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IN PURSUIT OF CAREERS IN THE PROFESSORIATE OR BEYOND THE PROFESSORIATE: WHAT MATTERS TO DOCTORAL STUDENTS WHEN MAKING A CAREER CHOICE?

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ABSTRACT

Aim/Purpose	This qualitative study was conducted to illuminate the under-researched aspect of doctoral students' career decision-making by examining their internal cognitive processes based on the Cognitive Information Processing (CIP) theory. Specifically, this study compared doctoral students' career decision-making from two career groups, those pursuing the professoriate versus those pursuing careers beyond the professoriate.
Background	Due to PhD workforce supply-demand imbalances in academic job markets and to a growing interest in careers outside academia around the world, an increasing number of doctoral recipients have pursued careers beyond the professoriate, which are considered non-traditional career paths in doctoral education. While a growing number of studies have investigated these changing trends, it remains limited to fully capture more introspective domains of the career choice processes. Given that the career decision-making experience is highly individualized, it is critical to explore doctorate students' own narratives about career decision-making.
Methodology	Individual structured interviews were conducted with 30 doctoral students from a public research-oriented university in the United States. Employing Directed Content Analysis, two researchers developed the initial coding categories based on the guiding theory, CIP theory, and deductively analyzed the data to identify emerging major themes.

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Contribution	Findings from the study highlight the core factors that influence doctoral students' career choices across fields, which allows developing centralized career resources and support systems at the institutional level. Specifically, findings pointed to different approaches for doctoral students to (re-)assess their career choice while providing implications for institutions, academic departments, and individual stakeholders such as faculty advisor and doctoral students, to develop systematic career support in this changing academic job market.
Findings	Data analysis uncovered three core factors impacting doctoral students' career decision making, which are (1) roles of the first-hand experience in career confirmation/shift; (2) dissimilar career readiness status by group; and (3) impact of personal career values.
Recommendations for Practitioners	Both institutions and academic departments could reassess the culture and value of career development and refine co-curricular activities to offer adequate professional development opportunities in doctoral training to develop career support systems aligned with students' diversified career needs and interests. As time and first-hand experiences are identified as critical factors facilitating their career progress, doctoral students may want to proactively seek diverse opportunities to gain first-hand experience in and outside campus.
Recommendations for Researchers	Researchers could continue similar research in other universities and countries where similar concerns exist. These studies would help fully clarify common influential factors on career choices of doctoral students across fields.
Impact on Society	Considering the realities of doctoral students' diversified career interests and career outcomes, institutes of higher education should make intentional efforts to broaden the definition of "successful" PhD career outcomes, which ultimately helps break the prevailing myth that doctoral students or recipients who pursue careers beyond the professoriate, called nontraditional or alternative career paths, are considered as failures or incompetent.
Future Research	Future research should consider examining diverse doctoral student populations such as early-stage doctoral students to discover additional factors influencing their career decision-making. The authors also recommend cross-cultural studies in other countries where similar career concerns exist, such as the U.K. and the Netherlands, to develop a more comprehensive understanding of how doctoral students' career decisions are made.
Keywords	doctoral student career decision-making, professoriate career, careers beyond the professoriate, qualitative research, Cognitive Information Processing theory, graduate student career development

INTRODUCTION

In times of globalization and uncertainty, doctoral education around the world has been considered a critical part of national competitiveness in a global knowledge-driven economy as it develops a new generation of advanced-knowledge producers and innovators who create or transfer knowledge to applicable innovations (Nerad, 2020; Rudd & Nerad, 2015). Traditionally, the structure of doctoral training in the United States was based on an apprenticeship or mentor model that guides trainees to follow in the footsteps of their mentors: tenure track faculty careers (Sinche et al., 2017). Over the past decade, however, the employment landscape for PhDs has shifted significantly. While the number of academic tenure-track jobs has stayed stable or decreased, there is no indication that the size of PhD workforce is decreasing (Larson et al., 2014; St. Clair et al., 2017). Due to PhD workforce supply-demand imbalances in academic job markets in the U.S. and to a growing interest in careers

outside academia, an increasing number of doctoral recipients have pursued careers beyond the professoriate (Sauermann & Roach, 2012; St. Clair et al., 2017). This emerging trend does not limit the U.S. context since an increasing body of doctoral recipients worldwide, such as in the U.K., Estonia, Netherlands, France, and Spain, also pursue careers beyond academic research and teaching careers (Auriol 2007; Beltramo et al., 2001; Kindsiko & Baruch, 2019; Lee et al., 2010; van der Weijden et al., 2016).

A growing number of scholars have investigated these trends (e.g., Agarwal & Ohyama, 2013; Fuhrmann et al., 2011; Larson et al., 2014; Sauermann & Roach, 2012; Seo et al., 2020; St. Clair et al., 2017), providing valuable insights and generating empirical evidence to better understand PhD career pathways and career experience during or after their training. However, the majority of the research on doctoral career development has mostly utilized quantitative methods, which remains limited in its ability to fully capture more introspective domains of the career choice processes by which doctoral students gather, transform, and apply information to arrive at a career choice. Given that the career decision-making experience is highly individualized, we believe it is critical to explore how individuals experience their career choice process in their own words instead of asking doctoral students to fit their experiences into researchers' pre-determined measurements.

Moreover, a large number of existing empirical studies on doctoral students' career-related experiences focus heavily on the science and engineering fields (e.g., Fuhrmann et al., 2011; Larson et al., 2014; Roach & Sauermann, 2010; Sauermann & Roach, 2012; St. Clair et al., 2017). These studies illuminated unique field-specific career challenges and experiences of doctoral students or graduates, but due to limited cross-disciplinary studies, an understanding of the other side's experience simultaneously is lacking. Such a limited view of doctoral students' overall career-related experiences prevents institutional leaders and policy makers not only from recognizing the core, or common, factors that influence career choices of doctoral students across fields but also from developing centralized career resources and support systems at the institutional level (Sinche et al., 2017).

