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The financial literacy of Generation Y and the influence that personality traits have on financial knowledge: Evidence from Canada

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Abstract

This article examines the financial literacy of the Generation Y age cohort and explores how personality traits influence individual's financial knowledge. Using a detailed financial literacy survey, multiple areas of financial literacy are measured (investments, budgeting, economics, risk management, and retirement planning) along with the well-known Big Five personality traits. The findings of this article suggest that the Generation Y cohort is more knowledgeable in budgeting and risk management segments of financial literacy but lack knowledge in retirement planning. Secondly, extraversion and conscientiousness are both important personality traits when regressed on individuals overall financial literacy levels. These finding help develop the insights into how behavioral and personality traits influence the cognitive and financial decision-making ability of individuals.

JEL classification: A20; I20; D04

Keywords: Financial literacy; Behavioral finance; Personality; Generation Y

1. Introduction

Individuals around the globe are confronted with financial decisions on a daily basis. With the evolving information technology landscape, financial information is more abundant than ever before. Following conventional economic theory, one would conclude that with all this

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readily available information, individuals should be able to make better financial decisions. However, to make better decisions, individuals need to know how to interpret and use this information effectively. Further, even with the ability to understand and effectively apply the abundant amount of financial information, society is faced with several more choices of financial products and services. These changes in the financial services industry may lead to what is known as the "Paradox of Choice." As Schwartz (2004) suggests, the fact that some choice is good does not necessarily mean that more choice is better.

The financial literacy of individuals has been assessed in many countries, and the consensus is that people lack the financial knowledge to make use of the new information that is provided to them in the new age of information sharing. The recent financial product developments now make it even more important for individuals to understand the financial decisions they are making as the "human touch" of traditional banking services are now being transitioned to Internet-based platforms and algorithms. Many of these new "FinTech" products are adopted by the Generation Y age cohort, which in previous financial literacy research has been shown to exhibit low levels of financial literacy. This generation has to make critical financial decisions early in life, such as going to postsecondary education, buying a vehicle, housing decisions, among others that are vital to their future financial positions. Thus, it is important for practitioners, academics, and regulators to better understand the financial literacy levels of the Generation Y demographic and this study aims add to the growing amount of information on this group.

Behavioral finance has also emerged as an alternate view on decision-making from the traditional finance theory which depended on rational decision-making models. From the behavioral finance stream, previous literature has investigated how personality traits impact investment choices and other financially related decisions, but little research has focused on how personality traits affect one's financial literacy. This study intends to fill such gap in the literature and provides academics and practitioners with a new understanding of how personality traits influence one's ability to digest and implement the financial information provided to them. Additional stakeholders can benefit from understanding and increasing the financial literacy of Canadians. Financial institutions can benefit from understanding the financial literacy of the individuals whom they serve to better cater products and services to them; thus, improving customer retention and reducing the potential risks financial service firms face via litigation or debt defaults. Additionally, policymakers and regulators will benefit from insights into the financial literacy of the Generation Y cohort in Canada. Beginning in 2009 the Canadian federal government initiated a financial literacy task force that has further evolved into what is now the National Strategy for Financial Literacy–Count Me In, Canada. The national strategy focuses on bringing together various stakeholders in the financial services landscape to further the development and understanding of financial literacy in Canada. This research complements the Canadian Government initiative by providing a detailed view of the financial literacy levels of young Canadians and also testing how behavioral (personality) traits can influence their financial understanding.

The remainder of this article is as follows: Section 2 will provide an overview of the relevant literature on financial literacy and behavioral finance. Section 3 will outline the data sources. Section 4 describes the methodology. Section 5 will consist of the results. Section

6 will provide a discussion of the results including the implications. Section 7 will provide the conclusion and recommendations for future research.

2. Background and literature review

2.1. Financial literacy

Financial literacy is defined as the ability to process economic information and make an informed decision about financial planning, wealth accumulation, debt, and pensions (Lusardi, 2015). Over the past decade, financial literacy has been pushed into the spotlight by different government organizations around the globe. The Organization for Economic Co-operation and Development (OCED) has initiated some financial literacy programs and studies via the Program for International Student Assessment to assess and develop the financial literacy of youth across the globe. On a national scale, many developed countries now see the importance of financial literacy, which can bring increased financial stability to financial markets and have launched campaigns and surveys to promote and collect data on financial literacy.

In the United States, beginning in 2004 financial literacy questions were added to the Health and Retirement Study (HRS) and later added to several other surveys including the National Financial Capability Survey (NFCS). Data from these surveys indicate low levels of financial literacy by individuals in the United States (Lusardi & Mitchell, 2011a; Lusardi & Mitchell, 2011b Lusardi, Mitchell, & Curto, 2010). Other studies such as Bernheim (1995, 1998), Lusardi and Mitchell (2014), Lusardi and Tufano (2009), and Smith and Stewart (2009) all draw similar conclusions suggesting the lack of knowledge of basic financial concepts for the general U.S. population. Additional data from the Jump$tart Coalition for Personal Financial Literacy and National Council on Economic Education focuses on a younger sample of the U.S. population. Using data from this survey, Mandell (2008) along with Mandell and Klien (2007) find high school students in the U.S. also receive a poor grade for their financial literacy.

