Career patterns in entrepreneurial, occupational and leadership dimensions : optimal matching analysis with multiple job roles

Setor, Tenace Kwaku; Joseph, Damien; Chan, Kim Yin

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Career Patterns in Entrepreneurial, Occupational and Leadership Dimensions: Optimal Matching Analysis with Multiple Job Roles

Abstract

This present study analyses the career patterns of a sample of 2916 individuals drawn from the National Longitudinal Survey of Youth (NLSY79) by characterizing their careers as consisting of job roles unfolding in entrepreneurial, occupational and leadership dimensions i.e., our coding allows individuals to hold singular job roles (e.g., Professional only or Entrepreneur only or Manager only) or multiple job roles (e.g., Professional-Managerial or Entrepreneurial-Professional) at certain points of their careers. We identified five broad career patterns, labelled as mid-professional, late-professional, persistent-professional, persistent-vocational and entrepreneurial career patterns. We also examined the antecedents and consequences of adopting the distinctive career patterns and found that individual and social hierarchy attributes play an important role in career pattern adoptions. Significant differences were also observed in the levels of objective career success across the identified career patterns. Contributions to the broader careers, entrepreneurship and human capital literatures are discussed.

Introduction

Considerable studies have examined career patterns in terms of a sequence of distinctive roles that groups of individuals hold over a full life course or a part, using optimal matching analysis. The individuals' job roles also tend to be in organization-centric ways, e.g., occupational (i.e. vocational and professional) and managerial job roles (e.g. Gubler, Biemann, & Herzog, 2017; Vinkenburg & Weber, 2012) . In addition, the organization-centric roles tend to be coded as independent job types (cf. Kanter, 1989), which assumes that they exist in isolation of another.

Often, however, careers unfold not only in organizations but also beyond them, e.g., entrepreneurially (cf. Kanter, 1989). Moreover, individuals have multiple personal interests: In a bid to satisfy their personal interests, individuals may simultaneously hold multiple job roles over sustained periods (Caza, Moss, & Vough, 2017; Hall, Briscoe, & Kram, 1997). Such a person-centric perspective of careers, which are self-crafted, proactively managed and driven by personal interests, treats careers as the property of the individual; and does not restrict the concept of careers to only organization-bound roles but also entrepreneurial job roles (Chan et al., 2012). Taken together, the person-centric articulations on careers suggest that an individual may hold concurrent combinations of entrepreneurial, occupational and managerial job roles (i.e., with careers unfolding in entrepreneurial, occupational/professional and leadership/managerial dimensions) over a full life course or a part.

Yet few studies have empirically examined careers from the perspective of holding concurrent combinations of entrepreneurial, occupational and managerial job roles over sustained periods (e.g. Chan et al., 2012; Kennedy, Chan, & Ho, 2016). Using a cross-sectional survey design, Chan et al. (2012) demonstrated that individuals construct their subjective careers – defined by individual motivations to pursue a given career – as consisting of concurrent combinations of entrepreneurial, occupational and leadership or

managerial job roles. Given that individual motivations and career aspirations change over time (Harmon, 1989), subjective careers do not always translate to objective careers. In the current research, we build on this stream of research by tracking the objective and longitudinal work histories of a cohort of workers and examining career patterns composed of concurrent combinations of entrepreneurial, occupational and managerial job roles.

An analysis of careers cannot be fully understood without an appreciation of the factors that drive individuals to follow distinctive career patterns and the ensuing implications for career outcomes. Prior research argues that motivational needs for achievement, power and social status predispose individuals to follow distinctive career patterns (Lent & Brown, 1996; Super, 1957; Super & Hall, 1978), which ultimately determines career success (Joseph, Boh, Ang, & Slaughter, 2012). Essentially, subscribing to distinct career patterns is principally hamstrung or enabled by differences in individual characteristics (Fitzgerald & Betz, 1994; Holland, 1997).

So, are there differences in the characteristics of individuals who follow distinctive career patterns composed of multiple job roles, which we refer to as multiple role career patterns or careers unfolding in multidimensional space? Are there differences in the level of career success associated with such career patterns? These questions deserve empirical attention to further our understanding of why individuals follow such career patterns. Yet no empirical research that we are aware of has examined the antecedents and consequences for subscribing to multiple role career patterns.

Against this backdrop, the current research takes a three-step approach toward remedying the little empirical insights we have about multiple role career patterns; (1) we identify and describe career patterns; (2) we examine the antecedents of the identified career patterns and; (3) we examine objective career success associated with the subscribed career patterns.

Using the National Longitudinal Survey for Youth (NLSY) 79 cohort data, we take an inductive and quantitative approach to identify and describe career patterns. The entrepreneurship, professionalism and leadership (EPL) career framework is particularly relevant for understanding multiple role career patterns (Chan et al., 2012). The EPL framework conceptualizes and maps individual careers in a three-dimensional career space using entrepreneurial, professional and leadership roles as career vectors.

Figure 1 presents the heuristic model guiding the goals of the current study. In the section that follows, we provide the theoretical foundation relevant to the discussion of multiple role careers. In addition, we review the literatures on career patterns and characterize career patterns as consisting of multiple job roles. Following, the current study presents in details the antecedents (i.e. characteristics) and outcomes (i.e. objective career success) associated with the adoption of distinctive career patterns.

Insert Figure 1 about here

Entrepreneurship, Professionalism and Leadership Career Framework

Traditional models of careers (e.g. Kanter, 1989) prescribe that individual careers are a succession of entrepreneurial, occupational or managerial job roles that do not coexist. However, the emergence of the concept of boundaryless careers has precipitated career theorists (e.g. Baruch, 2004; Baruch & Campbell Quick, 2009; Chan et al., 2012) to rethink and reconfigure career models from a multiple job role perspective. Building on Kanter's (1989) career model, which describes entrepreneurial, occupational and bureaucratic (managerial or leader) careers as three separate career forms, Chan et al., (2012) proposed the entrepreneurship (E) professionalism (P) and leadership (L) career framework which situates individual careers in a three-dimensional career space using E, P and L as dimensions. Rather than thinking of entrepreneurial, occupational and managerial roles as competing job types,

the EPL framework recognizes the possibility that individuals' interests in entrepreneurial, occupational and managerial job roles can coexist over sustained periods. The EPL framework characterizes an individual's career based on the magnitudes of the E, P and L dimensions. For example, if an individual is high on the professionalism dimension and low on both entrepreneurial and leadership dimensions it depicts a career largely composed of professional job roles, which requires deep expertise often acquired via a high level of educational attainment, and less of entrepreneurial and managerial job roles (Chan et al., 2012). Alternatively, an individual career that is high on any two of the EPL dimensions or all three dimensions depicts a multiple role career.

