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Exploring Financial Wellbeing
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Guest editorial

Exploring the antecedents of financial well-being: where we are and where we go from here

Many consumers are living on the brink of financial meltdown, living paycheck to paycheck hoping to meet monthly and even daily financial needs (Morduch and Schneider, 2017). News reports continue to highlight the trend of consumers living on the financial edge – with many consumers having no means to survive if faced with a financial crisis. Even so, consumers are generally feeling better about their finances and feel financially secure (Magni et al., 2018). This apparent paradox illustrates a disconnect between consumers’ actual financial state and their perceived financial state, and highlights how little we really know about consumers’ financial status. Not surprisingly, significant attention has been given to understanding and improving financial well-being (CFPB, 2015; Shim et al., 2009).

An extensive body of literature on financial well-being exists across different domains (e.g. economics (Gutter and Copur, 2011), finance (Greninger et al., 1996), psychology (Shim et al., 2009) and marketing (Brüggen et al., 2017). Some research works consider only objective measures when predicting an individual’s financial well-being (e.g. Schmeiser and Seligman, 2013), while others conceptualize financial well-being by using both subjective and objective measures (Shim et al., 2009). However, more recent research streams consider financial well-being to be purely subjective, as the perception of being able to sustain current anticipated desired living standards and financial freedom (Brüggen et al., 2017).

Recognizing that aspects of consumer financial well-being are still largely misunderstood, the goal of this special issue is not to choose one operationalization over the other, but rather to study consumer financial well-being by applying an intersectional approach from various disciplines and diverse research methodologies. Here, we hope to shed light on consumer financial well-being by identifying and mapping its likely causes (e.g. individual and environmental factors). Though there have been an increasing number of articles related to financial well-being, a well-developed framework dedicated to antecedents of financial well-being is lacking and is therefore addressed in this special issue of IJBM.

Where we are: this special issue

This special issue provides further confirmation for the academic interest in understanding factors that contribute to financial well-being. The eight articles selected for this special issue explore a range of variables as antecedents of financial well-being in different countries. These antecedent variables range from personal factors such as objective and subjective knowledge, financial literacy and credit card self-efficacy, to institutional factors such as bank information transparency. Table I provides a summary of antecedents along with the country used as a study context in each article.

Specifically, Riitsalu and Murakas’s research studies the effects of individuals’ subjective and objective knowledge and individuals’ financial behavior on personal finance management as well as the effect of individuals’ socio-economic status on their financial well-being in Estonia. Their results indicate that subjective knowledge and sound financial behavior are better predictors of financial well-being than objective knowledge. Similarly, Bayuk and Alotello find that subjective financial knowledge, financial self-efficacy and long-term financial literacy predict financial well-being better than objective financial knowledge or short-term financial literacy; in their article that integrates financial literacy and financial well-being fields with gamification research. In fact, financial literacy seems to be a popular antecedent included in
multiple articles in this special issue. Kuntze and his colleagues discuss how financial literacy can be improved by modernizing its delivery and measurement, while Limbu and Sato investigate the role of a specific type of financial literacy, i.e., credit card literacy on the financial well-being of college students. Their results offer greater insight into credit card consumption by showing how credit card literacy has a stronger effect on financial well-being when students own fewer credit cards. Ponchio, Cordeiro and Goncalves investigate other personal factors as antecedents in their study conducted in Brazil. Their findings suggest that the role financial knowledge plays in predicting financial well-being weakens in the presence of other personal factors such as consumer’ spending self-control and saving orientation. Personal factors related to individual characteristics of consumers (i.e. financial preparedness for emergencies, credit limit beliefs and risky indebtedness behavior) are also shown to influence financial well-being in Abrantes-Braga and Veludo-de-Oliveira’s research. Similarly, other behaviors such as individuals’ desires for income security, socially driven aspirations and level of materialism are found to influence individuals’ subjective financial well-being in Chatterjee, Kumar and Dayma’s research on consumers in India. Finally, unlike the other articles in this special issue, Losado-Otalora and Alkire investigate an institutional variable, rather than individual factors, as an antecedent of financial well-being. Here, they investigate bank information transparency as a factor that contributes to bank customers’ financial well-being.

Where to go from here: topics for future research
While this special issue contributes to the growing literature on financial well-being, especially pertaining to a deeper understanding of its antecedents, financial well-being is still a fertile area of investigation with many more research questions that other studies may examine in the future. Here, we identify four areas of future research that can be readily studied.

One research stream that warrants more research is the conceptualization of the financial well-being construct. While there seems to be a growing consensus to treat financial well-being as a subjective measure, and thus use perceived financial well-being
as its assessment, other researchers still prefer to treat financial well-being using solely objective measures or a combination of both subjective and objective measures. It would be interesting for future studies to compare both objective and subjective measures of financial well-being and investigate the reasons for a possible inconsistency between these different conceptualizations.

Another area for future research is to broaden the scope of financial well-being. To date, many studies limit their subject pool to include college students and young consumers when investigating different financial well-being related topics. Future studies may want to include different age cohorts in their analyses to assess generalizability of existing findings while also providing new insights for the literature.

The relationship between financial well-being and consumer well-being is another area of future research that needs greater attention. While many papers in this special issue focus on understanding the antecedents of financial well-being, more empirical research on how financial well-being relates to overall consumer well-being is necessary. In this context, we believe that research is needed in the area of financial education and awareness. We urge future researchers to consider the role of financial education, financial products, financial services and other initiatives dedicated to improving financial capability as a means of improving financial well-being and in turn overall consumer well-being.

Finally, we advocate for more research on how consumer financial well-being relates to financial vulnerability and in turn financial hardship. Using the transformative service research framework that suggests services can create uplifting and positive changes for consumers, companies and society (Anderson and Ostrom, 2015), we believe future studies should investigate which interventions are needed in financial service companies (e.g. banks, financial advisors, etc) to improve consumer financial well-being. Finding holistic solutions to improve financial well-being would entail innovative financial products, adaptive policies and creative community programs with systematic evaluations of their effectiveness. Such research would not only provide interesting and relevant academic and managerial implications, but also public-policy insights to enhance overall well-being of consumers and society.

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References


Further reading


Subjective financial knowledge, prudent behaviour and income
The predictors of financial well-being in Estonia

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Abstract
Purpose – The purpose of this paper is to study how subjective and objective knowledge of finance, behaviour in managing personal finances and socio-economic status affect financial well-being.
Design/methodology/approach – The financial well-being score is constructed in quantitative financial literacy survey data from Estonia as the arithmetic mean of four statements on a five-point scale. Four hypotheses are tested in multiple regression analysis.
Findings – Subjective knowledge has a stronger relation with financial well-being than objective knowledge. Financial behaviour score and income level correlate with financial well-being.
Research limitations/implications – The paper contributes to literature on financial literacy, subjective financial knowledge and financial well-being. In future research, psychological factors and future orientated financial well-being should be included, and their relationship to subjective well-being could be analysed further.
Practical implications – The results highlight the importance of subjective knowledge and sound behaviour for improving financial well-being. Providers of financial services should address these more in the design of their services and communication.
Social implications – Policymakers developing national strategies for financial education need to address subjective financial knowledge for increasing financial well-being in society.
Originality/value – Knowledge, behaviour and subjective knowledge have not been used simultaneously in the analysis of financial well-being in Europe before.

Keywords Estonia, Financial literacy, Economic psychology, Financial well-being, Subjective financial knowledge

Paper type Research paper

1. Introduction
Prudent management of personal and household finances has become essential due to demographic changes and pension reforms. Financial well-being is the ability to meet the needs and responsibilities of current and anticipated life-style (Brüggen et al., 2017; Kempson et al., 2017). As individuals are increasingly responsible for securing their own long-term financial well-being, having the necessary knowledge, skills, attitudes, confidence and motivation to act are crucial (OECD, 2014a). To empower them to make prudent financial decisions, financial education programmes are provided by public and private sector institutions with the ultimate aim of increasing financial well-being. However, there is empirical evidence of shortcomings in financial knowledge and skills (Klapper et al., 2014; Lusardi, 2015; OECD, 2016), and a substantial body of literature on the limited effects of such knowledge on actual behaviour (Fernandes et al., 2014; Kaiser and Menkhoff, 2017; Miller et al., 2015). Furthermore, psychological factors such as self-control (Thaler and Shefrin, 1981), self-efficacy (Farrell et al., 2016), conscientiousness (Tang et al., 2015), locus of
control (Bastounis et al., 2004) time-orientation, impulsivity and achievement-orientation (Kempson et al., 2013) have been found to be correlated with sound management of personal finances more than objective financial knowledge.

Instead of focussing on the improvement of objective knowledge, Hadar et al. (2013) suggest addressing subjective knowledge in financial education programmes. Subjective financial knowledge is defined by Rosen et al. (2017, p. 5) as the “confidence in one’s own knowledge of financial issues”. Allgood and Walstad (2016) find that a score that measures both perceived (i.e. subjective) and actual knowledge correlates better with behaviour than either of them separately. However, majority of financial education programmes are dedicated to the promotion of objective knowledge alone.

The aim of the current study is to analyse the relationship between subjective and objective financial knowledge, behaviour and financial well-being, while controlling for the socio-economic status. It uses data from a representative sample of the Estonian population. Financial well-being is operationalised as the arithmetic mean of responses to four statements on a five-point Likert scale. The data were collected for the OECD financial literacy survey in Estonia in 2015. It is hypothesised that subjective financial knowledge, knowledge and behaviour score, and income level relate positively to financial well-being. The findings should make an important contribution to the field of financial education by enabling to reach its ultimate aim – financial well-being – via improved understanding of the factors significantly related to it.

In the next section, an overview of financial well-being, financial literacy and subjective financial knowledge literature is provided, followed by an explanation of the constructs and methods used. Next, the hypotheses are tested and the results of regression models are discussed. The paper concludes with suggestions for implications and further research.

### 2. Increasing attention to financial well-being

Due to ageing population, individuals need to plan personal finances prudently for increasing their financial well-being in all life stages, including retirement. Substantial effort from both public and private sector is put into promoting financial literacy. For example, there are national strategies for financial education designed and implemented in more than 50 countries over the world (OECD, 2015a) and the European Banking Federation organises a financial education week in more than 30 countries every year (EBF, 2018). Yet there is a limited understanding of the factors explaining sound behaviour in managing personal finances. Furthermore, there is no common agreement on what financial literacy (Huhmann, 2017; Nicolini et al., 2013; Xiao and Porto, 2017) and financial well-being stand for, and how these constructs should be measured (Brüggen et al., 2017; Hastings et al., 2013; OECD INFE, forthcoming). To avoid terminological confusion in the current study, definitions of all constructs are provided.

Financial education is defined by the OECD (2005) as:

[…] the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being.

Although the aim of financial education programmes is to increase financial well-being as made explicit in the above quoted definition, most of these initiatives have been found to have little effect on actual behaviour, especially in the longer term (Atkinson et al., 2015; Fernandes et al., 2014; Miller et al., 2015; Willis, 2008). Therefore, it can be assumed that many of such programmes have failed to improve financial well-being.
The definition of financial literacy used in the Programme for International Student Assessment (PISA) test emphasises confidence and motivation for applying financial knowledge and skills for increasing the financial well-being of individuals and society (OECD, 2014b):

Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life.

This approach acknowledges the limited effects of knowledge alone and highlights the importance of being confident to apply knowledge in financial decisions. However, there is no general agreement in neither defining nor measuring financial literacy, although several researchers have drawn attention to it (Huston, 2010; Remund, 2010; Knoll and Houts, 2012; Riitsal and Pöder, 2016). Some see it as the synonym for knowledge and skills, others include attitudes and behaviour into its conceptualisation. Such a large variety complicates comparison of the findings in relevant literature. The authors of the current study support the above cited definition, but for avoiding confusion, use constructs financial knowledge and financial behaviour in the analysis.

Financial well-being, especially its conceptualisation and measurement, have gained increasing attention in recent years (see, e.g. Brüggen et al., 2017; Kempson et al., 2017; OECD INFE, forthcoming). There are discussions on whether the construct includes objective (e.g. income, borrowing-to-income ratio), subjective (e.g. satisfaction with the current economic situation) or both kinds of measures (Brüggen et al., 2017; Kempson et al., 2017; OECD INFE, forthcoming; Xiao and Porto, 2017). Similarly to financial literacy research, there is no generally accepted definition of financial well-being. Kempson et al. (2017, p. 19) suggest it is “the extent to which someone is able to meet all their current commitments and needs comfortably, and has the financial resilience to maintain this in the future”. Brüggen et al. (2017, p. 229) conceptualise it as “the perception of being able to sustain current and anticipated desired living standards and financial freedom”. Finney (2016) and Netemeyer et al. (2018) divide financial well-being into two parts – current financial well-being, and longer-term financial security.

In addition to the debates on the definition of financial well-being, there are concepts such as financial wellness, financial health and financial resilience used to study similar issues (see their explanations in OECD INFE, forthcoming). Therefore, general agreement is needed on the concept of financial well-being and for enabling its measurement, comparison and analysis.

The authors of the current study support the simple yet comprehensive definition provided by Brüggen et al. (2017), their conceptualisation reflects the self-reported and subjective nature of financial well-being and its scope from keeping the current financial status up to achieving financial freedom. The perception of living standards is a subjective matter; therefore, it cannot be operationalised by using objective measures. In Estonia, planning and investing for the long term is rare. Merely 17 per cent state to plan their finances for a year or more, a few per cent invest on stock market (Saar Poll, 2015). Such present orientation does not enable meaningful analysis of future orientated financial well-being. Therefore, in the current study the object of research is current financial well-being, not the desired or perceived financial future, and it is operationalised using subjective measures.

Research on factors explaining the differences in financial well-being is only beginning to be conducted, as indicated by the extensive list of suggestions for further research in the Brüggen et al. (2017) study and the call for the current special issue. Muir et al. (2017, p. 3) find the “strongest influencers of financial well-being to be financial capability, financial inclusion,
social capital, income”, and (mental) health. Vlaev and Elliott (2013) find the feeling of being in control of personal finances to be the best predictor of financial well-being. They suggest that banks could develop a Financial Well-Being Index that would be presented for each of their services; this way consumers could compare and choose the services that help to gain control of their finances. Although such an index would simplify decision-making, the different needs and values of consumers might make the creation of such a universally applicable objective index too challenging. Kempson et al. (2017) propose a conceptual model, which includes socio-economic environment, knowledge and skills, psychological factors and behaviours as the determinants of financial well-being. Their model is used as a basis of the current study. However, the psychological factors cannot be measured in the existing data, yet confidence is mediated by subjective knowledge to some extent.

The effect of financial well-being reaches far beyond the financial context. Shim et al. (2009) studied the financial well-being of young adults in the USA and showed it to be a predictor of academic success, overall life satisfaction and health. Arber et al. (2014) found in the UK subjective financial well-being having a strong impact on health in middle age and later in life. Netemeyer et al. (2018, p. 68) found in the USA that perceived financial well-being is “a key predictor of overall well-being and comparable in magnitude to the combined effect of other life domains”. Therefore, improved understanding of the antecedents of financial well-being is needed for increasing overall well-being.

3. Objective and subjective financial knowledge
It has to be kept in mind that economic issues are “notoriously hard to understand” for a layman (Leiser and Krill, 2017, p. 140). Financial decisions may seem overwhelmingly complex; therefore, individuals may lack confidence to negotiate with the providers of financial services for optimising their financial well-being. Furthermore, they may doubt they have sufficient knowledge for making prudent financial decisions and leave the decisions undone. Huhmann (2017) explains in the context of financial services marketing that if the information provided in an advertisement exceeds the consumers’ knowledge level and available time for learning, the desired outcome will not be reached, as the decision will be perceived as overwhelmingly risky. In such situations, it is hard to find motivation for processing the complex information. Instead, it is more appealing to “choose not to choose” (Sunstein, 2014). Hastings et al. (2013) point out that the causality of the relationship between financial knowledge and improved economic outcomes is unclear; better knowledge can lead to certain economic behaviours, being engaged in certain economic behaviours can lead to better knowledge of the topic, and there can be a third underlying factor such as numeracy or patience, which contributes to both.

In traffic and health behaviours, individuals have been found to be overconfident in their skills; a majority rate themselves to be above-average drivers (Svenson, 1981) or behave more healthily than the average person (Hoorens and Harris, 1998). In the financial literacy survey conducted by the OECD in 2015, the respondents were asked to assess their own financial knowledge and skills. The same assessment is used for operationalising subjective financial knowledge in the current study. The results of the OECD survey show that in most countries, people have rather adequate understandings of their financial knowledge (OECD, 2016) and no such illusion of superiority existed. No more than half of the respondents rate themselves to be above the average in financial knowledge and their assessment correlates with their knowledge score. Only in Finland did overconfidence seem to be an issue: 74 per cent of the respondents there assessed their financial knowledge to be above-average. However, it may have been caused by the wording of the statement. Although there is substantial literature on the risks of overconfidence and its effect especially on investment decisions, these results confirm the findings of Robb and Woodyard (2011, p. 66), overconfidence “may not be as much of a problem for the general financial behaviours”.

The predictors of financial well-being
Financial education programmes tend to concentrate on the provision and evaluation of objective financial knowledge. In the current study, the relation of both objective and subjective knowledge to financial well-being is analysed. As suggested by Hadar et al. (2013), financial education should address the enhancement of subjective knowledge rather than focussing on improvement of objective knowledge alone.

In a recent study, the effect of a similar construct, perceived financial self-efficacy, on perceived financial and overall well-being was analysed by Netemeyer et al. (2018, p. 72), although it was "not a main focus of research". They explain that the "consumers with a high level of perceived financial self-efficacy are confident in their ability to obtain information to make financial decisions, confident in their ability to make wise decisions, and disciplined with finances" (Netemeyer et al., 2018, p. 73). The authors of the current study interpret that construct to be closer to subjective financial capability than subjective financial knowledge. This refers to the terminological debates in financial literacy, financial capability and financial education research. Many researchers define financial literacy as a synonym to financial knowledge, financial capability has been interpreted more as the money management skills and behaviours. Vlaev and Elliott (2017, p. 202) emphasise that "a ‘financially capable’ person not only acquires skills and knowledge, but also puts them into practice". Similarly, the above quoted explanation of perceived self-efficacy reflects not only confidence and ability, but also practice – being disciplined in one’s personal finance. Therefore, perceived self-efficacy is a broader concept than subjective financial knowledge.

In the current study, the approach of Rosen et al. (2017) to defining subjective knowledge, the confidence in knowledge of money matters, is used for operationalising the construct. Subjective financial knowledge (or perceived knowledge) has been found to have at least as significant (Allgood and Walstad, 2016) or even stronger (Robb and Woodyard, 2011) influence on financial behaviour than objective knowledge. Individuals more confident in their knowledge are more likely to make sound long term investment decisions (Parker et al., 2011). This refers to the importance of confidence and motivation to apply knowledge in financial decisions as noted in the definition of financial literacy.

4. Hypotheses
As explained in previous sections, researchers of financial literacy and promoters of financial education have stressed the importance of financial knowledge for improving financial behaviours and ultimately financial well-being. However, there is limited yet contradictory evidence of the effect of knowledge on financial well-being. To study it further, the first hypothesis is proposed:

H1. Higher financial knowledge score has a positive relationship with financial well-being.

Subjective financial knowledge has been found to have at least as significant or even bigger effect on behaviour than knowledge, but its relation to financial well-being is only beginning to be studied. To contribute into its investigation, the second hypothesis is developed:

H2. Subjective financial knowledge has a stronger relationship with financial well-being than knowledge score.

