securing academic employment (Dijk et al., 2014; Kim & Kim, 2015; Singhapricha et al., 2018). Though Gopaul (2011) argued the importance of additional measures such as funding, his study was conceptual in nature. Therefore, the current study furthered existing research by empirically examining numerous measures of technical competency within academia, and their effect on securing academic employment within social science departments.

Applying the lens of human capital theory, the first research question aimed to examine the importance of technical competency on the academic job market. In support of human capital theory, research-oriented measures of technical competency were highly valued on the academic market, as they were associated with an increased likelihood of reporting an initial career within academia. The bivariate analysis found that the greater the amount of funding received by respondents, the greater their likelihood of reporting an initial career as a professor. However, this relationship was explained away by the introduction of socio-demographic variables included in the multivariate analyses. In line with previous assertions (Laurance et al., 2013; Tregellas et al., 2018), respondents with a greater number of publications were more likely to report an initial career as an academic (professor or postdoctoral researcher). Unlike the results pertaining to funding, this relationship did not disappear when additional variables were controlled for in the multivariate analysis.

According to human capital theory, this would suggest that the skills and knowledge imparted by the publication process is amongst the most highly valued on the academic market, at least initially.

However, the relevance of human capital theory is questioned to some extent when examining the second research question. This sought to examine the importance of research-oriented versus teaching-oriented measures on securing initial academic employment. According to human capital theory, the technical competency awarded by both teaching- and research-oriented measures should be valued on the academic market. Despite this, there was no evidence that the investments in teaching-oriented measures increased the likelihood of securing an initial academic appointment. It was surprising that previous sessional experience did not increase the likelihood of reporting an initial career as a professor. Given that these positions are less commonplace than teaching assistantships, and given the rise of teaching-track appointments (Chiose, 2017), it was hypothesized that increased value would be placed on the skill and ability associated with demonstrating this teaching-oriented competency. Instead, only certain research-oriented measures of technical competency (e.g. publications) impacted the likelihood of securing an initial academic appointment. As publications displayed the greatest payoff, at least initially, this disadvantaged PhDs who focused their efforts on more general or teaching-oriented pursuits. In line with previous research, teaching-oriented measures may hold less value in academia, viewed as a distraction from research (Addy & Blanchard, 2010; Barry, 2013; Findlay, 2011; Latulippe, 2006; Luft et al., 2004).

In contrast to human capital theory's assertions, except in the case of publications, certain socio-demographic characteristics (e.g., gender, race, parental education) were better predictors of securing initial academic employment than measures of technical competency (e.g., funding, research assistantships, sessional positions). Though not the focus of the current study, these results coincided with recent empirical evidence that outlined the gender and racial biases in hiring processes within STEM departments (Eaton et al., 2019; Moss-Racusin et al., 2012). Eaton et al. (2019) found that female post-doctoral candidates were stereotyped as less competent and "less hireable" than their male counterparts, as were certain

visible minorities (Black & Latinx) relative to White and Asian applicants. Given the gendered and racial biases at play, it will be important to acknowledge the potential for additional barriers faced by women and visible minorities when integrating professional development opportunities into institutions moving forward.

Despite the empirical contribution of the current study, it is not without limitations. The most overt limitations of the current study are related to its sampling procedure. First, the current study was prone to self-selection bias (Bethlehem, 2010). Participants were likely to be more interested in graduate outcomes, and to have had more positive or negative experiences during and after their PhD. Second, as the most successful recruitment methods were distributed institutionally, the sample overrepresented the number of PhDs within academia. Most departments and faculty were found far more likely to keep in contact with graduates within academia than those outside of academia. The recruiting channels employed outside of academia recruited a much smaller number of participants. To mitigate this for the analysis, the subsample in the current study focused on those who aspired to pursue an academic career. However, future research would benefit from establishing a stronger foundation of recruitment channels outside of academia to foster a better understanding of the trends that influence social science PhDs to pursue employment outside of academia.

Finally, though the current study controlled for a number of relevant factors that have been overlooked within the Canadian context, there remain some it was unable to control for given the nature of the study. Some concepts such as the role of departmental fit (Perlmutter, 2016), value of a research statement to a hiring committee, and additional criteria hidden from job advertisements (Leiter, 2018) are not easily quantified to determine their effect in securing academic employment. These considerations can be addressed in two main ways. First, future research that considers these experiences through a qualitative lens would add depth and specificity to the current context. Second, this research could benefit further by including members of the search committee, speaking to both sides of job advertisements. This would allow the research to speak to what happens behind the scenes of job advertisements, while outlining how these practices are perceived by applicants.

Chapter 4: Examining the Academia-Industry Connections of Social Science PhDs

4.1 Introduction

“We don't want to cultivate PhD students to think about themselves in a dichotomous way. We need students who can be bridge builders between industry, government, and the academy. That's so important in terms of the changing landscape of postsecondary education in Canada.”

- Joy, Geography PhD

The transferability of a PhD outside of academia has been acknowledged by recent media and policy reports (Edge & Munro, 2015; Pedersen, 2014; Polk, 2017; Sastre, 2016).

Although many PhD candidates have academic career aspirations, an increasing proportion of graduates seek employment beyond academia upon graduation from their program (Roach & Sauermann, 2017). According to Jonker (2016, p. 15), 35% of Ontario's PhD's work outside of academia, and another 21% work within academia but off of the tenure-track (e.g. researchers, instructors, and administrators).

Despite the potentially expansive nature of the labour market for social science PhDs¹³, we know little about how their careers progress outside of academia (Charbonneau, 2011; Wendler et. al., 2012). We do not know whether PhDs aspire to pursue sectors beyond academia due to the transferability of their training to these sectors, because they are dissuaded from an academic appointment, or because of personal preferences. Furthermore, we know little about what influences their decision to pursue employment in other sectors, and whether they believe their PhD training prepared them for these careers. Much of the existing research has focused on the tight connections between academia and industry among hard science PhDs (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). However, little if any research has examined whether recent

¹³ In this paper, social science PhDs will be referred to as PhDs.

social science PhDs perceive meaningful connections between their training and industry in terms of preparing them for a wide range of careers, including those outside of academe. To fill in these gaps in the literature, this paper employs field theory to examine whether social science departments have tightened the link between academia and industry, and if so, in what way. To address these lines of inquiry, this article outlines three related propositions.

Little existing research employs field theory to examine the strength of academia-industry connections outside of the hard sciences. A “field” can be defined as a social structure or institution, each with its own rules and norms (Fligstein & McAdam, 2011, p. 3). Field theory asserts that mechanisms are meant to generate strong connections between fields (ibid.). Using field theory, the current study will identify the potentially expansive nature of the market for social science PhDs, what impact (if any) expanding institutional workshop offerings has had on students’ career development, and how to further develop academia-industry links. Employing field theory’s perspective in the proposed manner, the current research furthers our understanding of the career ideologies prevalent within social science departments, and the transferability of their graduates’ training to other employment sectors. In order to shed light on these considerations, the current research draws upon 28 interviews conducted amongst Canadian PhDs from selected social science departments¹⁴ to answer the following research questions: (1) How do recent social science PhDs describe their socialization experiences and career norms in graduate school? (2) How do participants describe the links between academia and industry? What, if any, do participants perceive were the initiatives taken to strengthen academia-industry links? How successful do participants believe these initiatives or partnerships were? (3) What initiatives do participants believe should be promoted in graduate school?

4.2 Theoretical Framework

As adopted by Davies and Mehta (2018), field theory focuses on the prevalence of school-society connections that have emerged within the last few decades. Their take on field theory was influenced by a combination of various authors and theorists who spoke to the school-

¹⁴ More information on inclusion criteria can be found under the methods section.

society connection. Firstly, by Daniel Bell's concept of the "post-industrial society," which asserts that schooling influences social mobility and sparks economic growth. Second, by Baker's concept of the "schooling society," whereby social life is structured by schooling. Finally, by new institutional theorists who focused on the embedded social structure of institutions, and how institutions interact with one another (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Meyer & Scott, 1983). NIT emphasizes how taken for granted institutional norms constrain individual choices, and states that these norms are perpetuated to ensure institutional survival (*ibid.*).