Accordingly, the EPL framework affords us the flexibility to operationalize careers as a sequence of all the possible combinations of entrepreneurial, occupational and managerial job roles. In doing so, the current study responds to calls for more research that use longitudinal data to empirically validate the EPL career model and build a more comprehensive understanding of multiple role careers (Chan et al., 2012; Kennedy et al., 2016).

Characterizing Careers Patterns Composed of Multiple Job Roles

Career patterns, defined as the careers that groups of individuals follow, is a fundamental concept in the study of careers (for a review, see Vinkenburg & Weber, 2012). The concept is a simple yet effective tool for clustering individual careers, which may initially appear qualitatively different (Abbott & Hrycak, 1990). Perhaps most prominent among the studies on career patterns is the seminal work of Abbott & Hrycak (1990), who analyzed the careers of 18th century German musicians. They found that 18th century German musicians adopted four distinct career patterns – organists, church musicians, court musicians and others – as the musicians rose through the lower ranks of the musical establishment to the highest rank of *Kapellmeister* or music director.

More recent studies have contributed to this stream of research and analyzed the career patterns of IT professionals (Joseph et al., 2012) and women in finance careers (Blair-Loy, 1999). Blair-Loy (1999) found two broad career patterns among women in finance careers. The first career pattern depicts an upward mobility from professional job roles to managerial job roles. The second career pattern begins with vocational job roles outside the finance labor market and transitions into entrepreneurial job roles, which involve the women starting their own businesses.

Joseph et al. (2012) analyzed the careers of IT professionals and identified three career patterns – careers in IT, the Professional (PLM) and Secondary (SLM) labor markets. Careers in IT and PLM are composed solely of professional job roles. Careers in SLM begin with professional job roles in IT but transition into vocational job roles at the mid and late stage of careers.

The common thread that runs through these earlier studies (Abbott & Hrycak, 1990; Blair-Loy, 1999; Joseph et al., 2012) is the conceptualization of career patterns as consisting job roles that are independent and exist in isolation from one another. As earlier articulated this concept of career patterns is not entirely reflective of contemporary thought on career development. There is growing interest in careers consisting of multiple job roles (Caza et al., 2017). It therefore becomes incumbent to investigate anew whether individuals adopt career patterns composed of multiple job roles.

Antecedents and Consequences of Adopting Distinct Career Patterns

In this section, we examine individual characteristics that influence the adoption of distinctive career patterns. Further, we examine objective career success as an outcome of the adopted career patterns.

Individual Characteristics and Career Pattern Adoption

The career development theories formulated to explain why individuals adopt distinctive career patterns can be organized around two dominant perspectives; psychologically-based (Holland, 1959, 1997, Super, 1957, 1990) and sociologically-based (Hotchkiss & Borow, 1996; Musgrave, 1967; Sewell, Haller, & Straus, 1957).

Proponents of psychologically-based theories of career development take an agentic perspective, which argues that individual actors and their motivations play a central role in choosing distinctive careers. Holland's (1959, 1997) theory on vocational choice posits that differences in personality attributes influence occupational choice. The decision to pursue an occupation results from a congruence between personality attributes and the focal occupational environment (Holland, 1997).

Super (1957, 1990) refined Holland's theory by proposing that career choice and development is the implementation of self-concepts. The self-concept refers to how individuals view themselves and thus includes not just non-cognitive or personality elements as in the case of Holland's theory but also cognitive elements (Super, 1990). Super's theory on career choice and development argues that careers that conflict with core elements of the self-concept including cognitive and non-cognitive attributes will most likely be rejected (Brown, 2002; Super, 1990). Conversely, careers that have greater compatibility with the core elements of the self-concept will be adopted (Super, 1990).

The sociologically-based perspective offers a structural explanation of individual career choice and development. Socioeconomic inequality perpetuated by structural or institutional discrimination differentially shape individual careers and ultimately determine the career patterns that individuals adopt (Hotchkiss & Borow, 1996; Musgrave, 1967). Proponents of the sociologically-based perspective explain that socioeconomic inequalities create inequities in access to educational and career opportunities, and social capital resources (Musgrave, 1967; Reissman, 1953; Sewell et al., 1957).

Greater access to career resources resulting from higher placement in the socioeconomic hierarchy enables individuals to find favorable employment opportunities in higher status occupations and careers (Musgrave, 1967; Seibert, Kraimer, & Liden, 2001). In contrast, limited access to resources predisposes individuals, lower in the socioeconomic hierarchy, to adopt career patterns composed of lower status occupations (Brown, 2002)

Career Patterns and Objective Career Success

The career patterns that groups of individuals adopt have important implications for objective career success (Joseph et al., 2012). Objective career success are tangible career achievements including promotions (Boudreau, Boswell, & Judge, 2001) and pay (Judge, Cable, Boudreau, & Bretz Jr., 1995). In the current study, we examine pay as a key indicator of objective career success. Pay is generally believed to be the most important and proximal outcome of the career decisions that individuals make (Judge et al., 1995), which reflects the career patterns they follow.