There is evidence of the positive effect of prudent financial behaviours on financial well-being (Brüggen et al., 2017; Kempson et al., 2017), but previous studies have used different operationalisation methods for both of the constructs. To test the applicability of the indexes developed by the OECD and for enabling international comparisons in the future, the third hypothesis is formulated:

H3. Higher behaviour score has a positive relationship with financial well-being.
At the first glance it seems natural to assume that higher income leads to higher financial well-being. However, previous studies have found that the effect of income is less evident when the psychological factors are included in the analysis (McNair and Crozier, 2017). For studying the effects of income on financial well-being when also subjective measures are included in the analysis, the fourth hypothesis is proposed:

**H4.** Higher income has a positive relationship with financial well-being.

In the next section, the methods for operationalising the constructs and testing the hypotheses are explained.

### 5. Data and methods

#### 5.1 Data and sample

The study uses Estonian data from a cross-national financial literacy survey carried out in 2015. As the data from all countries participating in the OECD financial literacy survey are not available, and not all statements were included in every participating country, the current study uses only Estonian data.

Estonia is a small country by the Baltic Sea, its GDP was €20,342m at the time of the study (Estonian Bank, 2018). In 2018, the Republic of Estonia was celebrating its 100th birthday, although half of its history it was occupied by the Soviet Union. It has developed faster than the rest of the former Soviet countries (Mitra et al., 2010) and is a member of the European Union. The OECD categorises Estonia as a high income country and praises its “excellent business environment, high educational attainment, high labour market participation, an innovative ICT sector and solid public finances” (OECD, 2017a, b, p. 10). However, there is substantial income inequality in Estonia (Eurostat, 2017).

For the financial literacy survey, 1,125 individuals aged 18–79 years were interviewed face-to-face. The interviews were carried out by the survey agency Saar Poll, and funded by the Estonian Ministry of Finance. In the sample, there were 752 Estonians and 373 individuals from other nationalities, mostly Russian speakers. This is representative of the general population. At the time of collecting the data, the population of Estonia was 1.313 million, 908 thousand of them were Estonians (Statistics Estonia, 2018).

Estonia ranks highly in international education and financial literacy surveys, such as PISA and Programme for the International Assessment of Adult Competencies (Bhutoria et al., 2018; OECD, 2014b), but in financial behaviours they are in the bottom end in international comparison (OECD, 2016). In well-being and life satisfaction studies, Estonia ranks below the average (European Social Survey, 2015; Harrison et al., 2016; OECD, 2017a, b; Steptoe et al., 2015). Compared to other member countries of the European Union, income level is rather low in Estonia. At the time of the data collection, Estonia was among the lowest four in average annual wages (US$22,438) but in annual growth rate of household disposable income (5.35 per cent) among the top three countries in the European Union (OECD, 2018).

The summary statistics of the socio-economic background of the sample are presented in Table I.

#### 5.2 Constructs

In the international comparison of the OECD financial literacy survey data, financial well-being has not yet been analysed, although the toolkit suggested using four statements for constructing the financial well-being measure (OECD, 2014a). Based on their suggestion, the financial well-being score was constructed in Estonian data as the arithmetic mean of responses to four statements on a five-point scale where 1 = strongly agree, and 5 = strongly disagree:

1. My financial situation limits my ability to do the things that are important to me.
2. I tend to worry about paying my normal living expenses.
(3) I have too much debt right now.

(4) I am satisfied with my present economic situation.

The scale of the last statement was reversed due to its wording. Cronbach’s α test of reliability for this index gives a value of 0.7. For evaluating the internal consistency of a construct that uses four components, the 0.7 Cronbach’s α is considered satisfactory (Robb and Woodyard, 2011). Therefore, these statements can be summed into a financial well-being construct.

For testing the external validity, we calculated an index based on statements that can be treated as indicators of financial well-being. The statements reflect having run short of money in the last 12 months’ time and being able to cover an unexpected cost without borrowing. The sum of these responses correlates with the financial well-being measure on 95% confidence level ($r = 0.555$), indicating sufficient external validity of the financial well-being construct.

The second construct – subjective financial knowledge – is measured by responses to the question:

Could you tell me how you would rate your overall knowledge about financial matters compared with other adults in Estonia?
where 1 = very high, and 5 = very low, but for the purpose of analysis the scale has been reversed. The authors acknowledge the weaknesses of using a single measure, but trust it to be sufficient for the current study. It has been measured as the response to a single statement in previous studies and found to be sufficient for analysing the phenomenon (Allgood and Walstad, 2013, 2016; Lusardi and Mitchell, 2014; Lusardi and Tufano, 2015; Rosen et al., 2017; Xiao et al., 2015). For studying specific behaviours, more detailed measure would be needed, such as used by Parker et al. (2011) for retirement planning, but for the overall financial well-being this instrument is sufficient. The distribution of both constructs is presented in Figure 1.

As evident in Table II, socio-demographic factors such as nationality and education are correlated with financial well-being and subjective financial knowledge. With the first, all socio-demographic indicators are significantly correlated. The stronger correlations are with income ($r = 0.32$), being Estonian ($r = 0.28$) and with education level ($r = 0.12$). In the last, socio-demographic background is less significant, except for being Estonian ($r = 0.09$), education ($r = 0.25$) and income level ($r = 0.17$).

Subjective financial knowledge has been found to increase with income and age (Lusardi and Tufano, 2015; Parker et al., 2011; Rosen et al., 2017). In the current analysis, the correlation with income is confirmed but no significant relation to age was found. Women have been found to be financially less knowledgeable than men (Bucher-Koenen et al., 2016; Pinto, 2012; Xiao and Porto, 2017) and less confident than men in their financial knowledge as they tend to respond with “don’t know” in relevant surveys more often than men (Bucher-Koenen et al., 2016). In the current study, gender is not significantly correlated with subjective knowledge, therefore the lower confidence in own knowledge is not confirmed. However, women report lower financial well-being, but it must be noted that in

**Table II. Correlation of socio-economic factors with financial well-being and subjective financial knowledge**

<table>
<thead>
<tr>
<th></th>
<th>Financial well-being</th>
<th>Subjective knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.077*</td>
<td>−0.049</td>
</tr>
<tr>
<td>Age</td>
<td>−0.070*</td>
<td>0.017</td>
</tr>
<tr>
<td>Estonian</td>
<td>0.282*</td>
<td>0.087*</td>
</tr>
<tr>
<td>Education</td>
<td>0.124*</td>
<td>0.246*</td>
</tr>
<tr>
<td>Household income</td>
<td>0.321*</td>
<td>0.172*</td>
</tr>
<tr>
<td><strong>Note:</strong> $^*p &lt; 0.05$</td>
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</table>
Estonia, the gender pay gap is the largest in the European Union (Eurostat, 2017). Therefore, the results may not be generalizable.

In the evaluation of financial literacy of the adult population, the OECD approach is to calculate three scores: knowledge, attitudes and behaviour score; and to sum them into the financial literacy index. As the current study is using data collected for the OECD financial literacy survey, similar scores are calculated. In a recent study (Riitsalu et al., forthcoming), the three components of financial literacy – knowledge, attitudes and behaviour – were found to correlate with each other, but the measurement of attitudes has its limitations. It is also noted by Kempson et al. (2017) that there is “limited research on the role of attitudes in determining financial well-being”. Therefore, in the current study, the attitudes score is not included, although its possible effects on financial well-being are acknowledged. Furthermore, financial well-being itself can be interpreted as an attitude.

Both financial knowledge and behaviour scores (third and fourth construct) were calculated as the sum of “correct” answers or “sound” behaviours, based on the OECD methodology (OECD, 2015b). However, one element from the behaviour construct has been excluded due to insufficient data; therefore, the minimum score for both is 0 (all answers incorrect), and maximum score is 7 points. The topics and proportions of answers to each of the questions can be found in Appendix; the distributions of the scores are presented in Figure 2. The descriptive statistics of all four constructs are presented in Table III.

5.3 Method

Once the constructs were created, pairwise Pearson correlations between them were calculated (Table IV). Package cocor was used for testing the statistical significance of the differences between correlation coefficients. The dependent variable in the regression analysis was financial well-being. As independent variables, the construct of subjective financial knowledge and composite measures of knowledge and behaviour were used. In testing the quality of these measures, Cronbach’s $\alpha$ was calculated. Standard socio-demographic variables were

![Figure 2. Financial knowledge and behaviour score distribution](image)

Notes: Min. = 0; max. = 7

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial well-being</td>
<td>3.115</td>
<td>0.907</td>
<td>1</td>
<td>5</td>
<td>1,098</td>
</tr>
<tr>
<td>Subjective knowledge</td>
<td>3.204</td>
<td>0.753</td>
<td>1</td>
<td>5</td>
<td>1,089</td>
</tr>
<tr>
<td>Knowledge score</td>
<td>5.289</td>
<td>1.577</td>
<td>0</td>
<td>7</td>
<td>1,125</td>
</tr>
<tr>
<td>Behaviour score</td>
<td>4.417</td>
<td>1.596</td>
<td>0</td>
<td>7</td>
<td>1,125</td>
</tr>
</tbody>
</table>

Table III. Summary statistics of the four constructs
used as the control variables. In order of gaining better understanding of the data, distributions and frequencies were calculated; correlations were used for studying the relations between the variables. For testing the hypotheses, multiple linear regression analysis was conducted. To check the stability of the obtained results, regression models were ran in random sub-samples of the original data set. Results were rather similar to the ones of the entire sample; therefore, the findings can be considered to be reliable.

Regression model 1 reflects the socio-demographics; model 2 adds household income. All four constructs are added to model 4; model 3 excludes income level. Clearly income is a significant predictor of financial well-being, but as a substantial number of respondents did not report their income, model 3 was calculated without it to control the findings. All four models are presented in Table V.

6. Results and discussion
The first finding is that in pairwise correlations, subjective knowledge has a higher correlation with financial well-being and behaviour than knowledge score, see Table IV. The differences in correlation coefficients are statistically significant. Financial well-being correlates with all three constructs.

Next, in regression analysis the hypotheses were tested (see Table V).

The first hypothesis was not confirmed. In model 3, the financial knowledge score has no significant relation to financial well-being. In model 4, it is weakly correlated. Therefore, higher knowledge score has weak impact on financial well-being, if any at all. This confirms the limited effects of financial education as provision of knowledge.

The second hypothesis was confirmed in models 3 and 4, indeed subjective financial knowledge is a better predictor of financial well-being than the knowledge score. These results support the suggestion of Hadar et al. (2013) to address subjective knowledge in financial education programmes. In the same models, evidence was found to confirm also the third hypothesis. Behaviour score is significantly predicting financial well-being. This outcome is contrary to that of Netemeyer et al. (2018) who found prudent long term behaviours to have little effect on current financial well-being. The confirmation of the second and third hypothesis support the findings of Xiao and Porto (2017), who showed that subjective financial knowledge and sound behaviour correlate more with financial satisfaction than objective knowledge does.

The fourth hypothesis, the positive relation of income to financial well-being was confirmed in models 2 and 4. Those who earn higher income, assess themselves to be on a higher financial well-being level. In model 2, the higher income group has significantly higher financial well-being ($B = 0.626, p < 0.001$) than the individuals in the lower income group report. In model 4, where all four constructs are included, the coefficient of higher income group is still above 0.5 and significant on 0.001 level. Therefore, the positive correlation between income and financial well-being found in previous studies (Muir et al., 2017; Netemeyer et al., 2018) is confirmed in Estonia. However, it must be noted that the current study analyses present financial well-being without operationalising financial freedom in the future and a large number of observations were lost due to unreported income data.

<table>
<thead>
<tr>
<th>Knowledge score</th>
<th>Subjective knowledge</th>
<th>Behaviour score</th>
<th>Financial well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge score</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective knowledge</td>
<td>0.232*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Behaviour score</td>
<td>0.194*</td>
<td>0.375*</td>
<td>1.000</td>
</tr>
<tr>
<td>Financial well-being</td>
<td>0.172*</td>
<td>0.262*</td>
<td>0.238*</td>
</tr>
</tbody>
</table>

Note: *$p < 0.05$
When controlling for socio-demographic variables, tertiary education becomes significant when income and both of the knowledge constructs are excluded. Without income level, those not working have a significantly lower financial well-being level \((B = -0.427, p < 0.001)\) than those who are in employment. No significant regional differences were noted, except for model 1, where areas with lower average income negatively correlated with financial well-being.

Similarly to Xiao and Porto (2017), financial well-being is significantly lower in middle age group. The broader concept of subjective well-being is U-shaped, the lowest in middle age between the ages of 32 and 50 (Dolan et al., 2008). Therefore, such a U-shape can be expected in the financial well-being domain. However, in the context of personal finances, this should be the age where individuals earn the highest income, are less dependent on others, and freer in their choices. Therefore, results of the current study refer that the respondents may relate financial well-being more to overall well-being and satisfaction with life, rather than reflecting purely on the economic situation. Contrary to previous research (Kempson et al., 2017), in Estonia the younger individuals are on higher financial well-being level than the older cohort. One possible explanation for the higher level of financial well-being among the younger

<table>
<thead>
<tr>
<th>Male</th>
<th>0.123 (0.052)*</th>
<th>0.126 (0.055)*</th>
<th>0.159 (0.051)**</th>
<th>0.156 (0.054)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (base: 18–29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30–59</td>
<td>−0.247 (0.078)**</td>
<td>−0.235 (0.083)**</td>
<td>−0.262 (0.075)**</td>
<td>−0.221 (0.080)**</td>
</tr>
<tr>
<td>60–79</td>
<td>−0.238 (0.121)*</td>
<td>−0.239 (0.129)</td>
<td>−0.239 (0.121)*</td>
<td>−0.220 (0.129)</td>
</tr>
<tr>
<td>Estonian (base: non-Estonian)</td>
<td>0.597 (0.066)**</td>
<td>0.613 (0.073)**</td>
<td>0.541 (0.066)**</td>
<td>0.555 (0.072)**</td>
</tr>
<tr>
<td>Region (base: Northern Estonia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Estonia</td>
<td>−0.137 (0.119)</td>
<td>−0.091 (0.123)</td>
<td>−0.184 (0.118)</td>
<td>−0.108 (0.121)</td>
</tr>
<tr>
<td>Central Estonia</td>
<td>0.034 (0.111)</td>
<td>−0.002 (0.120)</td>
<td>0.061 (0.111)</td>
<td>0.044 (0.119)</td>
</tr>
<tr>
<td>North-Eastern Estonia</td>
<td>−0.279 (0.126)*</td>
<td>−0.104 (0.138)</td>
<td>−0.284 (0.126)*</td>
<td>−0.089 (0.134)</td>
</tr>
<tr>
<td>Southern Estonia</td>
<td>−0.291 (0.102)**</td>
<td>−0.142 (0.107)</td>
<td>−0.347 (0.102)**</td>
<td>−0.185 (0.108)</td>
</tr>
<tr>
<td>Type of municipality (base: village/town with less than 3,000 inhabitants)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small town</td>
<td>0.041 (0.088)</td>
<td>0.127 (0.093)</td>
<td>0.090 (0.086)</td>
<td>0.152 (0.092)</td>
</tr>
<tr>
<td>Town</td>
<td>0.040 (0.093)</td>
<td>0.011 (0.093)</td>
<td>0.062 (0.090)</td>
<td>0.018 (0.089)</td>
</tr>
<tr>
<td>City</td>
<td>−0.078 (0.096)</td>
<td>−0.070 (0.103)</td>
<td>−0.070 (0.097)</td>
<td>−0.054 (0.102)</td>
</tr>
<tr>
<td>Education (base: less than secondary)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>0.126 (0.087)</td>
<td>0.084 (0.095)</td>
<td>0.008 (0.086)</td>
<td>−0.036 (0.091)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>0.226 (0.085)**</td>
<td>0.224 (0.094)*</td>
<td>0.134 (0.087)</td>
<td>0.050 (0.092)</td>
</tr>
<tr>
<td>Employment (base: employed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-employed, entrepreneur</td>
<td>0.276 (0.086)**</td>
<td>0.199 (0.098)*</td>
<td>0.215 (0.085)*</td>
<td>0.135 (0.097)</td>
</tr>
<tr>
<td>Not working</td>
<td>−0.427 (0.095)**</td>
<td>−0.292 (0.103)**</td>
<td>−0.306 (0.097)**</td>
<td>−0.227 (0.102)**</td>
</tr>
<tr>
<td>Retired</td>
<td>−0.055 (0.113)</td>
<td>0.242 (0.125)</td>
<td>−0.053 (0.115)</td>
<td>0.195 (0.127)</td>
</tr>
<tr>
<td>Student</td>
<td>−0.207 (0.136)</td>
<td>0.002 (0.166)</td>
<td>−0.180 (0.128)</td>
<td>−0.041 (0.149)</td>
</tr>
<tr>
<td>Household income (base: up to 75% of median income)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 to 125% of median income</td>
<td>0.220 (0.081)**</td>
<td>0.180 (0.080)*</td>
<td>0.180 (0.080)*</td>
<td></td>
</tr>
<tr>
<td>More than 125% of median income</td>
<td>0.626 (0.080)**</td>
<td>0.515 (0.079)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective financial knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial knowledge score</td>
<td>0.171 (0.038)**</td>
<td>0.180 (0.041)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial behaviour score</td>
<td>0.027 (0.018)</td>
<td>0.044 (0.019)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.789</td>
<td>2.287</td>
<td>1.858</td>
<td>1.354</td>
</tr>
<tr>
<td>Number of observations</td>
<td>1,088</td>
<td>911</td>
<td>1,064</td>
<td>891</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.175</td>
<td>0.241</td>
<td>0.230</td>
<td>0.294</td>
</tr>
</tbody>
</table>

**Notes:** *198 missing observations due to unreported data. \(*p < 0.05; **p < 0.01; ***p < 0.001*

Table V. Regression models (unstandardised coefficients and standard errors), the dependent variable is the financial well-being score.
population can be found in the historic and economic backgrounds of the respondents (individuals in the age of 18–29 grew up after the collapse of the Soviet Union). This contradiction emphasises the impact of societal and economic conditions, and calls for further research. Another possible explanation is that this cohort may still rely on their parents’ financial support, therefore they are not yet responsible for their own financial well-being.

The country-specific results are that Estonians and individuals living in Northern Estonia, the capital city region, have higher financial well-being. The Russian-speaking community has been found to have lower levels of financial literacy (Riitsalu et al., forthcoming; Riitsalu and Põder, 2016; Saar Poll, 2015) and to be on lower income levels (Statistics Estonia, 2018). The inhabitants of Southern and Eastern Estonia earn less than in the Northern part (Statistics Estonia, 2017). Therefore, their financial well-being is likely to be lower for objective reasons.

The generalizable results are the positive relation of subjective financial knowledge, behaviour and income to current financial well-being.

7. Implications

These findings contribute to literature on financial literacy, subjective financial knowledge and financial well-being. Previous research on financial literacy, financial capability and financial education relies mainly on knowledge, attitudes and measurable behaviours (see, e.g. Klapper et al., 2014; OECD, 2016). However, in recent studies several researchers have highlighted the role of confidence and motivation (Vlaev and Elliott, 2017; Xiao and Porto, 2017), and subjective financial knowledge (Allgood and Walstad, 2016; Hadar et al., 2013; Robb et al., 2012; Robb and Woodyard, 2011). The current study advances the understanding of the relationship between subjective financial knowledge and financial well-being. One possible way of improving subjective financial knowledge is providing positive experiences with choosing and using financial services. Such experiences can be acquired in gamified financial education programmes (IOSCO, 2018) and simulations that “promote problem solving by simulating a real-life scenario without real-life consequences” (Peeters et al., 2018, p. 12). For building confidence in one’s knowledge, financial sector institutions can design and provide interactive tools such as learning the basics of stock market by investing virtual money.