Outside of the United States, several studies in Europe and Asia has yielded similar findings.[1] In Canada, the quantitative survey data has started to develop but still lags behind the United States and some European countries. The primary sources of financial literacy data are the survey's sponsored by the Financial Agency of Canada (FCAC) and Statistics Canada Financial Capability Survey (FCS). The most recent FCS in 2014 indicated that 60% of adults rate their financial knowledge as "fair" or "poor" and 80% of young Canadians are not confident in their financial knowledge. Boisclair, Lusardi, and Michaud (2014) find that 42% of Canadians were able to correctly answer three questions centered on interest compounding, inflation, and risk diversification. These findings put Canada ahead of the United States but lagging behind some European countries. Also, they also conclude that the young and the old, women, and minorities score lower in their financial literacy level. Buckland (2010) draws qualitative data from a subsection of low-income Canadians and finds that the "low income" population of Canada is perhaps more financially literate than the quantitative data suggests. He suggests that the low-income sample he drew from cope well

with budgeting, credit, and knowledge of government programs but may lack knowledge in institutional policies and deeper financial life goals.

2.2. Generation Y

Following Brosdahl and Carpenter (2011) individuals born after 1981 are classified as the Generation Y age cohort. A key formative characteristic for Generation Y is early and frequent exposure to technology, which has advantages and disadvantages regarding cognitive, emotional, and social outcomes (Immordino-Yang, Chrisodoulou, & Singh, 2012). Generation Y consumers have also benefited from the increased availability of customized products and personalized services. They "want it all" and "want it now," particularly in relation to work/pay and benefits, career advancement, work or life balance, interesting work and being able to make a contribution to society via their work (Howe & Strauss, 2009; Ng, Schweitzer, & Lyons, 2010).

Within the financial landscape, youth have been targets of financial institutions growth plans for decades. Advertisements from the financial services industry can be seen on display across college campuses across Canada. Students can sign up for credit cards on campus with little information provided and little income to pay for the credit extended to them. Cudmore, Patton, Ng, and McClure (2010) documents the importance of financial literacy to "protect" the millennial generation from aggressive and sometimes deceptive tactics by financial institutions. Innovations by financial institutions via the technology sector has created a new avenue for financial institutions to strengthen their positions with this up and coming generation. Prior studies on the financial literacy of the college-aged demographic show that they are not very knowledgeable about personal finances pillars (Chen & Volpe, 1998; Harrison & Chudry, 2011; Lusardi, 2015). Thus, there is a potential for severe risks to the millennial demographic but also to the financial markets as a whole if young adults turn to "FinTech" resources without the necessary knowledge of the economic landscape. Further, as the baby boomer transition into retirement, an estimated $750 billion dollars in wealth will be transferred to a younger generation in Canada. This leads to significant implications for the entire financial system, and increased emphasis on the importance of financial literacy for the young generation is warranted.

2.3. Psychological elements and financial decision making

A fundamental assumption in the traditional literature on financial markets centers on rational expectations theory, which states that individuals use all the relevant information available when forming their expectations about economic decisions. In this traditional theory, to make good financial decisions, an individual requires proper information as well as the ability to process this information. In the recent past, the traditional view on financial markets has been challenged, and the behavioral characteristics of individuals have been used to better understand the choices people make in the financial markets (Shiller, 2003; Shleifer, 2000; Thaler & De Bondt, 1993).

Personality traits are important because they influence the way individuals interact within a particular environment. The Big Five Taxonomy has been used to provide evidence linking

personality traits to various elements of a person's life including health and longevity, social, work, and academic outcomes.[2] When focusing on how personality traits may influence one's financial environment, the behavioral finance literature has provided some possible connections. Mayfield, Perdue, and Wooten (2008) research indicate that individuals who are more extroverted intend to engage in short-term investing, while those who are higher in neuroticism and risk aversion avoid this activity. Risk adverse individuals also do not engage in long-term investing. Further, individuals who are more open to experience are inclined to engage in long-term investing; however, openness did not predict short-term investing. Further, Wilhelm, Varcoe, and Fridrich (1993) found that conscientious people are more likely to be savers. Brandstatter (1996) found emotional instability and introversion are linked to the increased likelihood of one saving over spending. More recently, Davis and Runyan (2016) explore individual's personality characteristics and financial satisfaction. Their findings suggest that trait characteristics such as the need for material resources and emotional instability affect one's overall financial satisfaction.

Although research linking personality traits and financial literacy is limited, previous literature does provide us with potential linkages. Garcia (2011) discusses both behavioral finance and financial literacy. One discussion in her article centers on the topic of "bounded rationality" of individuals, which suggests that it is almost impossible for individuals to process the sizable amount of financial information in the current informational environment and thus individuals take "shortcuts" when making financial decisions. These shortcuts are what Kahneman and Tversky (2000) referred to as biases and heuristics. Lusardi (2008) concluded that to improve individual's financial decision-making ability, the process must be simplified, and barriers for processing information must be reduced. One shortcoming of the Lusardi (2008) conclusion is that not all individuals are alike in their abilities to filter, understand, and interpret financial information and thus furthering the understanding of what impacts the financial literacy levels of individuals may aid financial planning practitioners in determining whether biases or shortcuts need to be monitored. Previous research has identified several important control variables to include when examining the level of one's financial literacy and behaviors. These variables include gender, age, race, marital status, presence of children, employment status, education, and income (Fernandes, Lynch, & Netemeyer, 2014; Robb & Woodyard, 2011; Xiao, Chen, & Chen, 2014; Xiao, Chen, & Sun, 2015; Zick, Mayer, & Glaubitz, 2012). For example, minorities and those with less education and income tend to score lower on measures of financial knowledge and women tend to score lower than men.

The studies mentioned above provide evidence that financial literacy is sensitive to a variety of elements unique to each individual but does not explore the impact personality, or behavioral traits have on one's financial literacy. Previous studies have shown potential pathways between personality traits and cognitive performance. Specific personality traits such as conscientiousness as well as openness are positively correlated with academic performance (Goldberg, Sweeney, Merenda, & Hughes, 1998; Noftle & Robins, 2007). Further, Davis and Runyan (2016) suggest conscientious individuals might be more effective problem solvers lead to better understating of the complexities of the personal financial landscape. This leads this research to suggest that conscientiousness will be the strongest

personality trait influencing one's financial literacy and suggests it will have a positive impact.