The distinctive career patterns that individuals follow influence the skills and experiences they acquire, which differentially imparts their stock of human capital (Volmer & Spurk, 2011). These skills are entrepreneurial, occupational and managerial or any combination of them depending on whether the career patterns are composed of multiple job roles or not. Human capital research has demonstrated that higher endowments of entrepreneurial, occupational or managerial skills prompt favorable career outcomes in terms of pay (Ang, Slaughter, & Yee Ng, 2002; Mithas & Krishnan, 2008; Ng, Eby, Sorensen, & Feldman, 2005). By characterizing career patterns as consisting of multiple job roles, we can espouse a more nuanced understanding of how combinations of entrepreneurial, occupational and managerial skills influence pay; and thereby contribute to the human capital literature.

Methodology

The centerpiece of our analysis is the construction of individual career sequences using work history data. In the following section, we provide a detailed description of our source of data. Following, we provide information about our sample inclusion criteria, measures and the data analytic technique we employed.

Data

Our data comes from two sources: (1) the publicly accessible NLSY79 survey data and (2) the Online Information Network (O*Net) database. The NLSY79 provides work history and job-level data necessary to construct career sequences; and code entrepreneurial and leadership job roles. Data obtained from O*Net was used to code for occupational job roles.

The NLSY79 Survey. The NLSY79 is a longitudinal study conducted by the US Bureau of Labor Statistics (US Bureau of Labor Statistics, 2006). The NLSY79 periodically interviews, surveys and tracks the lives of American youths born between the years of 1957-64. Subjects are interviewed on a broad range of topics including work and employment. The first wave of the survey was conducted in 1979 and sampled 12686 respondents. Since 1979 the survey has run annually through to 1994, after which respondents were interviewed on a biennial basis.

The most recent interviews and surveys were conducted in 2014. There have been 26 waves of data collection since 1979, when subjects were first interviewed. The current study used the most recent version of the NLSY79 data released in 2014. The recent NLSY79 data contains the work history and employment data of respondents from 1979-2014.

O*Net Database. The O*Net database is developed under the auspices of the US Department of Labor/Employment and Training Administration. The database contains occupation-specific information to help students, job-seekers and employers understand the real world of work (O*NET, 2016). O*NET uses 277 standardized variables, referred to as

descriptors, to provide distinguishing information about the knowledge, skills and ability requirements of 974 occupations classified according to the 2010 US Standard Occupation Classification (SOC) system (Bureau of Labor Statistics, 2010).

An important O*Net job descriptor pertinent to the current study is the knowledge descriptor. The knowledge descriptor categorizes educational requirements for all the SOC jobs. There are 12 categories: Category 1 – Less than a high school diploma; Category 2 – High school diploma; Category 3 – Post-secondary certificate; Category 4 – Some college courses; Category 5 – Associate’s degree; Category 6 – Bachelor’s degree; Category 7 – Post-baccalaureate certificate; Category 8 – Master’s degree; Category 9 – Post-master’s certificate; Category 10 – First professional degree; Category 11 – Doctoral degree and Category 12 – Postdoctoral training. We provide a detailed description of how we used O*Net’s categories of educational requirement to code for professional and vocational jobs later in the section.

Sample. We constructed a sample from the universe of NLSY79 data released by BLS in 2014. We subjected our sample to the following inclusion criteria:

1. Respondents must be at least 18 years and must have attained a high school diploma or its equivalent. The US Youth Employment Provisions of the Fair Labor Standards Act (FLSA) prohibits persons under the age of 18 from entering certain employment relations. Accordingly, we employed this criterion to effectively capture respondents who could work in any job.
2. Respondent must have held a full-time job. Career psychologists argue that temporary job holders do not undergo the same cognitive processes as full-time job holders in regards to career decisions and career-self management (Hulin, Roznowski, & Hachiya, 1985). Accordingly, we only considered full-time job holders. Consistent with the definition of the BLS, incumbents in full-time jobs work for more than 35 hours a week.

3. The number of job observations per individual must be at least 18 i.e. 70% of the 26 waves of data collection. The analytical technique – optimal matching analysis – produces biased and inconsistent estimates in cases whereby 30% of sequence data are missing or incomplete (Dlouhy & Biemann, 2015).

After subjecting the universe of 12686 respondents of the NLSY79 data to our inclusion criteria, our final sample comprised of 2916 respondents (30%). The final sample contributed 67773 person-period observations.

Measures: Career Sequence

Entrepreneurial Job Role. To code for entrepreneurial job role, we used employment data of our NLSY79 sample. The employment data contains information about the business ownership status of respondents at each wave of data collection. The NLSY79 asks if a respondent is self-employed in an unincorporated business. Unincorporated businesses are businesses in which respondents worked as a sole-proprietor, independent contractor, consultant or freelancer (US Bureau of Labor Statistics, 2006). We coded for entrepreneurial job “E” if the respondent is self-employed in an unincorporated business; “0” if the respondent is not self-employed in an unincorporated business (i.e. an employee).

Occupational Job Roles. In differentiating professional job roles from vocational job roles, we adopted Wilensky’s (1964) description of professional jobs as those jobs that require systematic knowledge acquired only via long prescribed training or education. We coded for professional job role using the work history data obtained from the NLSY79. The work history data contains detailed information about the dominant jobs respondents held in each wave of data collection. The NLSY79 describes a dominant job as the job a respondent held for the most amount of time in each wave of data collection. A job is denoted dominant if a respondent held the job for at least 13 weeks in each year or wave of data collection (US Bureau of Labor Statistics, 2006).

The NLSY79 classifies jobs according to the US Standard Occupational Classification (SOC) system. Specifically, the NLSY79 classifies jobs using the 1970 SOC codes. The 1970 SOC codes differentiate jobs into 12 major categories (e.g. professional, technical and kindred workers, managers and administrators, sales workers) and further into 417 subcategories (e.g. engineer, life and physical scientists, physicians, dentists and related practitioners). To reflect the rapidly changing nature of work and the proliferation of jobs in the US labor market, the SOC codes are revised and updated periodically. The 2010 SOC codes are the most recent.

We cross-referenced the 1970 SOC job codes appearing in the NLSY79 data to obtain the corresponding 2010 SOC codes for all occupations in our sample. This is to reflect contemporary descriptions of jobs and job titles and facilitate easier interpretation of our data. The 2010 SOC codes categorize civilian workers into 22 major job categories (e.g. management occupations, legal occupations, computer and mathematical occupations), 96 minor groups within the broad categories (e.g. top executives, computer occupations, financial analysts), 449 broad occupations within the minor groups and 821 detailed occupations within the minor groups (Bureau of Labor Statistics, 2010).