Furthermore, for increasing financial well-being, the motivation to apply both objective and subjective knowledge in decision-making instead of keeping the status quo is crucial. Especially with complex financial decisions, it is more appealing to leave the decision undone (O’Donoghue and Rabin, 1998; Riitsalu, 2018a; Sunstein, 2014), rather than find the motivation for comparing available options and making a prudent decision for improving one’s long-term financial well-being. However, such procrastination can severely limit the well-being of individuals and society at large. Therefore, the design of financial services and financial education needs to nudge individuals towards finding the necessary confidence in own knowledge and motivation to take the first steps.

Tools for that are provided by researchers of interdisciplinary fields, such as behavioural economics and economic psychology. For example, Vlaev and Elliott (2017) discuss motivational techniques such as evaluation and goal-setting, and planning for improving financial behaviours. Such techniques can be designed into both financial education and financial services. For example, the participants of a financial education programme can be asked to set a measurable and salient goal on the first meeting and its achievement can be evaluated at the end of the course (Riitsalu, 2018b). Banks can design goal setting and the visualisation of progress towards it into their online and mobile platforms using real time customer data. Such behaviourally designed services not only motivate to take action but also provide experiences for building confidence in one’s skills.

Although confidence and motivation alike are included in the OECD definition of financial literacy (see Section 2), neither is measured in international financial literacy surveys. Therefore, they could not be included in the analysis. These and other
psychological factors, such as the locus of control, conscientiousness and self-efficacy should be included in future surveys, in addition to measures of objective and subjective knowledge, attitudes, behaviours and financial well-being. Ideally, internationally comparable studies would be conducted longitudinally to enable analysis of societal changes and the effectiveness of various initiatives for improving financial well-being.

The current study analysed financial well-being, subjective financial knowledge and financial literacy in Estonia, similar studies could be conducted in other countries to test the generalizability of the results. Such studies would enable the analysis of the role of cultural, societal and economic conditions in differences in financial well-being.

8. Conclusion
This study contributes to the emerging research on the antecedents of financial well-being by exploring how subjective and objective knowledge of finance, behaviour in managing personal finances and socio-economic status affect financial well-being. The results revealed that objective knowledge has a weaker correlation with financial well-being than subjective knowledge and behaviour do. Therefore, instead of promoting knowledge and skills alone, confidence and motivation to take action for improving financial well-being need to be in the focus of financial education initiatives. The results confirm the findings of the need to address subjective financial knowledge in financial education programmes (Hadar et al., 2013; Netemeyer et al., 2018; Robb and Woodyard, 2011) and the positive correlation between income and financial well-being. The main limitations of the study are the possibly country-specific effects of socio-economic status and the exclusion of attitudes and psychological factors due to the limitations of the existing data.

References


The predictors of financial well-being

949
Appendix. Knowledge and behaviour score

<table>
<thead>
<tr>
<th>Topic of the question</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-value of money</td>
<td>82.8</td>
</tr>
<tr>
<td>Interest paid on a loan</td>
<td>88.9</td>
</tr>
<tr>
<td>Calculation of interest plus principle</td>
<td>79.3</td>
</tr>
<tr>
<td>Compound interest</td>
<td>43.2</td>
</tr>
<tr>
<td>Risk and return</td>
<td>85.2</td>
</tr>
<tr>
<td>Definition of inflation</td>
<td>87.6</td>
</tr>
<tr>
<td>Diversification</td>
<td>64.8</td>
</tr>
</tbody>
</table>

**Note:** \( n = 1,125 \)

<table>
<thead>
<tr>
<th>Topic of the question</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considered purchases</td>
<td>76.3</td>
</tr>
<tr>
<td>Timely bill payment</td>
<td>88.7</td>
</tr>
<tr>
<td>Keeping watch of financial affairs</td>
<td>76.1</td>
</tr>
<tr>
<td>Long-term financial goals</td>
<td>40.4</td>
</tr>
<tr>
<td>Responsible for household budget</td>
<td>40.9</td>
</tr>
<tr>
<td>Active saving</td>
<td>40.4</td>
</tr>
<tr>
<td>Not borrowing to make ends meet</td>
<td>83.1</td>
</tr>
</tbody>
</table>

**Note:** \( n = 1,125 \)

**Corresponding author**
Leonore Riitsalu can be contacted at: leonore.riitsalu@gmail.com

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Can gamification improve financial behavior? The moderating role of app expertise

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Suzanne Aurora Altobello
Department of Marketing, Management, and Entrepreneurship, Fayetteville State University, Fayetteville, North Carolina, USA

Abstract

Purpose – The purpose of this paper is to explore potential benefits of gamification (application of game-playing elements) for financial well-being and motivation to save.

Design/methodology/approach – A preliminary survey of college students explored how gamification principles incorporated into money-savings/personal finance smartphone apps could improve financial well-being. The main study utilized Mechanical Turk participants, exposing them to financial game app descriptions that emphasized social features (e.g. leaderboards and ability to share achievements) or economic features (e.g. ability to earn real money or a higher interest rate). Objective and subjective financial measures including expertise with financial apps, perceived benefits of financial apps and behavioral intentions were examined.

Findings – Financial worry, financial literacy, subjective knowledge and expertise with money-savings/financial applications predicted financial well-being. Additionally, consumers varied in their preferences for certain financial game app features based on past financial app experience. Those who already used a financial app tend to exhibit higher subjective (though not objective) knowledge, and want both “social” and “economic” features of financial applications, whereas those with no experience are more motivated by economic features.

Practical implications – These results could be used to guide game designers regarding which features may be more attractive to consumers depending on their prior expertise with financial smartphone applications. Financial services marketing would benefit from further research into whether smartphone financial applications that emphasize social features have benefits for consumers’ motivation and financial well-being.

Originality/value – Examining college students about to enter the real world and the general population, this project contributes to research to improve understanding of financial well-being by examining how already having a financial gamification application impacts perceptions of knowledge and expertise, as well as intentions to save given a more socially focused vs economically focused savings app. Additional research needs to further explore gamification as an experimental intervention to ultimately improve both subjective financial well-being and objective financial behaviors, especially for consumers with lower expertise and high risk of financial vulnerability.

Keywords Gamification, Intervention, Financial literacy, Financial well-being

Paper type Research paper

Introduction

Over half of Americans are very worried about financial issues, including not having enough for retirement, to pay normal monthly bills, to make minimum credit card payments or pay medical costs for normal healthcare (Saad, 2015). Additionally, two-thirds of working millennials in the USA have not saved anything for retirement, and only 5 percent are saving enough (Brown, 2018). These worries and concerns are global. According to a Barclay’s survey including 100 employers and 2,000 employees in the UK, almost half worry about their finances, and 20 percent choose not to think about their finances because they find it too upsetting (Barclays, 2018). Whereas some are optimistic, and expect to be better off financially in the future (Berman et al., 2016), for many it is just overconfidence.
Financial well-being has been studied using both subjective and objective measures, where objective well-being relates to income- and wealth-related factors and subjective well-being is measured by perceptions of one’s financial status (Xiao and Porto, 2017), as people in the same financial predicament can view their financial well-being quite differently (Garman et al., 2004). There are numerous definitions of financial well-being and several approaches to studying this construct. Some view financial well-being as subjective (e.g. “perception of being able to sustain current and anticipated desired living standards and financial freedom,” Brüggen et al., 2017), whereas others focus on the construct’s objective components (e.g. “state of being wherein you have control over day-to-day, month-to-month finances, have the capacity to absorb a financial shock, are on track to meet your financial goals, and have the financial freedom to make the choices that allow you to enjoy life,” CFPB, 2015). Ultimately, both subjective and objective financial well-being are important, as people may have subjectively positive financial well-being yet not acknowledge their minimal savings. These hopeful individuals may also not realize their financial vulnerability, as an unexpected emergency could threaten their financial security (O’Connor et al., 2018).

Poor subjective and objective financial well-being have numerous consequences. Both low incomes and financial problems are associated with poor health in mid-life (Arber et al., 2014). In the workplace, employees with financial worries say their work is impacted as they are too distracted and less productive (Barclays, 2014). A PwC (2016) study reports that 45 percent of employees say that personal finances lead them to incur greater stress than the combination of their job, health or relationship. This phenomenon is not just a US issue – almost a third of those earning between £35,000 and £44,999 a year admit that financial worries have affected their work (CIPD, 2017). Financial well-being is an important predictor of overall well-being (Netemeyer et al., 2018), and overall improved well-being is linked to positive outcomes including smarter consumer choices (Gilovich et al., 2015) and living a longer life (Diener and Chan, 2011). Research has investigated ways to improve financial well-being, including providing social information regarding the behavior of others (e.g. Winterich and Nenkov, 2015), educating consumers (e.g. Lusardi and Mitchell, 2014; Xiao and Porto, 2017) and using subtle nudges to encourage changes in behavior (Thaler and Sunstein, 2008).

As consumers’ financial health is becoming increasingly worrisome, the use of mobile phones and mobile games is rising, with 67 percent ownership worldwide by 2019 (Statista, 2018b). Most of this growth can be attributed to the increasing popularity of smartphones; forecasters estimate that smartphones will account for 93 percent of mobile phones in the USA by 2020 (Statista, 2018c). Researchers and federal government agencies are aware of this trend and are exploring how mobile phones can enhance consumers’ financial health and literacy (e.g. Baptista and Oliveira, 2017; Gross et al., 2012). Concurrent with the rise of smartphones is the rise of mobile gaming apps, with, gaming being the most popular Apple App Store category, followed by business, and education/lifestyle apps (Statista, 2018a). Approximately 70 percent of Forbes Global 2000 businesses have applied or considered applying principles of gaming, or gamifying, their operations (Washburn, 2017), and the expectation is that the gamification market will grow to $11.1bn by 2020 (Markets and Markets, 2016). Specifically, gamification entails “the application of game-design elements and game principles in non-game contexts” (Deterding et al., 2011) or “a process of enhancing a service with affordances for gameful experiences in order to support user’s overall value creation” in services marketing (Huotari and Hamari, 2017, p. 25).

Considering increasing concerns regarding financial well-being and the rising use of smartphones and mobile gaming apps, researchers have begun exploring gamification principles in the financial domain. The Federal Reserve (2012) has been particularly focused on exploring how mobile technology can be used to enhance the financial health of
US citizens, especially vulnerable populations often without bank accounts, using payday loans or check-cashing services, but having mobile phones. A recent Federal Reserve project further examined how mobile banking services can be more “fun” for consumers through the development of financial entertainment video games. In pilot tests of games teaching debt management, 401(k) savings and college savings, Maynard and McGlazer (2017) found that users (vs non-users) of a mobile game that provided challenges, digital badges for savings achievements and interactive messaging to encourage players saved on average 25 percent more. Another study provided consumers with either financial learning materials, the use of a financial video game, or neither of these interventions. The financial learning and video game conditions increased consumer confidence and knowledge compared to the baseline, but actual savings were slightly higher for the video game group (vs the learning group) (Maynard and McGlazer, 2017).

Although the principles of gamification have been applied to develop mobile smartphone apps focusing on consumer finances, including Acorn, Digits and Stash, academic research has only begun to explore what characteristics of the new technologies, including game features or incentives, are most effective in motivating individuals to save, and whether use of these financial gaming apps improves financial well-being. Specifically, it is unclear how financial expertise including expertise with financial decision making or expertise using financial apps in general (e.g. bank apps) impact consumers’ motivations to use the apps and ultimately save more. This paper will review relevant literature on financial well-being and the importance of understanding consumer expertise as it relates to experience with mobile financial apps, present some existing work on gamification that relates to learning and/or finance, and present our findings on the impact of mobile banking and money saving apps on financial well-being and preferences for game features. This paper concludes with a discussion of future research that could build on this work to examine the use of gamification as an intervention to improve financial well-being and increase saving motivation.

Conceptual background

Financial well-being and interventions

Improving financial well-being should be the key goal of financial education (CFPB, 2015), as knowledge about saving and improving financial literacy is an antecedent to improved financial behavior. While recent research has studied the links between financial literacy and saving or investment behaviors (e.g. Hastings et al., 2013; Hsu, 2016; Japelli and Padula, 2013), relative financial literacy is lacking. In the USA, only half of age 50+ respondents could correctly answer two simple questions regarding interest compounding and inflation (Lusardi and Mitchell, 2005). This is a global issue, even in well-developed countries like Germany, Sweden, Italy, Japan and New Zealand (Lusardi and Mitchell, 2011), and the effect of financial literacy for retirement saving is quite significant. In the Netherlands, answering an additional financial literacy question correctly is associated with a 10-percentage point higher probability of planning for retirement (Lusardi and Mitchell, 2011). Numerous programs have been introduced targeting specific populations (e.g. welfare recipients, low-income households, women and minority populations; Vitt et al., 2000), given clear discrepancies of financial literacy between different groups of individuals (e.g. whites and Asians are consistently found to be more financially knowledgeable vs African-Americans and Hispanics (Lusardi and Mitchell, 2011)). Other research shows that greater financial literacy leads to a lower likelihood to be in debt (Lusardi and Tufano, 2009), an increased likelihood of stock market participation (Van Rooij et al., 2011) and better planning for retirement (Lusardi and Mitchell, 2009).

Financial literacy and related interventions could also have negative implications. There is evidence that financial literacy reduces satisfaction, and thus subjective financial well-being, as financially literate individuals are better able to see the gaps they still need
to fill (Xiao et al., 2013). A meta-analysis looking at the relationship between financial education and literacy on financial behaviors found mixed evidence; specifically, interventions to improve financial literacy explain only 0.1 percent of the variance in financial behaviors studied (Fernandes et al., 2014). Even “just-in-time” education, provided just before students made important financial decisions (e.g. choosing automobile insurance, selecting a credit card), is not always beneficial (Mandell, 2006). Regardless, consumers that are likely to be the most financially vulnerable (e.g. younger, without a college education, from lower socioeconomic backgrounds) are less likely to receive this information, and less likely to put forth time and effort necessary to understand the information and its implications.

Another intervention includes auto-enrolling participants in employer-sponsored retirement plans. More enroll as a consequence (Friedman, 2018; Madrian and Shea, 2001), but overall seem to invest less than they may otherwise (PNC, 2014). Additionally, in a recent study on US Army civilian employees automatically enrolled in a savings plan were compared to individuals hired a year prior and a year after automatic-enrollment. The auto-enrolled worker carried over $1,500 more in debt than a co-worker hired before auto-enrollment (Beshears et al., 2017). Auto-enrollment is being considered in many countries, with the UK recently making it mandatory (Bauer, 2018). Another attempt to encourage saving included different ways of presenting financial messages, suggesting a financial message in a narrative format results in stronger positive affect, greater emotive response and purchase intention (Hauff et al., 2014).

Given academics and practitioner concerns, another intervention, using gaming principles, could be effective by increasing engagement and relevance with financial decisions. In fact, if an individual tracked their steps using a Fitbit, or their frequent flyer miles in hopes of earning their next reward, followed fantasy football on a mobile app, or competed with friends on a running app such as Strava, they have engaged in that activity via gamification principles. But could gamification engage people, especially more vulnerable consumers, and encourage them to save more and improve their objective (and subjective) financial well-being? Additionally, who is already using financial gamification apps, and what do they feel would keep them engaged? Before going further in depth into our research questions, we discuss gamification and its consequences.

Gamification
Gamification elements can be divided into three main types: website, process-related and social-related game components (Gatautis et al., 2016). Website components are the functional parts of the gameplay, such as the visual field of play and the characters in the game. Visual indicators, such as badges or small images, can appear on the gaming website, beside a user’s name, in their profile, or other easily recognizable location. Badges can signify goal achievement (Gamrat et al., 2014), or serve as status indicators to recognize activity completion. In finance gaming apps, website components can be the ability to customize a character/avatar, or obtain certain badges as achievements within the game (e.g. passing a quiz on finance concepts or reaching a savings goal). Process-related components of games give information about the user’s progress, such as indicating goal progress by seeing a visual progress bar or by unlocking a new aspect of the game based on mastering a previous skill or level. A process-related component of a money-savings financial app could include the ability to see “percentage achieved” indicator toward a customized money-savings goal (e.g. vacation fund, or paying off a loan), or potentially sharing your success with others.

Social components of games contain interaction between game players, including co-operation, teamwork or giving gifts to other users. Social influence has an important role in how effectively gamification works in an app (Hamari and Koivisto, 2015b). “Fun” aspects
of a game are important in increasing motivation, especially in numerous health and exercise studies (Johnson et al., 2017). These fun activities include experiences with other users, like sharing goals, cooperating, giving feedback or even commenting on other people’s gameplay (Penkkimäki et al., 2015). Social rewards and leaderboards encouraged exercise among groups working cooperatively (Chen and Pu, 2014). Social components in a health app might include adding fitness challenges between friends (e.g. “I can walk more steps than you this week”) or being able to socially share one’s goal achievements; the same type of social components could exist in a financial gaming app (e.g. “I can save more than you this week”). With gamification, customers can receive recognition from their peers for achievements such as meeting savings goals, providing encouragement to each other across social networking sites or the previously mentioned leaderboards.

Additional studies extended such gaming elements into the business environment. Workplace task learning is enhanced via “smart games” teaching technical skills to pilots and medical surgeons (Perryer et al., 2012). For salespeople, adding game elements, such as quests, point accumulation, monthly “challenges” involving avatars and leaderboards, increased both leads and sales (Salcu and Acatrinei, 2013). Utilizing gamification principles in a workplace environment, employees reported lower stress levels and higher well-being after playing a mobile app game called “The Wellbeing Game,” as the game helped them connect better with colleagues.

While many possible game elements could be incorporated into money-savings or other financial gaming apps, a review of 24 studies on gamification found that points, leaderboards and badges are most common (Hamari et al., 2014). GameSparks (2014), a game development resource acquired by Amazon, also suggests top social features to include in gaming apps. Although there may be a temptation to include all possible elements into a gaming app, it may be that some elements are more applicable to a finance-specific app, compared to other domains. This research examines key features from these lists, as well as from other work on gaming app development. The gaming elements themselves are a precursor to how consumers are motivated by such features and how features result in real-world outcomes.

**Understanding gamification motivators**

Gamification accomplishes behavioral changes by influencing a person’s motivations, abilities and behavioral triggers. The presence of game elements evokes experiences (Hamari et al., 2014) and promotes intrinsic motivations to engage in activities (Hamari and Koivisto, 2015b). These motivations can result in greater user engagement (Kwon et al., 2015; Penkkimäki et al., 2015; Shivnetra, 2017), enhanced customer loyalty (Saidon et al., 2016), improved effectiveness and efficiency of learning (Deterding et al., 2011) and even concrete behavioral changes (Maturo and Setiffi, 2015; Mitchell et al., 2017; Washburn, 2017). Badges motivate continued engagement, which increases time spent on the learning task (Gibson et al., 2013). In a review of 19 studies examining gamification in the physical health domain, Johnson et al. (2017) found that the impact of gamified interventions on health and well-being was predominantly positive (59 percent), and few studies reported direct negative impacts on health or well-being.

Gamification can have downsides, including demotivation or distraction. In a longitudinal study of gamification classrooms, students in a gamified (vs non-gamified) classroom with an anonymous leaderboard and badges showed decreased motivation, satisfaction and empowerment over time (Hanus and Fox, 2015). Intrinsic motivation of the student mediated the relationship between the course type and final grade. Similarly, Perryer et al. (2016) found that employees’ intrinsic motivation mediated the effect of gamified systems in the workplace and performance. Hamari et al.’s (2014) review of gamification literature stated that “positive experiences from gamification” (e.g. on engagement and enjoyment) were reported in
all studies” (p. 4). Yet, they also stated that some of these same aspects were disliked by some participants, suggesting that not all aspects are perceived the same by game users.

