CHARTERED PROFESSIONAL ACCOUNTANTS CANADA

How personality traits and economic beliefs shape financial capability and literacy

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for Chartered Professional Accountants of Canada

2019

20-1506

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Foreword from CPA Canada

The final report in CPA Canada's series on financial capability provides a broad overview of the connection between financial behaviour and personality traits. This series is a Canadian first in making the connection between the two in what is a budding area of research.

Chartered Professional Accountants of Canada (CPA Canada) has long been at the forefront of confronting the challenge of promoting positive financial behaviours. Through our capacity as trusted financial experts and advisors – per our thought leadership and our award-winning financial literacy programming – we have done our best to help Canadian families and newcomers to the country understand the importance of financial literacy.

However, part of our responsibility as leaders in financial literacy is also to investigate the factors that impact how Canadians learn and how they translate that learning into their ongoing behaviour. Our work connecting financial capability and personality traits has shown us that financial wellness is impacted by factors well beyond what existing literature proposes – that there are invisible barriers that we need to overcome if we are to address what is rapidly becoming one of the most significant challenges of our time.

Financial wellness is at the heart of many public policy issues, from poverty and low income to the increasing economic disenfranchisement of certain pockets of society. We hope this research will help policymakers develop solutions that benefit those that may face challenges in these areas. We are at a critical juncture in the world today. Let us make sure we are having the right conversation.

Executive Summary

Dozens of studies of financial literacy have reviewed predictors of financial capability and financial literacy. However, these investigations have mostly focused on socio-economic characteristics like age, gender, education and income as a way to identify groups that have higher or lower levels of financial literacy and financial capability. Separately, psychologists who study financial behaviour have long found that individual differences in personality and beliefs contribute to differences in specific financial habits.

Building on two prior studies for CPA Canada, this study takes a deeper dive on the role of psychological factors, focusing on the influence of personality traits and economic beliefs on financial knowledge and financial capability.

CPA Canada conceived and designed a survey that builds on work by the Financial Consumer Agency of Canada and Statistics Canada's Canadian Financial Capability Survey. In addition to assessing financial attitudes, habits and knowledge, this survey also assesses psychological traits and economic beliefs. Data was collected from an online panel of adult Canadians in 2015 by a third party under contract to CPA Canada.

The current study suggests that psychological variables play as large a role in shaping financial literacy and financial capability as do the most frequently studied socio-economic variables. Even when controlling for age, gender, income and education, individual differences in psychological traits and beliefs about economic control were strongly and significantly associated with measures of financial literacy. For the purposes of this report, literacy is measured by a 14-item objective quiz on financial knowledge, while capability is measured via five different scales, as the per the Canadian Financial Capability Survey.

Specifically, the personality trait, conscientiousness (i.e., having high self-discipline, ability to exert self-control over impulses) and belief in internal locus of control (i.e., the belief that financial outcomes are due to effort and ability as opposed to chance and fate) were strongly and consistently linked to better financial literacy and financial capability.

It's important to note that these results are from one survey and more research is needed. But based on our preliminary results, we think there may be important limits to policy aimed at improving financial literacy when it is targeted by socio-demographic characteristics. Public policy can't really be targeted by individual differences in psychological traits, but the correlation

between financial capability and personality suggests that variation across populations in this regard need to at least be considered when designing programming going forward.

Overall, our results have several important implications for financial education programs and public policy:

- First, financial interventions may be more successful if they take into account the personality traits and beliefs of participants. For example, someone who scores very low on the personality trait of conscientiousness might benefit more than others from being taught to develop habits that aid in self-control (Gollwitzer, 1999).
- Second, in addition to addressing financial habits directly, more effective financial training interventions might also include strategies to try to deliberately shift aspects of personality traits dimensions and beliefs towards those more amenable to financial management. While overall personality is thought to be relatively stable, aspects of personality traits and psychological beliefs and traits can be successfully moved to some degree.

Ultimately, we think that these results ought to give us pause in evaluating short-term or even medium-term goals to raise the financial capability and financial literacy of entire populations. On the one hand, our results show that the majority of individual differences in financial capability and financial literacy remain unexplained. On the other hand, our results also show that the portion of individual differences in capability we can explain is strongly associated not only with socio-demographic variables but also with personality traits and beliefs. These psychological variables will continue to moderate efforts to change a population's financial knowledge and habits, likely dampening the effects of any policy designed for "an average" consumer. We also feel that this study, along with the existing body of literature from economic psychology, should inform discussions on financial consumer policy and the balance between responsibility of individual consumers, financial service providers and regulators.

1. Introduction

In 2015, Chartered Professional Accountants Canada (CPA Canada) commissioned a survey of adult Canadians' financial habits, attitudes and knowledge. In addition to questions about personal finances, the survey also collected information on certain psychological traits of the respondents. The data collected by CPA Canada is unique in that it lets researchers look at how psychological traits – such as personality characteristics and beliefs about control over financial outcomes – might be associated with differences in personal financial capability and financial literacy. Individual differences in personality and beliefs can lead to real differences in how we think and act in many areas of our life – including personal finances.

In two previous studies, we've used the CPA Canada data to show that personality plays a key role in explaining superficial gender differences in financial literacy and financial capability, and we've shown a link between volatility in monthly income and differences in beliefs about economic control. In this report, we again use the CPA Canada data to take an in-depth look at the role of personality and beliefs about financial control in individuals' overall financial capability and financial literacy. We look at five personality traits as well as beliefs about economic control to see how these predict financial habits, attitudes and knowledge. Do these "soft" psychological variables explain financial literacy and financial capability above and beyond more frequently used "hard" demographic variables like age, gender, education and income?

2. Previous research on personality and personal finances

Before discussing the current study, we briefly describe the measurement of personality traits and economic beliefs, and we review the literature on the role of personality and economic beliefs in personal finances, including specific financial attitudes and behaviours and broader measures of financial literacy. Many readers will already be familiar with research on financial literacy and financial capability, but the psychological literature hasn't yet been well-understood or integrated into research, programs or policy on financial literacy. Our present study starts to do just that.

2.1 Personality traits

Personality is a combination of characteristics or qualities (i.e., traits) that form an individual's distinctive character. Personality traits manifest in the consistent patterns of feelings, thoughts and behaviours that a person exhibits across situations (Fleeson & Gallagher, 2009). Psychologists describe a person as having a specific personality trait if they act in line with this trait more often than not. For example, a person scoring high in the trait agreeableness will feel, think and act more forgivingly, helpfully, trustingly and politely across a variety of social situations, whereas a person scoring low on this trait will feel, think and act more reserved, cold and aloof, or even start quarrels with others.