Field theory asserts that a reciprocal relationship exists (or "interpenetration") between schools and broader society. The "intensifying logic" describes the influence schools have on other social spheres. It is triggered by the vertical expansion of education, which devalues lower-rank credentials and intensifies the competition for more elite credentials. As demand for higher-tier credentials rises, institutions become more selective, and their credentials grow in scarcity. As educational expansion intensifies, it gives rise to an accommodating logic. Schools become dependent on the financial resources of their students, and in order to maintain itself, it becomes more responsive to students' needs. Reversing traditional (isomorphic) practices, schools adopt aspects of other social spheres, becoming a more "hybrid" institution. Though schools are praised during this process for responding to student needs, in the same turn, they are critiqued for watering down academic standards. Applied within the current context, this research will determine whether the accommodating logic has effected the highest tier of education, or whether traditional academic norms prevail.

Though existing literature has examined the career transitions and pathways of PhD graduates, much of this research employed a policy-based approach, and lacks theoretical orientation. Those that employ a theoretical lens have considered frameworks such as activity theory (Golovushkina & Milligan, 2013), socialization theory (Barry, 2013), and institutional prestige (Headworth & Freese, 2016; Pinheiro, Melkers, & Netwon, 2017). In comparison, the current study undertakes an approach that is underutilized by existing literature, particularly at the graduate level. The following section outlines the theoretical

underpinnings from field theory to consider how well-prepared social science PhDs are for a versatile number of career opportunities.

4.2.1 Career Norms for Social Science PhDs

The university setting is a model environment to foster norms, given the similarities in training across various graduate institutions (Di Maggio & Powell, 1983; Pizarro-Milian et al., 2016; Meyer & Rowan, 1977; Mizruchi & Fein, 1999). However, universities are not the only organizations to face pressures of conformity. Organizations, more broadly, face these same pressures of conformity, regardless of effectiveness or fit of the proposed norms. Organizational norms are dispersed and perpetuated through the process of socialization (Beckert, 2010; Meyer & Rowan, 1977; Di Maggio & Powell, 1983). Students' socialization experiences during their programs reflects the messages they receive from existing faculty members (DiMaggio & Powell, 1983). Though less than one-quarter of PhDs obtain academic employment (Baker, 2015), doctoral programs place a heavy emphasis on research, academic freedom, and tenure (De Grande et al., 2014, p. 540; Pizarro-Milian et al., 2016).

Though the process of conducting doctoral research has changed in recent decades, pursuing an academic career continues to be an emphasis of many programs. Supervisors are inclined to prepare students for academic appointments unless informed otherwise, perpetuating a norm of preparing for an academic appointment (Monk et al., 2012). Weak industry ties have been legitimized by stigmatizing careers beyond academia for social science PhDs (Baker, 2015). Perpetuating academic norms (at the cost of exposure to other career paths) benefits the institution as it strengthens the longevity, legitimacy, and autonomy of their organization (Di Maggio & Powell, 1983). In doing so, institutions are able to compete for top talent, ensuring the survival of their respective disciplines (ibid., Meyer & Rowan, 1977).

In turn, students may be unlikely to voice career plans that differ from the norm of an academic appointment. This has led many social science PhDs to focus more heavily on academic careers than their peers in the hard sciences (Golovushkina & Milligan, 2012; Nerad, 2008). Therefore, the PhD program may be viewed as an internship to a future

academic appointment, rather than as an experience that prepares them for a versatile number of career opportunities (Annan, 2012; Benderly, 2017). By perpetuating weak links to industry, students lack an understanding of how their academic experiences contributed to the development of skills sought after by employers (De Grande et al., 2014, p. 539). These skills include: leadership, creativity, communication, problem-solving, and project management (CCCE, 2014; Golovushkina & Milligan, 2012, p. 4, 11). As a result, students who lack exposure to careers outside of academia experience difficulty transitioning to these employment sectors (Annan, 2012; De Grande et al., 2014; Maldonado, Wiggers, & Arnold, 2013; Rose, 2012; Wood & Gurwitz, 2013).

4.2.2 An Accommodating Logic: Versatile Career Preparation

Whether due to an awareness of market saturation, or a greater understanding of available career pathways, an increasing number of graduates have expressed interest in employment beyond academia. The skills and experiences of PhDs lend themselves to these roles, and as a result, an increasing number of companies seek to hire graduates with advanced credentials (Pedersen, 2014). However, we are unaware of whether these opportunities are as vast and versatile for those in the social sciences as those in the hard sciences. Neumann & Tan (2011, p. 603-604) mention that this is even more apparent within the last two decades. As of 2011, nearly 60% of Canadian PhDs were employed in careers beyond academia (Munro, 2015). When accounting for differences by field, social science PhDs are increasingly represented in sectors outside of higher education. Jonker (2016, p. 26) found that 30% of social science PhDs were employed beyond academia, relative to 20% of those in the humanities and over 40% in both engineering and science. The distribution differed when considering alternative-academic (alt-ac) careers. Humanities (29%) and science (28%) PhDs were most likely to hold these positions, relative to 20% of those from the social sciences and 11% from engineering.

Although PhD's pursue careers in sectors outside of academia at increasing rates, their career preparation for these sectors prior to graduation may be called into question. This has prompted a paradigm shift, whereby external stakeholders have requested that institutions

better prepare PhDs for a broader range of career paths, often holding administrative stakeholders (e.g., chairs, deans) accountable (Edge & Munro, 2015; Benderly, 2017; Golovushkina & Milligan, 2013; Rose, 2012; Rudd & Nerad, 2015; Wood & Gurwitz, 2013). Enacting an accommodating logic in response to these pressures, many Canadian institutions have introduced professional development opportunities aimed to prepare PhDs for versatile career pathways (CAGS, 2016; Crago, 2015). These range from outlining the types of careers available beyond academia to translating a curriculum vitae to a resume. Others have begun to collect data contextualizing the career outcomes of their PhD graduates, as recommended by Allum, Kent, and McCarthy (2014).

Despite an increase in professional development opportunities, many graduates feel a disconnect between their doctoral training and their preparation for careers beyond academia. According to the 2016 Canadian Graduate and Professional Student Survey (CGPSS), only half of PhD students were satisfied with the information they received about these types of careers (CAGS, 2016, p. 22). Of respondents who participated in workshops in this area (75%), less than 50% were satisfied with them (*ibid.*, p. 24). Furthermore, only about one-third of respondents felt supported by their institution in their preparation for careers beyond academia (*ibid.*, p. 30). When accounting for differences by program, students in research-oriented programs that were less overtly linked to industry felt least prepared for careers beyond academia (Sekular, Crow, & Annan, 2013, p.10). Unlike their counterparts in professionally-oriented programs, they demonstrate weaker ties to industry, they may lack supervisory support, and have fewer obvious career options.

Emulating professional programs, institutions have enacted other forms of professional development opportunities to tighten academia-industry links, such as internships or joint-funded research opportunities. However, at the graduate level, they remain less common amongst social sciences than the hard sciences (Crago, 2015; Golovushkina & Milligan, 2013). As an example, a partnership between the Social Sciences and Research Council of Canada (SSHRC) and Mitacs was introduced in 2014 (Congress 2018, 2018). Though this spurred increasing involvement amongst PhD students in the social sciences, they still remain underrepresented by the total number of funded projects. The largest proportion of funded

projects belong to engineering (36%), whereas only 15% of all projects belonged to the social sciences and humanities (Projects, 2018).¹⁵ As many of these initiatives are in their preliminary stages among social science programs, their efficacy in tightening academia-industry links stands to be determined.