Thus, understanding what motivates which consumers is important, as matching the right types of motivators with the right types of people is crucial for gamification effectiveness (Perryer et al., 2016; Washburn, 2017). This research begins to explore what types of rewards consumers seek in financial gaming apps, including social rewards, which can include the acknowledgment of achievements that are shared with a community of others (e.g. visible badges, leaderboards or team challenges), and economic rewards, which can include actual monetary rewards for gameplay (e.g. discounts, coupons or real money-savings added to an account).

Gamification in the financial domain

Although research on gamification has gained popularity, understanding how gaming and game elements influence financial decision making and financial well-being is a relatively young research domain. Over 50 percent of all Americans monitor their personal bank accounts using an app or a mobile site provided by their banking institution (Federal Reserve Board, 2016), and most industry reports focus on functional features such mobile banking apps should have, including bill pay, international transfers and peer-to-peer payments (e.g. Toplin, 2018). Though this type of mobile app could have visual components, such as digital badges, banking institutional apps often do not have other app components, such as process or social elements, that increase engagement, enjoyment or motivation. In fact, most mobile banking services were not designed to be fun or entertaining, just transactional, yet consumers have higher intentions to use a banking app if hedonic elements increasing fun and enjoyment were more emphasized (Baptista and Oliveira, 2017).

Beyond typical banking services offered in a smartphone app, the financial domain also offers more interactive, engaging “games” to entertain and positively influence financial behaviors, including saving, debt management and credit usage, in broader populations (NEFE, 2015). The Federal Reserve has focused on financial entertainment video games and other digital games to teach financial topics and improve financial security. Retirement-planning games and debt management games can foster learning and increase individuals’ participation in their own financial planning. SavingsQuest, designed to motivate and reward consumers for ongoing real-world savings actions in a dynamic, entertaining interface, used an animated pig that danced for every saving activity, resulting in 25 percent more frequent saving than other cardholders (Maynard and McGlazer, 2017).

Since banking customers are not new to using their smartphones to access financial information, there is an opportunity for the intersection of banking with traditional gamification principles, and great potential for gamification features to improve financial behavior. Digital badges could serve as indications of progress in a learning module on interest rates or taxes. Users could create “goals” within the app and set achievement-based financial health outcomes. Users can even develop learning “quests,” to set out to explore new financial topics, or acquire knowledge via tests and then compare their progress to others. Basically, money-savings/financial apps could become more like health and exercise apps by creating similar incentives and motivators as in apps such as Fitbit. But which features would be incentivizing in this domain? Are some features or incentives more impactful than others? What other consumer demographics or differentiators play a role in financial gamification outcomes?

Expertise

One such differentiator could be expertise, defined as the knowledge about a product or product class, derived from experience, study or training (Friedman and Friedman, 1979). Experts and novices vary in familiarity, and thus process information in different ways
(Alba and Hutchinson, 1987), including their processing of online reviews (novices more influenced by benefits, experts by attributes, Park and Kim, 2008), and differ in the criteria they use to make decisions (Bettman and Sujan, 1987). Novice investors even differ in the decision rules they use compared to expert investors, and are more likely to use name-based heuristics or other shortcuts (Itzkowitz and Itzkowitz, 2017).

In the realm of gamification, expertise could be examined in several ways. First, the level of expertise one has with games in general. Second, focusing specifically on financial expertise, expertise could be knowledge of financial concepts or investing principles. Third, expertise could be whether a consumer has experience with smartphone apps provided by their banking institution to conduct simple tasks related to their checking, savings accounts, such as seeing account balances, receiving text alerts/notifications based on banking transactions, transferring balances or pay a bill (Merry, 2018). This third type of expertise can also extend to whether an individual has experience using financial apps other than those provided by their banking institution, including apps and financial technology platforms like Acorns, Qapital and Stash, which create rules and reward to encourage savings and investment activity. Many of these financial apps are connected to a consumer’s debit or bank card and allow the creation of a “round-up rule,” such that every purchase made with the card is rounded to the next dollar, with pennies entering a separate account. These platforms have many game elements discussed previously and use both social and economic motivators within.

In this work, we are interested in two key types of experience: experience with mobile banking and experience with money-savings financial apps. This research aims to further explore the differences between individuals who do and do not already use such apps, and to better understand what type of apps or features would be most motivating and encouraging.

**Social influence**

Comparing ourselves with others is an inescapable social phenomenon. Festinger’s (1954) work on social comparison theory suggests that people gain knowledge by comparing themselves and their abilities to those of others. Individuals compare themselves with others in order to evaluate or to enhance some aspects of the self (Suls \textit{et al.}, 2002). Nowadays, consumers gain information about others pursuing goals similar to theirs, whether Fitbit or Strava for exercise, Weight Watchers or AA for losing weight or quitting drinking, or Acorn for saving.

However, not everyone wants to gain information about others or share their own goal progress socially. People often avoid information about others and their progress when they are in the middle of their goal pursuit journey (vs at beginning or end), to avoid receiving information when others are pursuing the same goals and could be doing similarly or better (Huang, 2018). Information about someone doing better can negatively impact self-esteem (Gardner \textit{et al.}, 2002), and in avoidance, people attempt numerous strategies including reducing the relevance of the comparison or distancing themselves from others doing better (e.g. Pemberton and Sedikes, 2001; Shrauger and Lund, 1975). Additionally, those threatened or with lower self-esteem are more likely to compare themselves with others who are worse off vs those who are better off (Willis, 1981). To improve their self-worth, gain social approval or increase status, consumers are often engaging in behaviors that conform to others (Dreze and Nunes, 2009). This self-enhancement motivation is prevalent in many aspects of consumers’ daily life (Swann, 1990). Overall, individuals tend to compare themselves with others who are worse off, in a downward comparison, to feel better, yet those better off or more knowledgeable may be more willing to share socially and be more open to information about others’ progress.

But how does experience influence perceptions of knowledge or standing? Uncertainty reduction theory (Berger and Calabrese, 1975), which examines communication among people prior to their actual communication process, suggests that people need to reduce
uncertainty about others by gaining information about them. Similarly, individuals should feel more confident if they gain information about themselves (vs without precise information) and are actively engaged in this content. For example, a Fitbit calculates exact number of steps, vs not having a Fitbit. Having this precise information allows users to make judgments about their behavior (“Am I active enough? Am I active relevant to my peers?”) Thus, people become more confident in their judgments when their judgments are less ambiguous. We suggest that the use of financial apps provides information. Individuals using them are more certain about their finances, and should feel more confident about their financial well-being (“I know where I stand and where my money is”), leading to increased willingness to share their progress with others.

Research questions
We see from application of game principles to various domains including job-training, health and even finance, that games can be empowering. Existing research has yet to explore what types of game features are most important to consumers in financial apps and whether consumers vary in their key motivators. This research examines preliminary research questions regarding the role of consumer expertise and gaming feature preference in financial apps to inform future research projects in this arena. The key research questions are as follows:

RQ1. Does expertise with mobile banking applications or additional money saving/financial applications predict financial well-being?

RQ2. Who are the experts vs novices, or users (vs non-users), of financial applications, and how do they differ on subjective knowledge, objective knowledge and overall financial status?

RQ3. Do users (vs non-users) of financial applications differ in their preference for certain game features and motivations to use apps?

RQ4. Do users (vs non-users) of financial applications differ in their ratings and intentions to use financial gaming apps with specific benefits (e.g. social vs economic)?

These research questions are examined in two studies. The primary goal is to understand the impact of experience (using a financial app, beyond one offered by the bank or primary financial institution) on financial well-being, motivation to save and interest in “social” vs “economic” features of financial apps. In the preliminary study, we look at college students approaching graduation, and measure their interest in various features of financial applications. In the main study, we utilize Amazon Mechanical Turk (MTurk) participants and manipulate the description and primary features of a financial application.

Preliminary study
A preliminary survey of 216 current college students, conducted in a behavioral lab using Qualtrics, examined objective and subjective financial knowledge and well-being, and explored the importance of a variety of smartphone app game features, including intentions to use such apps for money-savings and financial goals. Demographic and behavioral measures of usage of smartphone apps related to financial and banking activity were also collected.

Method and procedure
First, participants responded to whether they used a smartphone app to access their banking institution and whether they used a smartphone app for money-savings/financial activities not specifically designed by their banking institution (each question with a

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Next, we assessed financial knowledge, financial well-being and financial worry (see the Appendix for key study measures). Respondents answered three financial knowledge questions, related to savings, inflation and stocks vs mutual funds, with objectively correct answers (Lusardi and Mitchell, 2011). Subjective financial knowledge was assessed via three self-assessment questions, evaluating perceived overall financial knowledge and perceived financial knowledge relative to others on a seven-point scale. Financial well-being was assessed using the ten-item CFPB (2015) scale. The questions measure present and future financial security and financial freedom of choice. Financial fragility was assessed with one item from the FINRA Investor Education Foundation measuring confidence to come up with $2,000 if an unexpected need arose in the next month (Lusardi, 2013). Financial worry measured worry about running out of money in retirement, and reverse coded such that higher numbers reflect fewer concerns about running out of money. Eight items from the Organisation for Economic Co-operation and Development (OECD) questionnaire, designed with the International Network on Financial Education, assessed both long-term (e.g. keeping a close watch on personal finances) and short-term financial outlook (e.g. spending over savings) (five-point scale, higher numbers indicating more agreement) (OECD INFE, 2011).

The next part of the survey explored ideal gamification features in a financial smartphone app. Respondents were instructed to “think about an ideal smartphone app that would encourage you to improve your personal finances or encourage money-saving behaviors.” A list of 14 features of education games was curated from a variety of descriptions of education games, and game-based learning features based on app development (cf. GameSparks, 2014). Participants rated the importance of each feature from 1 (not at all important) to 5 (extremely important).

Respondents indicated how likely they would be (on a five-point scale), to use a financial app if they obtained social rewards (e.g. others seeing one’s own progress or social rankings, and ability to share achievements with others on social networks), and their motivation to use a financial app if they obtained economic rewards (e.g. such as earning real money, a higher interest rate on savings or lowering insurance costs). Finally, participants answered demographic questions such as age, gender, education, ethnicity, living situation, self-reported class status, income and, at last, budget and spending habits within the household.

**Results**

Participants had an average age of 21.75, and were 59 percent female. Almost 83 percent of participants reported using an app for their banking institution ($n = 179$); however, only 35 percent ($n = 76$) reporting using a smartphone app for money-savings or personal finance that was not designed by their banking institution. A cross-tabulation of these variables showed that 71 of the 76 money-savings app users were also users of their banking institution smartphone app (93 percent), suggesting that using the smartphone app of the banking institution may be a precursor to being open toward using a money-savings/personal finance app.

**Objective and subjective knowledge.** Three financial questions that assessed objective financial knowledge were coded as correct (1) or incorrect (0) and summed to create an objective financial knowledge index, ranging from 0 to 3. Not surprisingly, given that majority of the participants were business majors approaching graduation, respondents had objectively high financial knowledge ($M = 2.43$, $SD = 0.76$). Three self-assessments of subjective knowledge were highly correlated and combined into an index (reliability assessed with Cronbach’s $\alpha = 0.87$), with higher numbers indicating greater subjective knowledge ($M = 4.13$, $SD = 1.38$).
Financial literacy and well-being. The eight OECD financial literacy items were factor analyzed, using principal components factoring with varimax rotation. Two factors were extracted that accounted for 54 percent of total variance. Factor 1 includes five items assessing careful consideration of purchases, paying bills on time, keeping a personal watch on financial affairs, setting long-term financial goals and risking some money when making an investment; these items were averaged to create a subscale. Factor 2 includes the other three items measuring agreement with a more short-sighted perspective on money, such as living for today rather than tomorrow, and desire to spend money, rather than saving; these items were reverse coded, then averaged, to create a subscale. These subscales were coded on a 1–5 scale, such that higher numbers indicated more financial literacy. The OECD Factor 1 mean was 3.84 (SD = 0.69), with a Cronbach’s α of 0.71, and the OECD Factor 2 mean was 2.83 (SD = 0.88), with Cronbach’s α = 0.69.

Financial well-being (assessed with the CFPB ten-item scale) was examined using the CFPB scoring worksheet (CFPB, 2017a), and final scores in the present sample ranged from 26 to 88 (M = 59.19, SD = 9.29), with Cronbach’s α = 0.82.

Regressions. Hierarchical multiple regression was used to examine RQ1, testing whether experience with banking apps or money-savings/financial apps predicted financial well-being, as measured by the CFPB final score. In the first block, financial assessments of objective knowledge, literacy, financial worry and subjective perspectives of financial knowledge were entered as continuous predictors; in the second block, the use of smartphone apps for banking transactions and money-savings/personal finance was entered as predictors.

The first block of financial measures significantly predicted financial well-being (R² = 0.29, F(5, 209) = 17.09, p < 0.001). Financial worry was the most important predictor of financial well-being in the first block with a standardized β of 0.306 (t = 5.23, p < 0.001), consistent with prior research (Farrell et al., 2016), followed by OECD long-term literacy with a β of 0.252 (t = 3.72, p < 0.001), subjective knowledge with a standardized β of 0.221 (t = 3.24, p < 0.001) and OECD short-term literacy with a β of −0.121 (t = −2.02, p < 0.05). All predictors were in the positive direction with higher numbers predicting higher financial well-being, except the OECD short-term literacy. The higher a respondent’s focus on short-term financial goals (e.g. spending over saving, living for today), the lower their financial well-being. Objective financial knowledge (three questions) was not a significant predictor of the CFPB financial well-being.

The use of a banking institution app and the use of another money-savings/financial app were added as dichotomous predictors in Block 2 and significantly improved the prediction of financial well-being, above the financial measures in Block 1 (R² change = 0.024, F change (2, 207) = 3.55, p < 0.05). With seven predictors in the model, the financial measures significant in Block 1 remained significant in Block 2 and in their original direction. Whether the respondent used a money-savings/financial app also was a significant predictor of financial well-being (t = −2.64, p < 0.01). Respondents who used a money-savings/financial app tended to show significantly lower scores on the CFPB than those who did not use the app. Objective financial knowledge was not a significant predictor in either block, nor was whether the respondent used a banking app from their core financial institution in Block 2. Final regression results are presented in Table I.

Financial application experience. To explore RQ2, money-savings/financial gaming experience was explored in more detail. Those with experience with a money-savings/financial app did not differ from those without experience on age, gender, likelihood to save in an employer-provided retirement plan, and class status perception. Participants also did not differ on whether they worried about how they would make monthly rent/mortgage payments.
Experience (vs no experience) with financial apps revealed significant differences on budget behaviors and subjective knowledge, and marginal differences on objective knowledge. A larger percentage of respondents with (vs without) financial app experience reported having a budget (54 vs 41 percent), $\chi^2(2) = 5.45, p < 0.1$. On the three-item index of objective financial knowledge, those who had (vs did not have) experience with an app had slightly lower scores ($M_{NoApp} = 2.53, SD_{NoApp} = 0.66$ vs $M_{YesApp} = 2.34, SD_{YesApp} = 0.79, t(210) = 1.86, p < 0.1$). However, those same individuals with (vs without) financial app experience had significantly higher ratings of their own subjective knowledge ($M_{NoApp} = 3.98, SD_{NoApp} = 1.39$ vs $M_{YesApp} = 4.41, SD_{YesApp} = 1.35, t(205) = -2.16, p < 0.05$).

Gamification features and motivation. To address RQ3, a series of $t$-tests were conducting using experience with a money-savings finance app as the grouping variable and gaming features and motivation to use the financial app as the dependent variables. Two gamification features were rated as significantly more important for the group without financial app experience: the ability to get feedback/coaching on progress toward financial goals ($M_{NoApp} = 3.70, SD_{NoApp} = 1.37$ vs $M_{YesApp} = 3.30, SD_{YesApp} = 1.02, t(205) = 2.11, p < 0.05$), and the desire for interactive learning exercises regarding savings and finance to understand how to get to the next level of the app ($M_{NoApp} = 3.49, SD_{NoApp} = 1.28$ vs $M_{YesApp} = 3.10, SD_{YesApp} = 1.28, t(205) = 2.13, p < 0.05$), suggesting that those who do not use a mobile money-savings or finance app wanted more economic features that focused on “teaching” objective financial knowledge.

Conversely, individuals who use a money-savings/financial app placed significantly higher importance on the ability to share their financial achievements within the app with friends on outside social networks ($M_{NoApp} = 1.93, SD_{NoApp} = 1.16$ vs $M_{YesApp} = 2.41, SD_{YesApp} = 1.23, t(205) = -2.77, p < 0.01$), and the ability to see a leaderboard or a scorecard within a group finance challenge ($M_{NoApp} = 2.04, SD_{NoApp} = 1.24$ vs $M_{YesApp} = 3.04, SD_{YesApp} = 1.24, t(205) = -2.38, p < 0.05$). These results suggest that those who use a money-savings/financial app want features that emphasize their own standing relative to others, a more “social” focus.

The two groups were also compared on two items measuring motivation to use the app if given “social” or “economic” rewards. If social rewards were provided, respondents with (vs without) experience with a money/finance app displayed higher motivation to use the app ($M_{NoApp} = 2.64, SD_{NoApp} = 1.35$ vs $M_{YesApp} = 3.28, SD_{YesApp} = 1.23, t(205) = -3.41, p < 0.001$). If economic rewards were provided, respondents without (vs with) experience displayed higher motivation ($M_{NoApp} = 4.34, SD_{NoApp} = 1.00$ vs $M_{YesApp} = 3.93, SD_{YesApp} = 1.00, t(205) = 2.81, p < 0.01$).

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<td>−1.27*</td>
<td>−0.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of banking institution app</td>
<td>0.29</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of money-savings finance app</td>
<td>−3.12**</td>
<td>−0.16</td>
<td></td>
</tr>
</tbody>
</table>

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
Discussion

This study shows that having experience with a money-savings/financial mobile app impacts individuals subjective financial knowledge ("how much of an expert I think I am") but not objective knowledge (assessed by three financial questions) or objective financial situation (assessed by ability to handle a financial emergency, socioeconomic status, etc.). Interestingly, data revealed a marginally significant difference in that individuals with (vs without) financial app experience had lower objective knowledge. Additionally, individuals with financial app experience tended to prefer more “social features,” such as sharing progress with peers, whereas individuals without the financial app tended to prefer more “economic features” that helped them learn and progress. These insights were used to inform the main study, where we used MTurk participants, a sample significantly more diverse than college students (Buhrmester et al., 2011), and manipulated rather than measured the social vs economic features participants saw.

Main study

For this experiment, 194 respondents were recruited via the Amazon MTurk website and paid $0.70 for the approximately 8-min survey. We manipulated (instead of measured) whether participants saw a detailed description of a financial smartphone gaming app that emphasized social rewards or emphasized economic rewards.

Method and procedure

This survey first asked respondents if they used a smartphone app from their banking institution and whether they used any other money-savings or financial smartphone app outside of their banking institution. Respondents rated how much expertise they had with financial topics (nine-point scale from “Not much expertise at all” to “A lot of expertise”). Four questions regarding subjective knowledge asked “how knowledgeable do you feel about financial decisions,” “how much expertise do you have making financial decisions,” “how familiar are you with ways to save money” and “how knowledgeable do you feel about financial technology products” (five-point scales from “Not at all” to “Extreme”). The final subjective knowledge questions had a Cronbach’s α reliability of 0.88.

