Racing to get self-employed? Life history models and self-employment

Marcus T. Wolfe[a],[*], Pankaj C. Patel[b]

[a] *Price College of Business, University of Oklahoma, 307 W. Brooks Street, Norman, OK 73019-0450, USA*
[b] *Villanova School of Business, Bartley Hall Rm 2067, Management, 800 Lancaster Avenue, Villanova, PA 19085, USA*

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ABSTRACT

Entrepreneurship research has shown that self-employment is a result of individual, environmental, and social factors, however, there is a limited understanding of whether the extent of coalescence of these factors over time is associated with self-employment. Using Life History Theory, we examine whether a single Super-K factor, encompassing general health, social relationships, and general personality factors, is related to self-employment. Results indicate that the Super-K factor is positively associated with the likelihood of self-employment, and that self-employment partially mediates the path between Super-K and income. However, the effect size is small, but not negligible, for the likelihood of self-employment. Our results also indicate the negligible overarching role of life time accumulation of health, social relationships, and personality on income through self-employment.

1. Introduction

Scholarly research has long been interested in individual (e.g. personality), contextual (e.g., social relationships), and well-being (e.g., health) factors that can influence whether or not individuals choose to pursue entrepreneurial activities. Prior research has uncovered a wide range of cognitive (De Carolis and Saparito, 2006; Hmieleski and Baron, 2008), psychological (Baron et al., 2016; Ekelund et al., 2005), and environmental (Bates, 1995; Welter, 2011) factors that can substantially affect both the likelihood that individuals will engage in self-employment, as well as the success they might experience as a result of such endeavors. Evidence suggests that indeed factors ranging from hormone levels (Bönte et al., 2015; Greene et al., 2014) to genetic variations (Nicolaou and Shane, 2009; Nicolaou et al., 2011) could play an important role in determining the likelihood that individuals will pursue self-employment as an occupational choice. While it is a foregone conclusion that no single factor could explain self-employment choice or success, it seems that the next step for the literature could be to consider a combination of these factors to develop a richer understanding of the interplay among these elements and how this interplay relates to the entrepreneurial process.

As such, the life history strategy that individuals develop can help to effectively predict a considerable number of important outcomes. Life History Theory (LHT), is a "mid-level theory from evolutionary biology that describes the strategic allocation of bioenergetic and material resources among different components of fitness" (Figueredo et al., 2006:244). LHT predicts that a substantial amount of individual variance in a wide range of behavioral and cognitive factors can be explained by a single, underlying factor (Figueredo et al., 2005). Interestingly, evidence indicates that indeed there is a single, latent factor (K-factor) underlying individual differences in life history strategies, and that this factor accounts for substantial variation in a wide range of otherwise unrelated individual outcomes and behaviors (Figueredo et al., 2014b; Sherman et al., 2013). Furthermore, recent research has

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expanded on the K-factor, incorporating key measures of covitality (i.e. general mental and physical health and well-being) and personality (i.e. Big Five personality factors) to form a Super-K construct that has been found to have substantial associations with a wide variety of cognitive, attitudinal, and behavioral outcomes (Figueredo et al., 2007). Those with "slow" life histories are considerate, kind, hard-working, and reliable, but also socially awkward, insecure, and over-controlling. Conversely, those with "fast" life histories are more apt to exhibit greater social skills and be viewed as eloquent and charming, but also are more likely to be unpredictable, impulsive, and manipulative (Griskevicius et al., 2011). Extending the differences in slow and fast life histories to self-employment, it is possible that one trajectory could be more closely related with self-employment than the other.

In completing the first study on life-history models in entrepreneurship research, we ask: (i) is the Super-K factor positively associated with self-employment; and (ii) whether self-employment mediates the influence of Super-K on income? In answering these research questions, we make several contributions to the existing literature. First, despite the calls for understanding the life-cycle conditions influencing self-employment, the cumulative resources and experiences at a particular life stage is also an important piece of the puzzle. Our results suggest that indeed a single, underlying latent factor (i.e. Super-K), is significantly related to both the likelihood that individuals will engage in self-employment, and the partial mediation effect of Super-K on income through self-employment. However, it should be noted that the effect size of the relationship between Super-K and the likelihood of self-employment is small, and the mediation effect of Super-K on income through self-employment is negligible.

Second, whereas most prior research on the biological influences of self-employment have focused on specific hormonal or genetic factors (Van der Loos et al., 2013a; White et al., 2006), we present evidence for the importance of a broad scope construct (i.e. Super-K) in determining specific outcomes with regards to self-employment. Third, studies have shown that while self-employed individuals have higher job satisfaction, they tend to experience lower income. The Super-K factor represents a culmination of the "all roundedness" necessary to be self-employed. As such, it is possible that individuals with specific characteristics (i.e. Super-K scores) will be uniquely suited to excel in self-employment contexts. Interestingly, while we postulated a positive association between Super-K scores and income, as mediated by self-employment, our results indicate that higher Super-K factor does not seem to be practically meaningful in explaining why some self-employed individuals have higher income than others.