4.3 Contribution to the Literature

Research concerning various non-academic pathways available to social science graduates is largely underutilized outside of recent media and policy reports. However, this information can inform current students of the career pathways available to them upon graduation. As some advisors may be unsupportive or lack non-academic connections (Cason, 2016; Monk et al., 2012), it is important students have alternate venues for this information. The current study will provide insight into the skills and experiences participants felt were emphasized by employers from various employment sectors.

Media and policy reports have acknowledged the popularity of career pathways beyond academia among PhDs (Hughes, 2017; Munro, 2015; Polk, 2017; Sastre, 2016). Furthermore, employment in these sectors is becoming more common and valued amongst fields that were historically less tightly-linked to industry, such as the liberal arts (Anders, 2015; Olejarz, 2017). Much of the research examining the transition to employment has focused on hard science PhDs (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). The literature examining these transitions amongst other fields is much more limited (Cason, 2016; De Grande et al., 2014; Monk et al., 2012; Neumann & Tan, 2011; Rabe & Rugunanan, 2011).

This point is exacerbated when limiting the scope to a Canadian context (Porter, et al., 2018; Reithmeier, 2018; Wood, 2012; Yachnin, 2016, 2017). Much of the existing evidence within Canada is limited to an institutional-level, such as the reports published by the University of British Columbia (UBC) and the University of Toronto (U of T) (Porter, et al.,

¹⁵ The social sciences were aggregated with the humanities as per Mitacs website.

2018; Reithmeier, 2018). Though the Track, Report, Connect, and Exchange (TRaCE) project is a multi-institutional Canadian report, available findings are currently limited to the humanities (Yachnin, 2016, 2017). While the authors have begun to expand the study to include social science PhDs, their approach focuses on disseminating the trends identified by the data, but lacks a theoretical underpinning attempting to explain or speculate the reasoning behind them.

The current research, in comparison, uses field theory to situate its findings. The Canadian educational landscape offers a unique perspective given its flat structure and lack of differentiation relative to the hierarchal structure of prestige adopted in the U.S. (Davies & Hammack, 2005; Davies & Quirke, 2007; Davies & Zarifa, 2012). As a result of these contrasting structures, there are differences in the ways in which Canadian versus US institutions have adapted to external pressures (Davies & Hammack, 2005). As such, whether Canadian universities have shifted away from traditional academic norms, and embraced an accommodating logic in terms of PhD career development, stands to be determined.

Existing analyses have examined broad-level trends in educational and occupational outcomes (e.g., time to degree, employment status, sector of employment). However, the deductive nature of past quantitative research has influenced its model building process. Much of the existing empirical evidence, such as those outlined above, have not focused on the individual experiences and complexities which have shaped social science PhDs long-term career pathways. The current study aims to extend previous literature by providing further context and perspective to existing empirical evidence.

Though some qualitative research of PhD career outcomes exists, the scope of these studies differs from the proposed research. Existing studies have examined topics such as: skills valued by employers (De Grande et al., 2014), student career aspirations versus faculty perspectives (Monk et al., 2012), and action research to examine graduate preparedness for multiple careers (Cason, 2016). Though each examines a similar area of research, each differs from the proposed research according to population, methodology, or main intent of the analysis.

Most comparably, Rabe and Rugunanan (2011) conducted in-depth interviews with South-African sociology bachelor of arts (B.A.) graduates. However, their focus on non-academic career pathways is limited in scope. The introduction of non-academic employment reads as a “backup plan” to early academic aspirations in many cases. In doing so, the research overlooks the fact that a growing number of students take interest in a non-academic career as their first choice. Though the research provides rationale as to why respondents left academia, it overlooks other important considerations. Some examples include: elaborating further on the non-academic job search, identifying the transferable skills non-academic employers emphasize, and exploring the influences respondents wish they knew when pursuing a non-academic job search.

To the author’s knowledge, no available literature has employed a qualitative lens to provide perspective on the career pathways of social science PhDs. However, this information is of increasing importance as there is a large market for social science PhDs beyond the academic sector (Ladner, 2011; Shah, 2011). Ladner (2011) asserts that academia and market are not separate entities; therefore, social science PhDs are already familiar with how social and market interactions coincide. They provide a different perspective than many hard science PhDs by prioritizing the social behaviours surrounding a product, rather than vice versa. Furthermore, their understanding of the complexities of human behavior aid their ability to foster collaboration within the organization (Shah, 2011). In essence, social science PhDs are arguably an untapped resource to many sectors beyond academia. By employing the data collected from 28 interviews, the current study aims to identify the extent of the shift in institutional practices, and create a dialogue aimed to foster greater institutional awareness of the versatile career pathways available to social science PhDs.

4.4 Methods

The current research builds upon a larger research project by interviewing respondents who participated in a web survey from chapter 3 of this dissertation. Multiple recruitment methods were used to secure the sample for the web survey. Alumni departments, faculty members within 13 eligible social science departments, and those involved in PhD transitions outside

of academia (e.g. non-academic career coaches, government employees) were contacted to determine their willingness to circulate the recruitment materials amongst their networks. Respondents were also encouraged to relay the research onto any eligible graduates within their networks.

In order to participate, respondents must have met two eligibility criteria. First, they must have received a PhD in one of the five most common social science departments in Canada. These departments were chosen according to the number of institutions that offered a PhD program in that department within Canada. The five most common departments are: Economics, Geography, Psychology, Sociology, and Political Science. Second, respondents must have obtained their PhD no more than 10 years before completing the web survey of the previous phase of research. A 10-year time period was utilized as a compromise between concerns over sample size and concerns for recall bias associated with including a greater time span. Participants of the current study voluntarily provided their contact information when completing the web survey of the previous phase of the research. Participants were provided the necessary supporting documentation to consent to participate in the subsequent phase of the research.

The interviews provide the “micro-situational grounding” the previous phases of the research project lacked (Collins, 2000, p. 18). This allows the research to interpret the social reality of the encounter or experience through the perspective of the individual, providing context that quantitative analyses may not (ibid.). The exploratory nature of the current research accounts for respondents’ individual experiences. In comparison to broad-scale trends identified in previous quantitative phases, this adds breadth and depth to our understanding of the relationships that have influenced graduates’ career pathways.

In order to do so, the current study draws on 28 semi-structured in-depth interviews with social science PhD graduates. Interviews were conducted during a one-year period, between April 2018-April 2019. Demographic information provided by participants during the web survey of the previous phase of research was incorporated into the current interview data to avoid respondent fatigue. These included questions regarding respondents’ age, gender, race,

marital status, number of dependent children, and measures of socioeconomic status (i.e. parental education, amount owed in loans upon graduation from the PhD, initial and current salary).

Interviews ranged from approximately 45 minutes to 3 hours and were recorded digitally after obtaining consent to do so from respondents. Pseudonyms are used and any other identifiable information was removed from the data to ensure the confidentiality of all respondents. This method allows respondents to speak most honestly to the experiences and outcomes from the PhD onwards. All data was encrypted on a password-protected personal computer to further ensure the confidentiality of respondents.

The interview schedule included five sections. Questions 1-5 acted as general questions to build rapport with respondents. Questions 6-11 built upon the theoretically-driven questions of the previous phase of the research to determine what has influenced the career pathways of respondents. Questions 12-15 identified the alignment between graduates' PhD training, career expectations, and eventual career pathways. Questions 16-19 outlined the value respondents place on the PhD training they received, and the extent of its transferability between sectors. Finally, questions 20-24 asked respondents to reflect on and offer recommendations regarding PhD training and their career pathway.

4.4.1 Analysis

Interview data was analyzed using NVivo 12, and a two-phase coding strategy was employed. In phase one attribute coding and provisional coding were employed to deductively code the transcripts. Attribute coding outlines basic descriptive characteristics of each respondent, and is often included to provide context during analysis (Saldana, 2013). As such, descriptive and demographic information obtained during the web survey of the previous phase of research was incorporated into the current interview data. This table included information such as: participant pseudonym, year of PhD, department, institution, age, gender, race, current career (and initial career if applicable), and whether the respondent participated in professional development opportunities (see Appendix A for a condensed version of this table). Including this type of coding allowed for an efficient comparison

between the experiences of those who obtained their PhD at different times and from different departments, among other comparisons.