Next, respondents were randomly assigned to see one of two detailed descriptions of a financial gaming app that emphasized the app’s social rewards or economic rewards. The “social rewards” condition saw the following description:

Now, we would like you to imagine a smart phone mobile app that is intended to encourage the user to save more money by linking their bank account with a game within the app. This game will allow you to set specific financial goals and will include features normally found in pleasurable, fun games, such as digital badges, the ability to set specific quests or goals, and interactive characters.

Specific features of this financial gaming app include the ability to:

- compete with friends;
- customize a character/avatar in the app for others to see as your player identity;
- share the game with friends via your social networks;
- compare your ranking/progress toward meeting your financial goals to others in your network; and
- see a “leaderboard” with financial progress of you and others in your network that displays who has met their financial goals.
The “economic rewards” condition saw the following description:

Now, we would like you to imagine a smart phone mobile app that is intended to encourage the user to save more money by linking their bank account with a game within the app. This game will allow you to set specific financial goals and will include features normally found in pleasurable, fun games, such as digital badges, the ability to set specific quests or goals, and interactive characters.

Specific features of this financial gaming app include the ability to:

- earn real money as a reward for your progress in meeting your own financial goals/quests;
- earn a higher interest rate on the money that you save within the game;
- earn a discount on insurance costs for using the app;
- get feedback or coaching within the app on how to progress higher toward your goals; and
- learn financial education facts within the game.

Immediately after reading the description, participants evaluated their likelihood to use the app if it existed (“If the app existed, I would be likely to use it”) and perceptions of the efficacy of the app to help them save (“If the app existed, I think I would be able to save more to better reach my financial goals”) on a 1 (strongly disagree) to 5 (strongly agree) scale. Subsequently, to ensure the manipulation of social vs economic reward app description was effective, respondents rated the app on the following two items on a 1 (strongly disagree) to 5 (strongly agree) scale: “The app will help me interact socially with others” and “The app will help me to obtain economic rewards.” Finally, usefulness of the app was assessed using four key measures: “Using this app would make it easier for me to save more money,” “I think this app would be useful for purposes of saving money,” “I think I would find this app to be useful” and “I would feel more effective with regard to saving money when using this app,” measured on a 1 (strongly disagree) to 5 (strongly agree) scale (Hamari and Koivisto, 2015a). These last four items measuring aspects of usefulness had high internal reliability, with Cronbach’s $\alpha = 0.88$.

Identical to the preliminary study, respondents were then asked three objective financial knowledge questions related to savings, inflation and stocks vs mutual funds (Lusardi and Mitchell, 2011) and a set of demographic questions.

**Results**

Even though MTurk participants tend to be more attentive than average participants (Hauser and Schwartz, 2016), we used an attention check question in the midst of a list of other dependent measures, given that individuals completed this survey outside of a lab setting. Specifically, participants were asked: “If you are reading carefully, choose ‘somewhat disagree’ for this item.” All final analyses included only those respondents who answered this question correctly ($n = 167$).

**Manipulation checks.** Significant differences emerged between the two app description conditions on both manipulation checks in the predicted direction. The 71 participants who saw the social (vs economic) app description condition rated the app as helping them interact socially with others significantly higher ($M_{Social} = 3.63$, $SD_{Social} = 1.08$ vs $M_{Economic} = 2.92$, $SD_{Economic} = 1.12$, $t(165) = 4.04, p < 0.001$), whereas the 96 participants who saw the economic (vs social) app description condition rated that the app would help to obtain economic rewards significantly higher ($M_{Social} = 3.68$, $SD_{Social} = 1.12$ vs $M_{Economic} = 4.16$, $SD_{Economic} = 0.82$, $t(165) = -3.20, p < 0.01$). Of the 96 respondents who had not used a financial/money-savings...
app, 44 then saw a description of the app that emphasized social rewards, and the other
52 saw a description of the app that emphasized economic rewards. For the 71 respondents
who had previous experience with a financial/money-savings app, 37 saw the social reward
app description, and 34 saw the economic reward app description.

Knowledge. t-tests showed significantly higher ratings of subjective knowledge, expertise and familiarity for individuals who had (vs did not have) experience with a money-savings/finance app. Significant differences also emerged between the two experience groups on objective financial knowledge but in the opposite direction than the previous items: those with previous experience with a money-savings/finance app had significantly lower objective knowledge than those without previous experience. Table II presents the means and standard deviations, separated by experience, on the five items along with t-test results.

Motivation. We found significant interactions of app description and experience with money saving apps on our key dependent measures. A 2 (app description condition: social, economic) by 2 (experience with money-savings/finance app: yes, no) ANOVA on motivation to use the app (“If the app existed, I would be likely to use it; F(1, 163) = 48.45, p < 0.01) and on efficacy of the app (“If the app existed, I think I would be able to save more to better reach my financial goals”; F(1, 163) = 4.64, p < 0.05). The pattern of means was the same for both dependent variables: if subjects saw the app description with social features and rewards, experience (vs no experience) with a money/savings/finance app resulted in significantly higher intentions to use the app (simple effect t-test: M_NoApp/Social = 2.72, SD_NoApp/Social = 1.30 vs M_YesApp/Social = 3.78, SD_YesApp/Social = 1.08, t(79) = −3.93, p < 0.001) and higher belief that the app would help save more (simple effect t-test: M_NoApp/Social = 3.07, SD_NoApp/Social = 1.23 vs M_YesApp/Social = 3.59, SD_YesApp/Social = 1.01, t(79) = −2.08, p < 0.05). Figure 1 presents two panels of the means for intentions to use and perception of savings with each panel illustrating the interaction.

App usefulness. To further answer RQ4, a 2 (app description condition: social, economic) by 2 (experience with money-savings/finance app: yes, no) ANOVA with perceived usefulness as the dependent measure revealed a significant interaction (F(1, 163) = 4.11, p < 0.05). For participants reading the social app description, experience (vs no experience) with a money-savings/finance app resulted in significantly higher perceived usefulness of the app (simple effect t-test: M_NoApp/Social = 3.36, SD_NoApp/Social = 1.14 vs M_YesApp/Social = 3.93, SD_YesApp/Social = 0.78, t(79) = −2.60, p < 0.05). Experience with a money-savings/finance app did not affect perceived usefulness of apps that promoted economic features and rewards. The pattern of usefulness is presented in Figure 2.

<table>
<thead>
<tr>
<th>Have money-savings/finance app?</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>t(165)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate how much expertise you have about financial topics</td>
<td>No</td>
<td>96</td>
<td>5.11</td>
<td>2.07</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>6.21</td>
<td>1.39</td>
</tr>
<tr>
<td>How knowledgeable do you feel about financial decisions?</td>
<td>No</td>
<td>96</td>
<td>3.04</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>3.42</td>
<td>0.80</td>
</tr>
<tr>
<td>How much expertise do you have making financial decisions?</td>
<td>No</td>
<td>96</td>
<td>3.00</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>3.35</td>
<td>0.85</td>
</tr>
<tr>
<td>How familiar are you with ways to save money?</td>
<td>No</td>
<td>96</td>
<td>3.45</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>3.77</td>
<td>0.85</td>
</tr>
<tr>
<td>How knowledgeable do you feel about financial technology products?</td>
<td>No</td>
<td>96</td>
<td>2.95</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>3.34</td>
<td>0.94</td>
</tr>
<tr>
<td>3-item index of objective knowledge</td>
<td>No</td>
<td>96</td>
<td>2.34</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71</td>
<td>2.04</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Table II. Does experience with money-savings/finance app affect expertise, knowledge and familiarity

Notes: *p < 0.05; **p < 0.01; ***p < 0.001
Discussion
The main study manipulated the type of financial app features presented to individuals, and showed that whether “social” or “economic” features were deemed important, and perceptions of app usefulness, intentions to use and belief that using the app will make the user reach their savings goals, depended on whether the consumer has experience with money-savings/financial apps. When the presented features are more social in nature, those with (vs without) experience saw the app as more useful, as if those without prior experience may not understand or appreciate the value of social features in a financial app. Both experience groups perceived apps described as economic in nature (e.g. earning real money or discounts, getting a higher interest rate) as equally useful.

Conclusion, limitations and managerial implications
Financial well-being is important to academics, public policy advisers, employers, banks, financial managers and of course, individuals themselves. The average person saving for retirement is commonly described as uninterested in savings issues, non-involved and passive (Benartzi and Thaler, 2007). Financial education has a direct and an indirect impact
on financial satisfaction and subjective financial well-being (Xiao and Porto, 2017), and interventions including financial education and auto-enrollments have had mixed results. Thus, it is important to investigate additional interventions to increase financial well-being and improve financial behavior (Brüggen et al., 2017), and this research provides an initial investigation into how the application of gamification principles could encourage increased saving and hopefully improve financial well-being for different segments of consumers.

The interest in using digital financial services and exploring technologies that can improve financial education is not new. It is known that, overall, gamified information presentation promotes consumer innovation adoption (Müller-Stewens et al., 2017). Financial gaming apps already exist to make money-savings or other financial goals more fun and engaging, and The National Endowment for Financial Education emphasizes efforts made, in conjunction with the Doorway to Dreams Fund, to promote the creation of financial games to improve financial habits and empower gamers to manage their finances (NEFE, 2015).

Our research adds to this work with several really interesting findings. First, having a smartphone app from one's banking institution seems to be a gateway or initial step to having a financial gaming app, as almost no respondents used a financial app with gaming features who did not already use the app from their traditional bank. It is encouraging that 63 percent of smartphone users have at least one financial app, most from their checking account or traditional bank (Barba, 2018), so mixing finance and mobile phone usage is not a new concept to them. Building on this, banks may want to incorporate gamification features into their apps or partner with companies who create financial saving apps that incorporate gamification features to deepen engagement.

Second, we find differences between those who do and do not have experience with those financial/money-savings apps, including whether they budget and subjective financial knowledge. Interestingly, those with previous experience showed significantly lower objective knowledge, but significantly higher subjective knowledge. We do not know the direction of these effects: whether those with lower objective knowledge use financial apps in the hopes it will improve their financial well-being (or at least make them feel better about their finances, hence, the higher subjective knowledge). Future research will explore more extensive measures of objective knowledge (e.g. grades in finance/math classes, or substantially more questions on financial topics). Experience vs no experience individuals in our study did not differ on gender, age, socioeconomic status, their perceived ability to pay off debt or on any other dimension we examined. Unfortunately, we did not look at consumers’ finances (e.g. credit score, debt, etc.) as it would make locating and targeting these individuals a lot easier. Rather, we focused on more subjective characteristics which revealed some interesting and insightful findings that deserve attention.

Third, by both measuring and manipulating financial app descriptions, we show that prior experience with finance and money-savings apps leads to different preferences for financial app features. Specifically, in both studies, we find that only those who have experience with financial apps value social features. Relying on social comparison theory and uncertainty reduction theory, we suggest that this is likely because these individuals are fairly certain of where they stand financially (perhaps even knowing where they are relative to their peers), and thus feel more comfortable and are more interested in the social aspects, such as badges, challenges and leaderboards. It is important that app designers build social features into their apps, aligning with the banking industry’s strategic priority to improve engagement between customers and banks via mobile banking apps (Digital Banking Report, 2017). Yet, it is important to realize that different approaches need to exist for different individuals. Those with limited knowledge and low financial well-being, or those with less experience with apps that incorporate gamification features such as quests and leaderboards, could be frustrated by too many saving goals or by the
introduction of too much complex information at once (York, 2015). Additionally, consumers who are lower in financial well-being and have limited experience may not want competitive play, so having the option to opt in or opt out to certain types of game features is crucial, as not to discourage segments of users. Thus, knowing a consumer’s past experience with financial and/or gaming apps can help assess which incentives, rewards and features would be most motivating and engaging, and gaming features should be used strategically.

This work has some limitations that could open up multiple avenues for future research. In our work, we examine expertise as a function of experience with a financial and money-savings app beyond a traditional banking institution app. However, expertise can be defined in many ways relevant to this particular area of research. It can include expertise with financial decision making (e.g. number of years investing, absolute size of portfolio), expertise with setting budgets, or increasing savings. Expertise could mean professional certifications or careers in financial industries or could even refer to expertise with general smartphone gaming apps that are not financial in nature. Future research could measure and then control such expertise indicators. For example, we could control for a respondents’ income level and current savings activities, as individuals with greater financial expertise (as measured by absolute dollar amount) would likely have greater savings. Additionally, the next logical step is to move this work out of the lab and MTurk settings and investigate the phenomenon in a more complex, real-world scenario using actual apps and tracking usage and saving behaviors, as MTurk is not always an appropriate sample (Hulland and Miller, 2018).

Another interesting question that needs to be explored further is whether simply having a financial savings game downloaded on one’s phone leads individuals to feel more powerful. Feeling powerful leads people to save more (Garbinsky et al., 2014), but the question remains whether asking people to download a financial savings app is a way to increase perceptions of power. Additionally, we could more deeply explore participants’ usage of such an app. We did not measure usage in this project; we simply asked participants if they “used a financial or money-savings app not provided by their banking institution.” By encouraging “experience with a financial app,” researchers would need to be careful to avoid being viewed by users as non-voluntary or forced. For example, management games introduced without employee consent produced resistance in some workers, resulting in decreased affect and lower performance (Mollick and Rothbard, 2014). Future research must understand how experience with money-savings/finance apps can be encouraged as voluntary and what aspects of that experience can increase intrinsic motivation to play the game, and subsequently how using the app contributes to long-term improved financial well-being.

Furthermore, while we found differences among individuals who vary in level of experience with financial apps, additional work is needed to understand how other potential moderators, such as demographic and psychographic characteristics, including experiences, personality factors and learning styles, are impacted by potential game features and whether game features in financial apps increase intrinsic motivation, extrinsic motivation or both (e.g. Hofacker et al., 2016; Perryer et al., 2016). Additionally, future researchers need to further explore the types of rewards offered to participants in exchange for app usage. Different people may be more motivated by different social rewards than others. For example, in this project, we let participants draw their own conclusions about the nature of “competition with friends.” Competition could be based on amount of savings, amount of time spent within the app or even percentage of goal achievement. Competition in our study was vague enough to simply be interpreted as allowing others to see progress or time in the financial app. Similarly, future research should explore economic rewards in more detail to find which economic rewards contribute to improved financial knowledge and improved financial savings behaviors.
In sum, this research focuses on understanding financial well-being from a more subjective angle, using mostly consumers’ self-assessments of their financial situation. Future research should examine whether certain gamification app interventions would be more impactful and engaging for individuals with more objective financial hardships, such as low income. Another idea would be to explore whether individuals who show alignment between their objective and subjective knowledge respond differently to social and economic rewards, compared to individuals for whom these are mismatched (e.g. low objective knowledge, but high subjective knowledge). Additionally, interventions to encourage positive financial behaviors, which should ultimately result in a higher financial well-being, should begin at a young age. While some research has begun to look at apps and games that could teach children about saving and financial skills (e.g. Leyva, 2013), and many children have piggybanks early on, it is unlikely that the same approach would work with all types of children, and better understanding the features that would be most effective for different children could be extremely useful. Ultimately, we join and endorse Hofacker et al. (2016), who suggested another 22 research questions regarding gamification and mobile marketing effectiveness, several of which pertain to our research agenda.

To conclude, there is a lot more work to be done in this area as understanding financial well-being and interventions to improve it is more important than ever, and the utilization of mobile apps especially those with gaming features, as well as academic research on gamification, is on the rise. Hopefully, this paper inspires increased interest in investigating the impact of gamification on improving financial well-being.

References


Further reading


Appendix. Financial measures in preliminary study

Objective knowledge

1) Suppose you had a $100 in a savings account and the interest rate was 2 percent per year. After five years, how much do you think you would have in the account if you left the money untouched? Less than $102, Exactly $102, More than $102
Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. Compared with what you can buy with your money today, how much will you be able to buy with the money that is in this account, one year from now? Less, Exactly the same, More

Do you think that the following statement is true or false? “Buying the stock of an individual company usually provides a safer return than a stock mutual fund?” True, False

Subjective knowledge (seven-point scales; Questions 1 and 2 endpoints were “strongly disagree” to “strongly agree”; Question 3 endpoints were “very low” to “very high”)

(1) I feel quite knowledgeable when it comes to managing my finances.
(2) I think I know more than my peers about saving money and retirement programs.
(3) How would you assess your overall financial knowledge?

Financial well-being (Consumer Financial Protection Bureau) (0–4 scales, from “completely describes” to “not at all describes” or “never” to “always”)

(1) I could handle a major unexpected expense.
(2) I am securing my financial future.
(3) Because of my money situation, I feel like I will never have the things I want in life.
(4) I can enjoy life because of the way I’m managing my money.
(5) I am just getting by financially.
(6) I am concerned that the money I have or will save would not last.
(7) Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the next month.
(8) I have money left over at the end of the month.
(9) I am behind with my finances.
(10) My finances control my life.

Financial fragility (0–4 scale, from “certainly could not” to “certainly could”)
How confident are you that you could come up with $2,000 if an unexpected need arose within the next month?

Financial worry (1–7 scale, from “strongly disagree” to “strongly agree; reverse coded)
I worry about running out of money in retirement.

Organisation for Economic Co-operation and Development (OECD)*: factors are indicated with superscript, as noted (1 indicates OEDC Factor 1 subscale; 2 indicates OEDC Factor 2 subscale)

(1) Before I buy something, I carefully consider whether I can afford it.¹
(2) I tend to live for today and let tomorrow take care of itself.²
(3) I find it more satisfying to spend money than to save it for the long term.²
(4) I pay my bills on time.¹
(5) I am prepared to risk some of my own money when saving or making an investment.¹
(6) I keep a close personal watch on my financial affairs.¹
(7) I set long-term financial goals and strive to achieve them.¹
(8) Money is there to be spent.²

Features rated in hypothetical money-savings/financial gaming app

1. Digital badges (such as a star or medal) that display next to your username when you reach a financial goal.
2. Option to compete with your friends.
3. Ability to customize your money-savings goals/quests.
4. Ability to customize an avatar/character.
5. Specific “status” levels to indicate financial progress.
6. Allow for private group savings challenges.
7. Ability to get feedback/coaching on progress toward financial goals.
9. Interactive learning exercises regarding savings and finance to understand how to get to the next level of the app.
10. Motion graphics, like videos, charts, or GIFs, to visualize your savings progress.
11. Ability to share the game with friends via a URL link or on your social networks.
12. Ability to share your achievements with friends on outside social networks.
13. Ability to see a “leaderboard” or a scorecard within a group finance challenge.
14. Inclusion of philanthropy or altruism goal(s), such as ability to donate to a non-profit organization.

Motivation and intention

1. I would be more motivated to use the app if I obtained social rewards for using it, such as other people seeing my progress toward my goal or social ranking.
2. I would be more motivated to use the app if I got economic rewards for using it, such as earning real money, earning a higher interest rate on the money I save, or lowering insurance costs.

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Improving financial literacy in college of business students: modernizing delivery tools

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Abstract
Purpose – The purpose of this paper is to develop and test through an experiment, an innovative online video teaching module that significantly improves financial literacy in college of business students. Specific business major financial literacy levels are also tested.

Design/methodology/approach – A total of 244 college of business students were given a financial literacy test. Half of the students were exposed to the “treatment” (watched a video module), while other half were not. The videos comprised 67 min of micro-lectures that students could download, free of charge, at their own convenience. The researchers analyzed the impact of a previous personal finance course on students’ financial literacy levels and tested across four business majors.