Finally, in completing our study we contribute back to research on LHT. Even though evidence indicates that the Super-K factor is related to a wide array of important life outcomes and events ranging from psychosocial development (Dunkel et al., 2012) to gender differences (Kenrick and Luce, 2000) and social behaviors (Figueredo et al., 2006), our study suggests that the effect of the Super-K factor on self-employment is small, and its effect on income through self-employment is negligible. In the pages that follow, we first describe the theoretical foundation of our model. We then follow up with a description of our research method, the results, and a discussion of our findings.

1.1. Theory and hypotheses

Scholars have long sought to uncover the factors that substantially influence the entrepreneurial process. Prior findings have uncovered a multitude of various cognitive (Baron, 2004), social (Davidsson and Honig, 2003), and environmental (Atuahene-Gima and Ko, 2001) elements that can all play a role in the entrepreneurial process. Despite the fact that evidence has shown that elements such as IQ (Vinogradov and Kolvereid, 2010) and personality (Singh and DeNoble, 2003) can factor into self-employment, there remains a considerable amount of variance left unaccounted for within this process. Research on the "jack-of-all-trades" perspective of self-employment has found that general cognitive ability is positively related to both the likelihood individuals will engage in self-employment as well as the income that self-employed individuals can obtain (Hartog et al., 2010). However, it has been suggested that "education and general intelligence variables have mixed performance in determining self-employment...which suggests that either (intelligence) is not a major determinant of the self-employment decision, or that its influence is more appropriately captured using other variables" (Le, 1999:387). Additionally, in meta-analyses of the link between personality traits and entrepreneurial intentions and performance, Zhao and colleagues found that the relationship between these variables was "moderate" at best (Zhao and Seibert, 2006; Zhao et al., 2010). Even in studies that focus on the association between personality and self-employment, it is often noted that there are significant interactions between personality and other key factors that can influence the self-employment process (Singh and DeNoble, 2003). As such, it is imperative that we look to alternative perspectives that consider the potential cumulative effects that these individual aspects might have on individuals who are self-employed, in order to gain additional insight into these processes.

There have been several competing theoretical views in regards to how individual and developmental factors can contribute to the key decisions that individuals make throughout their lifetimes. For instance, ecological causation theory focuses on how environmental factors can specifically influence life histories and trajectories (Pianka, 2011), and social privilege theory posits that differences in life history traits are due to variations in social advantages that individuals experience during their lives (Gottfredson, 2004). Conversely, the study of behavioral genetics predicts that parents pass along key genetic factors that predispose their offspring towards specific life strategies (Rowe, 2000). While research focusing specifically on either the individual internal or external environmental factors that influence self-employment has provided key insights, there remains a relative paucity of research into how the interaction between individual and environmental factors is related to the self-employment process.

It has been suggested that individual life strategies are a function of both demographic selection as well as the manner in which environmental effects are manifested (Reznick et al., 2002), and that certain environments can favor the development of individuals with specific traits (Geary, 2005). As such, the choice of self-employment as an occupation, and ultimately the success of individuals who pursue this career as a component to their overall life strategy, is likely a result of a complex combination of internal and external factors. Indeed, Life History Theory (LHT) predicts that family structure, social behavior, and personality will all be interrelated to produce and overarching life history strategy (Thornhill and Palmer, 2004). Furthermore, LHT predicts that a substantial amount of

variance in a variety of behavioral and cognitive indicators can be explained by a single factor related to an individual's life history strategy (Figueredo et al., 2004). From an evolutionary perspective, life history strategies allow individuals to adapt to systematically different environments, improving the alignment between individual and environmental characteristics (Sherman et al., 2013). Additionally, recent efforts have expanded on LHT, by incorporating facets of both personality and covitality, to construct a Super-K measure of life history strategies (Figueredo et al., 2007). While research into personality and covitality has provided valuable insights into the phenomenon of self-employment (Rietveld et al., 2015; Zhao et al., 2010), recent evidence suggests that the Super-K factor can account for important, non-additive variance in key attitudes and behaviors above and beyond that which is attributed to its individual sub-components (Figueredo et al., 2014a). This suggests that there are potentially important interactions between these sub-dimensions that are not necessarily captured when examined individually. As such, adopting a LHT perspective allows for the incorporation of the interactive effects that can occur between individual and environmental characteristics that can influence entry into, and eventual performance in, self-employment endeavors. Based upon this reasoning, we propose the following:

Hypothesis 1:. *Super-K factor will be positively associated with the likelihood that an individual is self-employed.*