Hypothesis 1: Individuals scoring high in conscientiousness will score higher in their overall financial literacy.

Secondly, Saucier and Goldberg (1996) drawing from their research on the Big Five trait domains, conceptualized the Openness domain as "Intellect," emphasizing its connection to creativity, abstract thinking, depth of thought, and other intellective qualities. Thus, this article will test the impact of Openness on one's financial literacy and suggests that openness will have a positive impact.

Hypothesis 2: Individuals scoring high in openness will score higher in financial literacy.

Finally, Connor-Smith and Flachsbart (2007) found extraversion was predictive of concrete problem-solving skills as well as coping strategies. Further, extroverted individuals, who are optimistic and outgoing, can be seen as more likely to consult someone for financial advice and take the initiative to gather additional resources to become better informed. Thus, the third hypothesis suggests extroverted individuals will have higher levels of financial literacy.

Hypothesis 3: Individuals scoring high in extroversion will score higher in financial literacy.

3. Data

This study uses the "Big Five" personality framework to capture the personality characteristics of each individual. This research uses five-factor model (FFM), or the "Big Five," because it is, unquestionably, the most universal and widely accepted trait framework in the history of personality psychology (John & Srivastava, 1999).[3] Specifically, the article uses the 44-item inventory (Version 4A and 54) that measures an individual on the Big Five Factors (dimensions) of personality.[4] The first dimension refers extraversion or introversion to the preference of interacting with others or being alone. The second agreeableness includes trust, moderation, altruism, cooperativeness, modesty and kindness or compassion (McCrae & Costa, 2010). The third conscientiousness involves competence, order, sense of duty, a tendency toward achievement, self-discipline, and cautiousness. This dimension has been associated with academic success (McCrae & Costa, 2010). The fourth neuroticism is defined as a personality dimension characterized by a tendency to experience negative emotions and is associated with emotional distress or negative effect. People scoring high in Neuroticism report greater anxiety, depression, hostile anger, impulsiveness, self-consciousness, and emotional vulnerability. The fifth openness includes esthetic openness and openness to feelings, activities, ideas, and values (McCrae & Costa, 2010). Following the standard approach in the literature this research creates the standardized Cronbach alpha reliability index to assess the internal consistency of the five items, leading to the following reliability measures for the sample: conscientiousness (0.77), extraversion (0.86), agreeableness (0.75), neuroticism (0.81), and openness (0.73). These diagnostic measures of

reliability fall within the previous reliability findings of the various Big Five personality traits surveys and provide confidence (above 0.70) of the reliability of the assessment in this study.

The financial literacy questions were developed by the author by incorporating previous financial literacy surveys such Canadian Financial Capabilities Survey (CFSC) conducted by Statistics Canada[5] along with academic studies by Chen and Volpe (1998) and Lusardi (2015). This new survey measures not only the overall financial literacy of an individual but also how knowledgeable a participant is in the different subcategories of financial literacy that include; Investments, Budgeting, Economics, Risk Management, and Retirement Planning. Thus, this survey provides further details into the strengths and weaknesses that individuals may have in regards to their financial knowledge and allows policymakers, practitioners, and educators to potentially focus more resources on specific areas of the financial services environment (see Appendix for Financial Literacy Survey).

The data from the survey was collected via two different college campuses in Canada during October 2016 and April 2017. Both schools were located in large metropolitan centers and benefited from a broad range of ethnic diversity, educational backgrounds, and prior financial experiences. In total, 157 individuals participated in the study in which 149 of these were able to be used (eight incomplete surveys). While the sample size is somewhat smaller than other studies using national datasets, the power and generalizability of this study remain robust with the inclusion of four (base model) and nine (full model) independent variables.[6] Table 1 shows the descriptive statistics of the variables used in the study. Panel A of Table 1 illustrates the distribution of individuals based on gender, race, and employment status. Panel B of Table 1 outlines the financial literacy and Big Five personality variables. The personality traits are ranked on a five-point scale, and the data suggests we have a wide variety of different personality traits across individuals in the study. The first financial literacy variable (FLO) indicates that the highest score recorded on the financial literacy survey was 97% and the lowest only 21% with a mean score of 67%. Out of the five different subcategories of financial literacy, participates scored well in budgeting, economics, and risk management but are weaker in categories of investments and retirement planning. Table 2 documents the correlation matrix for the financial literacy and personality measures. High degrees of correlation exists between the financial literacy variables, but little correlation is shown between the Big Five personality traits that will be included as independent variables in the regression which should lead to robust results.

4. Empirical methodology

This study uses a multiple regression approach to investigate the impact personality traits have on financial literacy. The initial model development was based on previous literature that has suggested that gender, race, and employments status tend to impact one's level of financial literacy (Fernandes et al., 2014; Xiao et al., 2014; Xiao et al., 2015). Further, because of Canada immigration policies and the high proportion of international students in postsecondary education, this study controls and tests whether