Findings – The video intervention was the most successful at increasing financial literacy, surprisingly more so than having taken a past personal finance course. Interaction effects were not significant. Four college majors were tested with a shorter, improved financial literacy measure – finding, to our surprise that non-quantitative business majors (particularly marketing students) are not less financially literate than other majors. Supporting past research, the authors found that female and African-American college students performed significantly lower on the test.

Originality/value – The research adds value to the literature by developing and testing a modern, novel teaching innovation to improve financial literacy in young adults. Using an experimental setting, the authors showed that the innovation was more effective than the commonly proscribed personal finance course. This is one of the few studies to measure financial literacy levels for specific college of business majors.

Keywords Experiment, Video, College of business students, Financial literacy improvement

Paper type Research paper

Introduction: financial literacy – a significant individual and societal problem
Since the late 1990s, the study of “Financial Literacy” has been a hot-button issue in the popular press as well as in education, economics, management, finance and marketing journals. Politicians, pundits, educators, economists and the media fervently express trepidation that Americans, particularly younger ones, appear unable to save money, invest appropriately, handle credit, solve basic math and financial problems as well as comprehend both personal and national financial matters (Hamilton, 2013; Henager and Cude, 2016; Huhmann, 2017; Mandell, 2008; Marcolin and Abraham, 2006). Researchers have identified alarmingly lower levels of financial literacy in certain at-risk demographic groups potentially leading to negative financial behaviors (Bucher-Koenen et al., 2017; Nejad and O’Connor, 2016). Recent studies have also shown that consumers may be over-confident in their perceived financial literacy (subjective vs objective financial literacy – see Hadar et al., 2013) and as a result may take part in riskier financial behaviors (Nejad and Javid, 2018; Porto and Xiao, 2016).
Millennials are particularly challenged by financial illiteracy due to the unprecedented burden of credit cards and student loans (de Bassa Scheresberg and Lusardi, 2014; Xiao et al., 2011), making US college students a surprisingly vulnerable population. This extends to recent college graduates. Several studies find mean college financial literacy scores not much higher than K-12, even among business majors (Hamilton, 2013), with post-secondary US students having “inadequate knowledge” of personal finance (Hanna et al., 2010; Mandell, 2008; Xiao et al., 2014). As a result, even educated and affluent younger Americans may find themselves unable to navigate the financial world, prone to make uninformed decisions and misled about financial matters (Marcolin and Abraham, 2006). Williams and Oumlil (2005) have called for an “intervention strategy” to improve young college adults’ ability to make informed financial decisions. From a macro-economic perspective, if the highest educated and financially secure cohort (college graduates) in a nation are crippled by poor financial skills and knowledge, we risk an “uncompetitive and unattractive workforce that by necessity will lean more on social programs,” according to Ted Beck, CEO of the National Endowment for Financial Education (Malcolm, 2012).

Although a generalized lack of objective financial knowledge among younger Americans has been documented for decades at both the high school and college level (Chen and Volpe, 1998; Danes and Hira, 1987; Lusardi et al., 2010), there appears to be little research focused on the financial literacy of specific college majors. As marketing and finance professors, several of the researchers on this project were interested in whether the poor financial literacy scores found in college of business studies extend equally across all majors. There is a concern that poor financial literacy may be amplified in marketing, where there is a long documented history of students experiencing difficulty with math, statistics and numeracy (Aggarwal et al., 2007; Budden, 1985; Ganesh et al., 2010).

As marketing researchers and scale developers, we also hoped to find more research exploring financial literacy scale development, refinement and validation (as called for by Hastings et al., 2013; Hung et al., 2009). Researchers disagree upon construct definitions for financial literacy, ways to measure it and direct links to behavior (Huhmann and McQuitty, 2009). There are additional ongoing disagreements about related constructs such as financial capability, objective financial knowledge and financial self-efficacy (Hung et al., 2009; Taylor, 2011; Shim et al., 2013; Xiao and O’Neill, 2016).

Finally, it appears that the major thrust, in terms of efforts to improve financial literacy in millennials, is often relegated to a mandated personal finance course “unevenly applied” in K-12 grade (Harrington and Smith, 2016). We would like to see the rich tapestry of modern marketing educational tools such as mixed media, online video workshops and seminars, and exploratory teaching methods available to marketing educators expand to include the improvement of financial literacy across the college curriculum.

Study purpose
The purpose of this study is to extend the conceptual and theoretical literature related to financial literacy improvement in young people, particularly in college of business students. We analyzed the effectiveness of short videos vs taking a more traditional finance course and evaluated the impact on the participants’ performance on a financial literacy test. Working with online media sources already in place, the researchers utilized video self-tutorials, and an experiment was conducted with 244 college of business students to explore if these online tutorials would significantly improve financial literacy in business majors. Specific business school major, GPA, demographics and exposure to a personal finance course were each analyzed, as well as more appropriate measures of college student literacy proposed. The study more deeply explores marketing and management majors, potentially at risk for poor financial literacy demographic groups, and calls for marketing researchers to assist in scale development and improvement. This study also extends
research in utilizing greater diversity in teaching perspectives (Xiao and O’Neill, 2016), and simplifying and modernizing information/content learning and delivery (Huhmann and McQuitty, 2009) using online web tools and systems (Alwehaibi, 2015; Wankel, 2010).

Financial literacy and students
The GAO (2012) defined financial literacy as: “the ability to make informed judgments and to take effective actions regarding the current and future use and management of money. It includes the ability to understand financial choices, plan for the future, spend wisely, and manage the challenges associated with life events such as a job loss, saving for retirement, or paying for a child’s education” (p. 3). The origins of academic research and measurement of financial literacy began with US high school seniors and the development of a lengthy measurement instrument in the late 1990s with the “Jump$tart, Baseline Survey 1997–1998 of 12th Graders” (Mandell, 2008). Scores on the measure were problematic at best, with high schoolers in the “failing ranges” of 48–57 percent (Jump$tart, 2014). American university students performed poorly displaying a “dismal knowledge” of personal finance (Chen and Volpe, 1998; Volpe et al., 1996) with a mean score of 53 percent on the instrument in the early years of survey (Hanna et al., 2010). Although the performance of a sub-segment including both college-bound and college students improved in the late 2000s, the annual nationwide high school and college student averages were by most measures still “not passing” (OECD, 2005). Jump$tart survey results support a litany of research indicating American consumers, particularly younger ones, are financially illiterate and this is causing serious issues at home as well as in business and society (Fernandes, 2014; Malcolm, 2012; Mandell, 2008; Marcolin and Abraham, 2006).

Lack of financial literacy in college students continues to resonate in the popular business press as this cohort struggles with repaying soaring student debt (Lachance, 2012; Xiao et al., 2014). The average college student now accrues over $35,000 in student debt (Ellis, 2013), and poor financial literacy skills in college graduates magnify the problem. “It comes back to a financial literacy issue and making sure students understand what they’re getting into, how much they’re borrowing and an understanding that there are different options for them at the end,” says Megan McClean, Director of Policy and Federal Relations at the National Association of Student Financial Aid Administrators (Bidwell, 2013).

More recent research has focused on parsing out and measuring important objective and subjective or “perceived” knowledge elements of the financial literacy construct (Hadar et al., 2013; Nejad and Javid, 2018). It is presumed that overly confident college students and graduates who lack true objective financial literacy will make uninformed personal decisions in their everyday financial lives (Perry, 2008; Porto and Xiao, 2016) and may even negatively impact significant financial decisions at work after graduation. Fernandes (2014) worried that financial illiteracy runs rampant in corporate America and that business executives and managers without basic financial skills make key strategic decisions daily. Numerous studies and measures indicate that American college students score poorly when it comes to financial literacy and performance is deteriorating for most groups. Of particular concern are minority student populations (Harnisch, 2010) and women (Bucher-Koenen et al., 2017) who continue to test at lower financial literacy levels. Experts further warn that a lack of financial literacy and basic financial skills in graduated business majors is costing our economy through entrepreneurial failure (Hannaher, 2011), consumer debt (Collins et al., 2011; Ellis, 2013; Lusardi and Tufano, 2009), risky decision making (Mouna and Jarboui, 2015; Blankson et al., 2012) and poor corporate decision making (Fernandes, 2014; Gruca, 2000).

Relatedly, there has been great concern over marketing students’ apparent weaknesses in math, statistics and quantitative skills. First diagnosed nearly 30 years ago by Budden (1985), researchers since have called for educators to enhance financial and analytical skills in the classroom (Brennan and Vos, 2013; Ganesh et al., 2010; Gruca, 2000) and have warned
that math and quantitative skills have become even more important for marketers post-graduation (Davis et al., 2002). Undergraduate marketing majors have been found to lack mathematical and quantitative skills in general (Aggarwal et al., 2007), and may even gravitate to the major because of perceived lower quantitative skills requirements when compared with other business majors (Ganesh et al., 2010). According to Tarasi et al. (2012), marketing students are less likely to have an affinity for the crucial quantitative aspects of the discipline and statistical anxiety is especially strong for marketing majors relative to other business majors. This has become a significant concern for marketers with the contemporary emphasis on “Big Data” analysis and marketing metrics in the workforce (Schlee and Harich, 2010). This is extremely important for marketing faculty, since weaknesses in marketing math and elementary financial understandings weaken employability of marketing graduates (Brennan and Vos, 2013). “Poor mathematical fluency” appears to continue even after four years of marketing curricula (Saber and Foster, 2011). Degreed marketing managers exhibit poor financial planning skills (Abernethy and Gray, 2000) and their lack of financial literacy, numeracy and problem-solving skills can significantly handicap a marketer’s business career as well as hurt his or her ability to advance in an organization (Ganesh et al., 2010). Aggarwal et al. (2007) warned that particularly quantitatively challenged marketing undergraduates may find difficulty both on the job front and in their hopes of gaining an MBA with poor and declining GMAT scores. After graduation, marketing majors are increasingly called upon to be accountable for their financial decisions within the firm (Brennan and Vos, 2013; Ganesh et al., 2010; Saber and Foster, 2011).

The marketing major has a significantly higher percentage of female graduates compared to higher paying numerical majors such as engineering and computer science (50 percent vs below 20 percent – Perry, 2016), supporting the argument that women marketing majors comprise a vulnerable group in terms of financial well-being. Mahdavi and Horton (2014) found college-educated women particularly at risk for lower levels of financial knowledge and call for action to enhance financial literacy in this population as well as vulnerable ethnic groups (Bucher-Koenen et al., 2017; Nejad and O’Connor, 2016).

On the positive side, poor quantitative, statistics and numeracy skills (and apparent interest) among marketing majors (Tarasi et al., 2012) have resulted in a myriad of cross-departmental creative teaching innovations for undergraduates and MBA students (Brennan and Vos, 2013; Gruca, 2000; Saber and Foster, 2011). Innovative pedagogical tools and methods to improve the “less quantitative minded” business student have resulted in whiteboards in the classroom (Greene and Kirpalani, 2013), stand-alone self-study tutorials (Chen et al., 2012) and innovative class modules to improve numeracy (Ganesh et al., 2010). The financial literacy literature appears to have a gap in cutting edge pedagogical tools (see Lusardi et al., 2017 for an exception), and researchers have called for more creative methods in the classroom (Goetz et al., 2011; Huhmann and McQuitty, 2009).

Researchers have also suggested greater financial skills development and exposure to basic finance concepts be integrated into the marketing curriculum (Brennan and Vos, 2013; Gruca, 2000). A personal finance course and financial literacy itself is often ignored after high school, and neither is a part of the majority of university business programs. Bianco and Bosco (2011) examined the curricula of 100 AACSB accredited schools and found that only 54 percent offered a personal finance course, and that these were mostly (44 percent) only offered (not required) to business majors. Only 10 percent of these offerings were available to non-business majors (Lafond and Leaubie, 2014). These numbers indicate that many marketing majors and graduating marketing professionals from the social sciences and more practice-based backgrounds miss out on personal finance and financial literacy education after high school. The majority of advertising-, sales-, web-development- and branding-focused students are not exposed to the basic concepts of financial literacy.
Since financial literacy is “the ability to make informed judgments and to make effective decisions regarding the use and management of money” (Marcolin and Abraham, 2006), it should be a concern to marketing faculty that financial literacy is not more adequately addressed in or adjacent to the marketing curriculum.

Study rationale and measure development
In order to ascertain basic financial literacy levels in business majors and explore whether there might be problems and/or differences among majors, several researchers at different universities collaborated in an experiment. The idea began with a finance professor who had taught personal finance in the past, and was interested in analyzing financial literacy in different majors. This professor had been developing a shorter version of the lengthy Jump$tart Instrument (2009) that would be more concise (length of time to complete: 15 vs 45 min) and had more age appropriate measures. Researchers have often used abbreviated instruments to measure financial literacy (Hanna et al., 2010; Mitchell and Lusardi, 2015).

Through collaborating with several marketing professors, a 16-item financial literacy instrument was developed and pre-tested across three universities and scores of students. The shorter instrument maintained similar “means” to the larger, ungainly Jump$tart measure that had been used over decades primarily to study high school students. This research tested several new questions specifically developed to measure financially informed and effective judgments, vs more commonly measured financial knowledge (Jump$tart questionnaire). We also sought to update the context of the questions to better suit the age bracket of our subjects (college students). These two sample questions (among others) delve deeper into behavioral intentions:

1. You just received the following offers from credit card companies. It came in a good time because you needed $1,000 for a new laptop to replace the old one that just broke down. You expect to be able to pay it back in full in two years. Which of the following would be the best offer?:
   - $0 signup fee and 10 percent annual percentage rate (APR) interest for two years.
   - $200 signup fee, 0 percent APR interest for the first year and 12 percent APR interest for the second year.
   - $0 signup fee, 0 percent APR interest for the first year and 18 percent APR interest for the second year.

2. Which of the following scenarios would you choose for books for next semester? The on-campus bookstore price of these books is $400. If you buy from the bookstore at full price, they will give you $100 back if you sell back all the books at end of the semester (one quarter of your purchase). Assume you cannot sell back books from online, or if purchased at a discount from the bookstore. Choose the best priced option:
   - You buy the books full price from the bookstore, you only sell back 80 percent of the books.
   - Bookstore has a sale at 25 percent off.
   - Online store rents them for 50 percent full price; you must pay shipping and handling (receiving and returning) of approximately $45 each way.

Although these are two of the longest, most complex (and time consuming) questions, they clearly resonate with a younger subject pool and represent complex decision making with real financial outcomes.
The next step was to use the instrument to test and compare and contrast financial literacy levels of college of business majors. The marketing professors were interested in whether marketing majors would score poorly – particularly in comparison to more “quantitative” business majors such as accounting and finance.

After canvassing the financial literacy literature, two marketing professors suggested adding an experimental teaching component to the testing of business majors. The marketing professors had developed innovative pedagogical tools to improve numeracy and statistical knowledge in marketing students using online training videos in the past. Armed with the understanding that these kinds of tools were not being commonly used to improve financial literacy with college students, the co-authors set out to find or produce a more personalized, online video that could be easily accessed by students on their own time. The video would be short in time (shorter than a single class period), cost effective (utilizing extant videos on YouTube – or easily produced videos by a professor) and effective in terms of increasing financial literacy measures. The goal of this study then expanded beyond simply measuring financial literacy in college of business majors, to include a teaching innovation to improve students’ financial literacy knowledge. Collaborating researchers across different disciplines added to the richness of the scale development and teaching innovation.

Students at the private southeast school in three different business courses participated in the experiment. Students in introductory business (4 sections for a total of 116 students), introductory finance (2 sections for a total of 36 students) and introductory marketing (3 sections of 92 students) course took part so that the researchers could maximize students from multiple majors.

**Video treatment development**

In order to quickly roll out a video tool easily accessible to students, previously developed financial literacy videos on YouTube were chosen. It should be recognized, however, that instructors could create and develop their own videos for this or related pedagogical purposes. Researchers hoped the learning module could be integrated later into an introduction to business course – or a principles of marketing course (perhaps during “break-even analysis” or “marketing math”) without having to add any significant class time to the curriculum. Dowell and Small (2011) found that college students’ incorporating online resources into their self-regulated learning strategies can significantly improve engagement and outcomes. Lusardi and Mitchell (2014) indicated that videos can be particularly compelling at improving financial literacy and Henager and Cude (2016) suggested that young people specifically respond to new and creative self-directed learning options. We hope this research contributes to the growing literature on packaging learning modules for millennials and delivering them online through YouTube and social media (Alwehaibi, 2015; Phillips and Trainor, 2014).

Two private university professors were tasked with finding approximately one hour of video micro-lectures that could be easily aggregated into a module that students could download, free of charge, at their own convenience. This specific time length coupled with a short, financial literacy measurement tool would equate to the time of a single class period in a three or four credit-hour course. College students were expected to have a shortened attention span, one that is echoed by nearly all consumers who “spend very little time processing financial information” (Huhmann, 2017, p. 757).

To test the efficacy of the module, financial literacy levels were assessed across cohorts receiving the treatment (module) vs those not receiving the treatment. Financial literacy scores were also compared across several majors and several other classes (introduction to business), something not done in previous research. Finally, the researchers analyzed the impact of a previous personal finance course on their students’ financial literacy.
To minimize demand effects and not “teach to the test,” the researchers at the private institution were not given the measurement tool. They were given the GAO (2012) definition, several “popular press” articles on financial literacy and its decline among US students, and two other construct definitions as a guide for selecting the micro lectures to be included in the module (Jump$tart, 2014; Marcolin and Abraham, 2006). The total module length ended up at 67:36 – and the links can be accessed at: https://youtu.be/7cvDExdTKsw. The module was pre-tested with over a dozen undergraduate and MBA students to get feedback in terms of optimal length, concept clarity and the “level of boredom” as it was assumed (correctly, unfortunately, etc.) that undergraduate business students would have a limited attention span for some of these concepts. The pre-testing helped to inform the final length and video choices.

Experimental protocol and composition
The use of several introductory courses with multiple sections allowed the researchers to reach a wider variety of majors than otherwise possible. The researchers included a question allowing them to assess if a student had previously taken personal finance. We were agnostic as to how differing majors and previous exposure to personal finance might impact the experimental results, although it was expected that those students that had taken such a course in the past would score higher on measures of financial literacy. Students in the experimental group were given the link to the video and asked to view it within a two-week period before Spring break. Both the control and experimental groups were asked immediately after spring break to fill out a questionnaire in class for extra credit – providing an interval of time between viewing the module and measuring financial literacy. There were no discussions of financial literacy in any of the classes. No details about the study were provided until after all students had completed the survey.

A total of 244 students were involved in the research, all were given a financial literacy test. Of these, 122 were asked to watch the video, while 122 were not. The viewing data provided by the YouTube video indicated that there were 107 unique views of the video. Approximately 50 percent watched the entire video or most of it, while 13 percent watched less than 2 min of the video. The remaining 37 percent were exposed to varying amounts of viewing. We were unable to parse out performance on the test based upon viewing time. Of the 244 students, 12 declined to provide their major, the remaining 183 identified business majors were as follows: marketing 23.4 percent, management 45.4 percent, accounting 22.9 percent and finance 8.3 percent. The majority of respondents had not taken a personal finance course (72 percent), while 28 percent had, ten of the students declined to answer the question. The majority of students were male (63 percent), had a GPA between 2.5 and 3.5 (62 percent) and were mostly juniors (54 percent) and seniors (33 percent). The 49 percent of the students had $1,000 or less of credit card debt, 29 percent had $1,000 to $3,000 and 22 percent had over $3,000. In total, 62 percent of the students anticipated having less than $5,000 in student loans, while 28 percent anticipated loans between $5,000 and $30,000, and 22 percentage anticipated loans over $30,000 with 5 percent of these students estimating loans of more than $50,000. The majority of the students were white (70 percent), with 13 percent African-American, 11 percent Hispanic and 6 percent other (including Asian and Native American).