While it is possible that the Super-K factor is positively associated with the likelihood of self-employment, it is also probable that this Super-K factor can influence the relationship between self-employment and key performance outcomes such as individual income. As mentioned previously, individuals with higher Super-K scores are generally thought of as having greater social skills, which have been shown to prove beneficial with regards to entrepreneurial performance (Baron and Markman, 2000). Additionally, these individuals are often seen as more charming and charismatic, which can also prove beneficial with regards to the entrepreneurial process (Dobrev and Barnett, 2005). Even the potentially negative aspects of higher Super-K such as higher levels of impulsivity and unpredictable behavior, can produce positive outcomes within entrepreneurial contexts (Wiklund et al., 2016, 2017). Therefore, although self-employed individuals on average earn less than their wage-employed counterparts (Binder and Coad, 2013), it is possible that the relationship between self-employment and income is positively mediated by individual life history strategies in the form of Super-K scores. Based upon this reasoning, we propose the following:

Hypothesis 2:. *Self-employment will mediate the relationship between Super-K and personal income.*

2. Materials and methods

2.1. Data and sample

To test for the proposed hypotheses, we used data from the first Midlife in the United States (MIDUS I) survey. The MIDUS I is a national longitudinal survey that began in 1995 and was administered by a multidisciplinary team of researchers. The purpose of the survey was to investigate the psychological and social factors that influence people's health from early adulthood to later life (Brim et al., 2004). The researchers collected data from non-institutionalized adults in the United States and used stratified sampling based on gender and age. Participants ($N = 7108$) completed a random digit dialing (RDD) telephone survey. The sample also included oversamples for participants from the 48 contiguous states ($N = 4244$), as well as a sibling sample ($N = 950$). The researchers also screened for twins from a representative sample of about 50,000 people. The twins who agreed to participate then provided the contact information for their co-twins ($N = 1914$ or 957 pairs).

Respondents first completed a 30-min phone interview and then received two written questionnaires by mail. The survey content assessed health and other factors (e.g., demographic, sociological, epidemiological, psychosocial, and individual differences). Response rates were high for both the phone survey [random digit dialing (RDD) sample (70%), sibling sample (64%), and twin sample (60%)], as well as for the self-administered questionnaires [RDD sample (87%), sibling sample (81%), and twin sample (92%)].

After removing observations with missing values on variables of our interest, the final sample includes 5908 observations. On average, participants were 46.5 years old, 48% were male, and 68% were married. Among the participants, 10% did not have a high school diploma, 27% had a high school diploma, 23% had some college education (without degree), 26% had a 2-year or 4-year college degree, 3% had some postgraduate education, and 11% had a masters or doctoral degree. Finally, of the 5908 participants 91% were white, 5% were black, and 1% were Asian.

2.2. Measures

Behavioral indicators of life history strategy were created by aggregating items from the MIDUS I survey that reflected individuals' life history strategy. Figueredo et al. (2004, 2007) provided theoretical rationale for structuring the MIDUS I data into these lower-order and higher-order factors. Their hierarchical approach for structuring the data is also in line with prior research that has recommended and tested this approach (Figueredo and Rushton, 2009; Figueredo et al., 2013). Following this research, we provide a description of each factor and its corresponding subscales.

2.2.1. Super-K factor.[1]
Super-K factor consists of three dimensions: covitality factor, general personality factor (GPF), and K-factor. The covitality factor

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[1] Refer interested readers to Figueredo et al. (2014b) and Figueredo et al. (2004) for more details about the scale.

represents individual's positive mental health. Following past studies using MIDUS I (e.g., Figueredo et al., 2014), for the covitality factor we used the six-item negative affect scale, six-item positive affect scale, five-item general health scale, 29-item general symptoms scale, and 3-item subjective well-being scale. We averaged the five scales to create the index of covitality. Cronbach's alpha for the covitality factor was 0.80.

For the GPF, we used the Big Five personality scales available in MIDUS I database. This measure is also consistent with past life history studies drawing on MIDUS I. Specifically, we used six-item openness scale, four-item conscientiousness scale, five-item agreeableness scale, five-item extraversion scale, and four-item emotional stability (reverse of neuroticism) scale. The reliability for the GPF factor encompassing all these five subscales was 0.66.

For the K-factor, we used the 27-item self-directedness/planning scale, 12-item mother relationship quality scale, 12-item father relationship quality, 31-item marital relationship quality scale, 6-item family support scale, 6-item friends support scale, 20-item general social altruism scale, and 29-item religiosity scale (Figueredo et al., 2004). Cronbach's alpha for the K-factor including these 8 sub-scales was 0.70. We averaged the three factors to create an index for Super-K factor (α = 0.74).

2.2.2. Self-employment

The self-employment variable was available in the MIDUS I database. The self-employment question asked participants if they were self-employed (1 = self-employed, and 0 = not self-employed). *Personal income.* The personal income variable was available in MIDUS I database. Participants provided their average personal income for the past 12 months. We used the personal income value as our dependent variable.