During phase one, provisional coding was employed as the intention was for the current study to build upon the previous quantitative phase of the larger research project. Provisional coding employs a “start list” of codes that are expected to relate to or appear in the data prior to analysis of the data set (ibid., p. 266). Nodes employed at this stage were informed by the current research questions, overlapping themes from past research, and from the previous phase of the current research. Informing field theory, nodes identified as this stage included “professional development” and “program experiences.”

The node “professional development” identified the strength of academia-industry connections fostered throughout the PhD program. It included questions pertaining to respondents’ career goals during the program, the hard and soft skills they emphasized during the program, and what resources they sought to prepare them for their intended career pathways (e.g. workshops attended, publications and conference attendance). The node “institutional structure” included questions that identified career norms held by faculty and respondents. These questions detailed the value placed on careers within and beyond academia, and identified the support (or resistance) provided towards students’ intended career paths.

However, in order to utilize the exploratory nature of qualitative research, the focus of phase two coding was inductive and open-ended in nature. Allowing a more open-ended approach during the second phase identified a strength in employing evaluation coding during this phase. In doing so, a new primary code called “program evaluation” was introduced. This allowed the research to determine how to strengthen academic-industry connections in future, as respondents provided reflections and critiques of their experiences during the PhD program, and suggestions for institutional “best practices” moving forward.

4.5 Findings

4.5.1 The Gold Standard: The Perpetuation of Academic Career Norms

Institutions confer a greater number of social science PhDs than the number of available tenure-track appointments requiring the credential. An increasing number of PhDs have pursued employment outside of academia, shifting the employment norms of PhDs. Careers held by interview participants included: clinical psychologist, research facilitator, consultant, project manager, researcher (or analyst), among others. However, institutional norms have not adjusted in response, as far fewer PhDs articulated an awareness of specific careers beyond academia, or of their suitability to these sectors (e.g. consulting, alternative academic careers). This knowledge was often limited to specific fields (e.g. clinical psychology), very recent graduates, or was obtained after graduation by those who had already entered into employment beyond academia.

Instead, many of the interviewees spoke to the perpetuation of existing institutional norms that encourage an “all in” academic mentality. Pursuing an academic appointment is highly valued as there is significant overlap in the responsibilities of a faculty position and those during the PhD program. Some faculty may assume that careers beyond academia are less rigorous than the requirements of an academic appointment. As such, departments or institutions may perpetuate existing norms, emulating the values and norms of research-intensive universities.

Kaleb, a Geography PhD, mentioned that the career preparation he received from his advisor and department were largely academically-oriented. He was open to research-oriented careers in government or non-profit as long as he could remain in Canada. However, he felt that he was not exposed to viable career opportunities within these sectors during his program. Therefore, he lacked an awareness of how to conduct a job search accordingly. He wished his department connected him to alumni that pursued industry careers, as it would have aided his transition outside of academia. After pursuing a sessional appointment shortly after graduation, he transitioned to a career within the non-profit sector.

My advisor was very good in an academic way. He was an old-school professor. He supported me to do several articles and publish in very good journals after I finished my PhD... What was missed was a topic of showing what opportunities are out there outside of academia. Something like networking, connecting you with alumni in an industry... I was not prepared for the world outside of academia.

Due to these institutional norms, Nicholas and Katrina explain that students often feel pressured by faculty to pursue academic employment. As the competition for tenure-track employment has intensified, respondents felt pressured to commit to an “all in” mentality from an early stage of their graduate studies. Katrina mentioned that her department emphasized opportunities that prepared PhDs for an academic appointment (e.g. conferences, publications). She participated in these endeavors as she believed the skills they impart would translate to other sectors. Though her supervisor was supportive of employment outside of academia, she mentioned a desire to “live up to the expectation” of faculty members. As faculty encouraged her to apply to academic positions, she pursued a postdoctoral position upon graduation.

4.5.2 Off the Tenure Track: Examining Students’ Exposure to Other Sectors

Outside of academia, it appears the strongest academia-industry links are tied to the government sector. A number of respondents were aware of and interested in these careers prior to graduation. Keisha, Margaret, and Terry mentioned that PhDs in their department had the opportunity to attend a meet and greet with government employees. This provided them with an opportunity to learn about the in-depth expectations of various careers within this sector prior to their job search. As a result of respondents’ exposure to government careers, they often felt most prepared to pursue a career within this sector relative to alternate positions outside of academia.

Katrina, a Sociology PhD, focused on developing skills that would “open a lot of doors” for her in the government sector. She kept pace with the job market from an early stage of her PhD, and surrounded herself with faculty whose research displayed connections to government. She prioritized the development of her (quantitative) data analysis abilities as

they were a key requirement of many government careers she was interested in applying for. The part-time employment she pursued during her PhD was research- and policy-oriented in nature, which required the analysis of government data. She recognized that this work experience, and the value associated with her ability to analyze government data, would be in high demand for government careers. Though she initially pursued a postdoctoral appointment, she connected with a provincial research agency that propelled her long-term career in government.

Some of my committee members were involved in doing policy work. They were involved with government departments, and doing policy type research reports for them. I became aware of that part of research, in terms of the interaction with government departments, which made me more aware of those connections between research and government... That's a very valued skill to have knowledge of those [government] data sets in particular, and to be able to use and produce useful output from them.

However, connections to other sectors (e.g. private sector, not-for-profits) were extremely weak for most social science fields. Some participants mentioned that the norm to pursue academic (or government) employment may stem from some faculty's weak connections to (and lack of awareness of) other viable career opportunities. The connection between academic experiences during the program, and other sectors of employment, may not be as obvious. Other faculty may feel that by training students to pursue an academic appointment, they are providing students with the most applicable training for their intended profession. As such, many were dissuaded from exploring careers outside of academia and government until after graduation.

Many respondents spoke to the weak academia-industry connections of their departments or institutions more generally. Terry felt "too specialized" for her institution's career services department to aid her job search, the onus was on her to locate, apply for, and secure employment outside of academia. Margaret pointed to the pressure for many PhD students to complete their degree and secure employment as quickly as possible. This pressure leads some graduates to focus their efforts on the first career opportunity to present itself, rather than taking time to reflect on all available options. Julie, like other respondents, mentioned

that she wished she had a better understanding of the transferability of her skillset during (rather than upon completion of) her program. When deciding to transition outside of academia during her postdoctoral appointment, her advisor was unable to provide guidance. Therefore, she expressed continuing difficulty navigating the career opportunities available to her outside of academia. With an understanding of the transferability of her skillset at an earlier stage, she felt that she may have shifted her career preparation and job search towards her long-term goal prior to the pursuit of a postdoctoral appointment.

Stacey, a Sociology PhD, spoke to her department's awareness of the lack of tenure-track appointments available to PhDs. Of the PhDs from eight cohorts that she has kept in contact with, only three secured traditional permanent academic appointments. Although her department was aware of these outcomes, some faculty viewed other employment sectors as an alternative (or "backup") to the pursuit of academic employment. As a result of her department's weak connection to other employment sectors, it offered little support to students who transitioned to careers outside of academia.

It's crazy because we are in a discipline that recognizes that universities are not hiring anymore. We are hiring very selectively or you have to be a *superstar* [participant emphasis] and be willing to move across the country. There's a recognition of that, but at the same time not support to help the same students you're training get into other things. One time I had a conversation with my supervisor who said "we need to stop accepting sociology students, the discipline is dead." I was so disheartened because I thought "if the discipline is dead, what are we doing here? Shouldn't you be training me for something?"