To fill the gap, the purpose of this study was to illuminate the under-researched aspect of doctoral students' career decision-making by exploring their internal cognitive processes through in-depth individual interviews with doctoral candidates. With the Cognitive Information Processing (CIP) theory (Sampson et al., 2004) as our theoretical foundation, we specifically focused on comparing the career decision-making process of doctoral students from two different career groups—those pursuing a career in the professoriate (CP) versus those pursuing a career beyond the professoriate (CBP)—to uncover factors that influenced their career decision making. We employed a structured qualitative approach in an effort to keep both rigor and exploratory viewpoints.

DOCTORAL STUDENTS' CAREER DEVELOPMENT AND OUTCOMES

For decades, the majority of new PhD recipients pursued the traditional linear academic career trajectory: moving directly into tenure-track faculty positions (Fuhrmann et al., 2011; K. D. Gibbs & Griffin, 2013; Kindsiko & Baruch, 2019). In today's academic job market, however, less than 25% of PhD graduates are able to land tenure-track faculty positions, and some academic fields, such as life sciences, even require 5–6 years of additional postdoc training to attain these faculty positions in the U.S. (Stephan 2012). Similarly, a recent study conducted in Netherlands (van der Weijden et al., 2016) found that only fewer than 3% of PhD recipients actually secured a tenure-track job. Despite a shortage in available tenure-track faculty positions, becoming a tenure-track professor is still considered the common, most desired career in many PhD training universities (Sauermann & Roach, 2012; St. Clair et al., 2017). Due to the noticeable PhD workforce supply-demand imbalance in both national and global academic job markets (Kindsiko & Baruch, 2019; St. Clair et al., 2017), doctoral education communities have raised a concern about whether the U.S. higher education institutions overproduce a PhD workforce (Larson et al., 2014).

On the other hand, a growing number of scholars claim that the widening concerns about the PhD employment crisis results mainly from a mismatch between how doctoral students are trained and career opportunities actually available to them after completing their doctoral training rather than simple supply-demand imbalances or the oversupply of PhDs (e.g., Sauermann & Roach, 2012; St. Clair et al., 2017; Stenard & Sauermann, 2016). They viewed the current doctoral workforce challenge as being more about underutilization, rather than overproduction, of PhDs. This may be largely because of the observable PhD career outcomes trend, regardless of field, that many doctoral students and graduates have pursued careers outside academia such as industry, nonprofit organizations, and government, which are traditionally considered less acceptable and desirable career pathways for PhDs (Sauermann & Roach, 2012). According to the findings of the Survey of Earned Doctorates (National Science Foundation, 2019), only 46% of all PhD graduates from U.S. universities expressed definite commitments to traditional academic employment. Sinche and colleagues (2017) also found 34% of 8,099 PhDs who graduated from U.S. universities between 2004 and 2014 were employed as faculty members in research-oriented and teaching-oriented institutions. These findings clearly demonstrate that doctoral graduates are involved in a wide range of careers beyond the professoriate, which should be no longer considered as "nontraditional" or "alternative" careers for the doctoral workforce.

Further, empirical research has repeatedly found that doctoral students often change their primary career interest or preference over the course of their doctoral training. For example, based on the data collected from 469 biomedical science students across years of doctoral training, Fuhrmann and colleagues (2011) found noticeable shifts in doctoral students' career preferences during the third year of their graduate training from tenure-track faculty to careers outside academia (e.g., industry, government). Similarly, Roach and Sauermann (2017) also identified declining interests in the traditional academic career path even though the majority of the participants expressed strong interests in becoming faculty members during the early stages of their doctoral training. Such changes in career choices of doctoral students are not driven mainly by fierce competition in academic job markets, or by research interests to pursue academic research careers. Rather, the shifting career choices of doctoral students during their training is more related to personal values (e.g., balancing work and life), the research environment in academia (e.g., slow pace of academic research), and preferences for work activities (e.g., applied research to address practical problems) (Fuhrmann et al., 2011; K. D. Gibbs & Griffin, 2013; Roach & Sauermann, 2017; Sauermann & Roach, 2012).

Although the existing literature reveals unique patterns of career preferences and challenges of doctoral students and graduates during or after their training, knowledge about the doctoral career experience as a process is still partial. With heavy use of quantitative data, the current literature has not sufficiently explored the dynamic mechanisms through which doctoral students make their career choices and implement them, especially from their own perspective.

CAREER DECISION-MAKING PROCESS GROUNDED ON THE CIP THEORY

The Cognitive Information Processing (CIP) theory focuses on the role of cognitive factors in an individual's career decision-making process (Peterson et al., 1991; Sampson et al., 2004). In particular, the CIP theory illustrates an entire process of an individual's career decision making to clarify different types of mental activities regarding career choice. The process is composed of a five-phase cycle: communication, analysis, synthesis, valuing, and execution (the CASVE cycle). It describes how an individual gathers and processes information to make a career choice and develop action steps to achieve that career goal (Bullock-Yowell et al., 2012; Sampson et al., 2004).

During the *communication* phase, an individual identifies a career gap between "where they are and where they want to be" (Sampson et al., 2004, p. 26) as a result of self-awareness based on interac-

tions with themselves (internal cues) or their environment (external cues). When their recognized career gap makes them feel more uncomfortable than the fear of change, people tend to initiate career exploratory behaviors to reduce their career gap (Sampson et al., 2004). In the *analysis* phase, individuals expand their career knowledge domains, including self-understanding (e.g., interest, values, skills, employment preferences, personal/family situations) and occupational knowledge, as result of their career exploratory behaviors. Through these exploratory activities, individuals can recognize key factors, such as a gender stereotype, that may have positively or negatively influenced their career decision-making process. In this phase, people tend to elucidate career problems that may have caused their career gap (Bullock-Yowell et al., 2012; Sampson et al., 2004).