Table 1 Descriptive statistics
Panel A: Categorical and dummy variables

Variable	*N*	%
Gender		
Male	86	57.7
Female	63	42.3
Education		
High school	117	78.5
College diploma	17	11.4
Bachelor degree	11	7.4
Master's degree	4	2.7
Marital status		
Single	124	83.2
Married	22	14.8
Divorced	3	2.0
Years in Canada		
0–2	19	12.8
3–5	56	37.6
6–8	12	8.1
8 or more	62	41.6
Employment status		
Employed	96	35.6
Unemployed	53	64.4
Gross income per year		
>$15,000	69	46.3
$15,001 to $30,000	34	22.8
$30,001 to $65,000	22	14.8
<65,001	24	16.1
Ethnicity		
White	49	32.9
African American/Black	16	10.7
Hispanic/Latino	21	14.1
Asian	36	24.2
Other	27	18.1

new immigrant status impacts the level of financial literacy. Thus, the base model takes on the following form;

$$FL_i = \beta_0 + \beta_1 GEN_i + \beta_2 RACE_i + \beta_3 EMP_i + \beta_4 RES_i + \varepsilon \quad (1)$$

where FL_i is the financial literacy score of the participant *i*. This study uses an overall financial literacy score (FLO) based on 28 questions survey, along with financial literacy scores for subsections of financial literacy which includes: Investments, Budgeting, Economics, Risk Management, and Retirement Planning. GEN_i is a dummy variable equal to 1 for male participates and 0 for female. RACE is a dummy variable equal to 1 if the participant is White and 0 if identified as a minority. EMP is a dummy variable equal to 1 if the participant has been employed for over two years and 0 if not. Finally, RES is a dummy variable taking a value of 1 if the participant has been a resident of Canada for over five years and zero if not. Consistent with the previous literature, we would expect that

$$\beta_1 > 0,\ \beta_2 > 0,\ \beta_3 > 0 \text{ and } \beta_4 > 0.$$

Panel B: Descriptive statistics (financial literacy and personality traits)

Variable	*N*	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
FLO	149	0.19	0.97	0.71	0.13	−0.43	−0.59
FLI	149	0.17	1.00	0.67	0.19	−0.31	−1.11
FLB	149	0.00	1.00	0.74	0.16	−0.40	1.62
FLE	149	0.11	1.00	0.73	0.24	−0.38	−0.16
FLRM	149	0.00	1.00	0.72	0.26	−0.94	0.48
FLRP	149	0.00	1.00	0.58	0.28	0.09	−0.17
BFIE	149	2.01	4.75	3.58	0.55	−0.24	−0.24
BFIA	149	1.75	5.00	3.98	0.60	−0.51	0.69
BFIC	149	1.95	5.00	3.43	0.58	−0.27	0.17
BFIN	149	1.00	4.45	2.89	0.61	−0.56	0.26
BFIO	149	2.35	4.90	3.61	0.51	0.17	−0.39

Overall financial literacy (FLO) is the percentage of correct scores from 28 questions on financial literacy. FLI represents the financial literacy metric focused on investments. FLB represents the financial literacy metric focused on budgeting. FLE represents the financial literacy metric focused on economics. FRRM represents the financial literacy metric focused on risk management. FLRP represents the financial literacy metric focused on retirement planning. BFIE represents the level of extroversion an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (introvert) to 5.0 (extrovert). BFIA represents the level of agreeableness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not agreeable) to 5.0 (very agreeable). BFIC represents the level of conscientiousness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not conscientious) to 5.0 (very conscientious). BFIN represents the level of neuroticism an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (low neuroticism) to 5.0 (high neuroticism). BFIO represents the level of openness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (closed) to 5.0 (very open).

Building off the base model, this research will incorporate the personality measures to explore how they may influence individual's financial literacy. The second model takes on the following form;

$$\mathrm{FL}_i = \beta_0 + \beta_1 \mathrm{GEN}_i + \beta_2\ \mathrm{RACE}_i + \beta_3 \mathrm{EMP}_i + \beta_4 \mathrm{RES}_i + \beta_5 \mathrm{BFIE}_i + \beta_6 \mathrm{BFIA}_i + \beta_7 \mathrm{BFIC}_i + \beta_8 \mathrm{BFIN}_i + \beta_9 \mathrm{BFIO}_i + \varepsilon \quad (2)$$

where the measurement of FL, GEN, RACE, EMP, and RES are as above in the base model. BFIE is the measurement of extraversion/introversion, BFIA_i is the measurement of agreeableness, BFIC_i is the measurement of conscientiousness, BFIN is the measurement of neuroticism and BFIO_i is the measurement of openness. We would expect that

$$\beta_5 > 0,\ \beta_6 \neq 0,\ \beta_7 > 0,\ \beta_8 < 0, \text{ and } \beta_9 > 0.$$

5. Results

The results from the base regression model (1) can be seen in Table 3. The findings suggest that only race has a significant impact on financial literacy levels of the Generation Y demographic in Canada. The coefficient of 0.129 indicates that minorities exhibit approx-

Table 2 Correlation matrix

	FLO	FLI	FLB	FLE	FLRM	FLRP	BFIE	BFIA	BFIC	BFIN	BFIO
FLO	1.00										
FLI	0.73	1.00									
FLB	0.59	0.42	1.00								
FLE	0.77	0.38	0.36	1.00							
FLRM	0.73	0.35	0.38	0.53	1.00						
FLRP	0.79	0.56	0.27	0.59	0.44	1.00					
BFIE	−0.06	−0.09	−0.19	0.02	0.14	−0.13	1.00				
BFIA	0.09	0.14	0.15	−0.03	0.18	−0.10	0.15	1.00			
BFIC	0.28	0.22	0.32	0.25	0.40	0.17	0.43	0.37	1.00		
BFIN	−0.09	−0.14	0.08	−0.04	−0.09	−0.09	−0.32	−0.16	−0.35	1.00	
BFIO	0.14	0.13	0.21	0.03	−0.04	−0.04	0.35	0.18	0.33	−0.25	1.00

Overall financial literacy (FLO) is the percentage of correct scores from 28 questions on financial literacy. FLI represents the financial literacy metric focused on investments. FLB represents the financial literacy metric focused on budgeting. FLE represents the financial literacy metric focused on economics. FRRM represents the financial literacy metric focused on risk management. FLRP represents the financial literacy metric focused on retirement planning. BFIE represents the level of extroversion an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (introvert) to 5.0 (extrovert). BFIA represents the level of agreeableness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not agreeable) to 5.0 (very agreeable). BFIC represents the level of conscientiousness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not conscientious) to 5.0 (very conscientious). BFIN represents the level of neuroticism an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (low neuroticism) to 5.0 (high neuroticism). BFIO represents the level of openness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (closed) to 5.0 (very open).