Though connections to industry sectors were rare across most disciplines, Psychology proved to be the exception in many cases. Respondents hinted that it may stem from the applied and professional focus of the discipline and the understanding that most PhDs intend to pursue employment outside of academia. Teresa, a Psychology PhD, drew attention to the connections her supervisor made between academia and industry, as she participated in research projects involving academics and community stakeholders. In particular, clinical psychology PhDs discussed the benefit of their placements, which allowed them to gain experience with their intended employment sector (e.g. hospitals, private practice,

rehabilitation clinics) prior to graduation. Evelyn, a Psychology PhD, discussed how she became more confident in her abilities to pursue employment outside of academia as she participated in a greater number of placements. The “evidence-based” nature of her coursework proved extremely relevant, allowing her to apply the quantitative skills she developed during her PhD in an applied setting.

Teaching at a university or college was not something I was necessarily interested in... The self-employed private practice is a huge one [career option] for clinical psych, so I knew that was always an option for me... One of the strengths [of her program] is the fact that we're working all the time with a number of different people in hospitals and school boards... So there's sort of a natural networking that's occurring... Preparing for work outside [academia], the dots have to be really close together.

In comparison, she feels industry has a less clear sense of what humanities and other social science PhDs are capable of, given their lack of exposure to placements during the PhD. She spoke to how detrimental the public perception of academia as an “ivory tower” can be for PhDs in these disciplines. To counteract this perception, she encouraged a “clearer map” to be drawn between these fields and industry to clarify PhDs’ skillsets to employers. In turn, she explained that this would improve the working conditions of PhDs in academia, increasing their awareness of industry opportunities, resisting the ‘seasonal trap.’

The other demonstration of tight academia-industry links appeared to be associated with employers’ familiarity with PhD skillsets. Julie mentioned that her ability to transition to employment outside of academia was “really lucky,” given the lack of support she received. Her and Patricia mention that their hiring managers “took a chance” on hiring them. In Patricia’s case, although her supervisor did not have a graduate degree, he was familiar with PhD competencies. The individual who previously held the position had the same degree as Patricia, which paved the way for Patricia’s entry to the company. In comparison, Julie’s supervisor was a lapsed PhD from another field, which provided her with a unique perspective relative to other employers. Though the background and familiarity of Patricia’s and Julie’s supervisors differ, each example demonstrates the development of new connections to industry.

4.5.3 An Accommodating Logic: Institutional Professional Development Offerings

Adapting to graduate student expansion, participants noted that institutions have responded to pressures placed on them by governments, parents, and students to tighten academia-industry links. Joy pointed to a need to move away from the perception of PhD careers as a dichotomy (academic or not). Instead, she encouraged institutions to view PhD career outcomes as “inspiring, open, and endless.” In response to these pressures, many teaching and career centres within universities have created professional development opportunities aimed to aid PhD students in their transition to employment. Workshops include topics such as: the peer-reviewed publishing process, improving respondents’ teaching methods, teaching students how to sell themselves and their research on the job market, conducting a job search, and creating a resume and curriculum vitae. Interviewees like Anthony, Carter, and Esther acknowledged the value of participating in these initiatives.

Yet many respondents, like Janet, felt that workshops offered by their institutions were weakly linked to industry careers. The majority of opportunities presented to them were heavily geared toward obtaining academic employment, and became redundant early in the program. It is only more recently that institutional offerings have expanded to include topics aimed at preparing PhDs for careers outside of academia. Despite more expansive offerings, participants like Wes questioned their ability to prepare for careers outside of academia. Institutional initiatives appeared to focus on providing participants with formal credentials for participation, and on legitimizing careers outside of academia by identifying students’ transferable skills. However, respondents indicated that these initiatives did not draw attention to important distinctions in the job search process for those seeking careers outside of academia. Therefore, in support of previous research, many respondents who obtained employment outside of academia felt a disconnect between the training and career outcomes.

4.5.4 Fostering Industry Connections: The Benefit of Experiential Learning

Despite the institution’s response to furthering PhD career development, respondents who participated in experiential learning opportunities displayed the tightest academia-industry

connections. Those who participated in internships, such as Evelyn, gained a better understanding of how the skills fostered during their program translate to sectors beyond academia. Excluding Psychology PhDs, the way that respondents learned about experiential learning opportunities differed slightly. With that said, the majority learned about them through their supervisors or colleagues. Matthew, an Economics PhD, pursued an internship during the second year of his PhD. He felt this opportunity was more aligned with what he sought in a career upon graduation, so his career interest shifted away from academia. His internship acted as a stepping stone to long-term employment, as he continued to work for the same employer throughout his program, and beyond graduation.

The decision [to pursue a career pathway beyond academia] actually came the first or second summer where I did an internship at the company that I ultimately became my first job. I took an internship just to open my eyes. It was clear. The fit, the interest about shaping the future was more obvious to me in that environment compared to academia.

Few respondents outside of Psychology participated in experiential learning opportunities during their PhD, which suggests that this connection is not yet well-travelled in many social science disciplines. However, the ability to participate in experiential learning eased the career transition process for those who participated. As in Matthew's case, his internship opened his eyes to new long-term employment opportunities, and aided in his career transition outside of academia. Furthermore, experiential learning can strengthen employers' understanding of PhD skillsets, developing the connections between academia-industry. In turn, employer experiences like Patricia's and Julie's may become more common for PhDs who transition to employment outside of academia. As such, PhDs may benefit greatly from institutions enacting experiential education opportunities as a new norm to foster academia-industry connections.¹⁶

¹⁶ Some respondents (outside of Psychology) spoke to their desire to increase the relevancy of PhD programs to careers outside of academia, however, many were uncertain of how to do so. Therefore, WIL may represent one way to encourage the relevancy of PhD programs to careers outside of academia, however, this topic may warrant further consideration and prompting of participants in future.

4.6 Discussion & Conclusion

As a growing number of PhDs pursue employment beyond academia (Hughes, 2017; Munro, 2015; Polk, 2017; Sastre, 2016), it is important to prepare them for versatile career opportunities (Edge & Munro, 2015). Empirical evidence has acknowledged the suitability of hard sciences PhDs in sectors beyond academia given the tight link their program displays with these sectors (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). However, though participation of liberal arts PhDs is also increasing in these employment sectors (Anders, 2015; Olejarz, 2017), their experience during this career transition has been less clear.

As such, the current study aimed to explore the career transitions of PhDs from the social sciences. It aimed to uncover: (1) How recent social science PhDs describe their socialization experiences and career norms in graduate school (2) How participants describe the links between academia and industry. This included what initiatives they perceived were taken to strengthen this link, and whether they perceived them as successful (3) What initiatives participants believed should be promoted in graduate school. Informing the current study, these core aims uncovered the following three findings about existing academia-industry connections.

The first finding surrounded the norm of pursuing an academic appointment, perpetuating weak academia-industry links within social science departments. In line with previous research, the current study found that many PhDs were encouraged by faculty to pursue an academic appointment (De Grande et al., 2014; Golovushkina & Milligan, 2012; Nerad, 2008). In comparison, few supervisors were able to mentor their students in how to market themselves to other sectors of employment. This pressured many graduates into an “all in” academic mentality, where students prioritized academic opportunities that translated most overtly to the academic sector. These included: research assistantships (RAs), teaching assistantships (TAs), sessional appointments, and peer-reviewed publications. The “all in” academic mentality may be linked to the increasingly competitive (tenure-track) academic

market, and students' desire to signal their academic competency from an earlier stage in their graduate career. Though an "all in" academic mentality proved successful for graduates who obtained academic employment, there were implications for those who followed other career pathways. By perceiving careers beyond academia as a "backup plan," they lacked exposure to careers in other employment sectors upon graduation (Edge & Munro, 2015; Sekular, Crow, & Annan, 2013). As a result, supporting previous research, those who pursued employment beyond academia often reported difficulty transitioning into these sectors (De Grande et al., 2014; Wood & Gurwitz, 2013).