2.2.3. Control variables

We controlled for the individual demographic characteristics of gender, age, educational level, race, marital status, and the number of children. We also controlled for household total income and parent's educational level because they can influence individual's personal income level and self-employment outcomes.

2.2.4. Model fit

Prior to hypotheses testing, we ran a confirmatory factor analysis to examine if the higher-order model of Super-K factor fit the data well. For the analysis, we specified a second-order factor model with the lowest order factors as manifest variables. Consistent with past research (e.g., Figueredo et al., 2013), the result showed that the hypothesized second-order factor model fit the data well ($\Delta\chi^2$ (112) = 2348.86, $p < 0.01$; *CFI* 0.93; *TLI* 0.91; *RMSEA* = .06).

3. Results

Descriptive statistics and inter-correlations among variables are presented in Table 1. As expected, Super-K factor was positively and significantly associated with both personal income ($r = 0.11$, $p < 0.01$) and self-employment ($r = 0.04$, $p < 0.01$). Self-employment was also significantly and positively related to personal income ($r = 0.10$, $p < 0.01$). To test our hypotheses, we ran hierarchical (logistic) regression analyses. The results are presented in Table 2. Hypothesis 1 proposes that Super-K factor will be positively associated with the likelihood that an individual is self-employed. As shown in Model 2, consistent with the correlation analysis results, Super-K factor was significant in predicting self-employment ($b = 0.134$, $SE = 0.045$, $p < 0.01$). Therefore, Hypothesis 1 was supported. Specifically, a one-unit increase in Super-K factor increases the odds of self-employment by about 13%. Furthermore, change in Pseudo R-square from Model 1 to Model 2 is about 2%. The effect size are therefore small.

Hypothesis 2. states that Super-K factor is positively associated with personal income through self-employment. As shown in Model 4, Super-K factor is significantly and positively associated with personal income ($b = 2414$, $SE = 559.1$, $p < 0.01$). Self-employment was also significant in predicting personal income ($b = 3302$, $SE = 843.0$, $p < 0.01$). When both self-employment and Super-K factor were included in Model 5, the effect size of Super-K factor ($b = 2324$, $SE = 558.7$, $p < 0.01$) decreased in comparison with its effect size in Model 4, suggesting support for partial mediation effects, albeit with very small effects. Sobel tests (statistic = 2.37, $p < 0.05$), Aroian tests (statistic = 2.32, $p < 0.05$), and Goodman tests (statistic = 2.42, $p < 0.05$) all supported the significant mediation effect of self-employment for the Super-K factor-personal income relationship. The change in R-square from models 3 through 5 is negligible. While Hypothesis 2 was statistically supported we do not find practically meaningful effects, therefore, we do not infer support for Hypothesis 2.

3.1. Additional analyses

RDD, sibling, and twin samples. The types of sample (e.g., main RDD, sibling, and twin samples) warrants closer attention. As such, we created three dummy variables based on the types of sample, and we re-ran the analysis controlling for them. As Table 3 shows, above and beyond the fixed effects of the types of sample, Super-K factor was significantly associated with self-employment (b = 0.139, $SE = 0.045$, $p < 0.01$). Self-employment was also significant in predicting personal income ($b = 3271$, $SE = 843.1$, $p < 0.01$). As in our main analysis results, the indirect effect of Super-K factor on personal income via self-employment was significant and positive (Sobel test = 2.42, $p < 0.05$); Aroian test = 2.37, $p < 0.05$; Goodman test = 2.47, $p < 0.05$). (Table 3 and Figs. 1–3). Again, the effect size for Hypothesis 1 was small, but the effect size for Hypothesis 2 was negligible.

Super-K, demographic factors, and income. There is no strong theoretical basis, to our knowledge, for the influence of individual's demographic information on the Super-K factor, self-employment, and income relationship. However, based on the

Table 1
Descriptive statistics and correlations.

	Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Personal income	28,059	27,266	–														
2	Self-employment	0.14	0.34	0.10**	–													
3	Super-K factor	0.02	0.53	0.11**	0.04**	–												
4	Household income	76,032	61,885	0.54**	0.05**	0.15**	–											
5	Age	45.86	12.51	-0.12**	0.02	0.08**	-0.06**	–										
6	Gender	0.49	0.50	0.36**	0.11**	-0.03*	0.11**	0.00	–									
7	Educational level	7.10	2.43	0.35**	0.02	0.13**	0.30**	-0.08**	0.09**	–								
8	White	0.91	0.29	0.04**	0.06**	0.00	0.08**	0.09**	0.02	0.02	–							
9	Black	0.04	0.20	-0.04**	-0.05**	0.04**	-0.07**	-0.04**	-0.04**	-0.04**	-0.64**	–						
10	Native American	0.01	0.08	-0.03	-0.01	-0.02	-0.04**	-0.01	0.01	-0.03*	-0.24**	-0.02	–					
11	Asian	0.01	0.10	0.00	-0.01	-0.02	0.01	-0.07**	0.01	0.09**	-0.31**	-0.02	-0.01	–				
12	Multiracial	0.01	0.08	-0.02	-0.02	-0.02	-0.01	-0.01	-0.02	0.02	-0.24**	-0.02	-0.01	-0.01	–			
13	Marital status	0.69	0.46	0.06**	0.02	0.12**	0.31**	0.07**	0.09**	-0.01	0.11**	-0.08**	-0.01	-0.02	-0.04**	–		
14	Number of children	1.91	1.45	-0.10**	0.03*	0.03*	-0.01	0.41**	-0.05**	-0.18**	0.03	0.02	0.02	-0.06**	-0.01	0.25**	–	
15	Father's education	4.92	3.00	0.18**	0.01	0.04*	0.17**	-0.30**	0.02	0.39**	0.04*	-0.07**	-0.04**	0.07**	0.01	-0.02	-0.21**	–
16	Mother's education	4.91	2.50	0.20**	0.03*	0.05**	0.18**	-0.29**	0.04**	0.36**	0.07**	-0.04**	-0.04**	-0.01	-0.01	-0.02	-0.20**	0.58**

Note. $N = 5018$. a.
* $p < 0.05$.
** $p < 0.01$.

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Table 2

Logistic regression results – main effects of super-K factor and self-employment.

Predictor	Dependent Variables				
	Self-employment		Personal income		
	Model 1 b (s.e.)	Model 2 b (s.e.)	Model 3 b (s.e.)	Model 4 b (s.e.)	Model 5 b (s.e.)
Super-K factor		0.134** (0.045)		2414** (559.1)	2324** (558.7)
Self-employment					3302** (843.0)
Household income	0.000* (0.000)	0.000+ (0.000)	0.216** (0.005)	0.214** (0.005)	0.213** (0.005)
Age	0.002 (0.002)	0.001 (0.002)	− 166.0** (26.55)	− 176.0** (26.60)	− 176.9** (26.57)
Gender	0.336** (0.046)	0.345** (0.046)	16,600** (584.8)	16,746** (584.7)	16,501** (587.2)
Educational level	− 0.004 (0.011)	− 0.006 (0.011)	1850** (137.4)	1797** (137.7)	1801** (137.5)
White	0.196 (0.142)	0.201 (0.143)	349.6 (1698)	368.9 (1695)	236.5 (1693)
Black	− 0.359+ (0.207)	− 0.385+ (0.209)	465.3 (2207)	69.51 (2205)	225.8 (2202)
Native American	− 0.014 (0.345)	− 0.013 (0.347)	− 2604 (4085)	− 2452 (4078)	− 2451 (4072)
Asian	0.050 (0.284)	0.062 (0.285)	− 6320+ (3407)	− 6073+ (3401)	− 6118+ (3396)
Multiracial	− 0.139 (0.379)	− 0.129 (0.381)	− 4065 (4144)	− 3806 (4137)	− 3747 (4131)
Marital status	− 0.054 (0.054)	− 0.068 (0.054)	− 6960** (686.8)	− 7215** (688.2)	− 7163** (687.3)
Number of children	0.044* (0.018)	0.045* (0.018)	141.7 (228.1)	151.5 (227.7)	117.5 (227.6)
Father's education	0.001 (0.010)	0.001 (0.010)	− 64.55 (124.1)	− 63.34 (123.9)	− 63.90 (123.7)
Mother's education	0.017 (0.011)	0.016 (0.012)	274.4+ (146.4)	258.4+ (146.2)	246.5+ (146.0)
Constant	− 1.706** (0.182)	− 1.654** (0.183)	1280 (2228)	2389 (2239)	2316 (2236)
Observations	5018	5018	5018	5018	5018
(Pseudo) R^2	0.024	0.026	0.441	0.443	0.445

Note. $N = 5018$.

+ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.

entrepreneurship literature, we conjecture that such demographic information as an individual's age, gender, and educational level might moderate the relationship between self-employment and personal income. Thus, as post-hoc analyses, we tested the potential moderating influence of individual's age, gender, and educational level on the relationships of our theoretical model. As shown in Table 3 (Models 8–11), the interaction effects of self-employment with age ($b = 208.7$, $SE = 72.41$, $p < 0.01$), gender ($b = 5949$, $SE = 1716$, $p < 0.01$), and educational level ($b = 890.1$, $SE = 328.1$, $p < 0.01$) were significant with respect to personal income. Figs. 1 − 3 present the interaction effects. Fig. 1 shows that the effect of self-employment on personal income is stronger for older individuals relative to younger individuals. Fig. 2 suggests that the relationship between self-employment and personal income is stronger for males rather than females. Lastly, Fig. 3 shows that the effect of self-employment on personal income is stronger for more highly educated individuals. However, the changes in R-square across models 8–11 are minimal to infer practically meaningful effects.