Based on the self-understanding and occupational knowledge built from the analysis phase, individuals in the *synthesis* phase develop possible career directions that may be able to reduce or close the career gap. Once they collect all the possible options, they review them again to identify options that are congruent or incongruent with who they are. This process allows individuals to narrow down their career options and keep the list manageable (Sampson et al., 1999). Throughout the *valuing* phase, individuals prioritize the remaining career options by evaluating potential benefits and costs that would result from pursuing each option and the impacts on both themselves and their significant others or communities. This cost-benefit analysis strategy helps them determine a tentative primary career choice (Sampson et al., 2004). Individuals develop action plans and implement them during the *execution* phase to achieve their primary career choice (Reardon et al., 2000). Finally, they return to the *communication* phase to assess whether outcomes of the action items implemented during the *execution* phase successfully resolved the initially identified career gap. They restart the cycle again if the original career gap has not yet been solved (Sampson et al., 1999).

The CIP theory also highlights the impact of individual affective factors on the career decision-making process. In particular, negative beliefs or thoughts during the CASVE cycle prevent people from making steady progress in their career decision making (Bullock-Yowell et al., 2014; Meyer-Griffith et al., 2009; Sampson et al., 2004; Thrift et al., 2012). For example, Bullock-Yowell and colleagues (2014) reported that negative career thoughts significantly reduced students' confidence in their abilities to perform career decision-making activities, which in turn prevented them from engaging in career exploratory activities. The current empirical studies demonstrate that affective factors play a critical role in an individual's career decision-making process (Sampson et al., 2004; Thrift et al., 2012). However, it is difficult to fully gain comprehensive insights of the entire career choice process because the existing studies, driven mostly by quantitative research approaches, focused on a specific phase of the CASVE decision-making process (e.g., Bullock-Yowell et al., 2014; Thrift et al., 2012). We thus employed a qualitative research method to investigate the entire career-decision making process of individual doctoral students. In particular, we used the CASVE cycle to gain a process-oriented understanding, as individuals often use the cycle as a guide for their career decision making (Sampson et al., 1992). The process-oriented data ultimately helped us uncover influential factors on these career decisions.

METHOD

PARTICIPANTS

A total of 30 doctoral candidates across disciplines from a public U.S. research-oriented university were recruited. A purposive sampling strategy was used to recruit only participants who suited the purpose of the study (Patton, 2001). Specifically, we invited only doctoral candidates who had already decided their primary career choice and were about to enter or already in the job market after passing their preliminary exam, as we considered them "job seekers" who had recently experienced the entire career decision-making process. For comparison purposes, we managed the ratio of numbers of participants in each of the two career groups, the CP group and CBP group. In this study, career options

in the CBP group include higher education administrators and researchers/employees in research institutions, business, or government. The majority of them were in either the 4th or 5th year of their doctoral training. Over half were under the age of 30. Most of the participants were either White or Asian. Table A1 in the Appendix provides the profiles of interview participants based on self-reported demographic characteristics. We used pseudonyms for all participants reported in this article.

Data Collection

A qualitative research approach allows a phenomenon to reveal itself (Kindsiko & Baruch, 2019) to highlight a more introspective aspect of the doctoral career decision-making experience. We conducted individual open-ended, structured interviews. To capture the process-oriented career decision-making experience of doctoral students in a theoretically valid manner, core interview questions were initially developed by the first author based on the CASVE cycle framework (Sampson et al., 2004). To reinforce the feasibility and quality of our interview instruments, the interview questions were (1) reviewed by two doctoral-level experts who specialize in qualitative research and CIP theory and (2) modified after one-on-one pilot interviews with eight doctoral candidates.

Before conducting interviews, doctoral candidates across disciplines were invited to complete a brief online survey to collect their demographic information, including their primary career choice. Among the survey participants, only individuals who expressed their interest to participate in the interview and met the criteria of the study were invited to the one-on-one interviews. With permission, all interviews were audio-recorded. While asking the core interview questions, various probing questions were also used (e.g., "would you mind sharing a specific example?") to illustrate participants' responses if needed. In this way, we were able to obtain "rich data filled with words that reveal the respondents' perspectives" (Bogdan & Biklen, 2007, p. 104). The 30 in-depth qualitative interviews resulted in about 21 hours of audio data and 576 pages of transcript. The first author of the current study conducted all of the interviews and kept a reflective journal during the data collection. Reflective journaling enabled her to not only reflect on her interactions with participants but also recognize her own biases to minimize their impact during data collection and data analysis (Lincoln & Guba, 1985).

Data Analysis

Directed Content Analysis (DCA; Hsieh & Shannon, 2005) uses a guiding theory to develop initial coding categories prior to data analysis. Based on the pre-determined coding categories, researchers deductively analyze the data. DCA is a more structured approach than a traditional content analysis that employs an open-coding strategy (Hsieh & Shannon, 2005). Employing DCA, we used the CIP's CASVE cycle as our guiding theory and developed the initial coding categories, which enabled us to identify emerging major themes as they evolved throughout the interview data. All of the interviews were transcribed and uploaded into the NVIVO 11.0 software package for data analysis. Prior to data analysis, participants were invited to review their own transcript to assess whether the transcript accurately described what they said during the interview (Forbat & Henderson, 2005; R. G. Gibbs, 2007). This member-checking activity (Lincoln & Guba, 1985; Savin-Baden & Major, 2013) increased the credibility of the data, as confirmation from the participants ensured "adequate representations of their own (and multiple) realities" (Lincoln & Guba, 1985, p. 314).

We analyzed the interview data with four coding rounds. In the first round of coding, the first and second authors coded two randomly selected transcripts to decide how to segment texts to capture meaningful units of analysis in a consistent manner (Hruschka et al., 2004). After independent coding and discussion, the two researchers reached consensus about a "meaning unit" in this study, which ranged from one sentence to a paragraph. In the second round, both researchers independently coded two randomly selected transcripts by using the pre-established coding guide to reduce variation in understanding of code sub-categories and code definitions between the researchers, which

may affect the inter-rater reliability (Hruschka et al., 2004). Based on repeated comparison and discussion, modifications were made to the coding guide. In the third round of the coding, the two raters independently coded a randomly selected transcript based on the updated coding guide to examine the inter-reliability between the two coders. By using a Kappa statistic (Cohen, 1960), the inter-rater reliability between the two researchers was examined. If the inter-rater reliability of any of the CASVE cycle phases was lower than .80, the two researchers discussed to identify and make sense of the discrepancy between them. If necessary, the coding guide was modified. Then the researchers reanalyzed the data. This coding process was repeated until the inter-rater reliability reached .81 or higher, as the Kappa of .81 is considered the "almost perfect" agreement range between two raters (Viera & Garrett, 2005). Finally, the raters independently coded the remaining data and reviewed all the coded data prior to merging them. After the four coding rounds were complete, emerging themes were initially identified. After careful examination, the initial themes were merged and/or reduced into three primary themes indicating influencing factors on doctoral students' career decision making.