Experimental findings
The primary research finding was that the relatively short (just over one hour) video treatment had a significant positive effect upon financial literacy scores for the students – across all majors (see Table I). The video treatment had a stronger positive effect than a previously taken personal finance course (since most of these students are juniors, many of them would have recently taken the personal finance course – or even taking it concurrently). The most important finding is that those students exposed to the video
module scored significantly higher than those who did not receive the treatment ($p < 0.001$; $F$-statistic $= 20.03$). Having had a personal finance course also had a stronger positive effect ($p < 0.03$, $F$-statistic $= 4.64$) but curiously there was not a significant interaction effect ($p = 0.21$).

A two-factor ANOVA model with fixed effects for the two main variables of interest (video treatment and personal finance course) and their interaction was used to analyze results. To explore student/major effects, marketing and management majors were combined reflecting an extensive literature suggesting these two majors are the “non-quantitative” business majors vs the more numeracy-oriented accounting and finance majors (Chinen and Endo, 2012; Gruca, 2000; Saber and Foster, 2011). We combined the majors to verify this assertion, as well as increase sample size and statistical power. The marketing/management combined group scored significantly higher ($p < 0.02$) after the treatment.

Results indicated that all majors might benefit from the video treatment. A personal finance course also significantly improved students’ financial literacy scores ($p < 0.03$), but surprisingly, the effect was less than that of the video intervention (Table II).

Perhaps the most unexpected result is the fact that the interaction of the two variables (video and a previous personal finance course) is not statistically significant implying taking a personal finance course earlier and then watching an online tutorial does little to boost scores (as would be expected from the statistically significant impact of each). The video treatment boosts scores significantly and so does a personal finance course albeit to a lesser extent. The online video treatment does not seem to increase the financial literacy scores for those who already had personal finance. It should be recognized that the researchers did not measure the time distance between taking a personal finance course and the testing of financial literacy – so for some respondents there may have been a potential for recency effect.

We theorize that the video is so effective because it is very powerful in increasing understanding of personal finance, especially for those who never had personal finance. This bodes well for non-finance majors; perhaps the liberal arts college could make use of the video concept and this might also point to online tutorials as a way to improve adult learners. So why do these videos appear so effective? As mentioned earlier, there is a growing literature suggesting that online tools resonate more strongly with millennials.

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>df</th>
<th>Sum of squares</th>
<th>Mean square</th>
<th>$F$-statistic</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video treatment</td>
<td>1</td>
<td>125.3831</td>
<td>125.3831</td>
<td>20.0251</td>
<td>0.00</td>
</tr>
<tr>
<td>Personal finance course</td>
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<td>29.0723</td>
<td>29.0723</td>
<td>4.6432</td>
<td>0.03</td>
</tr>
<tr>
<td>Interaction</td>
<td>1</td>
<td>0.4396</td>
<td>0.4396</td>
<td>0.0702</td>
<td>0.21</td>
</tr>
<tr>
<td>Error</td>
<td>230</td>
<td>1,440.1010</td>
<td>6.2613</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>1,594.9960</td>
<td></td>
<td></td>
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</tr>
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</table>

Table I. Two-factor ANOVA analysis of impact of the video treatment and personal finance course for all students sampled.

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>df</th>
<th>Sum of squares</th>
<th>Mean square</th>
<th>$F$-statistic</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video treatment</td>
<td>1</td>
<td>22.5311</td>
<td>22.5311</td>
<td>5.2956</td>
<td>0.02</td>
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<tr>
<td>Personal finance course</td>
<td>1</td>
<td>1.7361</td>
<td>1.7361</td>
<td>0.4081</td>
<td>0.48</td>
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<tr>
<td>Interaction</td>
<td>1</td>
<td>16.7216</td>
<td>16.7216</td>
<td>3.9302</td>
<td>0.05</td>
</tr>
<tr>
<td>Error</td>
<td>86</td>
<td>365.9000</td>
<td>4.2547</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>406.8889</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table II. Two-factor ANOVA analysis of impact of video treatment and personal finance course for marketing and management students only.
According to Craig Kunitani, Co-founder of Security Mentor “The Millennial generation has a unique relationship with technology and digital information. Thanks to a lifetime of video games and always being connected to mobile digital communication/media, they are used to doing everything at ‘twitch speed’ and have little patience for lengthy lectures. Burst learning is a great fit for their preferences and data consumption habits – think snackable content” (SCMagazine.com, 2016) (Table III).

Financial literacy-level findings

Unexpectedly, the mean score of marketing students (7.64) on the questionnaire was not significantly lower than that of other majors (finance = 7.69, accounting = 7.50, management = 6.88) contrary to previous research (particularly Chinen and Endo, 2012). In fact, the score differences between majors were not significantly different, although management’s lowest score was marginally lower than the others (p = 0.0593). Previous research indicating that women perform significantly lower than men was supported (3.96 vs 4.71; p = 0.0002 – see Bucher-Koenen et al., 2017; Nejad and O’Connor, 2016). African-Americans (3.59) scored lower than the other demographic groups (range: 4.33–4.56) for a p-value of 0.016, also supported by the literature (Harnisch, 2010). There were no other significant race/ethnicity differences in scores. There were also no significant score differences between varying GPA level, or classmen (juniors vs seniors, etc.). See Table IV for a full summary of findings.

Discussion, implications and limitations

This research uses an experiment and teaching innovation to significantly improve financial literacy scores for college of business majors. Findings indicate that a web-based learning module was an effective teaching tool in improving financial literacy; surprisingly more effective than having taken a personal finance course. This supports Paramonova and Ijevleva’s (2015) research on web-based marketing tools, and Lusardi et al. (2017) and using

Table III.

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>df</th>
<th>Sum of squares</th>
<th>Mean square</th>
<th>F-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video treatment</td>
<td>1</td>
<td>51.5170</td>
<td>51.5170</td>
<td>11.1813</td>
<td>0.00</td>
</tr>
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<td>Personal finance course</td>
<td>1</td>
<td>9.3306</td>
<td>9.3306</td>
<td>2.0251</td>
<td>0.16</td>
</tr>
<tr>
<td>Interaction</td>
<td>1</td>
<td>5.0779</td>
<td>5.0779</td>
<td>1.1021</td>
<td>0.30</td>
</tr>
<tr>
<td>Error</td>
<td>136</td>
<td>626.6102</td>
<td>4.6074</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>139</td>
<td>692.5357</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table IV.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>Generally scores rise with GPA but increases are not statistically significant (&lt; 2.0, 2.0–2.5, 2.5–3.0, 3.0–3.5, &gt; 3.5)</td>
</tr>
<tr>
<td>Major</td>
<td>Marketing majors scored significantly higher than management majors. There was not a significant difference between the scores of marketing majors, accounting majors and finance majors</td>
</tr>
<tr>
<td>Degree aspiration</td>
<td>No significant difference among students with different terminal degree aspirations (bachelor’s, master’s, professional, doctorate)</td>
</tr>
<tr>
<td>Personal finance</td>
<td>Video treatment boosts scores significantly for students who have had a personal finance class</td>
</tr>
<tr>
<td>Gender</td>
<td>Males significantly outperform females</td>
</tr>
<tr>
<td>Race</td>
<td>African-Americans significantly underperformed. The differences between whites, Asians, Hispanics, Native American and other were not significant</td>
</tr>
</tbody>
</table>
videos and visual tools to improve consumer financial literacy. Video modules appear to be very effective delivering content to students outside of the classroom, particularly to teach additional and related concepts (Wankel, 2010; Kitchenham, 2011).

This online tool, easily accessed outside of the classroom, takes only about an hour and can be utilized by all business (including adjunct) faculty. Online and video modules may be used as a reinforcement tool thus providing an extra and “free” resource to assist in student success; particularly reinforcing a personal finance course that college students may have received in high school. An “interventional financial literacy” seminar (Lusardi et al., 2017) might also be used outside of the college of business to shore up financial literacy in any major. There are also non-college applications of the module – perhaps giving this or a similar module to community college students, to new hires for large organizations, or perhaps even to consumers requesting a student loan or a home loan. Future research could determine which micro-lectures of the module are most significant in improving financial literacy. It may be best to develop micro-lectures, or a module from scratch, rather than simply utilizing “off the shelf” products. Differing modules targeted at differing majors, level of education and potential end-use may be useful. A key value component of this method is the ability of the educator to develop and target videos to specific student populations and specific pedagogical content areas.

This project also involved testing financial literacy levels in individual college of business majors – an underdeveloped area of research. The study indicates that marketing majors may not be deficient in terms of financial literacy, mitigating concerns that marketers may be weak in all areas of “numeracy and quantitative skills” as past research has indicated. The levels of financial literacy based upon measures in this study found little variance between business majors (with the exception of marginally significant lower management scores), GPA or class standing. The financial literacy measures in this study did reinforce previous research that at-risk populations, women and African-Americans, scored significantly lower. This research argues that college students themselves, saddled with huge levels of debt upon graduation and low financial literacy levels based upon decades of research, are a vulnerable population needing more study and more pedagogical programs and tools focused on improvement.

As with all research there are some limitations. It would be beneficial to repeat this experiment with larger numbers of students, to show greater significance in individual majors (so we do not have to “combine” majors) and class standing (so we know “when to intervene”). Since a key finding is that these videos appeared more effective than taking a personal finance course, future researchers need to evaluate more clearly the timeline between taking this course and measuring financial literacy. Although video content delivery in education appears to be a growing and effective technique, we must make sure that recency, or other demand effects (such as a higher correlation between video topics and financial literacy measures) have not impacted the results. Further study is warranted to better control for these exigencies.

It would be valuable to extend this experiment and measurement beyond the college of business – liberal arts particularly – and to look at specific areas of concern for minority and female students across universities. A shortened financial literacy test was used (compared to the Jump$tart Instrument) – however, it was longer than most instruments used by financial literacy practitioners on adults (ours having 16 questions). We would also like to see more questions developed that are germane to college students and young adults. We admit that like other researchers, we did not fully develop our scale using rigorous scale development procedures (Bearden and Netemeyer, 1993). Our measures were pre-tested with students to show comparable score percentages and effectiveness, but our shortened instrument may have contributed to the lack of significance when analyzing smaller subgroups.
Moving forward, a more “age appropriate” and shortened instrument should be created specifically for college students and young adults, one developed following individual trait scale development procedures and validity and reliability testing more typically found in the social sciences. We contend the construct of financial literacy itself needs to be appropriately defined, supporting Williams and Oumlil’s (2005) call for theory development and Potrich et al’s (2014) request to develop a financial literacy model for university students. This research underscores the need for consumer behaviorists to develop a nomologically and internally/externally valid and reliable trait scale for financial literacy applicable for college students and adults, following rigorous scale development procedures (Bearden and Netemeyer, 1993).

Finally, we must recognize that financial literacy is a nuanced and complex array of cognitive abilities, personal attributes, behaviors and critical thinking that evolves over time. Our environment, our education, our family and friends (and major, and demographics) all potentially impact our financial literacy levels. Although this research found success with a simple and efficient online video module, we should remember that it is just one potential tool now available in our arsenal to battle a significant cultural and educational problem in the USA.

References


**Further reading**


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Credit card literacy and financial well-being of college students

A moderated mediation model of self-efficacy and credit card number

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Abstract
Purpose – By testing a moderated mediation model, the purpose of this paper is to examine the mediating role of credit card self-efficacy in the relationship between credit card literacy and financial well-being. The authors further examine if credit card number moderates this effect.

Design/methodology/approach – Data for the study were collected from 427 college students. The PROCESS macros in IBM SPSS Statistics 23 was used to assess the hypothesized relationships.

Findings – Credit card literacy positively influences financial well-being through self-efficacy. However, this effect is stronger when college students own fewer credit cards.

Practical implications – Banks and credit card issuers, policymakers and colleges and universities should place a greater emphasis on credit card literacy programs that enhance students’ general understanding of credit card terms and conditions and confidence in their ability to effectively use and manage their credit cards.

Originality/value – To our knowledge, this is the first study to examine the relationship between credit card literacy, self-efficacy and financial well-being.

Keywords Self-efficacy, Financial well-being, Credit card literacy, Credit card number

Paper type Research paper

1. Introduction
Research on financial well-being, one’s feelings of personal financial confidence and security, still remains scarce and scattered across disciplines (Brüggen et al., 2017). Only a handful of studies have attempted to explore the determinants of the financial well-being of college students (see Table I). The focus of these studies was to explore the extent to which economic and social factors influence the financial well-being of college students. For example, a study by Norvilitis and Mao (2013) shows that financial social comparison, the degree to which one compares one’s possessions and financial standing to those who have more money, can predict financial well-being. Another study finds that budgeting, saving and compulsive buying are significantly related to the financial well-being of college students (Gutter and Copur, 2011). Research also shows that irresponsible credit card use and credit card debt have a negative impact on the financial well-being of college students (Santos et al., 2016; Norvilitis et al., 2003, 2006). A study by Leach et al. (1999) explored perceptions of economic well-being by gender and concluded that male and female students differ in the significance of factors affecting the mediators and perceived economic well-being. Chan et al. (2012) found that cash advance, loans from banks and financial institutions and anticipated income upon graduation are negatively related to financial well-being. However, little is known about the effect of financial knowledge on the financial well-being of college students (Santos et al., 2016; Sabri et al., 2012). Yet, the role of behavioral skill as the mechanism through which financial literacy influences financial well-being is unclear.

Interestingly, the mediating effect of self-efficacy on the relationship between credit card literacy and financial well-being of college students has not been studied.
In this study, credit card literacy is defined as the general understanding of concepts related to the use and management of credit cards. The self-efficacy theory (Bandura, 1982) suggests that students’ behavioral skills can play a central role as an intervening variable in the relationship between credit card literacy and financial well-being; students who are highly knowledgeable in credit card terms and conditions are likely to feel more confident in their ability to use their credit cards responsibly, which in turn may lead to improved financial well-being. However, there is no empirical evidence to support this contention. Also, the literature is silent in regard to the possible role of the number of credit cards owned by students in the link between credit card literacy and financial well-being. Therefore, the current study aims to fill these gaps in the literature by examining the mediating role of self-efficacy in the relationship between credit card literacy and financial well-being that are moderated by the number of credit cards owned by students.

Prior studies have reported that financial well-being among college students is lower than other population groups as many students borrow money for acquiring education and constantly worry about their financial situations (Archuleta et al., 2013; Leach et al., 1999). The low level of financial well-being can generate detrimental consequences such as poor academic performance and college dropouts (Bennett et al., 2015; Joo et al., 2009).

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample and data source</th>
<th>Independent variables predicting FWB</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leach et al. (1999)</td>
<td>427 US college students</td>
<td>Gender</td>
<td>Male and female differ in the significance of factors affecting the mediators and perceived economic well-being</td>
</tr>
<tr>
<td>Norvilitis et al. (2003)</td>
<td>227 US college students</td>
<td>Debt-to-income ratio</td>
<td>Debt-to-income ratio is negatively related to perceived financial well-being</td>
</tr>
<tr>
<td>Gutter and Copur (2011)</td>
<td>15,797 US college students</td>
<td>Financial behaviors</td>
<td>Budgeting, saving, and compulsive buying are significantly related to financial well-being</td>
</tr>
<tr>
<td>Sabri et al. (2012)</td>
<td>2,219 Malaysian college students</td>
<td>Childhood experience, financial socialization, financial literacy</td>
<td>Gender, ethnicity, students’ residence, place of origin, and financial literacy are associated with students’ perceived financial well-being</td>
</tr>
<tr>
<td>Chan et al. (2012)</td>
<td>802 from Hong Kong</td>
<td>Cash advance, loans, anticipated income upon graduation</td>
<td>Cash advance, loans from banks and financial institutions, and anticipated income upon graduation are negatively related to financial well-being</td>
</tr>
<tr>
<td>Norvilitis and Mao (2013)</td>
<td>410 college students from US and China</td>
<td>Delay of gratification, financial social comparison, parent worries, credit card trouble</td>
<td>Students who reported better financial well-being reported greater delay of gratification, less financial social comparison, fewer parental worries about money, and lower belief that credit cards represent trouble</td>
</tr>
<tr>
<td>Santos et al. (2016)</td>
<td>784 female college students from US and Brazil</td>
<td>Self-confidence, social comparison</td>
<td>Self-confidence and social comparison influence on financial well-being through the use of credit cards</td>
</tr>
</tbody>
</table>
Therefore, understanding of how credit card literacy affects financial well-being of college students directly and indirectly through self-efficacy may have important implications for financial firms, colleges and universities, and policymakers. Since dealing with a credit card is a difficult task for college students because they are novice learners (Akben-Selcuk, 2015; Chan et al., 2012), it is interesting to examine if the number of multiple credit cards owned by students reduces their confidence in the responsible use of credit cards. Such understandings may provide credit card issuers, educators and policymakers a framework to develop credit cards educational programs that are designed to increase college students’ understanding of concepts related to the use and management of their credit cards and their financial confidence and security.

2. Conceptual framework and hypotheses

2.1 Credit card literacy, financial well-being and the mediating role of self-efficacy

There is a general consensus that knowledge regarding personal finance, referred as financial literacy, is directly associated with financial well-being (Sabri et al., 2012). Although the operationalization of financial literacy and well-being varies, numerous studies have supported this direct relationship in various sample population groups such as retirees (Adam et al., 2017), young workers and families with young children (Vlaev and Elliott, 2014), college professors (Taft et al., 2013) and college students (Sabri et al., 2012; Shim et al., 2009). In relation to financial literacy and well-being, scholars have paid some attention to credit card usage (Gutter and Copur, 2011; Norvilitis, 2014). The issue is particularly acute when the target research population is college students because college students tend to misuse their credit cards to accumulate debt due to their poor credit card knowledge (Norvilitis et al., 2006; Wang and Xiao, 2009; Limbu, 2017). Credit card literacy is defined as a college student’s general understanding of concepts related to the use and management of their credit cards, including minimum payment, interest rate and late fees based on the previous literature in financial literacy (Rosacker et al., 2009; Sabri et al., 2010). Consistent with the references mentioned above, college students with high (or low) credit card literacy should experience higher (or lower) level of financial well-being. Indeed, studies have shown that financial knowledge can promote the responsible use of credit cards and financial well-being through credit card debt (Limbu, 2017; Norvilitis et al., 2006).