We coded for professional job role using O*Net's categories of educational requirements for jobs. Professional job role is coded "P" if the level of educational requirement is at least an Associate's degree (Category 4) (O*NET, 2016). We coded for vocational job role "V" if the level of educational requirement is less than an Associate's degree (Category 1-3) (O*NET, 2016).

Leadership Job Role. We identified leadership job roles as managerial jobs. The 2010 SOC classification system categorizes management occupations into a major category using a series of codes beginning with 11 (Bureau of Labor Statistics, 2010). Consistent with the 2010 SOC classification system, we coded managerial job role "M" if the first 2 digits of

the SOC code for a job is 11; and “0” for non-managerial jobs. General and operations manager (11-1021), computer and information systems manager (11-3021) and human resources managers (11-3121) are examples of managerial jobs.

We coded a respondent's job role at each wave of data collection as combinations of *Entrepreneurial* (E), *Professional* (P), *Vocational* (V) and *Managerial* (M) job roles. We identified 8 discrete job roles. Table 1 shows the 8 job roles.

Insert Table 1 about here

Constructing Individual Career Sequences. We constructed individual career sequences by stringing together the job roles of respondents in each wave of data collection. Consider the following individual career sequence of a respondent i : $P-P-P-P-P-P-P-P-P-P-EP-EP-EP-EP-PM-PM-PM-PM-PM-PM-PM-PM-PM-PM-PM-PM-PM-PM$. The length of the sequence is 26, which translates to a 26-year working history. The sequence indicates that on entering the workforce the respondent i worked 10 years as a professional, then worked 5 years as self-employed professional, and then worked 11 years as a professional manager. The career sequences of respondents are analyzed using optimal matching technique, which we describe in the next section.

Data Analytic Approach

Optimal Matching Analysis. Optimal matching analysis computes similarity scores between pairs of individual career sequences. Optimal matching analysis awards costs to the minimum number of substitution, insertion and deletion (*indel*) operations necessary to transform one sequence into another. A single *indel* operation is set at a cost of 1 (Abbott & Hrycak, 1990).

Substitution costs range from 0-2 and are based on the transition rates of the job roles (Abbott & Tsay, 2000; Stark & Vedres, 2006). The transition rate measures the frequency at

which a job role (e.g. “P”) switches or changes into another (e.g. “EP”), as observed in our sequence data. The lower the transition rate, the higher the cost of substituting the focal job role for the other. Conversely, the higher the transition rate between a pair of job roles, the lower the substitution cost for replacing the focal job role for the other. Table 2 in Appendix 1 presents the substitution costs between pairs of job roles based on the observed transition rates in our data.

For a pair of respondents *i* and *j* in our sample, optimal matching analysis computes the total transition cost – the sum of *indel* and substitution costs – necessary to transform the career sequence of respondent *i* to that of *j*. Optimal matching analysis produces an NxN matrix that contains the transition costs of each pair of individuals in our sample (i.e. 2916 x 2916 matrix in the case of the current study). The transition cost matrix is used for the subsequent cluster analysis.

Cluster Analysis. Cluster analysis is a statistical technique that classifies individuals into a number of different groups or clusters based on a set of variables such that members within the same cluster are similar (Fraley & Raftery, 1998). The set of variables used for the cluster analysis are the transition costs between each pair of individuals in our sample i.e. the transition cost matrix. We used Ward clustering and identified five meaningful clusters (Abbott & Hrycak, 1990; Fraley & Raftery, 1998). Respondents belonging to a cluster have career sequences that are similar to one another and thus are considered to adopt the same career pattern.

Results

There are two parts to this section. In the first part, we report our results by describing the five career patterns obtained from the cluster analysis. The description of career patterns is two-fold. First, we describe career patterns by highlighting the demographic and job roles that make up each career pattern. And second, we describe career patterns by conducting

further analysis and reporting findings on characteristic determinants of the identified career patterns.

In the second part of the section, we conduct further analysis to determine whether there are significant differences in objective career success across the five career patterns. We report results on objective career success.

Career Patterns

The five career patterns are shown in Figure 2, along with the average times spent in each of the job roles. The first career pattern, which we label as *Mid-professional*, consists of 710 (24.3% of the sample) individuals. Of the 710, 63% are males, 68% are Caucasian and 90% attained either a bachelor's degree or high school diploma.

A greater number of individuals in this cluster, begin their careers as vocationists. In the mid-career stage, some become professionals and professional managers. In the late career stage, we see some transitions back into vocational job roles. These individuals have an average of ~10 years of experience in vocational jobs, the longest in comparison to the other job roles; ~6.6 years of experience in professional job roles and ~2.8 years of experience as professional managers.

Insert Figure 2 about here

The second career pattern, *Late-Professional*, consists of 649 (22.3%) individuals. Of the 649, 55% are males, 55% are Caucasian and 57% have attained a high school diploma. A greater number of these individuals are vocationists from the early to late stages in careers. In the late career stage, they transition from vocationists to professionals. The individuals spend an average of ~15.4 years in vocational job roles as compared to ~6.9 years in professional job roles.

The third career pattern, *Persistent-Vocational*, consists of 1028 (35.3%) individuals. Of the 1028, 58% are males; 52% Caucasian and 67% attained a high school diploma. The individuals hold vocational job roles throughout their careers and spend an average of ~18 years in vocational job roles.

The fourth career pattern, *Persistent-Professional*, consists of 380 (13.0%) individuals; 57% male, 66% Caucasian and 80% attained either a bachelor's or postgraduate degree. These individuals are professionals throughout careers. They spend an average of ~20 years in professional job roles.

The fifth career pattern, *Entrepreneurial*, consists of 149 (5.1%) individuals, the least of all the career patterns. Of the 149, 65% are male, 51% Caucasian and 76% have attained a high school diploma. A greater number of the individuals begin their careers as vocationists and professionals. They progressively transition into self-employed vocationists from the early career stage to mid-career stage.