The proposed primary themes were reviewed by two external experts. A doctoral-level expert on career development and the CIP theory conducted a peer review session. With the other external doctoral-level expert on qualitative research, the external audit was conducted to evaluate the trustworthiness of the study (Savin-Baden & Major, 2013).

RESULTS

The following three separate primary themes emerged from the results of the data analysis, peer review, and external audit. Each had a number of subthemes discussed by participants from the CP and CBP career groups.

WHAT'S FOR ME AND WHAT'S NOT: FIRST-HAND EXPERIENCES AS CAREER DECISION-MAKING CUES

Participants in both career groups indicated the first-hand experience that doctoral students gained during their training helped them not only to gain more self-knowledge and/or career knowledge but also to reassess whether their original career choice was well aligned with who they are (e.g., interests, skills, values). However, the major activities reported from each group were quite different. In the CP group, most participants reported that the experiential learning they gained within their departments, such as research or teaching experiences, helped them recognize that a faculty career was what they wanted to pursue after graduation. For instance, Soojung started to consider a faculty job at a teaching-oriented institution after a positive first solo-teaching experience:

> I taught classes last semester. I really enjoyed it and I got quite a good student evaluation, so I think that helped me to consider a teaching institution and not just researcher in a research institution.

Similarly, Cristina's teaching assistant experience helped her realize that being a professor at a teaching-oriented institution would be a great fit for her. She was convinced that being a faculty member would allow her to focus more on mentoring and teaching while continuing to "keep your research going." On the other hand, Nill described how his research experience during his doctoral program reshaped his interest in an academic research career, which was not part of his original career plan:

> I was strongly considering being a private practice therapist…. When I first got here, I didn't really understand research…. I didn't understand what it was. But as I started working through the program, I started understanding what you can do with research and I became obsessed with it…. I wanted to be a researcher pretty early on here and it's really sort of been confirmed over the last three or four years that research is more of my strength.

He especially emphasized that "publishing my first paper… fueled [his] research interest," resulting in shifting his career pursuit from a private psychologist to a faculty member in a research-oriented institution. Unlike the CP group participants, who reported their research or teaching experience as major career cues, most of the CBP group indicated employment experience outside the department and vicarious learning as their major career decision-making cues. For example, Jackson shared that working as a higher education administrator during his gap year "changed my mind because I realized I didn't just have to be a faculty member." Emma also indicated that her first campus job helped her see that working as a professor was not her only career option:

> I've worked as a graduate mentor, which is kind of an academic advisor. It started to make me think about other ways that you can work with students. The experiences that I've had made me think that that could be a good career path for me. Still in academia, but not necessarily teaching [as faculty].

In addition to these on- or off-campus employment experiences, participants in the CBP group also reported that knowledge learned vicariously from faculty members or colleagues who became faculty members served as career cues to reconsider their career choice. For example, Bella recalled the time when she learned about faculty's daily responsibilities from junior faculty members:

> Their stories were so discouraging…faculty members were like… "I teach four classes each semester. I had put in a lot of service as an assistant professor and I have to write grant proposals." I don't want to work 100 hours a week.

Terry observed several faculty members in and outside the classroom, which made him reconsider his original career choice, a faculty career path:

> I began to experience what being a faculty member really looked like…. [It is not about] right or wrong, but what I began to see was I do not want to do that. I don't want to go down that road.

Further, the majority of the participants from both groups emphasized that making their current career choice was a gradual process through their experiential learning over the years rather than a specific turning point. Participants described their decision as "a progression over time" or "gradual release of responsibilities" as a result of understanding "what's for me and what's not." For example, as a result of multiple teaching experiences (e.g., teaching assistant, instructor) during her program, Cristina was "slowly introduced to teaching," which helped her realize that teaching "is doable. I could enjoy doing this." She described her decision resulted from a "gradual takeover of responsibilities."

Clearly Aware of or Confusing: Dissimilar Levels of Perceived Career Readiness

While all the participants in the current study were at the final stage of their doctoral program, they perceived their current career statuses differently. Most participants in the CP group considered that they were either about to enter or already on the job markets, whereas the majority of CBP group participants reported that they were still in an exploration stage, collecting occupational information relevant to their sought career path.

The majority of participants in the CP group actively participated in action-oriented job search activities to achieve their chosen career goals. Over half reported that they had already applied for faculty jobs. For example, Soojung was "starting to send my applications to schools. This weekend, I [will] have one Skype interview." Similarly, Pei said that "I'm applying to places like the East Coast and wherever there's [an] opening." Most of the doctoral candidates in this group were clearly aware of what types of competencies and experiences were critical for their chosen career, which enabled them to strategically seek relevant opportunities to make their applications more competitive. The most frequently reported experiences were publishing academic articles, writing grant proposals, teaching classes, and presenting papers at academic conferences. For example, prior to entering the

academic job market, Pei intentionally sought teaching opportunities even beyond her department as she noticed that her teaching experience might be not enough to become a competitive faculty candidate:

> I try to teach as much as I can…whenever I can, so I have taught a lot in the community at libraries and stuff…to boost up my teaching experience on my CV, so that is one of the things I did.

Nill shared how he strategically built his CV by not only "set[ting] a goal for how many papers I wanted to have published by the time I leave," but also seeking collaborative research projects "to show interdisciplinary work." In contrast, such action-oriented activities were rarely discussed during the interviews with participants in the CBP group. In fact, over half the group participants (n=9) focused on career exploration activities to better understand the fields or occupations they chose to pursue. For example, Miyoung gained knowledge on possible career options in her field by talking "to friends, friends of friends…like quite a bit of people." In addition to direct interaction with professionals working in their fields of interest, several students, such as Jackson and Cooper, regularly checked online job descriptions for open positions to identify available career options and examine whether there was a possible career fit, as Jackson described:

> Every week or every other week, I am on the university job board [to see] if I see a job that I might want to apply for. I look at the qualifications…. I think about how I can talk about my own experiences as a way to fit into these qualifications.