Second, though institutions have enacted professional development workshops to ease the transition, respondents felt they were also weakly tied to industry fields. The majority of workshops remained focused on academic career preparation. Respondents felt that those that extended beyond this legitimized the pursuit of a career outside of academia, but failed to prepare them for the distinction in a job search outside of academia. Some respondents were aware of the transferable skills garnered during their PhD, unlike previous assertions (CCCE, 2014; De Grande et al., 2014, p. 539; Golovushkina & Milligan, 2012, p. 4, 11). However, many were uncertain about how to market these skills to employers, and how to facilitate the transition to specific careers beyond academia. Those who displayed this awareness were more likely to be extremely recent graduates. Instead, a number of respondents spoke to navigating and tailoring their transition to sectors beyond academia independently once they entered the job market.

Finally, in order to tighten academia-industry links, it is suggested that institutions strengthen a "show, not tell" process. Institutional workshop offerings would be strengthened by the addition of an applied component demonstrating the job search process for careers outside of academia, and by providing networking opportunities with employees from these employment sectors. Pushing the applied component one step further, some respondents spoke to the applicability of internships pursued in conjunction with their studies. At current, as argued by previous research, these opportunities seem to remain sparse within the social sciences (Crago, 2015; Golovushkina & Milligan, 2013). Though the argument is not to introduce internships as a mandated component of the PhD program, encouraging

institutional awareness of these opportunities is encouraged. However, it is also important to consider the potential effects on students' time to degree when suggesting integration of WIL into graduate programs. As such, smaller-scale WIL could be incorporated into course offerings to be mindful of this consideration. Examples could include the integration of opinion-editorials, white papers, or policy briefs into course requirements. Alternatively, it could include an independent study credit for a request for proposal (RFP) delivered to an external body. Beyond this, the argument is to remain open and flexible to new WIL considerations on an individual basis.

Greater awareness of the multitude of opportunities available to social science PhDs in various sectors would allow students to come to a well-informed decision about what career path they feel most suited to pursue. Further, in the rare cases where respondents pursued internships, fostering these networks beyond academia often greatly aided their job prospects upon graduation. Though participation in internships was rare, those who did were often offered a full-time permanent position within the company upon graduation. However, it is important to consider the potential effects on students' time to degree when suggesting integration of WIL into graduate programs.

To expand our understanding of how to best prepare social science PhDs for an evolving workforce, future research would benefit from examining the significance of work-integrated learning (WIL) opportunities (i.e. internships, co-op placements) at the graduate level. Many PhDs gain an awareness of how to articulate their transferable skills near or at the end of their program, rather than cultivating this understanding throughout the program (Dehaas, 2014; DeGrande et al., 2014; Golovushkina & Milligan, 2013). Work-integrated learning (WIL) initiatives may ease the transition, but they remain rare within social science PhD programs (Golovushkina & Milligan, 2013). Certain psychology programs prove to be the exception to the rule, as their clinical programs may mandate this initiative during the PhD.

Though integration of WIL opportunities into PhD programs is rare, they have been extremely successful in easing the transition to employment beyond academia among other postsecondary graduates. In many cases, undergraduates who pursued these opportunities

fostered networks to aid their search for future employment opportunities upon graduation (DeClou, Peters, & Sattler, 2013). Should the benefits of WIL hold amongst institutions that provide WIL opportunities to PhDs, it would provide support to include these initiatives in a greater number of PhD programs. However, program structure also warrants further consideration given the impact that participation in WIL may have on students' time to degree under a traditional PhD program format.

Chapter 5: Conclusion

5.1 Introduction

Graduate student career transitions have become a topic of increasing interest to media and policy stakeholders (Chohan, 2016; Edge & Munro, 2015; Jonker, 2016; Kay, 2014; McKenna, 2016). Yet empirical evidence examining PhDs' career transitions, particularly to employment sectors outside of academia, focuses heavily on the hard sciences (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Clair et al., 2017; Lee et al., 2010; Marshall, 2008). Far less of the evidence in the area focuses on other disciplines (Cason, 2016; De Grande et al., 2014; Monk et al., 2012; Neumann & Tan, 2011; Rabe & Rugunan, 2011). At the time of this dissertation, no available research had examined the career transitions of social science PhDs, and how they translate their skillsets outside of academia.

As such, the aim of this dissertation was to examine the experiences, opportunities, and institutional processes that influenced PhDs' (particularly from the social sciences) career transitions upon graduation. However, each chapter offers a different perspective and framework to tackle this unified concept. Chapter 2 adopted human capital and credentialist frameworks to identify PhDs' initial sector of employment, and what qualifications contributed to their employment within each sector. This framework allowed the chapter to speak to the job quality of respondents, and began to touch on the "payoff" of employing their degree outside of academia. Chapter 3 determined whether the investment into measures of technical competence increased the employability of PhDs' on the academic market. This allowed the research to examine whether the importance of technical competency differed according to research- or teaching-oriented measures. Informed by field theory, Chapter 4 examined the academia-industry links of PhDs during their program, and whether they felt prepared to pursue employment outside of academia. This chapter provided insight into current institutional processes and norms, the relatively weak existing academia-industry links of social science PhDs, and recommendations for what may strengthen these links in future. The results indicated that respondents feel substantial revisions are required in

order to prepare students for careers outside of academia, as the majority focuses on the (academic) outcomes obtained by few students. The following sections of this conclusion outline the main findings, policy recommendations, and contributions of the current research. This is followed by suggestions for future research focusing on the career transitions of graduate students and the role of work-integrated learning (WIL).

5.2 Summary of Main Findings

The first paper adopted human capital and credentialist frameworks to determine PhD graduates' sectors of employment, and the associated qualifications and job quality of each employment sector. In order to do so, this paper analyzed a secondary dataset from Statistics Canada that outlines students' career transitions. The results found that PhDs' from the hard sciences (e.g. physical & life sciences, STEM) were more likely to be employed in the private sector than those from social sciences and law. In relation to human capital theory, these results may indicate tighter industry links ("vocational specificity") among the hard sciences relative to the social sciences (Davies & Guppy, 2013; Kerckhoff, 2001, p. 5; Kerckhoff, 2002). Further, PhDs' who obtained an alternate source of funding (e.g. research assistantship) were more likely to be employed in the private sector relative to those who obtained a teaching assistantship. Therefore, employers outside of academia may value the transferability of these additional competencies, whereas the skills gained during a teaching assistantship may translate less clearly outside of academia. However, PhDs' with no reported source of funding were also more likely to report employment in the private sector. This questioned the applicability of human capital theory, as PhD's without the technical competencies imparted by a research assistantship displayed the same "leg up" in obtaining employment in the private sector as those with this experience.

In relation to credentialist theory, as expected, overqualification was more prominent in sectors outside of academia (private and public/unknown sectors). Therefore, the benefit of pursuing a PhD is less clear for those who initially transition to employment outside of academia. This may be due in part to employers' uncertainty of PhDs' capabilities outside of academia (DiPaolo, 2016; Kyvik & Olsen, 2012; Tholen, 2017), or to PhDs own uncertainty

of the transferability of their skills (Holloway, 2016). It seems less likely that overqualification outside of academia is associated with a lack of demand for the skillsets PhDs foster throughout their degree. Though some hard skills may not translate as clearly, the soft skills they develop (e.g. critical thinking, project management) are in high demand (CCCE, 2014). Despite moderate levels of overqualification in the private sector, job security (full-time employment) is common within it and the academic sector. According to credentialist theory, processes of overeducation and overqualification may be occurring in the public/unknown sector if initial part-time employment in this sector is rationalized as a stepping stone to job security in future positions. Alternatively, respondents may intentionally pursue part-time employment within the public/unknown sector to promote work-life balance or otherwise.

The second paper employed survey data gathered from social science PhDs to identify whether investing in technical competency increased respondents' employability on the academic job market. Technical competence refers to the knowledge, skills, and abilities gained during the PhD which is believed to impact their employability and earnings. Within the current context, measures of technical competence were operationalized to include: funding, research assistantships, publications, and sessional appointments. In line with previous research (Dijk et al., 2014; Kim & Kim, 2015; Singhapricha et al., 2018), research-oriented measures of technical competence had a greater effect on securing academic employment than teaching-oriented measures did. However, most measures of technical competence were not as strongly related to the initial career outcomes of respondents. With the exception of number of publications, certain socio-demographic characteristics (e.g. gender, race, parental education) were stronger predictors of obtaining academic employment than measures of technical competence (e.g. teaching and research assistantships, sessional appointments), questioning the relevance of human capital theory in this context. Though it extends beyond the scope of the current research, this may indicate weaker practices of affirmative action affecting the academic hiring process (Eaton et al., 2019; Moss-Racusin et al., 2012). Alternatively, it may indicate that highly-educated parents (e.g. PhDs) guide their

children towards activities that have the strongest association with their intended employment sector.