Specifically, we see many self-employed vocationists in the mid-career stage. In the late-career stage, we see self-employed vocationists transition into vocationists and professionals. These individuals spend an average of ~8.2 years as self-employed vocationists and ~7 years as vocationists.

Insert Table 3 about here

Individual Characteristics and Career Pattern Adoption

We examined the individual and socioeconomic determinants of career pattern adoption. Individual and socioeconomic attributes include risk preference, locus of control, extraversion, openness, cognitive ability and family socioeconomic status. These variables are by no means exhaustive. A review of the career development literature suggests that the

aforesaid attributes are frequently theorized as the principal antecedents that drive career choice and career development (see Bonin et al., 2006; Kolvereid, 2017; Smith, 2011).

Risk Taking is a measure of individuals' willingness to take risk under conditions of uncertainty. The NLSY79 captures respondents' attitudes toward economic risk. For the 15th wave of data collection, the respondents were asked if they would take a job that could either double family income or cut it by a third. *Risk Preference* is a dummy variable coded as "1" if respondents answered "Yes"; "0" if respondents answered "No".

Locus of Control is a measure of the degree to which individuals believe they have control over the situations and experiences that define their lives ((Ajzen, 2002). The NLSY79 asks respondents to choose which of the following statements applies to them: (A) "what happens to me is my own doing" (B) "I don't have enough control over the direction my life is taking me". *Locus of Control* is a dummy variable coded as "1" if respondents chose statement A; "0" if respondents chose statement B.

Extraversion and *Openness* are continuous variables. Extraversion measures the extent to which an individual is outgoing and sociable. Openness measures the extent to which an individual is willing to accept new experiences. The NLSY79 asks respondents to rate how traits of extraversion and openness applies to them on a 7 point Likert scale ("1" = Disagree strongly ... "7" Agree strongly).

Cognitive Ability is measured using the percentile score of the Armed Forces Qualifying Test (AFQT), which was administered to respondents of the NLSY79 in the second round of data collection. The AFQT assesses quantitative and verbal skills.

Family Socioeconomic Status is a measure of the median annual family income coded as "1" = \$0 – \$49999; "2" = \$50000-\$99999 and "3" = \$100000 and above. Annual family income is adjusted for inflation using the consumer price index deflator, with 2016 as the baseline year.

We estimated the effects of individual and socioeconomic determinants of career pattern adoption using a multinomial logistic regression. The multinomial logistic regression estimates the probability that an individual adopts a focal career pattern, relative to a reference career pattern, based on the individual and socioeconomic covariates.

Table 4 presents the correlations and descriptive statistics of the variables. The results of the multinomial logistic regression are shown in Table 5. The *Relative Risk Ratios* (RRR) are presented for easier interpretation. The relative risk ratios are exponents of the regression coefficients.

The relative risk ratio should be interpreted as the likelihood that an individual adopts a career pattern, relative to the reference career pattern, for a unit increase in the corresponding covariate given that all the other covariates are held constant. The reference career pattern used in the current study is persistent vocational career pattern.

Insert Table 4 about here

Risk Taking. Results of Table 5 indicate that risk taking is not significantly related to the adoption of mid-professional (RRR=1.241, *ns*), late-professional (RRR=0.916, *ns*), persistent professional (RRR=1.009, *ns*) and entrepreneurial (RRR=1.178, *ns*) career patterns.

Locus of Control. The results indicate that individuals who have control over the direction of their lives are 0.415 times less likely to adopt a persistent professional career pattern relative to a vocational career pattern (RRR = 0.415, $p < 0.1$). Locus of control is not significantly associated with the adoption of mid-professional (RRR=0.770, *ns*), late-professional (RRR=0.609, *ns*) and entrepreneurial (RRR=0.566, *ns*) career patterns.

Extraversion. Extraversion is not significantly related to the adoption of mid-professional (RRR=0.977, *ns*), late-professional (RRR=1.064, *ns*), Professional (RRR=0.963, *ns*) and Early-Mid Entrepreneurial (RRR=1.178, *ns*) career patterns.

Openness. The results indicate that a unit increase in our measure of the openness attribute increases the likelihood that an individual adopts the mid-professional career pattern by a factor of 1.122 ($p < 0.1$). A unit increase in the level of openness increases the likelihood of adopting the persistent professional career pattern by a factor of 1.157 ($p < 0.1$). Openness trait is not significantly related to the adoption of late-professional, and entrepreneurial career patterns.

Insert Table 5 about here

Cognitive Ability. The results indicate that a unit increase in the measure of cognitive ability increases the likelihood that an individual adopts mid-professional and persistent-professional career patterns by factors of 1.021 ($p < 0.01$) and 1.045 ($p < 0.01$) respectively. A unit increase in the level of cognitive ability is associated with a decrease in the likelihood of adopting the entrepreneurial career pattern by a factor of 0.992 ($p < 0.1$). Cognitive ability is not significantly related to the adoption of late-professional career pattern ($RRR = 1.125$, ns).

Family Socioeconomic Status: The results indicate that a unit increase in our measure of family socioeconomic status increases the likelihood that an individual adopts the mid-professional, persistent-professional and entrepreneurial career patterns by factors of 1.562 ($p < 0.01$), 1.551 ($p < 0.01$) and 1.405 ($p < 0.05$). Family socioeconomic status is not significantly related to the late-professional career pattern.

Career Pattern Adoption and Objective Career Success

To ascertain whether objective career success differs across the five distinct career patterns, we used the average real annual pay of individuals in each of the career patterns. Using the reported annual wages of the NLSY79 respondents, we computed average real annual wage using the US consumer price index deflator with 2016 as the baseline year. We conducted a Tukey multiple comparison test to determine how objective career success

differs across the career patterns. Figure 3 presents average real annual pay of the five career patterns.