Unlike participants pursuing paths to the professoriate, participants in the CBP group were largely unaware of how their doctoral education prepared them for their sought career path or how to translate their doctoral training experience to their potential employment beyond academia. Simply put, it was "a very confusing process" to them. Several students (e.g., Bella, Cooper, Diana, Emma, Joseph) expressed their anxiety or negative thoughts, such as "I have no idea what I am going to get"; "I do not know how to articulate my skills about how to be useful"; and "I am prepared to be a very good research scientist…[but] I'm unprepared for a job in the industry." For example, in the absence of sufficient career guidance and education from her department, Emma felt that she was not sure how her skills and knowledge could be transferred to various career options beyond the professoriate:

> I don't feel like we are trained to think about other things outside of faculty positions…. I feel a little bit inexperienced…or uneducated in terms of the various things that you can do with a [PhD] degree like this.

Similarly, Bella, who planned to pursue a government career, was not sure if she could secure a job due to her limited networks and knowledge in the government sector:

> I just do not know many people in government, so this is very difficult to obtain this kind of insider information…. That [how to secure a job in government] is so unknown. I would like to have more direction.

Having Freedom or Securing Boundaries: Personal Career Values as a Major Driving Force

Throughout the career decision-making process, emerging themes showed a clear difference between groups in terms of career values, which impacted their perceived congruence with their chosen career pursuit. The CP group participants indicated freedom as the most crucial element that they desire in their careers, whereas doctoral candidates pursuing CBP reported having a more balanced life with a fixed working schedule was their most critical career value.

A majority of doctoral candidates in the CP group (n=11) desired freedom with their time and work, which is a primary benefit associated with faculty careers. The participants used various terms when

talking about this freedom, such as "intellectual autonomy," "flexibility," "independence," "intellectual freedom," and "liberty," since they focused slightly different aspects. Several participants (e.g., Abigail, Felicia, Keri, Pei) defined the freedom as "the ability to structure my own time" rather than "being confined to certain hours of the day." For example, Felicia emphasized her desire to develop her own working schedule based on her productivity:

> I tend to do a lot of my creative work in the mornings and like to meet with people in the afternoon or evening…. In my future job, I would want to establish [my own working schedule] right away.… I will be here in the morning working on something. Then if you want to meet with me, set up a time to meet in the afternoon because I don't like to be bothered in the morning [as] that's when I like to be in the lab or writing.

In addition to freedom in working schedule, others described freedom as a capacity to decide independently what and how to do their work, as they would "be the boss" of themselves. For example, Abigail believed that being a professor would give her "the ability to have more independence and freedom in my research and in my teaching." Similarly, Brian wanted "to do the science" and being a faculty member at a research institution would give him "intellectual freedom" or "intellectual autonomy" to "approach a problem to solve it" rather than "being a button pusher":

> I don't want to do something where someone is telling me, "Push this button," and I push a button for however many hours I need to be there. I mean, it is obviously not one button... That is not a job that I would want.

The primary idea of freedom described by the CP group was the ability to decide what to pursue and how to accomplish those pursuits based on their own schedule.

Over half of the participants in the CBP group (n=9) indicated that a work-life balance was the most important element in their career. Participants in this group shared their desire to have a more structured work schedule so that they could set a clear work-life boundary. For example, Miyoung was not concerned about working long hours as it would be similar to "the graduate school lifestyle." However, what she sought in her next career was to separate her working time from personal time:

> One thing I do seek once I do graduate is when I finish work and come home, I feel like I am actually done with work and I can do home like this is my hour and I can do what I want.

In particular, participants who recently got married or have children in the CBP group (e.g., Emma, Jackson, Helen, Vivienne) emphasized the importance of a standardized working schedule so that their family members can "develop expectations around that structure." After her marriage, Vivienne changed her career pursuit to one that would let her to "work within a defined period of time," as she now valued more on being with a family:

> What I would like is to find a balance between that [my career] and my personal life...being able to have some time off to go visit my mom or my husband's family…. I mean I think that is why I am not fit for academia…. Maybe I am wrong, but all the examples that I have seen is like people are dedicated to their career…. It is really hard to have a family when you're in academia because there [are] so many things that you have to do and publish so much and all that. I do not think I would want something like a job that makes me put my family after my career. That is why a 9:00 to 5:00 is appealing to me because I want to be able, especially when we have a family, I want to be able to be done with my workday and then focus on my family.

Vivienne's major life changes restructured her career values, shifting her career choice to one might promise a better work-life balance lifestyle. Similarly, Hailey decided to pursue an administrative career instead of her initial career plan, being a faculty member, to support her work-life balance after having her first son:

> I think it's mostly a work value thing. I think in a lot of way I would still enjoy that [being faculty]…. But I think it's just mostly the amount of time you have to put in sort of beyond 9:00 to 5:00. I just do not know that I am interested in doing that [being faculty]. The older I get, the more I do value sort of leaving work behind and having the flexibility to do other things.

Based on the boundaryless work-life experience during her doctoral training, Hailey felt that it might be very difficult to balance her work and personal life if she became a faculty member. In her doctoral training, she had little room for her personal life because she felt "like I should have done more, I should be working on this, I should be doing that and it is hard to relax when it is always hanging over your head." Although what they wanted to do with their own time after work varied, it was clear that participants in the CBP career group all strongly expressed their desire to keep their personal time "apart from work" to establish work-life balance.

Interestingly, each group's career value was reported as one group's benefit, but another group's cost. Approximately half the participants in the CBP group indicated losing the freedom to "research necessarily what you want at all times" as a major cost. For example, although Edwin was excited to return to industry after graduation, he mentioned what he might need to give up:

> Maybe it is research that I enjoy…. Sometimes, when you work in industry you have no time to write papers because it is a business…. Maybe that is one of the things I will miss. I will stop doing it, but I still would love to do that. One thing I might give up is that research.