All personality traits exist on a continuum, with each person having some higher or lower degree of the trait. In the general population, the majority of people will score near the mean or average level of a personality trait, and very few people will have extreme scores at the low or high ends. That is, most people will be a little of both, sometimes acting warm and trusting, sometimes acting colder and more quarrelsome. The score on a personality scale indicates which side their behaviour falls on more often and by how much. Someone with a very high agreeableness score likely always acts very agreeably, whereas someone with an agreeableness score that is only a little above the mean of the scale likely acts agreeably only somewhat more often than not. In the present research we examine relative personality scores, that is, we examine the influence of scoring higher on a given personality trait on financial literacy and financial capability, as compared to other people in the same survey sample.

In the Big Five model of personality, an individual's personality can be exhaustively described in five traits: openness to new experiences, conscientiousness, extraversion, agreeableness and neuroticism. These five dimensions of personality are thought to describe the entire personality of a person. In other words, taken together these dimensions let us answer the question of what someone "is like" as a person, across different situations (Goldberg, 1990, 1992).

The Big Five model of personality has been researched extensively in psychology and other social sciences. It is the most widely-used measure of personality in social sciences research. Hundreds of studies have shown that these five traits predict fundamentally important life outcomes such as mortality rates, divorce and success in the workplace (e.g., see Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007, for a review).

The Five Factors of Personality

OPENNESS

The factor of openness refers to the openness to new experiences, imagination, intellectual curiosity and creativity.

For example,
"I am someone who ... is curious about many different things."

EXTRAVERSION

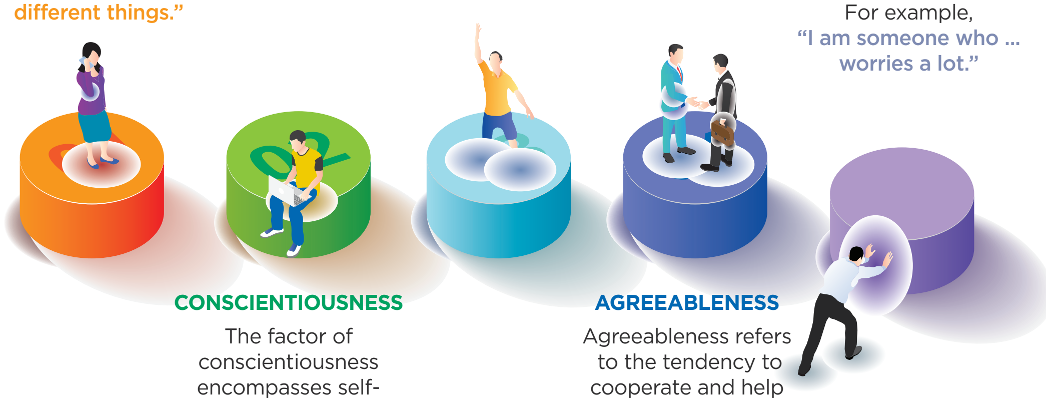
Extraversion describes the tendency to be sociable, gregarious, assertive and outgoing.

For example,
"I am someone who ... is talkative."

NEUROTICISM

Neuroticism describes the tendency to experience emotional volatility and negative emotions such as anxiety, depression and self-conscientiousness.

For example,
"I am someone who ... worries a lot."



CONSCIENTIOUSNESS

The factor of conscientiousness encompasses self-discipline, organizational and planning tendencies, industriousness and the ability to exert self-control over impulses.

For example,
"I am someone who ... does a thorough job."

AGREEABLENESS

Agreeableness refers to the tendency to cooperate and help others, experience empathy and maintain social harmony.

For example,
"I am someone who ... is helpful and unselfish with others."

Like most other psychological variables, personality traits are thought to be determined by both genetic and environmental factors. A review of 145 kinship studies (examining shared variance between twins, siblings and adopted siblings) estimated the genetic factor for the Big Five personality traits at between 31 per cent and 48 per cent (Johnson, Vernon, & Feiler, 2008). However, a more recent review points out that no specific genes have yet been linked to any specific personality trait. Furthermore, even when examining a broad spectrum of possible genes, estimates of the overall contribution of genetic variants to personality traits were 0 per cent to 21 per cent, with the highest for openness and neuroticism, and zero for agreeableness and conscientiousness (Penke & Jokela, 2016).

Previous research has shown, however, that personality traits are linked with certain socio-economic variables. More specifically:

- **Gender**. Women tend to score higher on agreeableness (Costa et al., 2001; Feingold, 1994; Weisberg et al., 2011) and higher on neuroticism (Costa et al., 2001; Weisberg et al., 2011) than men.

- **Age**. While personality is generally stable over the lifetime, in middle age people tend to score higher on conscientiousness and agreeableness and lower on neuroticism (see Roberts, Walton, & Viechtbauer, 2006 for a meta-analysis of 92 studies). For instance, a longitudinal study of 14,718 Germans across adulthood showed that extraversion, openness, agreeableness and emotional stability (i.e., the opposite of neuroticism) peak in later adulthood (40-60 years), resulting in a positive link between age and these variables across the majority of the lifetime which reverses only at very advanced age (Specht, Egloff, & Schmukle, 2011). Conscientiousness increases linearly with age across the lifetime (Roberts et al., 2006; Specht et al., 2011).
- **Education**. Conscientiousness and openness to experience are positively related to the number of years of formal education someone has completed (Goldberg, Sweeney, Merenda, & Hughes, 1998). It's important to note that psychologists find that education and personality differences are correlated, not that education changes personality. It could equally be the case that personality traits shape persistence in education.
- **Income**. Higher scores on conscientiousness, extraversion and openness to experience have been shown to be linked to higher salaries (Heineck, 2011) and to higher household income (Boyce, Wood, Powdthavee, 2013). Conscientiousness has also been associated with higher levels of wealth (Duckworth, Weir, Tsukayama, & Kwok, 2012). Conversely, agreeableness and neuroticism have been linked to lower salaries (Heineck, 2011), lower household income (Boyce et al., 2013) and a greater likelihood of needing financial assistance (Gillen & Kim, 2014). Again, psychologists don't know whether personality causes differences in income or if income causes differences in personality. Researchers can only look at the correlations between these variables, not at the direction of the relationships.