Table 3 Regression results (base model)

Variable	FLO	FLI	FLB	FLE	FLRM	FLRP
Constant	0.627[c] (0.051)	0.519[c] (0.061)	0.682[c] (0.054)	0.666[c] (0.074)	0.802[c] (0.082)	0.522[c] (0.081)
GEN	−0.019 (0.043)	0.019 (0.051)	0.020 (0.047)	−0.026 (0.064)	−0.121[a] (0.071)	−0.054 (0.071)
RACE	0.129[c] (0.044)	0.167[c] (0.053)	0.085[a] (0.048)	0.144[b] (0.66)	0.149[b] (0.073)	0.143[b] (0.072)
EMP	0.029 (0.042)	0.059 (0.051)	0.002 (0.046)	0.065 (0.063)	0.040 (0.071)	0.041 (0.069)
RES	−0.008 (0.044)	0.089 (0.053)	−0.015 (0.048)	−0.034 (0.066)	−0.087 (0.073)	−0.054 (0.072)
R^2	0.148	0.152	0.091	0.091	0.131	0.086
F-statistic	3.19[c]	3.24[c]	2.721[b]	2.654[b]	2.983[b]	2.457[a]

The dependent variables include: Overall financial literacy (FLO) is the percentage of correct scores from 28 questions on financial literacy. FLI represents the financial literacy metric focused on investments. FLB represents the financial literacy metric focused on budgeting. FLE represents the financial literacy metric focused on economics. FRRM represents the financial literacy metric focused on risk management. FLRP represents the financial literacy metric focused on retirement planning. The independent variables include: Gender (GEN) equal to 1 if the participant is male and zero if female. Race (RACE) equal to 1 if the participant identifies as Caucasian and zero if otherwise. Employment status (EMP) equal to one if the participant has been in the workforce force for more than 2 years and zero if not. Residence in Canada (RES) equal to one if the participant has held residence in Canada for more 5 years and 0 if otherwise.

[a]Indicates significance at the 10% level, [b]at the 5% level, [c]at the 1% level.

Table 4 Regression results (full model)

Variable	FLO	FLI	FLB	FLE	FLRM	FLRP
Constant	0.386 (0.252)	0.337 (0.311)	0.188 (0.277)	0.363 (0.398)	−0.068 (0.408)	0.992[b] (0.434)
GEN	−0.007 (0.042)	0.023 (0.052)	0.029 (0.046)	0.005 (0.067)	−0.082 (0.068)	−0.059 (0.073)
RACE	0.134[c] (0.041)	0.166[c] (0.051)	0.079[a] (0.045)	0.164[b] (0.065)	0.162[b] (0.067)	0.153[b] (0.071)
EMP	0.010 (0.040)	0.043 (0.050)	0.015 (0.044)	0.031 (0.064)	0.018 (0.065)	−0.006 (0.069)
RES	0.001 (0.042)	0.096[a] (0.051)	−0.030 (0.045)	−0.001 (0.065)	−0.069 (0.066)	−0.028 (0.071)
BFIE	−0.071[b] (0.034)	−0.089[b] (0.042)	−0.090[b] (0.037)	−0.034 (0.054)	−0.023 (0.055)	−0.120[b] (0.059)
BFIA	−0.005 (0.034)	0.018 (0.042)	0.055 (0.037)	−0.048 (0.054)	0.026 (0.056)	−0.092 (0.059)
BFIC	0.103[c] (0.035)	0.095[b] (0.042)	0.021 (0.038)	0.149[c] (0.055)	0.164[c] (0.056)	0.147[b] (0.061)
BFIN	0.007 (0.032)	0.040 (0.039)	0.047 (0.035)	0.037 (0.051)	0.029 (0.052)	−0.038 (0.056)
BFIO	0.033 (0.037)	0.036 (0.046)	0.106[b] (0.041)	−0.008 (0.059)	0.046 (0.060)	−0.032 (0.064)
R^2	0.276	0.268	0.252	0.197	0.271	0.196
F-statistic	4.156[c]	3.456[c]	3.032[c]	2.602[b]	3.756[c]	2.568[b]

The dependent variable(s) remain as in Table 3. The control variables GEN, RACE, EMP, and RES remain as described in Table 3. BFIE represents the level of extroversion an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (introvert) to 5.0 (extrovert). BFIA represents the level of agreeableness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not agreeable) to 5.0 (very agreeable). BFIC represents the level of conscientiousness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (not conscientious) to 5.0 (very conscientious). BFIN represents the level of neuroticism an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (low neuroticism) to 5.0 (high neuroticism). BFIO represents the level of openness an individual exhibits as measured by the Big Five personality survey with scores ranging from 0.1 (closed) to 5.0 (very open).

[a]Indicates significance at the 10% level, [b]at the 5% level, [c]at the 1% level.

imately 13% lower scores in the overall financial literacy survey. This result holds across all five subsections (Investments, Budgeting, Economics, Risk Management, and Retirement Planning) of the financial literacy survey and is significant at all conventional statistical significance levels. Unlike previous studies by Lusardi and Mitchell (2011a) and Van Rooij, Lusardi, and Alessie (2011) who find that women exhibit lower scores in financial literacy than men, this study does not find the gender variable significant in determining financial literacy levels. In fact, when measuring financial literacy surrounding risk management, males tend to exhibit lower financial literacy than females. Finally, employment status or experience and residency length do not seem to influence the levels of the participants in this survey.