Similarly, Bella expressed her concerns about losing her freedom to "research my most passionate research topics" if she left academia even though she was actively looking for a researcher position in the government sector.

On the other hand, a work-life balance was the most frequently indicated cost by the participants pursuing the CP. Some participants shared the major cost that they might pay to pursue a faculty career was an unstable life, which may "hurt the family life." For example, Cristina was concerned about how her career choice might affect her work-life balance, especially when she has her own family:

> If you have a family, [you need to] make those decisions together. I ultimately want to have this type of career, but I don't know when that will happen…. I think that [faculty career] can be just very stressful and sort of be a negative impact on your everyday life.

Another group of CP group participants, including Abigail, Nill, Natalie, and Pei, shared that they might face tremendous pressure to get tenure even after becoming an assistant professor, which could have negative impacts on their work-life balance. For example, Abigail described this cost:

> The process of getting tenure [is] time consuming and sometimes I worry that it is going to feel like being in a doctoral program all over again…. There is so much pressure to meet certain benchmarks and to be able to compile a certain kind of CV.

Abigail emphasized that going through the tenure process would be "like a repeat of graduate school because graduate school for me has been very, very stressful." She was concerned that such "unhealthy kind of stress" might make it hard to keep a psychologically healthy life even if she could land a faculty job. Despite such a major cost, a challenge to maintain a life-work balance, participants in this group strongly believed that becoming a faculty member outweigh that cost "because as a faculty member you have the freedom," as Nill expressed.

DISCUSSION AND IMPLICATIONS FOR RESEARCH AND PRACTICE

The main goal of the present study was to uncover major factors that play a major role in doctoral candidates' career decision making based on an examination of their entire career decision-making process. Three core themes affecting their career decision making are roles of first-hand experience

in career confirmation/shift; dissimilar career readiness status by group; and impact of personal career values. These findings offer important theoretical and practical implications/recommendations, as discussed below.

RESEARCH

The findings provide empirical evidence for CIP theory that career knowledge plays a critical role in the career choice process (Sampson et al., 2004) and for the utility of CIP theory in PhD career development. In this study, a majority of the participants, regardless of their career choice, were clearly aware of their personal core values and able to articulate how their career values impacted their career choice. We also found that our participants perceived their career readiness differently even though they were all at the final stage of their PhD training, because of different levels of occupational knowledge of their chosen career path. When interview questions related to the *execution* phase, most of the participants in the CBP group still focused on career exploration, one of the major activities in the *analysis* phase, while the CP participants focused on implementing action-oriented job search activities to achieve their career goals. This finding shows that an incomplete task in a certain phase (e.g., a limited occupational knowledge during the *analysis* phase) can prevent individuals from successfully completing career activities in other phases, empirically supporting the theoretically proposed cyclical nature of the CASVE cycle (Sampson et al., 2004; Thrift et al., 2012).

Previous research grounded in the CIP theory (e.g., Kim et al., 2015; Thrift et al., 2012) shows strong utilization of quantitative measures such as the Career Thoughts Inventory (Sampson et al., 1996), which shares a limited perspective on the entire process through which an individual determines and implements a career choice, as described by the CASVE cycle. The present study provides valuable insights to bridge this methodological gap while shedding light on the potential use of the CIP theory, especially the CASVE cycle for qualitative research.

PRACTICE

This study contributes to identifying different approaches for doctoral students to gain career knowledge and (re-)assess their career choice while recognizing their feelings of career readiness for a different pursuit of career. The findings are informative to reassess the culture and value of career development and refine co-curricular activities and provide adequate professional development opportunities in doctoral education. In this regard, this study has practical implications that can be established or supported at the institution/college, department, and individual levels.

Institution/college level

As the traditional primary objective of doctoral education is training future researchers and scholars, the perceived belief about doctoral students aspiring to faculty career is widespread (Nerad, 2004; Sinche et al., 2017). Due to such one-dimensional culture of career development in doctoral education around the world, growing career diversity for PhD postgraduate pursuits appears to be overlooked (Fuhrmann et al., 2011; St. Clair et al., 2017). As such, many doctoral students perceive institutional indifference toward career development concerns, especially careers outside academia (K. D. Gibbs & Griffin, 2013; Seo et al., 2020; Wendler et al., 2012; Woolston, 2017), and they do not feel properly prepared in terms of career expectations and planning (Kindsiko & Baruch, 2019; Wendler et al., 2012). Similarly, this study found that participants in the CBP group experienced social pressures and lower levels of support during their training to pursue careers outside academia, as they had difficulties navigating career options and resources and gaining mentors and networking outside of academia. Although a growing number of institutions have started developing and tailoring career development resources for doctoral students, many of the existing institutional career resources are often focused on tenure-track academic careers (Thiry et al., 2015). It is inequitable for those who pursue CBP to have fewer resources and opportunities due to the traditional perspective of career development in doctoral education.

An initial action at the institutional level would be acknowledging changes in the employment landscape for PhDs, such as shifting career patterns due to the supply-demand imbalances in academic job markets around the globe (Kezar & Maxey, 2015; Kindsiko & Baruch, 2019; van der Weijden et al., 2016) and growing interests in careers beyond the professoriate (Sauermann & Roach, 2012). Institutions of higher education may consider reviewing and rebuilding the career culture and values in doctoral education by evaluating career needs and preferences as well as the career development experiences of doctoral students. In addition, colleges could track and collect doctoral alumni career outcomes to inform faculty members and doctoral students of career trends and a variety of career opportunities for PhDs. They might also consider hosting annual meetings where PhD-trained professionals from a wide range of career sectors are encouraged to present their work and to network with current doctoral students. Such small but pertinent changes would allow doctoral education stakeholders and employers to become more aware that there are multiple ways that PhDs can make a difference in their discipline in addition to traditional scholarly contributions.