The third paper draws on semi-structured interview data, and employed field theory to examine the academia-industry links of social science PhDs. As previously reported, many respondents were encouraged by advisors and other faculty members to pursue an academic appointment as a primary career option, perpetuating weak industry ties (De Grande et al., 2014; Golovushkina & Milligan, 2012; Nerad, 2008). Many respondents felt faculty pressured them into an “all in” academic mentality, at the expense of preparation for more versatile career opportunities. As a result, in support of previous research, those who pursued employment beyond academia often reported difficulty transitioning into these sectors (De Grande et al., 2014; Wood & Gurwitz, 2013). Many respondents reported uncertainty of how to market their transferable skills to other employment sectors, and how to facilitate the transition to specific careers outside of academia. Respondents who reported ease transitioning to careers outside of academia were often recent graduates who participated in the growing number of institutional initiatives aimed at preparing them for versatile careers. Overall, though institutional initiatives seem beneficial to students, many participants reported that they provided little meaningful impact on their career preparation. Instead, respondents who participated in experiential learning opportunities during the PhD reported the strongest connections to industry. These results indicate that the career preparation of graduate students may be strengthened by offering more applied institutional initiatives during their degree.

Though these papers differ in their scope and theoretical application, their unifying theme surrounds the career transitions of PhD graduates, and what experiences impact these transitions. The first paper provided an overview of the initial career transitions of PhDs from various disciplines. The second paper honed in on social science PhDs to determine what measures of technical competency were most important in securing academic employment. The third paper provided insight into the career preparedness of social science PhDs for a variety of career pathways. Each paper provided policy recommendations based on the results, but a summary of these recommendations is also presented below.

5.3 Summary of Policy Recommendations

Existing reports and research often present PhDs' career outcomes as a dichotomy- either "academic" or "non-academic." As a result, there are two main concerns with the organization of many institutional initiatives: (1) As identified by my respondents, many initiatives focus heavily on preparing PhDs for academia. Though most students intend to pursue an academic career (Ann et al., 2009; Barry, 2013), most obtain careers outside of academia (Edge & Munro, 2015; Neumann & Tan, 2011; Sauermann & Roach, 2012). Therefore, it is of increasing importance to broaden the scope of students' career development during their program beyond academia; (2) Of the institutions that offer broader career development opportunities, many aggregate the scope of careers outside of academia. By doing so, the versatility and specificity of these careers, and of their job search process, are often overlooked. To address these shortcomings, the policy recommendations provided in this dissertation aim to support students' preparation and transition to employment sectors outside of academia. Though students are responsible (in part) for their career transitions, this dissertation focuses on its results which identified three main undertakings that can occur on behalf of institutions and their faculty.

5.3.1 Revising Existing Institutional Resources

Chapters 3 and 4 indicated that while completing their PhD, most respondents intended to pursue employment within academia. As such, respondents' work experiences and professional development opportunities largely centred around preparing them for an academic appointment. The professional development initiatives offered by teaching- and career-focused centres were described by some respondents as short-sighted and superficial in nature. Though some workshops taught students how to navigate the job search for careers outside of academia, respondents felt that they failed to prepare them for what happens when they assume these roles. As such, many respondents felt unprepared to assume their career outside of academia upon graduation. As Chapter 2 aligns with previous research (De Grande et al., 2014; Neumann & Tan, 2011) identifying that most PhDs assume employment outside

of academia, therefore it is increasingly important to address this gap in their career preparation during their PhD.

In order to prepare PhDs for their careers, regardless of employment sector, I propose revisions to the delivery of existing professional development resources. First, in addition to general workshops, additional discipline- or faculty-specific workshops should be created. This allows students the opportunity to apply the skills and experiences of the general workshops to a manner that is most relevant to them. To manage the additional workshops, it is suggested that institutions designate a “hub” for where both the general and discipline-specific information will be housed for students to access. By allowing students to access this information in one centralized location, it is likely to increase their awareness of all opportunities available to them. Once awareness of these opportunities grows, to increase participation, departments could incentivize students’ participation in these workshops. For example, some departments require a “professional development” milestone alongside completion of the PhD. In these instances, students’ professional development credits could be obtained in part from attending the proposed career development workshops. Finally, to ensure the ongoing effectiveness of the proposed and existing workshops, workshop facilitators should continually seek feedback from students (participants) and employers. This allows workshops to remain aligned with the needs of both students and the labour market.

5.3.2 Expanding Networks Outside of Academia

As evidenced by the data gathered for Chapters 3 and 4, most PhD supervisors kept in contact with their prior students who obtained academic employment upon graduation. In comparison, it was far less common for supervisors to keep in contact with those in other employment sectors. This perpetuates the isolation of academia from other employment sectors, making the transition to these sectors upon graduation more difficult. Instead, it serves students and institutions to bridge this gap and encourage collaboration between employment sectors. Though some collaborative initiatives (e.g. MITACS) exist, the majority of their funding and resources targets the hard sciences (Projects, 2018). To bridge

the gap for the social sciences, it is suggested that departments and faculty supervisors make greater efforts to keep in contact with graduates who pursue employment outside of academia. By fostering these networks, faculty are better able to advise students who plan to pursue careers outside of academia, and can connect students with the appropriate mentors to ease their career transition. Students may then pursue information gathering processes during their program (e.g. informational interviews) to decide what roles outside of academia are the best fit for them upon graduation.

5.3.3 Increasing Experiential Learning Opportunities

Relevant to career development during the PhD, the results from Chapter 4 indicated that many of those who obtained employment outside of academia felt unprepared to do so. The exception appeared to relate to students who participated in some form of experiential learning component during their PhD (e.g. clinical rotation, internship). Respondents who participated in work-integrated learning (WIL) opportunities had greater awareness of suitable careers outside of academia, expanded their networks, and expressed more certainty of how their skills translate to these careers. As such, WIL opportunities often acted as a stepping stone to permanent employment upon graduation, bridging the gap between academia and other employment sectors. However, WIL opportunities within the social sciences are rare, particularly at the graduate level. Given the benefit associated with WIL, it is recommended that institutions expand these opportunities amongst graduate students in the social sciences. Emulating undergraduate structure, it is recommended that WIL be offered as an optional opportunity in conjunction with the PhD for those who wish to pursue it.

5.4 Summary of Main Contributions

The current study contributes to research in the area of PhD career outcomes in four main ways. First, it acknowledged the expansive career opportunities available to PhDs outside of academia. Much of the discussion presents PhD career transitions as a dichotomy, either academic or “non-academic” (Mielcarek & Borbely, n.d.; Porter, 2017). As a consequence, this may narrow PhDs’ job search, as they may be unaware of the multitude of career opportunities available to them outside of academia. Furthermore, it may perpetuate the

stereotype of pursuing careers outside of academia as a “backup plan” (Baker, 2015; De Grande et al., 2014). However, careers outside of academia are gaining popularity among PhDs from various disciplines (Anders, 2015; Edge & Munro, 2015; Hughes, 2017; Neumann & Tan 2011; Olejarz, 2017; Polk, 2017; Sastre, 2016; Sauermann & Roach, 2012). As such, the current study considered sectors of employment outside of academia available to PhDs of all disciplines, and identified numerous specific careers available to social science PhDs.