Table 4 provides the results from regression (2) which incorporates the control variables above along with the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness). The extraversion and conscientiousness variables show to be statistically significant on the various measures of financial literacy but have differing effects. The extraversion coefficient ranges from −0.120 to −0.023 across the various measures of financial literacy suggesting that individuals that exhibit more extroversive characteristics have lower levels financial literacy than those who may be more of an introvert. The conscientiousness variable ranges from 0.164 to 0.021, indicating that individuals who score higher on conscientiousness tend to have a greater degree of financial literacy. Conscientiousness tends to impact risk management and economics literacy the most but has little impact on budgeting. Of the other personality traits

measured by the Big Five, agreeableness does not seem to affect financial literacy in any definitive manner. Neuroticism tends to have a positive impact (although not significant) across most financial literacy measures expect retirement planning. Finally, openness tends to have a mixed impact on financial literacy levels but does have a positive and significant impact budgeting literacy.

Before moving on to the discussion and implications, the assumptions of the regression analysis seem to be met. The first assumption, linearity, was assessed through an analysis of residuals and these results do not exhibit any nonlinear patterns. Tests to see if the data met the assumption of collinearity indicated that multicollinearity was not a concern (VIF scores ranging from 1.10 to 1.62. Finally, the data suggests that no consistent pattern was found of the residuals and normality of the error terms, thus fulfilling the independence and normality assumptions.

6. Discussion and implications

The findings of these study lead to several implications for the consumer, financial institutions, and regulators of the financial sector. The primary results that focus on behavioral traits of individuals add new evidence to the financial literacy literature that outlines what groups of people may be most at risk when it comes to financial decision making. The results indicate that extroverts exhibit less financial literacy than introverts, which should lead financial services practitioners to be more cautious in their dealing with these types of individuals and ensure that additional resources are provided, so they are aware of the financial products and services they are receiving. Second, for firms that are seeking to employ individuals that provide financial products and services to consumers, extroverts are sometimes preferred over introverts, as interaction with people is a necessary step in providing financial services. Popular human resource questionnaires that screen for behavioral traits that translate into sales roles may conflict with characteristics that ensure cognitive abilities in financial markets. Thus, regulators and firms should seek a proper balance when determining which traits to value during employment assessments. As the industry moves towards technology-based platforms where traditional human interaction is becoming less important, the financial sector may benefit from introverts being more employable and strengthening the financial sector's human capital by providing training models via alternative mediums such as social media platforms. Further, conscientiousness is an important trait for financial service employees to have and this adds further evidence that employers should value this quality when making hiring decisions in the financial sector as these individuals exhibit a better understanding of the overall financial landscape and again can add more stability to the overall financial system.

The lack of significance of the gender dummy provides differing results from previous studies such as, Chen and Volpe (2002); Lusardi and Mitchell (2011a); Van Rooij et al. (2011), among others who find that women seem to exhibit lower scores in financial literacy than men. This sample of individuals drawn from the Canadian population suggests that Canadian women have similar financial knowledge when compared with their male counterparts. This may be because of the increased gender neutrality that Canada has been

pushing for in the past decade in the overall workforce. As Drolet (2016) outlines, women now play a greater role in the purchase of items such as houses, automobiles, insurance, and financial services. Women also face different financial challenges than men. Canadian women can expect to live about 4.5 years longer than men and, therefore, must finance a longer period of retirement. Canadian women have higher disability rates than men and may incur costly long-term care needs as they age. These findings showcase why financial literacy is of great importance to females and that issues such as insurance and estate planning should be emphasized in future research.

The result that indicates that non-Whites experience lower financial literacy rates confirms previous findings such as Lusardi et al. (2010) and Lusardi and Mitchell (2014) who find minorities have significantly less financial literacy when compared to Whites. The findings from the previous research along with this article should provide financial literacy groups in Canada such as the Financial Consumer Agency of Canada (FCAC) to fund projects that are focused on developing the financial literacy of minority groups in Canada. After controlling for length of residency in Canada, it seems that new immigrants have transitioned well into the Canadian financial system. This becomes increasingly important as new immigrants to Canada have reached all-time highs in the past decade and the transition into a new banking system and economy can be difficult for them and could provide risks to the overall financial sector. Further research focused on new immigrants (potentially on various age demographics) is warranted to ensure new financial literacy programs are directed at the individuals most at need.

7. Conclusion

It is important to push forward the financial literacy of Canadians in many regards. Lusardi and Mitchell (2007, 2011a, 2011b) provided multiperiod life cycle model and evidence that shows that it is socially optimal to raise financial knowledge of everyone early in life. Former Federal Reserve Board Chair, Ben Bernanke stated in a speech in 2013 that, "Among the lessons of the financial crisis is the need for virtually everyone both young and old- to acquire a basic knowledge of finance and economics. Such knowledge is necessary for anyone who will be faced with managing a household budget, making financial investments, finding reliable information about buying a car or a house and preparing financially for retirement and other life goals" (Bernanke, 2013).

As we push forward with financial education programs to foster the financial literacy of households and individuals it is important to understand where educators and regulators focus their attention. This research concentrates on the Generation Y age demographic, which are some of the early adopters of the financial technology (FinTech) products and services. While focusing on this demographic, this research measures the personality traits of individuals and shines new light on how behavioral traits may influence one's ability to understand the complexities of the financial decisions people face.