In the 21st-century knowledge-based global economy, multiple paradigms coincide in higher education. Thus, it is time to call for each institution of higher education to attempt a cultural paradigm shift in doctoral education. Institutions might make intentional efforts to broaden the definition of "successful" PhD career outcomes, which are now mostly limited to tenure track faculty careers, as well as to reduce doctoral students' perceived anxiety toward careers beyond academia. It ultimately helps break the prevailing myth that doctoral students or recipients who pursue careers beyond the professoriate, called nontraditional or alternative career paths, are considered as failures or incompetent (Hayter & Parker, 2019; Sinche et al., 2017).

Department level

The disparity of perceived career readiness regarding different career paths in our findings suggests a sense of urgency to develop more structured career and professional development supports, in particular, tailored approaches for careers beyond academia, which is consistent with findings of the existing studies conducted inside and outside of the U.S. (Kindsiko & Baruch, 2019; Wendler et al., 2012; Woolston, 2017). Academic departments should consider developing consistent and long-term interventions for career advising and mentoring for doctoral students. Without it, as the current study identified, the quality of capacity building for career development is widely variable from individual to individual, which prevents some doctoral students, especially those pursuing CBP, from building knowledge and competencies necessary to pursue their career goals.

Departments may want to consider assessing their doctoral curriculum to examine whether their curriculum provides proper learning opportunities that are aligned with the career development needs of doctoral students to achieve their sought career paths, both inside and outside academia. Based on the assessment, departments can identify areas of improvement and redesign their doctoral curriculum. For example, departments can integrate career and professional development components as a formal part of the curriculum, especially from the early stage of graduate training as professional competencies, which are also called generic skills in the U.K., are not typical by-products of doctoral training (Nerad, 2020). Such curriculum reform should not be limited to offering general career workshops or seminars. Based on data-informed decisions, departments can build their own capacity for the integrated career and professional development curriculum and up-to-date career resources.

In addition, departments can build partnerships with campus career services offices to develop an experiential learning course where doctoral students can participate in micro-internships or local and campus community projects. In this way, students can explore various career possibilities remotely or locally and examine what career path best suits who they are from a relatively well-informed position. Considering that graduate students rely primarily on resources from their own academic department and fields for their career development instead of using career services on campus (Shen & Herr, 2004), academic departments and graduate schools should take more proactive roles in making existing career resources highly visible to both faculty members and students.

Further, academic departments can encourage faculty advisors to develop a structured schedule for career discussion with their doctoral students throughout training, especially from the early stage of graduate training. If necessary, departments can seek services from the campus academic advising center or career service centers to provide advising or training tailored to faculty members so that they can also receive help in supporting their doctoral students.

Individual level—Doctoral students and faculty advisors

Currently, conversations about careers between doctoral students and faculty advisors occur either near the end of doctoral training or not at all (Fuhrmann et al., 2011; Woolston, 2017). For example, from a recent worldwide survey of over 5,700 doctoral students from diverse scientific fields, Woolston (2017) found that students barely had conversations with their advisor regarding careers beyond academia. Because of their perceived low levels of career support from their program, doctoral students, especially those pursuing careers outside academia, were less likely to seek advice from faculty members, including their own advisor (St. Clair et al., 2017). To build an environment where doctoral students can discuss their career aspirations regardless their career pursuits, both student and faculty advisors need to take ownership.

Given the importance of personal career values in career decision making (Fuhrmann et al., 2011; Gaule & Piacentini, 2018; K. D. Gibbs & Griffin, 2013), as the current study indicates, doctoral students are responsible for identifying what matters to them personally and professionally and continually communicating these personal career values with their faculty advisors to build mutually clear expectations. On the other hand, it is important for faculty advisors to go beyond their advisor role, which usually focuses on programmatic academic support, by considering themselves as a mentor who provides "psychosocial support, career support, and role modeling" (Jones et al., 2013, p. 328). At the same time, both students and faculty advisors should recognize the shifting PhD employment landscape and acknowledge a diverse array of career options available. Such evidence-informed understanding allows doctoral students not only to avoid feeling overwhelmed or incompetent when pursuing careers beyond the professoriate (Hayter & Parker, 2019; Sinche et al., 2017) but also to develop a realistic training plan with their advisor for academic and career success.

Along with these intentional individual efforts, ongoing and structured career conversations between students and faculty advisors throughout doctoral training would hold students more accountable for their career development while allowing students to continuously reflect on their career interest formation. From active interactions with students, faculty advisors are also able to gain a more holistic understanding of their students' career progress.

Similar to previous studies (Fuhrmann et al., 2011; K. D. Gibbs & Griffin, 2013; Roach & Sauermann, 2017), we found that career development is a gradual process through experiential learning over years rather than a single turning point, highlighting that time and first-hand experiences are important factors facilitating doctoral students' career progress. Doctoral students may need to proactively seek resources and opportunities to gain first-hand experience in and outside campus, rather than relying on resources from their own academic department and field (Shen & Herr, 2004). Such experientially acquired knowledge enables individuals to discover or reinforce their likes, dislikes, skills, and values (Sampson et al., 2004), which eventually serves as indirect career support helping them identify available career option that might be a good fit.

LIMITATION AND FUTURE RESEARCH DIRECTIONS

As an exploratory study to investigate doctoral students' entire cognitive career decision-making process step by step, this present study research contributes to the literature on graduate career development and theoretical understandings of career choice process. Despite its contributions, there are several limitations of the study on which further research could focus. The first limitation is the data collection source, a single public research-oriented university in the United States. Although we intentionally chose a single institution as a research site to capture the unique institutional environment

and its impacts on students' career experiences in a consistent manner, caution is required when applying the findings of the study to other higher education institutions. Considering this context limitation, similar empirical research is needed at other institutions and other countries where similar career concerns exist, such as France, Netherlands, Spain, and the U.K. (Beltramo et al., 2001; Kindsiko & Baruch, 2019; van der Weijden et al., 2016). Such studies would promote cross-cultural comparisons, which provide a more comprehensive understanding of doctoral students' career decision-making experience. In addition, the current study examined only doctoral candidates who had already decided which career to pursue and the career decision-making experience of early-stage doctoral students or doctoral candidates who have yet to decide their career choice remain unknown. To fully illuminate how doctoral students' career decisions are made and changed throughout training, longitudinal research is recommended.