Second, the majority of this research focused on the career preparation and outcomes of social science PhDs, which has been overlooked. Much of the research examining PhDs’ transitions to employment has focused on hard science PhDs (Agarwal & Ohyama, 2013; Austin & Albert, 2012; Baker, 2015; Barry, 2013; Clair et al., 2017; Lee et al., 2010; Marshall, 2008; Roach & Sauermann, 2017; Sauermann & Roach, 2012). Studies examining the career transitions of other disciplines is much more limited (Cason, 2016; De Grande et al., 2014; Monk et al., 2012; Neumann & Tan, 2011; Rabe & Rugunanan, 2011). Many of the recent reports have aggregated disciplines (Jonker, 2016), or focused on humanities PhDs (Wood, 2012; Yachnin, 2016, 2017). However, it has become increasingly important to identify the career opportunities available to social science PhDs as market demand for them outside of academia has grown substantially (Ladner, 2011; Shah, 2011).

Third, the theoretical contributions of this research furthered the applications of human capital and credentialist frameworks, as well as field theory. Much of the literature employing human capital and credentialist frameworks have employed the theories among baccalaureate degree holders (Betts, Ferrall, & Finnie, 2013; Boudarbat & Chernoff, 2009; Fenesi & Sana, 2015; Wright, Walters, & Zarifa, 2013). Few if any studies, especially within the Canadian context, have linked these theoretical frameworks to the career pathways of PhD’s. Finally, though field theory has been applied broadly to educational research, it has been underutilized within the context of graduate education. Field theory has acknowledged the increasing school-society connections (or “interpenetration”) fostered in recent decades (Davies & Mehta, 2018). However, research has yet to examine whether social science PhDs have fostered academia-industry links in a way that is reminiscent of STEM fields. Applying

field theory in a new way, the current research focused on the academia-industry links of social science PhDs, and how to strengthen these connections in future.

Fourth, this research employed a mixed-method analysis to quantitatively and qualitatively examine what influences PhDs' career transitions. Previous research employed a quantitative lens to examine broad-level trends in educational and occupational outcomes (e.g., time to degree, employment status, sector of employment), but qualitative accounts were extremely limited. A quantitative approach allows the research to quantify elements related to PhD's career outcomes (e.g. hours worked per week, amount of funding received, representation per sector of employment), but it cannot determine the quality of these experiences and outcomes. Employing a mixed-methods analysis allowed the current research to speak to both the quantity and quality of PhDs' career transitions and outcomes. To conduct this mixed-methods research, national-scale primary data were gathered from 13 Canadian institutions, and external ethics and institutional approvals were obtained when required. To increase representation beyond academia, influential personnel employed in sectors outside of academia (e.g., government, career transition consulting) were contacted to distribute the research materials amongst their social networks. By gathering primary data in this manner, the current study found that although many students were aware of the professional development opportunities available during their PhD, their quality was questioned by respondents. Most respondents did not find these initiatives helpful in their career preparation, particularly outside of an academic context. However, the inductive (exploratory) nature of qualitative analysis also allowed PhDs' to provide their perspective on possible solutions. Though media accounts and institutional reports have identified a need to revise graduate student professional development, it lacked an explanation of how to do so. The current research indicated that although opportunities were rare, PhDs' associated significant benefit with work integrated learning (WIL) opportunities offered in conjunction with their PhD program. As a result, I intend to explore this connection to a greater degree in future research.

5.5 Suggestions for Future Research

Though the research was able to draw conclusions about PhD career development and transitions, graduates who pursued careers within academia were overrepresented within the study. By establishing stronger recruitment channels in sectors outside of academia, future research would not need to aggregate/collapse employment sectors outside of academia as was required in this dissertation. As a result, it could provide a more in-depth understanding of the trends that influence social science PhDs to pursue employment outside of academia, and how they may differ by employment sector.

In particular, the primary data controlled for numerous factors overlooked within the Canadian research context (e.g. number of publications, sessional appointments). However, it did not control for departmental fit, the value of a teaching and research statement, or additional criteria hidden from job advertisements, which were identified as important towards the conclusion of data collection. As many of these considerations have also recently been identified as potentially significant factors by media outlets (Leiter, 2018; Perlmutter, 2016), they may therefore be relevant to future empirical research in the area. To consider the intricacies of these factors, it is suggested that future research pursue these considerations through a qualitative lens. Furthermore, it is suggested that future qualitative research includes the perspective of hiring committee members in order to provide a new perspective. Doing so allows the research to speak to a new perspective that the confines of the current research missed, allowing hiring committees to provide their interpretation of how hiring practices are perceived by job applicants.

Finally, there is significant potential for future research to contribute to our understanding of the impact of work-integrated learning (WIL) opportunities (e.g. co-operative education, internships) on students' career transitions. As the majority of research in this area pertains to undergraduates, future research could examine whether similar benefits pertain to WIL offered during graduate programs. Employing a quasi-experiment comparing the employment outcomes of PhD's with and without WIL experience during their program could provide insight to answer this question. Furthermore, by examining mentorship

practices in addition to WIL experience, it could determine whether some forms of mentorship are able to compensate for WIL experience when transitioning to employment outside of academia. Though WIL may ease students' career transitions, they remain rare within the social sciences PhD programs (Golovushkina & Milligan, 2013). This research indicated that few respondents sought WIL opportunities that were not advertised by their institution, as most were unaware of these opportunities. To further develop the versatile career preparation of PhDs, it is recommended that institutions broaden the WIL opportunities advertised to graduate students. As more graduate programs begin to integrate WIL opportunities (e.g. University of Waterloo, University of Victoria, Carleton University), if the associated benefits of WIL hold at the graduate level, it would provide support to increase WIL opportunities within social science programs more specifically.

5.6 Final Thoughts

The results of this dissertation indicated that media and policymakers' concern for graduate student career transitions is warranted. Most respondents indicated that while they received strong preparation for an academic career, institutional opportunities focused on preparing them for careers outside of academia were limited or lacked specificity. As recent evidence indicates that most PhDs pursue employment outside of academia, it is increasingly important to address this concern. In order for institutions to stay current with labour market trends, it is recommended that they welcome the insight of alumni and stakeholders outside of academia. By improving their understanding of where recent graduates obtain employment, institutions and departments can tailor their optional career development opportunities to fit the needs of current students. It is also recommended that institutions take note of the effectiveness of graduate WIL opportunities that are increasingly offered across Canada. Should their effectiveness match that of the undergraduate level, WIL could serve as an excellent opportunity to boost the work-readiness skills of PhDs prior to completion of their program.

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Methodological Appendix

Chapter 2

1. The experiences included within the category “other funding source” could not be determined as it was aggregated by the NGS prior to the current analysis.
2. The variable “race” was dichotomized for the purposes of the current research due to cell count considerations of various categories of visible minorities.

Chapter 3

3. Employment as a “professor” within academia included tenured, tenure-track, and other contract faculty. The wording of the category (“professor”) was intentionally chosen to allow faculty of both universities and colleges to identify with this category.
4. To gather the five most common social science departments, web searches were conducted to determine what institutions offered a PhD program in Canada, and what social science disciplines those included. For example, if an institution had all five departments, recruitment materials were sent to all five of these departments.
5. Institutional prestige was not included as a control variable within the current analysis for three reasons. First, it is hypothesized to have less of an effect on employment outcomes within the flatter educational structure in Canada (relative to the US) (Davies & Hammack, 2005; Davies & Zarifa, 2012; McLaughlin, 2005). Instead, it is hypothesized that the Canadian educational structure may operate amongst a smaller series of academic networks that hire graduates from one another (e.g., small schools valuing teaching-oriented candidates, larger (U15) schools valuing research-oriented candidates). Second, we lack a holistic measure of institutional prestige, as some current measures prioritize research-oriented pursuits, others prioritize measures of student success. Finally, institutions catering their offerings towards improving their institutional prestige does not necessarily translate to better educational delivery, educational benefits, or social status (Brewer et al., 2002; Burris, 2004).

Chapter 4

6. Determining participation in experiential/work-integrated learning (WIL) was limited to respondents' PhD degree. Participants did not speak to whether they had pursued these opportunities during previous degrees.