The results of this research indicate that some personality traits do in fact play a role in financial literacy of an individual. The most significant personality trait shown to impact financial literacy is conscientiousness. Individuals that have a higher degree of conscientiousness tend to exhibit higher levels of overall financial literacy. These results hold across

the various measures of financial literacy which include: Investments, Budgeting, Economics, Risk Management, and Retirement Planning. Another personality trait that has an influence on one's overall financial literacy is extraversion. Those who tend to be more extroverted tend to score lower in their overall financial literacy.

Although the primary research goal of this article was to uncover the role of personality traits on financial literacy this article also confirmed that minorities tend to exhibit a lower level of financial literacy, which is supported by previous work by Lusardi and Mitchell (2014), among others. In contrast to the previous finding by Chen and Volpe (2002) and Lusardi and Mitchell (2011a), the gender dummy variable did not show any statistical significance suggesting that males and females in the Generation Y age cohort share similar levels of financial literacy.

The results of this research add to the growing literature in both the financial literacy and behavioral finance fields. Policymakers and regulators can use this research to understand how to develop their financial literacy initiatives. Financial institutions in Canada who want to strengthen their customer base to provide additional products and services can also benefit from understanding the gaps that exist in financial knowledge of the Generation Y age cohort. This age group may need further assistance in developing their financial literacy levels, and financial institutions and regulators can use social media outlets to engage the Generation Y cohort and build a more financially savvy base of young clients. Finally, financial institutions should be aware of the "Paradox of Choice." As Schwartz (2004) suggests, the fact that some choice is good doesn't necessarily mean that more choice is better. Understanding the limits of their customer base should lead banks and financial services providers to restrict the number of choices consumers need to make in complex financial planning areas.

Further research is imperative in Canada and around the globe, to further the understanding of how financial literacy affects the various stakeholders in the financial markets. As the baby boomer transition into retirement, an estimated $750 billion dollars in wealth will be transferred to a younger generation in Canada. This leads to significant implications for both young and old. The older generation will need to structure the transfer of this wealth properly, and the younger generation will have abundant amounts of capital that will need to be managed and preserved for future generations. This research acknowledges that estate planning literacy (outside risk management) was not addressed and future research is needed to better understand how wealth transfers in the coming decades can be managed effectively. Collins (2012) has shown that financial literacy impacts one's motivation to seek professional financial advice which should provide motivation for industry professionals to promote financial literacy as a complement rather than a substitute for their services. Further, industry professionals along with regulators need to modernize their communication mediums to include the various social media platforms which will allow them to capture the various personality types of the Generation Y age cohort.

Notes

1 See Lusardi and Mitchell (2011b) for a detailed list of literature outside of the United States.

2 For a detailed survey of the literature on these see John, Naumann, and Soto (2008).
3 Although widely accepted in the psychology literature, alternative approaches to the Big Five approach have been put forward including approaches with fewer than five factors and approaches with more than five factors. See Almlund, Duckworth, Heckman, and Kautz (2011) for a discussion of the alternatives to and criticisms of the Big Five approach that have been put forward in the psychology literature.
4 See John, Donahue, and Kentle (1991) and John et al. (2008) for detailed review of the survey used and analysis of personality factors.
5 CFSC survey see www.23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5159
6 The desired ratio of observations to independent variables is 15:1. When this level is reached, the results should be generalizable if the is representative. This research acknowledges that the sample is representative of the Generation Y demographic and the results should not be applied to other age groups.

Appendix

Financial literacy survey

Thank you for participating in our survey. This survey is intended to measure college students' knowledge of personal finance. The results will be used to help students improve their knowledge and colleges improve curriculums. Please answer all the questions the best of your ability. Again, thank you for participating.

Investments

1. Which of the following investment types carries the most risk?
A. Equities (stocks)
B. Short-term government bonds
C. Grade aa corporate bonds
D. Government insured certificates (GICS)
E. Balanced Canadian mutual fund

2. Which of the following investment types would offer the highest expected return?
A. Grade AA corporate bonds
B. Short-term government bonds
C. Equities (stocks)
D. Balanced Canadian mutual fund
E. Government insured certificates (GICS)

3. What do you think the average yearly return is on the overall stock market (Toronto Stock Exchange)?
   A. 30%
   B. 20%
   C. 2%
   D. 7%
   E. -5%

4. Which of the following is false?
   A. As shareholders of a mutual fund, you have a right to tell fund managers what securities to buy.
   B. A mutual fund is a diversified collection of securities used as an investment vehicle.
   C. A mutual fund is an investment corporation that raises funds from investors and purchases securities.
   D. Your ownership in a mutual fund is proportional to the number of shares you own in the fund.

5. A dividend is,
   A. Distributions paid to bond-holders
   B. Distributions paid to executives
   C. Distributions paid to equity(stock) holders
   D. Distributions paid from derivatives

Budgeting (savings and borrowing)

6. Which of the following can hurt your credit rating?
   A. Making late payments on loans and debts
   B. Staying in one job too long
   C. Living in the same location too long
   D. Using your credit card frequently for purchases

7. What can affect the amount of interest that you would pay on a loan?
   A. Your credit rating
   B. How much you borrow
   C. How long you take to repay the loan
   D. All of the above

8. Which of the following will help lower the cost of a house?
   A. Paying off the mortgage over a long period of time
   B. Agreeing to pay the current rate of interest on the mortgage for as many years as possible
   C. Making a larger down payment at the time of purchase
   D. Making a smaller down payment at the time of purchase

9. Your savings accounts in a federally insured commercial bank are insured by
   A. BOC to the maximum amount of $10,000 per account.

B. CDIC to the maximum amount of $100,000.
C. CDIC to the maximum amount of $50,000 per account.
D. BOC to the maximum amount of $100,000.

10. If you invest $1,000 today at 4% for a year, your balance in a year will be
A. Higher if the interest is compounded daily rather than monthly.
B. Higher if the interest is compounded quarterly rather than weekly.
C. Higher if the interest is compounded yearly rather than quarterly.
D. $1,040 no matter how the interest is computed.
E. $1,000 no matter how the interest is computed.