A final limitation of this study is the use of self-developed interview questions. As discussed in the method section, these interview questions were developed based on the original theoretical framework of the CIP theory's CASVE cycle. Although the interview instruments of the study were reviewed by two doctoral-level researchers and tested through a pilot qualitative study, it is possible that the interview data collected in this study might not fully capture the career decision-making process proposed by the CIP theory. Thus, more empirical research is needed to address questions regarding the applicability of the CASVE cycle–based interview instruments of the current study to other populations.

CONCLUSION

This study empirically illuminates doctoral students' career decision making via participants' own narratives. It is identified as a long-term developmental process through which various first-hand experiences intertwine with a personal career value system. As personal values were identified as the primary lens of doctoral students' career decision, goals of doctoral education, which is still focused mainly on developing future generations of tenure-track faculty members, should be realigned with the realities of doctoral students' diversified career interests and outcomes as well as a growing concern that universities are overproducing PhDs. The academic community should support and celebrate a wide range of career possibilities for the doctoral workforce as it facilitates continuous knowledge creation and transfer both inside and outside academia (Nerad, 2010, 2020; Lee et al., 2010). Any students, regardless of their degree levels, should benefit from a wider range of career possibilities.

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APPENDIX

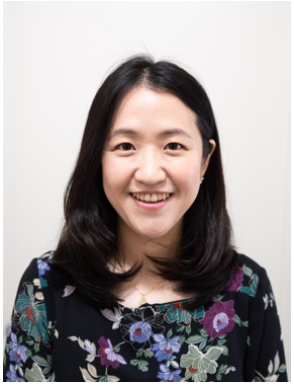
Table A1. Profiles of the interview participants by group

GROUP	PSEUDONYM	PRIMARY CAREER PATH [a]	GENDER	ACADEMIC DISCIPLINE	MARRIAGE STATUS	CHILDREN	CITIZENSHIP	ETHNICITY
CP	Abigail	TU faculty	Female	SS&H	Single	No	Domestic	Hispanic/Latino
	Brian	RU faculty	Male	S&E	Single	No	Domestic	Asian
	Cristina	TU faculty	Female	SS&H	Single	No	Domestic	Black/African American
	Ethan	TU faculty	Male	S&E	Married	Yes	Domestic	White
	Felicia	RU faculty	Female	S&E	Single	No	Domestic	Asian
	Keri	RU faculty	Female	S&E	Single	No	International	White
	Mark	TU faculty	Male	SS&H	Married	Yes	Domestic	White
	Minjun	RU faculty	Male	S&E	Married	Yes	International	Asian
	Natalie	RU faculty	Female	S&E	Single	No	International	Asian
	Nill	RU faculty	Male	SS&H	Single	No	Domestic	White
	Pei	RU faculty	Female	SS&H	Single	No	International	Asian
	Soojung	RU faculty	Female	SS&H	Single	No	International	Asian
	Thomas	RU faculty	Male	S&E	Married	No	International	White
	Tong	TU faculty	Female	SS&H	Single	No	International	Asian
	Vincent	RU faculty	Male	S&E	Single	No	International	White

GROUP	PSEUDONYM	PRIMARY CAREER PATH[a]	GENDER	ACADEMIC DISCIPLINE	MARRIAGE STATUS	CHILDREN	CITIZENSHIP	ETHNICITY
CBP	Austin	Government	Male	S&E	Married	Yes	Domestic	White
	Bella	Government	Female	SS&H	Single	No	Domestic	Asian
	Cooper	Administrative	Male	SS&H	Married	No	Domestic	Black/African American
	Diana	Industry	Female	S&E	Married	Yes	Domestic	White
	Edwin	Industry	Male	S&E	Single	No	International	Hispanic/Latino
	Emma	Administrative	Female	SS&H	Married	No	Domestic	Black/African American
	Gwen	Industry	Female	S&E	Single	No	Domestic	White
	Helen	Administrative	Female	SS&H	Married	Yes	Domestic	White
	Jackson	Administrative	Male	SS&H	Married	No	Domestic	Black/African American
	Joseph	Researcher	Male	S&E	Single	No	International	Asian
	Kai	Industry	Male	S&E	Single	No	International	Asian
	Miyoung	Industry	Female	S&E	Single	No	International	Asian
	Stephanie	Industry	Female	S&E	Single	No	International	White
	Vivienne	Administrative	Female	SS&H	Married	No	International	White
	Yunchao	Industry	Male	S&E	Single	No	International	Asian

Note. [a] RU faculty = research university faculty, TU = teaching university faculty. [b] S&E=sciences and engineering, SS&H= social sciences and humanities.

BIOGRAPHIES



Gaeun (Gwenn) Seo, Ph.D., CCSP, GCDF, is Senior Associate Director, Graduate Student Career Development at the Center for Career Development, Princeton University. Dr. Seo oversees diverse career development initiatives for graduate students to explore, design, experiment, and pursue their own meaningful careers inside and outside academia. As an experienced graduate career educator and scholar, she has devoted her career to advocate and support the idea that all graduate students benefit from pursuing any career path that they desire through career development practice, teaching, research, and assessment. Prior to Princeton, Dr. Seo worked at Weill Cornell Medicine, Cornell University, and the University of Illinois at Urbana-Champaign. Besides, Dr. Seo has actively shared her work via a wide range of outlets, including peer-reviewed journals and career development practitioner magazines.

HyeJin Tina Yeo, PhD, recently earned her Ph.D. in Sociology of Higher Education in the Department of Education Policy, Organization, and Leadership at the University of Illinois, Urbana-Champaign. Her research interests are motivated by the exploration of equity, diversity and inclusion in educational access and success of minoritized and unrepresented students. Currently, she has investigated campus climates, racial experience, educational and career pathways of domestic and international students of color at Predominantly White Institutions. Dr. Yeo plans to take an active role in teaching and mentoring the next generation of education professionals and scholars to be equity-minded and to advocate social justice. She tries to meditate every day. She loves watching a documentary about the history, space, and cold cases.