Individuals in the mid-professional career pattern obtained a significantly higher average annual pay than individuals in the late-professional (\$8534.9, $t=7.104$, $p<0.001$), persistent-vocational (\$9968.7, $t=15.786$, $p<0.001$) and entrepreneurial (\$8649.9, $t=9.712$, $p<0.001$) career patterns.

Insert Figure 3 about here

The average annual pay of individuals in the late-professional career pattern is not significantly different from those in persistent-vocational career pattern (\$1433.8 $t=1.215$, ns). The average annual pay of individuals in the persistent-vocational career pattern is not significantly different from those in entrepreneurial career pattern (\$1318.8, $t=1.531$, ns). Similarly, the average annual pay of individuals in the entrepreneurial career pattern is not significantly different from those in the late-professional career pattern (\$115, $t=0.086$, ns). Overall, individuals in the persistent-professional career pattern obtained the highest average annual pay across the five distinct career patterns (\$53001.39; $SD=17459.12$; $F(4)=332.1$, $p<0.001$). The average annual pay of individuals in the persistent-professional career pattern is significantly higher than individuals in the mid-professional (\$18906.3, $t = 21.948$, $p<0.001$), late-professional (\$27441.2, $t=20.829$, $p<0.001$), persistent-vocational (\$28875, $t=34.735$, $p < 0.001$) and entrepreneurial (\$27556.2, $t=26.448$, $p<0.001$) career patterns.

Discussion

The current study contributes to the study of career patterns by identifying and describing career patterns composed of both singular and multiple job roles based on Chan et

al.'s three-dimensional EPL theoretical framework. It is a pioneering attempt to apply this framework (originally developed for thinking about subjective careers) for modeling objective careers over a working lifetime. We also examined the individual characteristics as possible antecedents of the identified career patterns, and objective career success associated with the identified career patterns.

Career Patterns Unfolding in EPL Dimensions

This study finds five broad career patterns: (1) mid-professional; (2) late-professional; (3) persistent-vocational; (4) persistent-professional and (5) entrepreneurial career patterns.

The mid-professional career pattern consists of individuals who hold both singular professional job roles and multiple or plural job roles (i.e. professional managers). Notably, plural job roles are predominant in the mid-career stage and less in the early and late stages of careers. This is not particularly surprising considering that the mid-career stage is the most exuberant and productive period on the career clock (Kets de Vries, 1978; Skirbekk, 2008), when many individuals strive for multiple job roles to increase their impact and reach (Brightman, 2003). However, for the less experienced early career professionals and ageing late career professionals, an overload of job roles could result in higher burnout rates (Kouvonen, Toppinen-Tanner, Huuhtanen, & Kalimo, 2005).

Individuals who follow the late-professional career pattern hold vocational job roles in the early-mid stages of careers and switch to professional job roles in the late stage of careers. This upward movement in job status is somewhat consistent with the notions of the linear career mobility model (Brousseau, Driver, Eneroth, & Larson, 1996). Linear careerists are motivated by power, achievement and status (Brousseau et al., 1996). As such they move rapidly into higher status jobs in early-mid stages of careers (Vinkenburg & Weber, 2012).

However, the rapid upward mobility that characterize the linear career mobility model is not evident in our cluster of late-professional career pattern. This perhaps suggests that

there are variations or subtypes of linear careerists, one of them being vocational careerists who move into higher status professional jobs at the very late stages of careers. The potential subtypes of linear careerists could be attributed to idiosyncratic need for status attainment at distinctive stages of careers (Cohen, 1991; Hall & Chandler, 2005). It is conceivable to individuals who follow the late-professional career pattern may not have a higher need for status attainment in early-mid stages of careers. They move into professional job roles in late careers as a crowning attainment of status after serving longer tenures in relatively lower status (i.e. vocational) job roles (London, 1990).

Persistent-professional and vocational career patterns are similar. Persistent-professional careerists hold only professional job roles and show minimal upward movement into managerial job roles. Similarly, persistent-vocational careerists have long tenures in vocational job roles and show minimal upward movement into professional and managerial job roles.

Persistent-vocational and professional career patterns are consistent with traditional notions of the expert career mobility model (Driver, 1980, 1982). Expert careerists hold a life-long commitment to an occupational field to deepen their expertise (Brousseau et al., 1996). They evaluate career success across indicators of skills mastery and craftsmanship and are less driven by career promotions (Brousseau et al., 1996; Driver, 1980, 1982).

The entrepreneurial career pattern provides some important insights on the nature of self-employed entrepreneurs between the periods of the late 80's to early 90's. Our findings suggest that self-employed entrepreneurs worked predominantly in vocational jobs. This runs contrary to present-day stereotypical notions of freelancing as commonplace in professional and knowledge-based occupations including journalism and software programming (Osnowitz, 2010). An attributable cause for this distinction self-entrepreneurship or freelance careers could be the rapid advancement of digital technologies in modern times. The rise of

digital marketplaces has created flexible opportunities for professionals to market themselves and offer their services to a wider audience.

We observed that entrepreneurial careers are short-lived, peaking in mid stages of careers and ending before the late stages of careers. The greater adoption of entrepreneurial job roles in the mid-career stage is consistent with findings of prior research that has demonstrated that the average age of self-employed men and women are 44.4 and 43.4 respectively (Devine, 1994). Most importantly, our finding that entrepreneurial careers are not lifelong raises an important question. On the one hand, it is consistent with the high failure rates of self-employed businesses (Shepherd, 2003). On the other hand, it raises questions about entrepreneurial resilience in late stages of careers (Hayward et al., 2010), when individuals are more susceptible to career burnout.

In addition, it appears that individuals who adopt the entrepreneurial career pattern take a strategic approach to developing their stock of human capital. We observe these individuals hold vocational job roles in organizations, perhaps to build relevant experience for a mid-career stint in entrepreneurship (Shapero & Sokol, 1982). This strategic development of human capital is consistent with arguments flowing from the entrepreneurship literature, which posit that entrepreneurial success is enhanced via the feedback obtained from previous experience in a focal domain (Shepherd, 2003).