4. Discussion

Although previous research into differences regarding psychological, physiological, and personality characteristics has deepened our understanding of self-employment, whether the combination of these factors can influence individual's decision to engage in self-employment as well as the relative level of economic success (income) they achieve should they pursue such initiatives has been relatively understudied. Prior research has primarily focused on how specific cognitive (De Carolis and Saparito, 2006), psychological (Baron et al., 2016), and environmental (Welter, 2011) factors individually influence the entrepreneurial process, despite scholars' recognition of the importance of understanding how the interaction of such factors can uniquely influence entrepreneurial endeavors (Markman and Baron, 2003). In the current study, we begin to fill this gap by investigating whether the

Table 3

Robustness check: (logistic) regression results – main effect of super-K factor and interaction effect of self-employment.

| Predictor | Dependent Variables | | | | | |
| | Self-employment | Personal income | | | | |
	Model 6 b (s.e.)	Model 7 b (s.e.)	Model 8 b (s.e.)	Model 9 b (s.e.)	Model 10 b (s.e.)	Model 11 b (s.e.)
Self-employment × Age			208.7** (72.41)			199.5** (72.36)
Self-employment × Gender				5949** (1716)		5349** (1724)
Self-employment × Educational level					890.1** (328.1)	787.6* (329.3)
Self-employment		3271** (843.1)	− 6398 + (3469)	− 288.6 (1335)	− 3110 (2509)	− 14,872** (4243)
Super-K factor	0.139** (0.045)	2412** (559.7)	2328** (558.3)	2316** (558.1)	2387** (558.9)	2377** (558.0)
Household income	0.000+ (0.000)	0.213** (0.005)	0.213** (0.005)	0.213** (0.005)	0.213** (0.005)	0.213** (0.005)
Age	0.001 (0.002)	− 183.4** (26.67)	− 199.9** (27.71)	− 177.6** (26.54)	− 179.9** (26.57)	− 202.1** (27.69)
Gender	0.344** (0.046)	16,408** (588.3)	16,472** (586.9)	15,722** (628.1)	16,503** (586.9)	15,774** (627.8)
Educational level	− 0.007 (0.011)	1764** (138.0)	1790** (137.5)	1795** (137.4)	1663** (146.6)	1663** (146.4)
Marital status	− 0.065 (0.054)	− 7026** (689.7)	− 7132** (686.9)	− 7159** (686.5)	− 7190** (686.9)	− 7154** (685.9)
Number of children	0.045* (0.018)	119.9 (227.5)	89.36 (227.6)	101.8 (227.4)	114.2 (227.4)	73.49 (227.3)
Father's education	0.001 (0.010)	− 83.32 (123.9)	− 57.66 (123.7)	− 66.92 (123.6)	− 70.80 (123.7)	− 66.76 (123.5)
Mother's education	0.016 (0.012)	246.4+ (145.9)	238.4 (145.9)	252.5+ (145.8)	244.2+ (145.9)	242.0+ (145.7)
Main RDD sample	0.044 (0.079)	− 2733** (1010)				
Sibling sample	0.124 (0.092)	− 2147+ (1200)				
Twin sample	− 0.069 (0.085)	− 3355** (1078)				
Constant	− 1.654** (0.200)	5465* (2464)	3475 (2270)	2809 (2238)	3448 (2273)	4868* (2306)
Race	included	included	included	included	included	included
Observations	5018	5018	5018	5018	5018	5018
(Pseudo) R^2	0.028	0.446	0.446	0.446	0.446	0.448

Note. N = 5018.
+ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.

combination of life history, covitality, and personality factors, as measured by the established Super-K factor, is related to both the likelihood that individuals will choose to engage in self-employment, as well as the performance of those who are self-employed.

Our results indicate that Super-K scores are indeed positively associated with the likelihood of being self-employed (Hypothesis 1) with small effect sizes, and although Super-K scores are positively related to performance for those who are self-employed (Hypothesis 2), as measured by income, the effect size is negligible. These findings provide initial support for the notion that Super-K can help to explain a small amount of variance in separating employed from the self-employed.