2.2 Research on personality traits and financial behaviours

As mentioned earlier, to our knowledge, researchers have not yet looked at the relationship between personality traits and broad measures of financial capability or objective financial knowledge. However, previous research has shown that the Big Five personality traits are related to a variety of specific financial outcomes:

- **Conscientiousness**: The personality trait that is most consistently linked with personal financial behaviours and attitudes is conscientiousness. Individuals high in conscientiousness tend to make financial decisions that are more in keeping with mainstream advice and have objectively better financial outcomes across a range of measures. Conscientiousness has been associated with a number of economic decision patterns that are generally thought to indicate good conventional financial understanding such as preferring lower immediate payouts over larger later payouts (Daly, Hamon, & Delaney, 2009; also see Borghans, Duckworth, Heckman, & Ter Weel, 2008 for a review). Conscientiousness has also been associated with better self-reported money management in an Irish sample (Donnelly, Iyer, & Howell, 2012). In a study using the National Longitudinal Study of Adolescent to Adult Health, researchers found that Americans with higher scores on conscientiousness were significantly more likely to report not missing rent or bill payments (Xu, Beller, Roberts, & Brown, 2015). In fact, the effect was so large that researchers reported that a one-standard deviation (a standardized distance from the average score in a group) increase in conscientiousness reduced the likelihood of missing utility bill payment by 3.8 per cent (Xu et al., 2015). In the Chile Social Protection Survey, respondents who scored higher on conscientiousness were significantly more likely to report having savings (Kausel, Hansen & Tapia, 2016). Among young Americans, conscientiousness was linked to greater financial assets and moderated the effects of financial literacy – in other words, the trait conscientiousness compensated for low financial literacy to at least some degree (Letkiewicz & Fox, 2014). The same researchers did not, however, investigate the association between conscientiousness and scores on a test of financial literacy.

- **Neuroticism**: The trait neuroticism or emotional instability is consistently found to be linked with more negative financial behaviours and outcomes. Specifically, neuroticism has been linked with compulsive buying disorder (Mueller et al., 2010), missing bill payments and reliance on social assistance (Xu et al., 2015), and a lower credit score (Anderson et al., 2011). Again, it is important to emphasize that the research has looked at correlations between neuroticism and personal finances, not at causal relationships.

- **Extraversion**: Extraversion has sometimes been linked to negative financial experiences: Individuals assessed through the British Household Panel Survey with higher levels of extraversion reported higher amounts of unsecured debt (Brown & Taylor, 2014). Similarly, researchers using Dutch panel data found that higher levels of extraversion were associated with lower levels of saving (measured in a variety of ways) and higher levels of debt (Nyhus & Webley, 2001). However, there are also indications that extraversion can have positive effects on financial experiences. Researchers in the U.S. have found that more extraverted individuals are less likely to report experiencing financial distress (Xu et al., 2015).

- **Agreeableness**: There is limited evidence for the effects of agreeableness on financial behaviours and outcomes. Research using data from a Dutch panel survey finds that respondents with higher levels of agreeableness have lower levels of liquid savings, compared to less agreeable respondents (Nyhus & Webley, 2001). Similarly, in a U.S. sample, agreeableness was associated with greater likelihood of missing utility bill payments and worrying about food depletion (Xu et al., 2015).
- **Openness**: Evidence for the relationship of openness and financial behaviours or outcomes is even more limited. Only one published study has found that openness is weakly related to somewhat more financial distress (Xu et al., 2015).

While it seems plausible that personality traits will influence personal financial management and financial literacy, the reverse could also be true. Indeed, one study following a sample of German adults over the course of four years found that those who became unemployed during this time also reported lower conscientiousness, less openness to new experiences and less agreeableness the longer they remained unemployed (Boyce, Wood, Daly & Sedikides, 2015). Thus, while personality is generally stable across circumstances, it can shift somewhat as a result of life experiences. Extending this reasoning, personality traits may even shift as a result of financial decisions and habits: for example, taking a course on financial topics (an item from the 'staying informed' subscale of financial capability) might make someone more conscientious or open to new experiences.

From our review of the literature, the present study is the first to examine the associations between personality traits and both a comprehensive measure of financial capability (see section 3.4), and financial literacy. It is also the first study to examine the relationship between personality and financial capability using data collected from a Canadian sample.

2.3 Economic locus of control beliefs

In addition to individual differences in personality, individuals also differ in the type of beliefs they hold about how much control people have over their own financial outcomes. Locus of control is the degree to which people believe that they have control over the outcome of events in their lives, as opposed to external forces beyond their control (Rotter, 1954). Believing that one's own actions matter and that one has some control over outcomes is an essential component of self control and underlies health decisions, job and academic performance (Lefcourt, 2014).

With regard to one's personal financial situation, people might have more specific beliefs about whether their own economic situation can be controlled or not. Economic locus of control distinguishes whether someone believes their financial situation is due to internal, controllable factors such as ability and effort, or they might believe their financial situation is due to external, uncontrollable factors such as fate or luck (Furnham, 1986).

Internal locus of control	External locus of control
The belief that economic outcomes derive primarily from one's own actions and are within one's own control, such as effort and ability. Individuals who believe this would agree with the following statements: • Saving and careful investing is key to becoming rich. • Whether or not I become wealthy depends mostly on my ability. • In the long run, people who take care of their finances stay wealthy. • If I become poor, it is usually my own fault. • I am usually able to protect my personal interests. • When I get what I want, it is usually because I worked hard for it. • My life is determined by my own actions.	The belief that economic outcomes derive primarily from factors beyond one's personal control, such as chance or fate. Individuals who believe this would agree with the following statements: • There is little one can do to prevent poverty. • Becoming rich has nothing to do with luck. (reverse scored) • Regarding money, there isn't much you can do for yourself when you are poor. • It's not always wise for me to save because many things turn out to be a matter of good fortune or bad fortune. • It is chiefly a matter of fate whether I become rich or poor. • Only those who inherit or win money can possibly become rich.

2.4 Research on economic beliefs and financial behaviours and outcomes

Belief in internal causes of financial success (e.g., effort, ability) has been linked to more positive financial outcomes:

- Internal economic locus of control has been linked to greater satisfaction with one's own financial standing in a study of 2,510 U.S. households (Sumarwan & Hira, 1993).
- Internal economic locus of control has been linked to more planned and purposeful shopping habits among a sample of Canadian students (Busseri, Lefcourt, & Kerton, 1998).
- Internal economic locus of control has been linked to more rational financial choices (such as less discounting of future gains and losses) in a sample of British students (Plunkett & Buehner, 2007).