Individual Characteristics as Antecedents of Career Pattern Adoption

Prior research has demonstrated that extraversion and risk taking attributes are associated with entrepreneurial motivations (Brandstätter, 2011). However, in the current study we do not find an association between risk taking and extraversion attributes, and the adoption of the entrepreneurial career pattern. It appears that our measures of risk taking and extraversion do not differentiate self-employed vocationists from organization-employed vocationists – the comparison group in our analysis.

We found that individuals who perceive control of their lives are less likely to follow the persistent-professional career pattern compared to the persistent-vocational career pattern. This finding raises questions about the existence of autonomy in professional occupations relative to vocational occupations especially in the organizational settings. Organizations tend to restrict the autonomy of professionals via bureaucratic oversight mechanisms, which emphasize strict working standards and traditions (Meiksins & Watson, 1989). The restriction of autonomy in professional occupations may conflict with the desire of individuals to control and manage their own careers, favoring less the adoption of the professional career patterns.

We found that openness to new experiences is associated with the adoption of mid-professional and persistent-professional career patterns. Individuals who are open to new life experiences are curious to learn (Komarraju & Karau, 2005). They perceive greater compatibility with professional job roles because professional job roles are intellectually stimulating and involve less routine. Similarly, we found that adoptions of mid-professional and persistent-professional career patterns are associated with higher cognitive abilities. These findings are aligned with prior research that has demonstrated the differences in the cognitive ability requirements, degree of knowledge and task complexity across professional and vocational occupations (Avolio & Waldman, 1990).

Finally, we found that individuals who belong to high status families are more likely to adopt the professional career patterns than vocational career pattern. This finding confirms that argument that the position an individual occupies in the social hierarchy influences the adoption of distinct career patterns (Hotchkiss & Borow, 1996; Musgrave, 1967). Individuals belonging to families of a higher socioeconomic status have greater access to career opportunities and resources, which facilitate their entry into higher status occupations (Musgrave, 1967; Reissman, 1953; Sewell et al., 1957).

Career Patterns and Objective Career Success

We found individuals who follow the persistent-professional career pattern received the highest pay and those who follow the persistent-vocational career pattern obtained the least pay. These findings are consistent with human capital theory, especially when juxtaposed with the finding that most persistent-professional careerists attained the highest level of education whereas persistent-vocational careerists attained the lowest level of education. Human capital literature suggests that the level of educational attainment reflects an individual's investment in formal education (Becker, 1975; Mincer, 1970). Hence, higher levels of education warrants higher pay and vice versa (Ang et al., 2002).

Interestingly, individuals who follow the mid-professional career pattern are the second highest paid after persistent-professional careerists. A possible explanation for this finding could be attributed to the differentiation in productivity levels at different career stages. We suspect that individuals in professional job roles see greater economic returns in the mid-stage of careers, when they are most likely to reach peak productivity.

Contributions to Research

The current research makes important contributions to the broader careers and entrepreneurship literatures in the following ways. First, our study answers to calls to use longitudinal and objective career data to validate Chan et al.'s Entrepreneurship, Professionalism and Leadership career framework which was originally presented as a way for individuals to think about boundaryless careers subjective career "space". This study provides a quantitative extension of the EPL career framework by using optimal matching analysis with a large longitudinal data that is nationally representative of the U.S., and that captures a career lifetime of over 30 years.

Our use of optimal matching analysis to test the EPL career framework is novel and differs from prior research (Chan et al., 2012; Kennedy et al., 2016) that have used cross-sectional survey data and correlational analysis to test the validity of the framework. Our

study therefore offers an alternative approach for testing the EPL career framework, thereby contributing to the robustness of the framework to different analytical paradigms.

Second, the findings about the entrepreneurial career pattern carry important implications for research that examines motivations, attitudes and behaviors to entrepreneurship as a career. The learning experiences as well as the human capital endowments of individuals in the early, mid and late career stages differ significantly, and this difference could shape the motivations, attitudes and behaviors of individuals in discovering entrepreneurial opportunities.

Our finding that self-employment in vocational job roles occurs in episodic stages of careers as opposed to the popular notions of entrepreneurship as a lifelong career brings to light the need to reorganize entrepreneurial motivations, attitudes and behaviors around the different career stages. We call for future research to explore how distinctive career stages moderate entrepreneurial motivations, attitudes and behaviors and how this may impact on entrepreneurial success.

Further, the finding that the entrepreneurial career pattern is dominated by vocationists rather than professionals opens an avenue for research to inquire the potential differences in the job characteristics of vocational and professional occupations within the context of entrepreneurship. Are individuals more attracted to entrepreneurial careers in vocational occupations than professional occupations? What are the job characteristics of vocational occupations that readily lend themselves to the pursuit of self-employment or entrepreneurial careers? These questions could shape our thinking and theories about the nature of entrepreneurial jobs and we call on future research to explore them.

Third, our study provides a comprehensive empirical overview of the antecedents and outcomes of adopting distinctive career patterns composed of multiple job roles. Our focus on individual determinants of career pattern adoption and objective career success as a

consequence of adopting distinct career patterns tests longstanding theories on career choice and development. Most importantly, our study sheds lights on cognitive and non-cognitive attributes that may constrain or enable individuals to pursue plural careers or simultaneously hold multiple job roles.

In regards to objective career success, we expect our findings to inform human capital theories about how combinations of entrepreneurial, vocational, professional and managerial roles may complement one another in generating income or pay. The question of whether holding plural job roles over sustained periods necessarily results in greater pay is an important element to theorizing about career productivity, a line of inquiry seldom explored by the human capital literature.

Contributions to Practice

For career guidance counsellors, our study offers insights into distinct career patterns and the corresponding objective career success. Counsellors can rely on the findings of our research to advise their clients about the potential rewards for following a distinct career pattern.

The finding that individual characteristics are related to the adoption of distinctive career patterns has important implications for human resource planning in organizations. In planning the careers of employees, human resource managers can use our findings to forecast the career patterns that employees may adopt based on their individual attributes. A good forecast of career patterns could help firms prepare for systematic employee movements, which otherwise would be unexpected.