In completing our study, we make the following contributions to the existing literature. First, we provide the first evidence suggesting that there could be a single, underlying life-history factor that could help further explain self-employment. Although prior research has provided valuable insight into how individual biological, social, and psychological factors could influence individuals with regards to the entrepreneurial process, as of yet there have been relatively few attempts to understand how complex socio-biopsychological factors could interact to create the 'perfect storm' of conditions necessary for individuals to engage, and succeed, in self-employment as a career. Evidence suggests that the Super-K factor could influence a number of variables that could play an important role in the self-employment process ranging from individual risk propensities (Figueredo et al., 2005) to perceptions of control under conditions of uncertainty (Mittal and Griskevicius, 2014). Moreover, life history factors can also influence psychosocial development (Dunkel et al., 2012), which can in turn effect levels of both social and human capital, two important antecedents in the entrepreneurial process (Davidsson and Honig, 2003; Martin et al., 2013). We again highlight that although Super-K is an important factor, its effects are small.
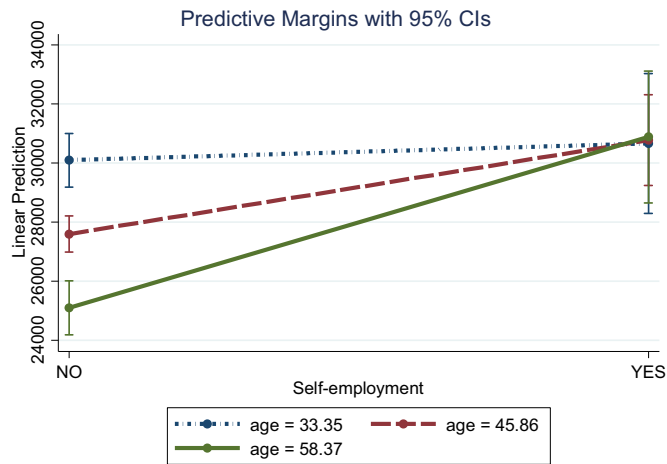
Fig. 1. Moderating effect of individual age for the self-employment-personal income relationship.

Second, our findings contribute to the ongoing conversation regarding the influence that biological factors can have on entrepreneurship and self-employment. Extending prior investigations into specific hormonal or genetic factors (van der Loos et al., 2013b; White et al., 2006), and with our findings robust to additional control for twin and sibling effects, we present evidence supporting the influence that a broad scope construct (i.e. Super-K). Our results suggest that perhaps this broader perspective regarding the biology/entrepreneurship interface could help to resolve some of the inconsistencies that have been presented with regards to the influence that biological factors could have on the entrepreneurial process. Furthermore, by adopting a LHT perspective, we highlight the need to consider not only the specific individual and environmental characteristics that could be involved in the self-employment process, but also the *interaction* that could occur between these factors and the consequences that these interactions can produce. As noted, research suggests that there are non-additive effects that constructs such as the Super-K factor can have on key outcomes (Figueredo et al., 2014a), and our results reinforce the need to consider these effects in future research.

Third, while a substantial amount of previous research indicates that those who are self-employed on average can expect to earn lower incomes than those who pursue organizational occupations (Carter, 2011), it is possible that individuals with specific combinations of social, cognitive, and psychological factors could be uniquely suited to excel within self-employment contexts. As a result, it is possible that specific life history trajectories could be more strongly associated with both entries into self-employment, as well as the overall success that individuals can experience after becoming self-employed. Although we do not find support for practically meaningful effects of Super-K on income through self-employment, additional research specifically examining the effects of "fast" versus "slow" life strategies on self-employment performance is needed in order to better understand the potential nuances in these relationships. Finally, our findings represent an important contribution back to the study of Life History Theory. We present preliminary evidence in support of the association between life history trajectories and self-employment, thereby building upon and extending previous research regarding how life history can have substantial effects on a myriad of attitudes, actions, and behaviors.

The study is not without limitations. First, while past research on Super-K has relied on MIDUS I, and for replication and consistency we rely on this data, we call on future studies to draw on longitudinal samples to assess life-history measured from an early age. While MIDUS I data has resulted in an ecology of studies in social sciences, recall bias and measurement errors cannot be
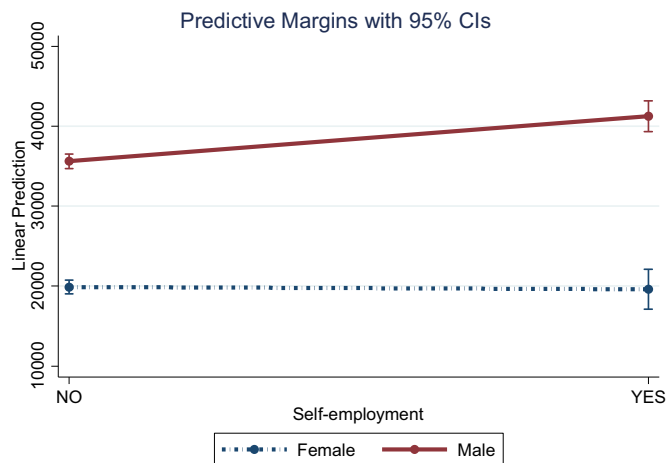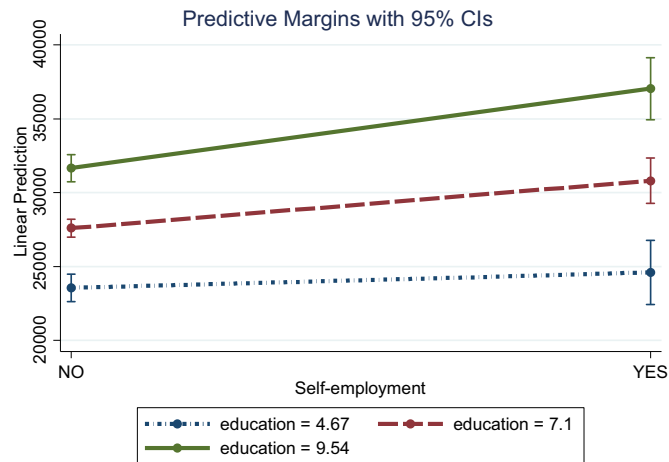

Fig. 2. Moderating effect of individual gender for the self-employment-personal income relationship.