- A study of close to 10,000 Australian households showed that households where at least one person in the household had an internal locus of control saved more of their income, both in absolute terms and as a percentage of earnings (Cobb-Clark, Kassenboehmer, & Sinning, 2016).

Beliefs about being able to control financial outcomes has been consistently linked with income and household net worth: higher income individuals and those with higher net worth are more likely to believe their economic situation is due to their ability and effort and less likely to believe they are due to chance or fate than low-income individuals (Cobb-Clark et al., 2016; Furnham, 1986; Sumarwan & Hira, 1993). Again, it is important to note that the research does not suggest that a more internal economic locus of control leads to higher income or net worth. It is equally plausible that higher income and net worth leads to a more internalized locus of control. In fact, other research is beginning to suggest that prolonged experiences of poverty can change the way that people think and act when it comes to decisions about money (Mullainathan & Shafir, 2013; Morduch & Schneider, 2017).

From our review of the literature, the present study is the first to examine the relationships between beliefs about economic locus of control and both a comprehensive measure of financial capability (see section 3.4) and financial literacy. It is also the first study to examine this combination of variables using data collected from a Canadian sample.

3. Data sources and methods

The goal of this study is to better understand the relationship of personality traits and economic beliefs with financial capability and financial literacy.

Data was collected from an online panel of adult Canadians in 2015 by a third party under contract to CPA Canada. The questionnaire replicated many parts of the Statistics Canada Canadian Survey of Financial Capability. Questions covered financial behaviour, financial attitudes, a 14-item objective knowledge quiz, psychological and socio-demographic traits. Anonymized data was shared with the authors for analysis. The data set covers 3,502 respondents, of whom 1,818 are female (52 per cent) and 1,684 are male (48 per cent). This distribution corresponds roughly to the gender distribution of the Canadian population. Geographically, respondents were distributed across provinces[1], broadly in proportion to the distribution of the general Canadian population.

1 (Ont. 39.2 per cent; Que. 24.1 per cent; B.C. 13.4 per cent; Alta. 9.8 per cent; Man. 3.6 per cent; Sask. 3 per cent; N.S. 3 per cent; N.B. 2.4 per cent; N.L. 1.1 per cent; P.E.I. 0.4 per cent)

Age is measured as a continuous variable in years. The youngest respondent was 18 years of age and the eldest was 90 years of age. Average age of respondents was 53.5 years, which is slightly older than the Canadian population. Financial literacy seems to have an inverted U-shaped pattern by age – it rises during working age but then declines again in older age (OECD, 2013; 2017).

Education is measured in terms of the highest level of education completed with categories ranging from less than a high school diploma, through to a graduate or professional university degree. The most frequent level of education among respondents was some post-secondary (including college, trades, CEGEP or university) but do not hold a diploma or degree. However, 30 per cent of the sample reported an undergraduate or advanced university degree. In general, education is associated with higher financial literacy (OECD, 2013, 2017).

Household income is measured as self-reported income, before taxes, for all members of the household, in categories ranging from less than $20,000 through to $150,000 or more. Average household income for respondents was between $60,000 and $69,999, which is relatively close to average income for all Canadian household types.

3.1 Measuring personality

We use a well-established scale, the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). The BFI measures the personality traits in the five-factor model of personality (Goldberg, 1990, 1992) in a 44-item scale that asks respondents how strongly they agree or disagree with various statements about themselves.

The Big Five Inventory is based on participants' insights about what they feel and do in their daily lives. Participants read statements (e.g., "I see myself as someone who is talkative.") and rate how much they agree with this statement. Based on these self-reports, personality is then summarized in five (the Big Five) dimensions of personality. Agreement for each statement is averaged across the statements for each subscale. All subscales are internally reliable (Cronbach's alphas > .78) and comparable to the reliability of the scales in the originally published sample (John et al., 1991).

A participant who reports seeing him or herself as talkative, full of energy, assertive, outgoing, as someone who generates a lot of enthusiasm and does *not* see themselves as someone who is quiet, reserved or shy, would have high scores on the extraversion dimension of personality. [8 items, Cronbach's alpha = .80]

A participant who reports seeing him or herself as reliable, efficient and as someone who makes plans and follows through with them, but *not* as disorganized, careless or lazy, would have high scores on the <u>conscientiousness</u> dimension of personality. [9 items, Cronbach's alpha = .79]

A participant who reports seeing him or herself as a person who is helpful, forgiving, trusting and kind, and as someone who likes to cooperate with others, but *not* as a person who is rude, cold or aloof, would have high scores on the <u>agreeableness</u> dimension of personality. [9 items, Cronbach's alpha = .81]

A participant who reports seeing him or herself as depressed, moody, tense and as someone who gets nervous easily, but *not* as a person who is relaxed, handles stress well or someone who remains calm in tense situations, would have high scores on the <u>neuroticism</u> dimension of personality. [8 items, Cronbach's alpha = .84]

A participant who reports seeing him or herself as someone who has an active imagination, is original and comes up with new ideas, and who likes to reflect and play with ideas, but does *not* see themselves as someone who prefers routine tasks, would have high scores on the <u>openness</u> dimension of personality. [10 items, Cronbach's alpha = .78]

3.2 Measuring beliefs about economic locus of control

In addition to financial behaviours and attitudes, the survey designed by CPA Canada also assesses respondents' beliefs about economic locus of control. In this scale developed by Furnham (1986), participants state their agreement with seven statements indicative of internal economic locus of control and with seven statements indicative of external economic locus of control. Agreement for each subscale is averaged across the seven statements. Both the internal locus of control scale and the external locus of control scale are internally reliable (Cronbach's alpha = .81 and .76, respectively), and comparable to the reliability of the scales in the originally published sample (Furnham, 1986).

On average, survey respondents reported believing more in internal locus of control of financial outcomes than in external locus of control, Mdifference = 1.64 on a 7-point scale, $t(3501) = 62.72$, $p < .001$.

Internal and external locus of control correlated moderately negatively, $r = -.29$, $p < .001$, suggesting that individuals who believe their financial outcomes are primarily determined by internal factors within their control tend to believe less in external causes such as chance and fate, and vice versa.