11. Which is false concerning credit cards?
A. You can use your credit card to receive a cash advance.
B. If your credit card balance is $1,000 and you pay $300, interest is charged on the unpaid balance of $700.
C. The rate of interest on your credit card is normally higher than you can earn on a savings account.
D. A credit card company will not charge you interest if you pay off the entire balance by the due date.

Economics

12. What is inflation?
A. The rate at which the country's exports grow
B. The rate at of unemployment in the country
C. The rate at which the average price level of goods and services changes
D. The rate at which the stock market grows

13. How do economists classify a recession?
A. Two negative quarters of GDP growth
B. Unemployment reaches 10%
C. Unemployment and inflation both rise
D. One (1) month of negative GDP growth

14. When the central bank of Canada (the bank of Canada) raises its interest rate how does this affect you?
A. Makes my investments more profitable
B. Makes my loans or mortgage more affordable
C. Makes my loans or mortgages more expensive
D. Increases inflation and make products and services more expensive

15. As the Canadian dollar falls in value compared to U.S. dollar what impact does that have on domestic (Canadian) prices?
A. Makes goods and services more expensive
B. Makes goods and services less costly
C. Has no direct effect

D. Prices will go up and then go down

16. If the inflation rate was 6% and you made a 5% return on your investment in the past year you would have more purchasing power now than at the beginning of the year?
A. True
B. False

17. If interest rates rise, the price of a 10-year government bond will
A. Increase.
B. Decrease.
C. Remains the same.
D. Trade at a premium.
E. Be impossible to predict.

Risk management

18. If each of the following persons had the same amount of take home pay, who would need the greatest amount of life insurance?
A. A young single woman with two young children
B. A young single woman without children
C. An elderly retired man, with a spouse who is also retired
D. A young married man without children

19. The main reason to purchase insurance is to
A. Protect you from a loss recently incurred.
B. Provide you with excellent investment returns.
C. Protect you from sustaining a catastrophic loss.
D. Protect you from small incidental losses.

20. What type of insurance product is limited in length of coverage?
A. Whole-life insurance coverage
B. Term-insurance coverage
C. Duration-insurance coverage
D. All insurance products are limited in length

21. Auto insurance companies determine your premium based on
A. Age of insured.
B. Record of accidents.
C. Type and age of vehicle.
D. All of the above.

22. Life insurance products remain in force even though premiums have not been paid?
A. True
B. False

Retirement planning

23. High-risk and high-return investment strategy would be most suitable for
A. An elderly retired couple living on a fixed income.
B. A middle-aged couple needing funds for their children's education in two years.
C. A young married couple without children.
D. All of the above because they all need high return.

24. Upon retirement today what is the approximate maximum value that a person could receive from the Canadian Pension Plan? (Monthly Payment)
A. 505.00
B. 1065.00
C. 1920.00
D. 2510.00

25. Your employer is obligated to provide you with retirement income if you worked for them for more than 25 years?
A. True
B. False

26. Consider the following scenario: Jack and Jill are twins. At the age of 20, Jack started contributing $20 a month to a savings account. After 20 years, at the age of 40, he stopped adding to his savings, but he left the money in the account. Jill didn't start to save until she was 40. Then, she saved $20 a month until she retired 20 years later at age 60. Suppose both Jack and Jill earned 6% interest per year on their savings. When they both retired at age 60, who had more money?
A. Jack
B. Jill
C. They had the same amount
D. Don't know

27. Alice wants to invest $1,000 for retirement this year. Her new employer will fully match her company pension contributions, up to $10,000 per year. All else being equal, which of the following options will give Alice the highest total amount at the end of the year?
A. Alice contributes $1,000 to her company pension plan and invests that money in mutual fund at the end of the year with mutual fund A and has earned a 5% return.
B. Alice does not contribute to her company pension plan but she invests $1,000 in mutual fund X outside of her company pension plan. At the end of the year, mutual fund X has earned a 20% return.
C. Alice does not contribute to her company pension plan, but she invests $1,000 in mutual fund Y outside of her company pension plan. At the end of the year, mutual fund Y has earned a 5% return.
D. Don't know.

General

28. What age category do you fall into?
A. 15–19
B. 20–24
C. 25–29
D. 30+

29. Indicate the highest level of formal education completed.
A. High school
B. Some college
C. 4-year bachelor degree
D. Master's degree or better

30. In the above education were you enrolled in business-specific program?
A. Yes
B. No

31. Indicate which ethnic category you define yourself as,
A. White
B. African American
C. Hispanic
D. Asian
E. Middle eastern
F. Other

32. What is your gender/sex?
A. Male
B. Female

33. What is you marital status?
A. Single
B. Married
C. Separated/divorced

34. How long have you lived in Canada?
A. 0–2 years
B. 3–5 years
C. 6–8 years
D. 8+ years

35. Indicate how many years of experience you have in the work-force.
A. 0–2
B. 3–5
C. 6–8
D. 8+

36. What is your approximate gross income per year?

A. Less than $15,000
B. $15,001 to $30,000
C. $30,001 to $65,000
D. $65,000+

37. How many times in a month do you psychically go to you banking institution?
A. 0–1
B. 1–3
C. 3–5
D. 5 or more

38. How many times in a month do you check your bank account online or via your banking app?
A. 0–3
B. 4–7
C. 8–11
D. 11 or more

39. Do you feel more comfortable interacting with someone about your finance in person or via a technology based platform?
A. In person
B. Technology-based

40. How many credit cards do you own?
A. 0
B. 1
C. 2
D. 3
E. 4 or more

Thank you!!!

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