Fig. 3. Moderating effect of individual educational level for the self-employment-personal income relationship.

fully ruled out. Second, the findings are not generalizable beyond the United States, as cultural and institutional differences could influence aspects of the Super-K factor. Third, although our additional post-hoc analyses suggest that demographic factors could influence the relationships presented in our model, we cannot tease out how these factors might contribute to the overall life history strategy that individuals develop and employ. Further research will be needed to specifically determine the nuances and complexities of these relationships and how they might affect the entrepreneurial process.

Fourth, while our measure of GPF is based on prior work that has found broader support in the literature (Musek, 2007; Rushton et al., 2008; Van der Linden et al., 2010), we also highlight the possibility of methodological artifacts in the measurement of such factors based on a recent meta-analysis of 370 samples of 155,781 individuals by Davies et al. (2015). The authors of the meta-analysis inferred that "GFP appears to be partly a stable, self-evaluative trait and partly a set of response tendencies specific to a particular personality inventory" (page 13). Given both the stable aspects of Super-K and the possibility of response artifacts, we call on a more careful consideration of these factors in interpreting our results.

Fifth, one possibility for obtaining low effect size could be the multidimensional aspect of Super-K that could be attenuate the effects of the unified Super-K dimension. For instance, personality may be driving the combined effects to a greater extent than the general health factors, and plausible combinations of other sub-constructs could be also driving the effects of Super-K more strongly than the unified dimension itself. While the dimensionality of Super-K is a matter of debate (Copping et al., 2014; Figueredo et al., 2016; Olderbak et al., 2014), the CFA in our analysis supports the unified dimension and we replicated the measure of Super-K from prior studies operationalizing Super-K from the same data as ours (Figueredo and Rushton, 2009; Figueredo et al., 2007). Nevertheless, we call on future research to refine the measurement of Super-K based on recent exchanges on the measurement validity of Super-K (Copping et al., 2017; Figueredo et al., 2015; Richardson et al., 2017).

Finally, it is important to note the relatively small effect sizes that we report with regards to key relationships. The use of the Super-K factor, although comprehensive, could, in fact, obscure certain details and nuances that could be gleaned from a more fine-grained approach. For example, on an all-encompassing measure of the Super-K construct, imagine that one individual score high on familial values is highly intelligent, but is in overall poor physical health and therefore has a lower life expectancy. Another individual avoids meaningful, long-term relationships, is highly intelligent, and in excellent physical health. A final individual is married with children, has a lower level of intelligence, but a longer life expectancy. These three individuals could have very similar overall scores on a Super-K strategy battery, despite the fact that they vary markedly on various subscales and are in reality pursuing radically divergent life strategies. Aggregating the diverse range of interwoven facets of personal history, covitality, and personality into a single Super-K score can serve to reduce the overall nuance and variance that can be distinguished between specific developmental trajectories and life strategies (Del Giudice, 2014). This "blurring" of the lines between specific sub-factors could be one explanation for the relatively small effect sizes that we see with regards to the relationship between individual's Super-K scores and key self-employment outcomes. Although recent debates on the dimensionality and measurement of the Super-K factor (Copping et al., 2017; Figueredo et al., 2015; Olderbak et al., 2014) have called for assessing different combinations of subdimensions of this instrument, many studies in the entrepreneurship literature have explored these subdimensions, as such we do not test for these subdimensions, and through the lens of life-history model we test for a more holistic picture of psycho-social factors that are associated with self-employment and income from self-employment.

The data does not include self-employment related experiences. Availability of such data could further help validate the nomological net of Super-K and self-employment dynamics. To tap into the 'lived' experiences of self-employed future studies could focus on survey-based data collection or exploit quasi-experimental designs to more robustly test and extend the proposed hypothesis.[2]

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[2] We thank the anonymous reviewer for this suggestion.

The results demonstrate two salient points. Super-K is an important predictor of self-employment after controlling for a variety of factors, however, its effect size is small. Second, although Super-K indirectly increases income through self-employment, despite a statistically significant relationship, the effect is negligible. As a result, we postulate and find support for the notion that a combination of personality, social engagement, and health, albeit with small effect, could provide a more holistic view of the choice of self-employment.

Conflict of interest

None.

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