3.3 Measuring financial knowledge (financial literacy)

Financial knowledge is measured in terms of correct answers to a quiz of 14 items included in the CPA Canada dataset. The questions broadly mirror those used by Statistics Canada's Canadian Financial Capability Survey (2008, 2014). The quiz covers topics such as interest rates, insurance, inflation and investments.

3.4 Measuring financial attitudes and behaviours (financial capability)

Financial capability is measured as a latent construct with five underlying domains, assessed both in term of self-reported behaviours as well as confidence about ones' own abilities:

- Making ends meet: capability in using financial resources to cover ongoing expenses.
- Keeping track: capability in budgeting and monitoring personal finances.
- Planning ahead: capability in making financial plans for known life events (retirement) and unexpected future expenses.
- Choosing products: capability in exercising choice in financial products and services.
- Staying informed: capability in ongoing learning about personal finances.

This approach has previously been used in studies in the United Kingdom, Ireland, Norway and Canada (Kempson, Collard & Moore, 2005; Atkinson et al, 2006; Statistics Canada 2008; 2014; McKay, 2011; Russian Trust Fund, 2013). Results are calculated as scores on five scales using responses derived from 16 question items.[2] In the case of the CPA Canada survey, one item is missing from each the scales for 'making ends meet' and 'planning ahead'. These are reported as truncated scales.

4. Results: Demographic influences on personality and beliefs

First, we look at the distribution of socio-demographic characteristics, personality traits, and economic beliefs among individuals in the survey sample. These are summarized in Table 1 below.

2 Further information on the scales and scoring is available in a report by Robson and Splinter (2015), titled "A new (and better) way to measure financial capability" and in a report by Robson (2012) titled "Piloting a financial literacy quiz in Canada." Many of the questionnaire items and scales were later replicated by the Financial Consumer Agency of Canada's online personal financial literacy quiz.

Table 1: Socio-demographic characteristics, personality traits, and economic beliefs

Average age	53.48 years [range 18-90 years]
Gender distribution	48% male, 52% female
Median education	some post-secondary education 59% had a college, trade school, or university degree
Median income	Between $60,000 and $69,999 [ranged from *less than 20,000* (12%) to *more than 150,000* (3%)]
Personality scales	*on 5-point scales*
Openness	3.37
Conscientiousness	3.74
Extraversion	3.00
Agreeableness	3.69
Neuroticism	2.79
Economic locus of control scales	*on 7-point scales*
Internal locus of control	5.00
External locus of control	3.35

All personality traits were normally distributed, suggesting that the survey captured a sample with the full range of personality traits evident in the population. While we have not weighted the sample to be representative of the Canadian population, we believe that these preliminary findings suggest that the data is of good quality for further analysis.

Next, we examined whether personality traits and beliefs differed by gender, age, income and education (i.e., the socio-economic variables of interest). Because the analysis by gender is comparing just two groups, we present comparisons of the mean scores for personality and economic locus of control. For the analysis of differences by age, income and education, we instead use regression analysis to measure the strength of the relationship between the psychological variables and each age, income and education.

- **Gender**. Compared to the men, the women in this sample scored higher on traits of conscientiousness, agreeableness and neuroticism. This finding is in line with previous research (Costa et al., 2001; Weisberg et al., 2011).

Table 2. Links between gender and personality traits, economic beliefs

	Women	Men	Are women and men in the sample significantly different?
Personality scales	*Average scores (out of 5)*		
Openness	3.355	3.385	No. The men and women in the sample are very similar on this trait.
Conscientiousness	3.777	3.692	Yes. The women are more likely to score higher on this trait.
Extraversion	2.995	3.010	No. The men and women in the sample are very similar on this trait.
Agreeableness	3.736	3.649	Yes. The women are more likely to score higher on this trait.
Neuroticism	2.885	2.682	Yes. The women are more likely to score higher on this trait.
Economic locus of control scales	*Average scores (out of 7)*		
Internal locus of control	4.95	5.04	Yes. The men are more likely to score higher on internal economic locus of control.
External locus of control	3.34	3.37	No. The men and women in the sample are very similar on this belief.

- **Age**. Older individuals in the sample were more conscientious, less neurotic and more agreeable than younger individuals (See Table 3 for regression coefficients). These findings are in line with previous research (Roberts et al., 2006; Specht et al., 2011). However, individuals in this study were also less open to experience the older they were, contrary to past research that found more openness in adults aged 40-60 than in younger adults (Specht et al., 2011) or mixed effects of age on openness (Roberts et al., 2006). When examining the effects of age in a U-shaped function (see Specht et al., 2011), researchers find evidence that the effect of age on personality changes on the lower and upper ends of the age distribution for all five personality traits, suggesting a more dynamic process through the life course.

- **Education**. More education was linked to lower agreeableness and neuroticism, and to greater openness to experience. Contrary to one other study, higher levels of education in this sample wasn't linked to greater conscientiousness (Goldberg et al., 1998). This difference may be explained by the different ways to measure education: the present study distinguishing degrees obtained in college/trade school from university degrees, whereas Goldberg et al.'s study recorded the number years of formal schooling regardless of the type of degree pursued.

- **Income**. Higher income was linked to greater conscientiousness and extraversion, and less agreeableness and neuroticism, replicating previous work (Boyce et al., 2013; Duckworth et al., 2012; Gillen & Kim, 2014; Heineck, 2011).

Table 3: Links between socio-demographic characteristics (age, education, income) and personality traits

	Age	Education	Income
Extraversion	.01	-.03	.07*
Agreeableness	.16*	-.11*	-.14*
Conscientiousness	.07*	.03	.11*
Neuroticism	-.17*	-.11*	-.10*
Openness	-.12*	.18*	-.02

Note. Reported coefficients are standardized regression coefficients (r) of a linear regression with all five personality traits as simultaneous predictors.

* denotes coefficients significant at $p < .01$.

Socio-economic variables were also linked with economic beliefs:

Individuals with a higher income were more likely to subscribe to the belief that economic outcomes are under their own control. Older individuals and those with a higher income were also less likely to subscribe to the belief that economic outcomes are mostly due to external causes such as chance and fate. The link of internal locus of control beliefs and income replicates previous research (Cobb-Clark et al., 2016; Furnham, 1986; Sumarwan & Hira, 1993).

Table 4: Links between socio-demographic characteristics (age, education, income) and economic locus of control beliefs

	Age	Education	Income
Internal locus of control	.06	.01	.13*
External locus of control	-.19*	-.04	-.12*

Note. Reported coefficients are standardized regression coefficients (r) of a regression with both economic beliefs subscales as simultaneous predictors.