For individuals, our findings suggest that there are varied career patterns. Individuals should not be constrained to pursue only singular careers. When faced with the decision to hold plural job roles, our findings suggest that combinations of professional and managerial job roles are the most rewarding especially at the mid-career stage.

Limitations

In their review of empirical studies of managerial career patterns, Vinkenburg and Weber (2012) cautioned: “the nature and number of unique career patterns identified is strongly influenced by where and when the data were collected (i.e. empirical access), and how career patterns are measured” (p. 592). The NLSY79 dataset used in this study while comprehensive and nationally representative is bound by the historical period of the cohort studied. Our coding of multiple jobs roles is also possibly constrained or limited by the specific variables available in dataset, e.g., entrepreneurship was coded mainly in terms of self-employment (rather than entrepreneurialism or entrepreneurial behaviors or actions) which quite naturally excludes organizational employment.

Table 1: Job Roles

Entrepreneurial	Occupational	Managerial	Role	Definition
0	V	0	V	Employees who hold vocational jobs (vocationist) e.g. file clerk
E	V	0	EV	Self-employed vocationists e.g. freelance photographer
0	P	0	P	Employees who hold professional jobs (professionals) e.g. computer programmer
0	V	M	VM	Managers in vocational jobs (vocational managers) e.g. food service manager
E	V	M	EVM	Self-employed vocational managers e.g. freelance funeral service manager
0	P	M	PM	Managers in professional jobs (professional managers) e.g. computer information systems
E	P	0	EP	Self-employed professionals e.g. freelance computer programmer
E	P	M	EPM	Self-employed professional managers e.g. freelance financial manager

Table 3 Education Level and Demographic Characteristics and Career Patterns

		N	Mid-professional	Late-professional	Persistent-vocational	Persistent-professional	Entrepreneurial	Chi-Sq. df =
		2916	710	649	1028	380	149	
Gender	Male	60%	63%	55%	58%	57%	65%	11.800* df = 4
	Female	40%	37%	45%	42%	43%	35%	
Ethnicity	Hispanic	18%	15%	24%	19%	15%	22%	79.497*** df = 8
	African American	23%	17%	21%	29%	20%	27%	
	Caucasian	59%	68%	55%	52%	66%	51%	
Education Level	High school	54%	43%	57%	67%	20%	76%	495.89*** df = 8
	Bachelor	38%	47%	39%	31%	53%	23%	
	Postgraduate	8%	10%	4%	2%	27%	1%	

Table 4 Descriptive Statistics and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9
1 Mid Professional Career Pattern	0.301	0.459									
2 Late Professional Career Pattern	0.055	0.228	-0.159***								
3 Persistent Professional Career Pattern	0.129	0.336	-0.253***	-0.093***							
4 Entrepreneurial Career Pattern	0.119	0.324	-0.241***	-0.089***	-0.142***						
5 Risk Taking	0.333	0.476	0.000	0.000	0.000	-0.135					
6 Locus of Control	1.131	0.337	-0.030	0.004	-0.017	-0.017	0.088				
7 Extraversion	5.060	1.640	0.032	0.026	0.007	-0.027	0.139	-0.079***			
8 Openness	5.233	1.514	0.027	0.005	-0.004	-0.039	0.127	-0.070***	0.287***		
9 Cognitive Ability	45.099	28.463	0.200***	-0.051**	0.287***	-0.137***	0.158	-0.088***	-0.029	-0.065**	
10 Family Socioeconomic Status	0.971	0.710	0.126***	-0.022	0.137***	-0.036	-0.184	-0.067***	0.011	-0.007	0.296***

*p <0.1; **p<0.05; ***p<0.01

Table 5 Results of Multinomial Logistic Regression

	Dependent variable: Career Pattern Adoption (reference category = <i>Persistent-Vocational</i>)			
	Mid- Professional	Late - Professional	Persistent- Professional	Entrepreneurial
Intercept	0.103*** (0.571)	0.093* (1.059)	0.024*** (0.834)	0.523 (0.737)
Risk Taking	1.241 (0.172)	0.916 (0.313)	1.009 (0.226)	1.178 (0.238)
Locus of Control	0.770 (0.247)	0.609 (0.500)	0.415** (0.404)	0.566 (0.358)
Extraversion	0.989 (0.056)	1.083 (0.105)	0.984 (0.078)	0.899 (0.069)
Openness	1.122* (0.061)	1.064 (0.109)	1.157* (0.088)	1.032 (0.077)
Cognitive Ability	1.021*** (0.003)	1.002 (0.006)	1.045*** (0.004)	0.992* (0.005)
Family Socioeconomic Status	1.562*** (0.122)	1.125 (0.226)	1.551*** (0.161)	1.405** (0.168)
Akaike Information Criterion	2345.351	2345.351	2345.351	2345.351

parenthesized: standard error
non-parenthesized: relative risk ratio (RRR)

* p<0.1; ** p<0.05; *** p<0.01

Figure 1: Heuristic Model

Figure 2: Career Patterns and Mean Times (Years) Spent in Job Roles

Figure 3: Objective Career Success Across Career Patterns

Appendix 1

Table 2 Substitution Cost Matrix

	V	EV	P	VM	EVM	PM	EP	EPM
V	0.00							
EV	1.64	0.00						
P	1.68	1.92	0.00					
VM	1.83	1.98	1.85	0.00				
EVM	1.90	1.78	1.94	1.92	0.00			
PM	1.68	1.91	1.72	1.97	1.91	0.00		
EP	1.82	1.92	1.70	1.99	1.82	1.95	0.00	
EPM	1.86	1.75	1.90	1.90	1.98	1.73	1.86	0.00

The substitution costs $\omega(x, y)$ are computed from the transition rates $p(x, y)$.

$$p(x, y) = \frac{\sum_{t=1}^{L-1} N_{t,t+1}(x, y)}{\sum_{t=1}^{L-1} N_t(x)} \quad \omega(x, y) = 2 - p(x, y) - p(y, x)$$

x, y are the job roles; L is the length of the sequence; t is the position of the job roles within L .

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