* denotes coefficients significant at $p < .01$.

The results so far have told us that personality traits and economic beliefs are somewhat linked with socio-economic variables of gender, age, income and education. In the next section, where we examine the role of personality traits and economic locus of control beliefs for financial knowledge and financial capability, we control for age, gender, education and income in all analyses. This approach lets us look at the influence of the psychological variables on financial capability and financial literacy, above and beyond the more frequently-used socio-economic variables.

5. Results: Variance explained in financial capability and financial literacy

First, we use regression analysis to test how well financial capability and financial knowledge in our sample is predicted by socio-economic variables versus the psychological variables of personality and beliefs about economic locus of control.[3] The figures below show the share of each aspect of financial capability and the financial knowledge quiz that can be explained by socioeconomic variables (age, gender, education, and income), personality traits (conscientiousness, extraversion, neuroticism, openness, agreeableness) and economic locus of control beliefs (internal locus of control, external locus of control), respectively.

3 We use OLS regression with robust estimation of standard errors. We enter each group of variables on separate steps of the regression model and then decompose the R^2 by grouped predictor variables.

**Figure 1:
% explained in
Making ends Meet**

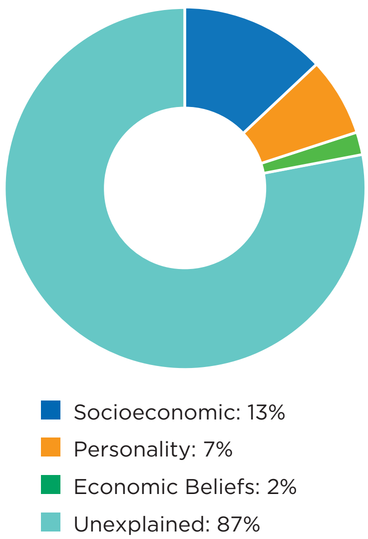


**Figure 2:
% explained in Keeping
Track of Money**

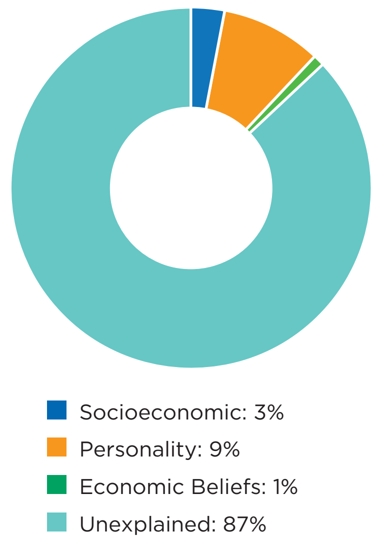


**Figure 3:%
explained in
Planning Ahead**

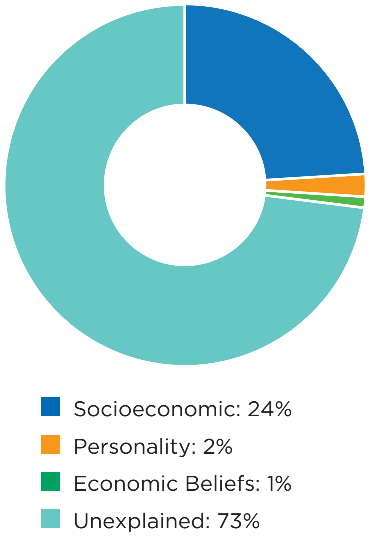


**Figure 4:
% explained in
Choosing Products**

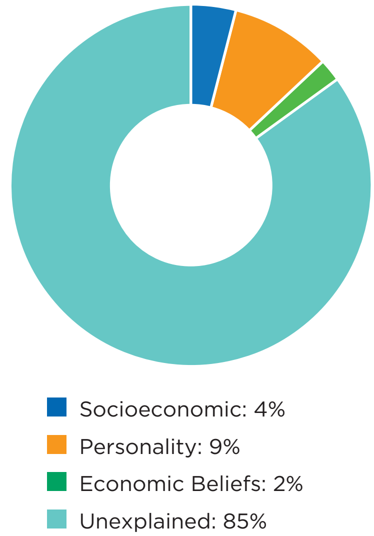


Figure 5:
% explained in
Staying Informed

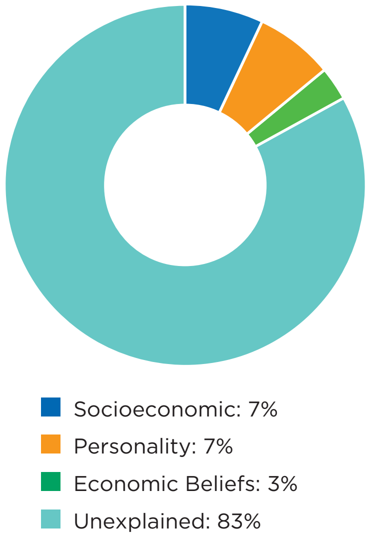
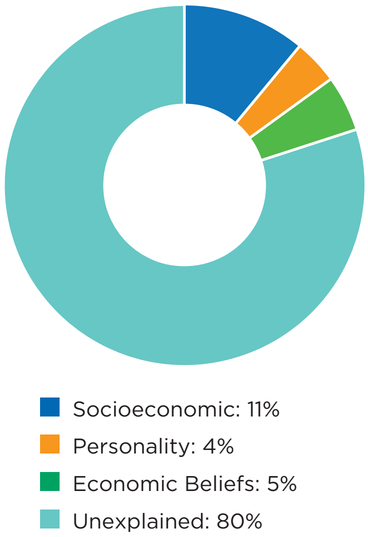


Figure 6:
% explained in Financial
Knowledge Quiz



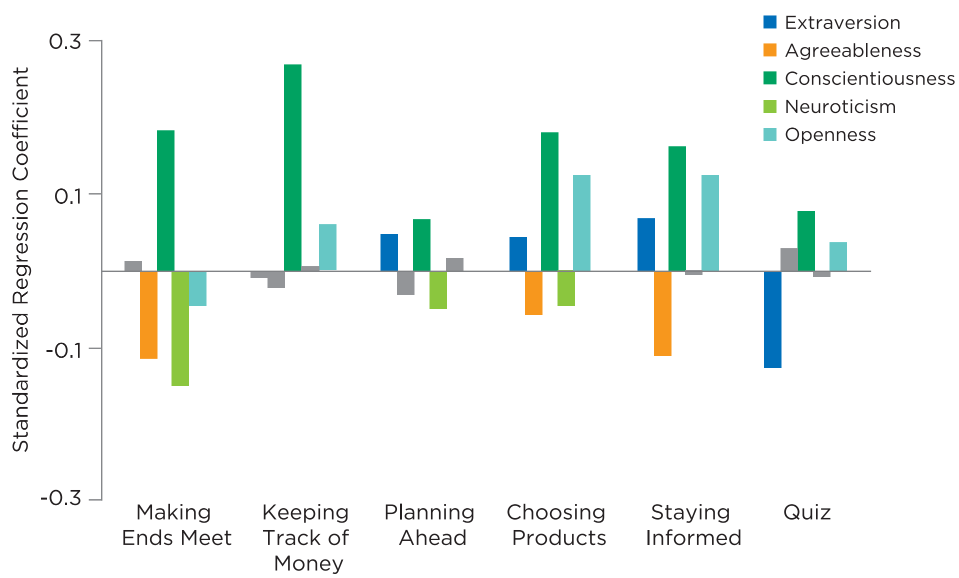
These results show that psychological variables explained as much or more variance as socio-economic variables in four out of five aspects of financial capability ('making ends meet,' 'keeping track,' 'choosing products' and 'staying informed') and explained unique variance in all aspects of financial capability and financial knowledge.

Next, we break down the categories of personality and economic locus of control beliefs into the individual personality traits and the individual beliefs to examine how each trait or belief is linked to financial capability and financial knowledge.

6. Results: Identifying which personality traits and economic locus of control beliefs predict financial capability and financial literacy

Figure 7, below, shows the magnitude (as a standardized regression coefficient) of each separate personality trait as a predictor of the different dimensions of financial capability. Socio-economic variables (age, gender, income, education) and economic locus of control beliefs were controlled in these regression analyses. Where the value of the standardized regression coefficient is positive, higher scores on the trait increases the respective aspect of financial capability, where the value of the standardized regression coefficient is negative, higher scores on the trait decrease the respective aspect of financial capability. Greyed out bars represent results that were not statistically significant ($p > .05$).

Figure 7. Standardized coefficients of personality traits predicting aspects of financial capability and financial knowledge quiz scores



Across all five dimensions of financial capability, greater conscientiousness was positively associated with financial capability. Respondents with higher scores on conscientiousness were significantly more likely to also have higher scores on 'making ends meet,' 'keeping track of money,' 'planning ahead,' 'choosing products,' 'staying informed' and to higher scores on the financial knowledge quiz. The strong relationship to 'keeping track of money' is perhaps not surprising in that it requires organization of financial records and disciplined attention to money moving in and out of the household. These results also underscore and replicate the link between conscientiousness and a number of positive financial behaviours and attitudes (Donnelly et al., 2012; Kausel et al., 2016; Xu et al., 2015).

Greater agreeableness was linked to lower scores on 'making ends meet.' This aligns with the past research that has found agreeable individuals may be more likely to miss utility bill payments (i.e., an aspect of 'making ends meet,' Xu et al., 2015). Two additional facets of financial capability most linked to agreeableness were 'choosing products' and 'staying informed.' These two aspects are the aspects of financial behaviour that require the most interaction with other people and this result seems to point to a specific downside of an agreeable temperament. Recall that respondents who score highly on "choosing products" are more likely to report that they shop around for the best financial product and are confident about their ability to identify the best products for their own needs; respondents who score highly on "staying informed" are more likely to take active steps to inform and educate themselves about financial matters. Given that being trusting of others is one of the facets of agreeableness (John et al., 1991), this trust might lead individuals to not seek disconfirming evidence for initial information ('staying informed'), or it might lead agreeable individuals to buy financial products from the most likeable not the most informed brokers ('choosing products').

Greater neuroticism was linked to lower scores on three out of five aspects of financial capability ('making ends meet,' 'planning ahead' and 'choosing products'), replicating prior work that suggests a negative relationship between neuroticism on financial behaviours, especially behaviours that fit the category 'making ends meet' (i.e., missing bill payments, Xu et al., 2015) and planning ahead (i.e., compulsive buying, Mueller et al., 2010). It is important to recall that neuroticism includes a propensity to experience negative feelings like anxiety. It may be that underlying anxiety interferes with financial habits and decision-making (such as selecting financial products and services or setting financial goals), but it is also equally likely that financial difficulties, such as trouble in 'making ends meet' and handling expected and unexpected future costs (key elements of 'planning ahead') can also increase anxiety.

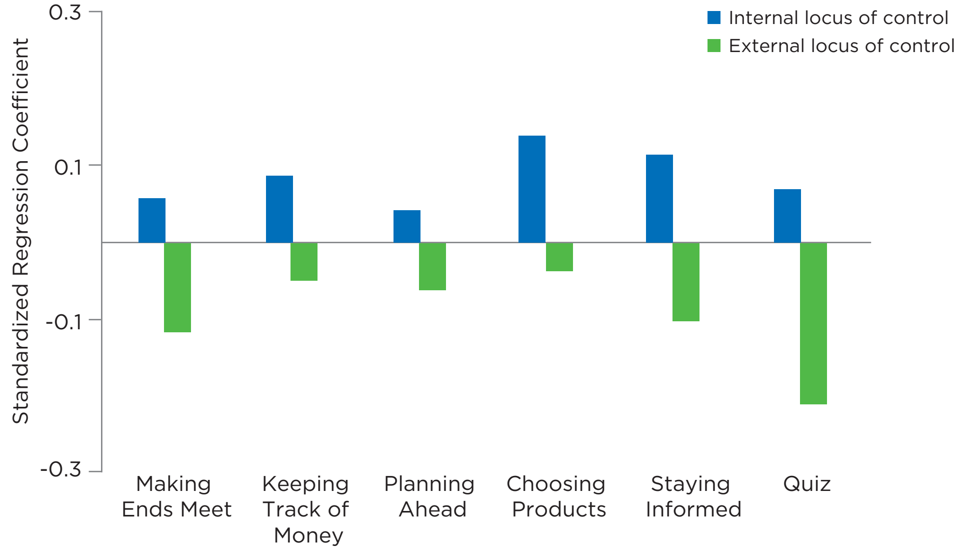
Greater extraversion was associated with higher scores on three out of five aspects of financial capability ('planning ahead,' 'choosing products' and 'staying informed') but was linked to lower scores on the financial literacy quiz. These mixed results suggest that the impact of being outgoing, social and assertive is highly dependent on the context of personal finances. This finding also reflects the mixed findings in previous studies (Brown & Taylor, 2014; Nyhus & Webley, 2001; Xu et al., 2015).

Greater openness to experience was most strongly linked positively to the two aspects of financial capability that involve seeking out new information: 'choosing products,' and 'staying informed' on financial services. To a lesser extent, openness was also linked to higher scores on 'keeping track of money' and the financial literacy quiz. However, individuals open to new experiences reported lower scores on 'making end meet,' suggesting that the impact of this personality trait is not uniformly positive.

Next, we examined the link between economic locus of control beliefs and financial capability and financial literacy.

Figure 8, below, shows the magnitude of internal and external locus of control beliefs on different dimensions of financial capability as well as the financial literacy quiz. Socio-economic variables (age, gender, income, education) and personality traits were controlled in these regression analyses. Where the value of the standardized regression coefficient is positive, those individuals who subscribe more to the belief scored higher in each respective area of financial capability; where the value of the standardized regression coefficient is negative, those individuals who subscribe more to the belief scored lower in each respective area of financial capability. All coefficients were significant.

Figure 8. Standardized coefficients of economic locus of control beliefs predicting aspects of financial capability and financial knowledge quiz scores



The belief that economic outcomes are within one's own control was significantly associated with links to higher scores across all areas of financial capability and to higher scores on the financial knowledge quiz. Conversely, the belief that economic outcomes are outside one's own control was linked to lower scores across all areas of financial capability and particularly to lower scores on the financial knowledge quiz. Again, this does not suggest that locus of control causes financial capability or financial literacy, but rather that individual differences in economic locus of control can help us to better understand individual differences in financial capability and financial literacy.

7. Discussions: Limitations and potential implications

The results above are from one study using one set of survey data and, as such, should always be interpreted with caution. We encourage other organizations to follow CPA Canada in collecting and making available to researchers, survey data on personal financial attitudes, habits and knowledge, and to include psychological variables that have proven important in this study.

The present study was based on a large and representative Canadian sample and underlined the importance of studying psychological variables such as personality traits and economic beliefs in personal financial management.

- Personality traits and beliefs about one's ability to control financial outcomes explained a significant portion of variance in all aspects of financial capability and in a test of objective financial knowledge, above and beyond socio-economic variables (gender, age, income, education).
- Among all personality traits, the most influential one for financial capability and financial literacy was clearly conscientiousness. Respondents high in conscientiousness (i.e., self-discipline, organization and planning tendencies, industriousness and the ability to exert self-control over impulses) scored higher in all aspects of financial capability and on the objective financial knowledge test than did respondents low in conscientiousness, even when controlling socio-economic variables and other personality traits and beliefs.
- Similarly, having a more internalized sense of economic control had a clear and positive relationship across all measures of financial capability and financial literacy. Respondents who believed in greater internal control over their financial situation scored higher in all aspects of financial capability and on the objective financial knowledge test than respondents who did not believe this or respondents who believed in external causes (e.g., fate and chance) instead, even when controlling socio-economic variables and personality traits.

Implications for programs or public policy

We think this study should raise new questions for policy and financial education programs in several ways:

- Financial interventions may be more successful if they take into account the personality traits and beliefs of participants. For example, someone who scores very low on the personality trait of conscientiousness might benefit more than others from being taught to develop habits that automate self-control (Gollwitzer, 1999). Financial programs and information may also be tailored to appeal to those who need it most. For instance, emphasizing the interpersonal and sociable aspects of financial education (e.g., in-person-chats with a financial manager) might make this intervention more appealing to extraverts who perform poorly on measures of objective knowledge. Likewise, a more private or one-on-one format for financial education may be more appealing and effective for participants who are more introverted.

- In addition to addressing financial habits directly, more effective financial training interventions might also include strategies to try to deliberately shift aspects of personality traits dimensions and beliefs towards those more amenable to financial management. While overall personality is thought to be relatively stable, aspects of personality traits and psychological beliefs and traits can be successfully moved to some degree. For example, control over impulses – a facet of conscientiousness – has been shown to improve through practice (e.g., resisting small temptations over time; Muraven, Baumeister, & Tice, 1999), and can be improved by teaching individuals to believe in the unlimited nature of willpower (Job, Dweck, & Walton, 2010). We are not aware of studies that have attempted to shift economic locus of control beliefs – however, a related concept, the belief in intelligence as variable (a "growth" mindset) has received extensive attention both in the academic world (see Dweck, 2013, for an overview) and in applied settings. Advice about building one's "growth" mindset (akin to internal locus of control in emphasizing the importance of effort) has permeated parenting forums and business communities alike[4]. The present study suggests that addressing clients' locus of control may be an important feature to effective programs that promote financial wellness.

4 https://www.business2community.com/strategy/top-7-ted-talks-develop-growth-mindset-double-productivity-01731937).

- In contrast to frontline programs, public policy is not well-equipped to be designed and targeted based on individual differences in personality. Nevertheless, we think this study has at least two important implications for policy makers. First, we think that these results ought to give us pause in evaluating short-term or even medium-term goals to raise the financial capability and financial literacy of entire populations. On the one hand, our results show that the majority of individual differences in financial capability and financial literacy remain unexplained. On the other hand, our results also show that the portion of individual differences in capability we can explain is strongly associated not only with socio-demographic variables but also with personality traits and beliefs. These psychological variables will continue to moderate efforts to change a population's financial knowledge and habits, likely dampening the effects of any policy designed for "an average" consumer.

- Second, we think that this study, along with the existing body of literature from economic psychology, should inform discussions on financial consumer policy and the balance between responsibility of individual consumers, financial service providers and regulators. Professionals involved in product design and marketing have known about the importance of consumer psychology for a long time and have successfully used that approach to improve product sales. We think our findings suggest that public policy needs to focus at least as much on consumer protection measures as on changing individual consumer knowledge, given that consumers' deep psychological traits will continue to moderate the effects of financial education.

The correlational nature of the present study and past research on the link between personality and financial outcomes does not allow us to draw conclusions about the causal direction of the link. However, the new information this study brings to light underscores the need to test and expand on these findings further, especially on the causal link between financial management and personality traits, as this has significant implications on how policy is developed in Canada and elsewhere. We would strongly emphasize the importance of including measures of personality traits and other relevant psychological characteristics when designing and fielding future studies as this is an issue that is of global importance.

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