Although nurturing financial literacy can play an integral role in financial well-being, previous literature has been somewhat scarce in understanding the underlying psychological processes regarding the relationship between credit card literacy and financial well-being among college students. Particularly focusing on the personal finance domain, scholars have also found that college students’ financial literacy and financial well-being are not directly associated, rather they are indirectly linked via potential intervening factors (Gutter and Copur, 2011; Shim et al., 2009). Self-determination theory (Ryan and Deci, 2000) has been commonly utilized to explain how individuals’ well-being can be enhanced by focusing on basic psychological needs (i.e. autonomy, relatedness and self-efficacy or perceived competence). Autonomy is associated with individuals’ free will when they engage in certain behaviors while relatedness concerns the need to be connected to other people. Self-efficacy (or perceived competence) refers to a personal judgment of one’s capabilities to successfully deal with certain situations. Ryan and Deci (2000) denoted that self-efficacy is one of the crucial factors of individuals’ well-being. Numerous studies have demonstrated that self-efficacy and other interchangeably used constructs (e.g. perceived competence and perceived behavioral control) are associated with well-being in various contexts (Cummins, 2000; Priesack and Alcock, 2015; Tamannaifar and Motaghedifard, 2014). Specifically, financial self-efficacy has been found to influence financial well-being (Gutter and Copur, 2011; Sahu and Rath, 2003).
Considering the empirical findings, credit card literacy itself can be of little use in terms of financial well-being if acquired knowledge about credit cards does not enhance one’s self-efficacy. In this study, credit card self-efficacy is defined as college students’ perceptions that they can control themselves taking cognizance of credit card overspending behavior. In other words, it refers to one’s beliefs in his or her own capabilities to use his or her credit cards responsibly and make appropriate decisions that deal with credit cards. From the learning perspective, knowledge is considered a useful resource for developing self-efficacy (Downey and Zeltmann, 2009; Lockwood and Wohl, 2012). Studies have shown that the more knowledge students acquire, they develop stronger financial self-efficacy (Danes and Haberman, 2007; Heckman and Grable, 2011). We, therefore, developed the following hypothesis:

\[ H1. \text{ Credit card self-efficacy will mediate the relationship between credit card literacy and financial well-being. } \]

2.2 The moderating role of the number of credit cards

Since the Credit Card Act of 2009, the number of credit cards held by college students has decreased (Norvilitis, 2014). Still, a research conducted in 2017 indicated that more than 75 percent of college students own one or more credit cards and 48 percent own four or more credit cards (Statistic Brain, 2017). Norvilitis (2014) contended that managing credit cards still seems to be a challenging task for college students. It could be reasoned that college students are still novice learners of the personal finance as they often start to deal with credit cards after their college years begin (Akben-Selcuk, 2015). With that in mind, it can be even more challenging for college students who have multiple credit cards.

This argument could be supported based on the theory of the planned behavior (Ajzen, 1991), which considers the relationship between individuals’ beliefs and behaviors by incorporating attitudes toward behavior, subjective norms, and perceived behavioral control. Self-efficacy, an integral component of perceived behavioral control, is considered an individual’s evaluating system as to whether performing a certain behavior is easy or difficult. Specifically, people who perceive a task to be difficult can feel less confident, lowering their self-efficacy. Considering the context of the current research, dealing with a credit card is a difficult task for college students because they are novice learners (Akben-Selcuk, 2015; Chan et al., 2012). Although acquiring knowledge can enhance college students’ self-efficacy as a focal task (Downey and Zeltmann, 2009; Lockwood and Wohl, 2012), the level of difficulty may vary depending on situations. Task difficulty generally increases with the number of attributes and alternatives (Duhan et al., 1997). When multitasking, people experience difficulties in tracking the performance of their behavior (Venables and Fairclough, 2009). Moreover, dealing with multiple tasks increases the probability of error per each task (Schell and Conte, 2008). These research can demonstrate that college students have lower level of confidence in the use of credit cards when they deal with multiple credit cards. We, therefore, propose the following hypothesis:

\[ H2. \text{ The number of credit cards will moderate the relationship between credit card literacy and credit card self-efficacy, such that the effect of credit card literacy on credit card self-efficacy will be stronger among those who own fewer (vs more) credit cards. } \]

The first hypothesis suggests that knowledge about credit cards can enhance credit card self-efficacy, which in turn improves financial well-being. The current research also investigates if the strength of the effect of credit card literacy on credit card self-efficacy depends on the number of credit cards owned by college students. Based on the theoretical background, we developed an overall conceptual model pertaining credit card literacy, the
number of credit cards, credit card self-efficacy, and financial well-being, as shown in Figure 1. Specifically, the effect of credit card literacy (X) on financial well-being (Y) via credit card self-efficacy (M) is conditional on the number of credit cards owned by college students (W). Hence, the following hypothesis is advanced:

\[ H3. \] The number of credit cards will moderate the indirect effect of credit card literacy on financial well-being via credit card self-efficacy. Specifically, there will be a positive (vs less positive) indirect effect between credit card literacy and financial well-being when college students own fewer (vs more) credit cards.

3. Methodology
3.1 Data collection procedure and sample
Data for this study were collected via an online survey that was administered using Qualtrics survey software to a convenience sample of 879 undergraduate students at a large public university in the northeastern USA. The participants were sent an e-mail with a link to the survey by course instructors. After sending two e-mail reminders to non-responders, a total of 431 students completed the survey yielding a 49 percent response rate. We excluded four cases due to missing data; the final sample consisted of 427 participants. All participations were informed that their participation was completely voluntary and they could stop at any time. In line with the purpose of the study, all participations were screened to make sure that they possessed at least one credit card in their own name. The participants responded to the question: “Do you have any credit card?”; the response options were “Yes” or “No.” Further, participants were also responded to another question: “Are you the sole account holder on this credit card?” Only those who responded “Yes” to this item were included in the study. The respondents were also asked to report the number of credit cards they owned. Furthermore, the survey items were designed to obtain participants’ demographic information and their perceptions of credit card knowledge, self-efficacy and financial well-being. The questionnaire was pre-tested with ten students for clarity of wording and relevance. Some minor revisions were made to the questionnaire to reflect the results of the pre-test.

As shown in Table II, the majority of the participants were women (62 percent). The average age of the participants was 25 years (SD = 6.82). The majority of the participants were Caucasian (61 percent). The average number of credit cards they possessed was two. About 26 percent of them paid off their credit balance at the end of each month.

3.2 Measures
To assess the students’ credit card literacy, a six-item scale was used that assessed their general understanding of credit cards such as minimum payment, interest rate, late fees. Items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Previous studies have used similar measure (e.g. Lachance et al., 2006; Mansfield and Pinto, 2008; Pinto et al., 2000). Cronbach’s \( \alpha \) for the scale was 0.92 above the recommended level of 0.70 (Nunnally and Bernstein, 1994). Credit card self-efficacy was
assessed with six items adapted from Sotiropoulos and d’Astous (2013). The items included were: “I can control my spending on my credit card(s)”; “I am confident that I will not overspend on my credit card(s)”; and “I feel confident about making decisions that deal with credit card.” Participants responded to the questions on a five-point scale (1 = strongly disagree, 5 = strongly agree). The scale demonstrated good reliability (Cronbach’s $\alpha = 0.92$). Financial well-being was measured with six items adapted from Norvilitis et al. (2003). The measure assessed students’ feelings of personal financial confidence and security. Examples of items used were: “I am uncomfortable with the amount of debt I am in (reverse item)”; “I worry about repaying my credit cards (reverse item)”; and “I think I am in good financial shape.” Cronbach’s $\alpha$ for the scale was 0.84. Finally, students were asked to report the number of credit cards they owned.

### 4. Data analysis

The overall hypothesized model incorporates the mediating role of credit card self-efficacy ($H1$) and the moderating role of the number of credit cards ($H2$), suggesting a moderated mediation model (Hayes, 2017). To test proposed hypotheses, we employed a step-by-step approach by using PROCESS model 4 for the first hypothesis (i.e. moderation model) and model 1 for the second hypothesis (i.e. mediation model; Hayes, 2017). Lastly, Model 7 was employed to test the overall moderated mediation model pertaining credit card literacy ($X$), self-efficacy ($M$), financial well-being ($Y$) and the number of credit cards owned by participants ($W$). Hayes (2009) demonstrated that the traditional mediation analysis (Baron and Kenny, 1986) has a statistical limitation in terms of the lack of power. We employed a 95 percent bias-corrected bootstrapping method using 5,000 resamples to obtain confidence intervals (CIs). The uses of the 95% CIs and 5,000 resampling method are the established criteria suggested by Hayes (2009). Although the default resampling option in the SPSS command is 1,000, it is recommended to use more rigid baseline (i.e. 5,000 replications) due to the concern regarding type 1 error (Hayes, 2017). These recent arguments supported the data analysis employed in the present study.

### 5. Results

#### 5.1 Preliminary analyses

Table III presents the descriptive statistics and correlation matrix. Credit card literacy was significantly and positively correlated with other variables ($p < 0.01$). Credit card self-efficacy was positively correlated with financial well-being. Credit card number was negatively correlated with financial well-being but not statistically significant.
5.2 Testing mediation effects
The first hypothesis, a mediating role of credit card self-efficacy, is confirmed by the significant indirect effect of credit card literacy on financial well-being through credit card self-efficacy (M). As shown in Table IV, the results of PROCESS model 4 with 5,000 bootstrapped samples indicated that the direct effect of credit card literacy was significant on self-efficacy ($\beta = 0.492$, 95% bias-corrected CI = 0.386 to 0.598, $p < 0.01$). Self-efficacy also significantly influenced financial well-being ($\beta = 0.216$, 95% bias-corrected CI = 0.095 to 0.337, $p < 0.01$). The indirect effect of credit card literacy on financial well-being via credit card self-efficacy was significant as a 95% bias-corrected CI for the indirect effect estimate ($\beta = 0.106$, SE = 0.039, $p < 0.05$) ranged from 0.036 to 0.187, which did not overlap zero. Therefore, the indirect effect of credit card literacy on financial well-being through credit card self-efficacy was significant.

5.3 Testing moderated mediation effects
It was also hypothesized that the relationship between credit card literacy (X) and self-efficacy (M) was moderated by the number of credit cards (W) owned by participants. As shown in Table V, the results of PROCESS model 1 with 5,000 bootstrapped samples revealed that the main effect of credit card literacy on self-efficacy was significant ($\beta = 0.475$, 95% bias-corrected CI = 0.37 to 0.58, $p < 0.01$) while that of the number of credit cards was not significant ($\beta = 0.002$, 95% bias-corrected CI = −0.06 to 0.06, $p = 0.94$). These main effects were qualified by the significant interaction ($\beta = −0.128$, 95% bias-corrected CI = −0.22 to −0.03, $p < 0.01$). Johnson-Neyman technique (Bauer and Curran, 2005) showed that the interaction was significant when the number of credit cards was equal to, or fewer than, 1.93 ($\beta = 0.227$, boot SE = 0.12, 95% bias-corrected CI = 0.01 to 0.45). 85.9 percent of participants owned credit cards equal to or fewer than this point. Figure 2 shows the interaction between credit card literacy and the number of credit cards owned by students. As hypothesized, the effect of credit card literacy on self-efficacy was stronger for those who have fewer (vs more) credit cards. It can demonstrate that managing more credit cards can be an overwhelming task for college students, which can negatively influence their credit card self-efficacy.

Finally, the results of the conditional process analysis using PROCESS model 7 with 5,000 bootstrapped samples demonstrated that the direct effect of credit card literacy was significant on self-efficacy ($\beta = 0.475$, 95% bias-corrected CI = 0.366 to 0.583, $p < 0.01$) (see Table VI). Self-efficacy also significantly influenced financial well-being ($\beta = 0.171$, 95% bias-corrected CI = 0.095 to 0.337, $p < 0.01$). The moderating effect of the number of credit cards on the relationship between credit card literacy and self-efficacy was also significant ($\beta = −0.128$, 95% bias-corrected CI = −0.221 to −0.034, $p < 0.01$). The conditional indirect effect of credit card literacy on financial well-being via self-efficacy was significant at low (−1SD: $\beta = 0.13$, 95% bias-corrected CI = 0.04 to 0.22, $p < 0.01$), moderate (Mean: $\beta = 0.10$, 95% bias-corrected CI = 0.04 to 0.18, $p < 0.01$), and high levels of the number of credit cards owned by participants (+1 SD: $\beta = 0.06$, 95% bias-corrected CI = 0.02 to 0.14, $p < 0.01$). Overall, the results of Model 4 (mediation) and Model 1

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Credit card literacy</td>
<td>4.64</td>
<td>0.748</td>
<td>1</td>
<td>0.190**</td>
<td>0.404**</td>
</tr>
<tr>
<td>2</td>
<td>Financial well-being</td>
<td>3.53</td>
<td>1.08</td>
<td>0.190**</td>
<td>1</td>
<td>0.228*</td>
</tr>
<tr>
<td>3</td>
<td>Credit card self-efficacy</td>
<td>3.99</td>
<td>0.911</td>
<td>0.404**</td>
<td>0.228**</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Number of credit card</td>
<td>1.99</td>
<td>1.50</td>
<td>0.138**</td>
<td>−0.084</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table III. Means, standard deviations, and correlations among key variables

Note: **$p < 0.01$ (two-tailed)
(moderation) were successfully replicated in the moderated mediation analysis. Specifically, the results indicated that college students who manage fewer credit cards feel higher self-efficacy, which eventually lead to the greater financial well-being.

6. Conclusion
This is the first study to examine the relationships between credit card literacy, self-efficacy and financial well-being. The results provide support for the indirect effect of credit card literacy on the financial well-being of college students through self-efficacy that are moderated by the number of credit cards owned by students. In line with the self-efficacy theory (Bandura, 1982) and the self-determination theory (Ryan and Deci, 2000), students' self-efficacy plays a central role as an intervening variable in the relationship between credit card literacy and financial well-being. In other words, college students' understanding of credit card terms and conditions influences perceptions of their skills to effectively use and manage their credit cards, which in turn increase their feelings of personal financial confidence and security. Consistent with the theory of planned behavior (Ajzen, 1991), the number of credit cards moderated the indirect effect of credit card literacy on financial well-being via credit card self-efficacy, suggesting that college students who owned fewer credit cards exhibited a higher level of self-efficacy, which eventually led to the greater financial well-being.

Table IV.
Summary of coefficients in PROCESS model 4 (mediation analysis)

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Credit card self-efficacy (M)</th>
<th>Financial well-being (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.  SE  BLLCI  BULCI</td>
<td>Coeff.  SE  BLLCI  BULCI</td>
</tr>
<tr>
<td>Credit card literacy (X)</td>
<td>0.492** 0.054 0.386 0.598</td>
<td>0.171* 0.075 0.024 0.318</td>
</tr>
<tr>
<td>Credit card self-efficacy (M)</td>
<td>–    –    –    –</td>
<td>0.216** 0.061 0.095 0.337</td>
</tr>
<tr>
<td>Constant</td>
<td>1.800** 0.245 1.319 2.282</td>
<td>0.106* 0.075 0.036 0.187</td>
</tr>
<tr>
<td>Indirect effect of X though M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: BLLCI, boot lower level confidence interval; BULCI, boot upper level confidence interval. *p < 0.05; **p < 0.01

\[ R^2 = 0.163 \]
\[ F(1, 425) = 82.872, p < 0.001 \]

Table V.
Summary of coefficients in PROCESS Model 1 (moderation analysis)

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Credit card self-efficacy (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.  SE  BLLCI  BULCI</td>
</tr>
<tr>
<td>Credit card literacy (X)</td>
<td>0.475** 0.055 0.366 0.583</td>
</tr>
<tr>
<td>Number of credit cards (W)</td>
<td>0.002 0.030 –0.057 0.062</td>
</tr>
<tr>
<td>X × W</td>
<td>–0.128** 0.048 –0.221 –0.034</td>
</tr>
</tbody>
</table>

Moderating effect of X at Ws

| Fewer credit cards (–0.998) | 0.602** 0.066 0.473 0.731 |
| Mean (0.00)                 | 0.475** 0.055 0.366 0.583 |
| More credit cards (1.50)    | 0.283** 0.098 0.490 0.475 |

Notes: BLLCI, boot lower level confidence interval; BULCI, boot upper level confidence interval. **p < 0.01
7. Managerial implications

Financial literacy levels among young adults are lower than other groups (FINRA Investor Education Foundation, 2013) and most students do not have much knowledge about terms of credit cards and cash advance (Chan et al., 2012). Many students misuse their credit cards, borrow money for acquiring education resulting in higher levels of debt, and constantly worry about their financial situations (Norvilitis, 2014; Archuleta et al., 2013; Leach et al., 1999). College students, therefore, are considered a high-risk group when it comes to financial stability and well-being (Leach et al., 1999). Hence, it is important for financial...
institutions, public policymakers and college administrators to place a greater emphasis on credit card literacy programs.

Banks and credit card issuers can organize and collaborate with colleges and universities to develop credit card literacy training and workshops on campus that are designed to educate students about important terms and conditions including minimum payment, interest rate, and late fees. The results also show that the effect of credit card literacy on self-efficacy was stronger for those who have fewer credit cards. It may indicate that students having multiple credit cards might not be able to effectively manage their credit cards even if they possess higher levels of credit card knowledge. Therefore, it is important that credit card companies and bank marketers educate students about specific information associated with credit cards (e.g. frequency of use of credit cards, the payment of credit card debt and the number of credit cards held) as well as the negative consequences of owning multiple credit cards when they fill out credit applications (Austin and Phillips, 2001).

Colleges and universities should emphasize and integrate financial literacy into university curricula. For example, undergraduate business programs can offer short-term credit card literacy education programs through service learning approach. Such programs, which allow students work on real-life projects and assignments in areas related to their business courses (e.g. accounting, finance, economics) have been found to be effective in educating students on basic financial knowledge (DeLaune et al., 2010). College students may benefit from on-campus seminars, workshops and guest speaker/lecture on credit card management that are organized to improve students’ credit card knowledge (Limbu, 2017). However, the focus of these curricula and programs should be not only to increase students’ knowledge about their credit cards but also enhance their capacities and confidence of using credit cards effectively which ultimately increase their financial confidence and security.

The results indicate that managing multiple credit cards can be an overwhelming task for college students, which can negatively influence their credit card self-efficacy and subsequently their financial confidence and security. The government, nonprofit organizations and consumer advocates can sponsor social marketing campaigns to educate college students about the potential costs of possessing too many credit cards and highlight the benefits of owning fewer credit cards that can result in better credit scores and improved financial well-being in the long-run. Findings suggest that improving credit card literacy may not be sufficient to build financial capability. Therefore, such campaigns can reinforce credit card knowledge by explicitly targeting students’ perceptions of their abilities to manage their credit cards.

8. Limitation and future research
In this study, we assessed students’ credit card literacy by using a subjective measure. While the subjective measure of financial knowledge has been used quite extensively; some studies found even stronger effects of subjective measure over objective measure (e.g. Xiao et al., 2014), future research should use both objective and subjective measure of credit card literacy to examine its effect on financial well-being. One of the limitations of this study was the use of a convenience student sample, which may limit the generalizability of these findings. Thus, the findings of this research can be replicated in other samples using a random sampling technique. Since most of the previous studies that examined the determinants of the financial well-being of college students were conducted in the USA (see Table I), another potential avenue for future research is to replicate our findings in other populations especially from Europe, Asia, Africa and South America. Future studies should consider examining the effects of other demographic and psychographic intervening and moderating variables in the relationship between credit card literacy and financial well-being.
References


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Abstract

Purpose – The purpose of this paper is to explore the impact of consumer spending self-control (CSSC), personal saving orientation (PSO), materialism, financial knowledge (FK) and time perspective (TP) on Brazilian consumers’ perceived financial well-being.

Design/methodology/approach – A conceptual framework is provided to support the research hypotheses. A survey with 1,027 respondents allowed the research hypotheses to be tested by means of regression-based models.

Findings – The findings show that the two dimensions of financial well-being – current money management stress and future financial security – are predicted by CSSC, materialism and TP; PSO also predicts future financial security. TP moderates the effect of materialism on current money management stress, and CSSC mediates this relationship.

Research limitations/implications – The role of FK in predicting financial well-being is weakened in the presence of the psychological variables investigated, which has important implications for financial education efforts. The use of survey data alone limits the research findings, as the advocated causal relationships are based solely on theory; gathering experimental data to further support the findings is a possibility for future research.

Practical implications – Banks and other financial institutions can create tools to stimulate control of their customers’ day-to-day spending and try to show assertive projections to evidence the impact of their present actions on their financial future, enhancing personal awareness and promoting overall well-being.

Originality/value – The authors advance knowledge on the antecedents of financial well-being and offer two explanations involving moderating and mediating relationships that enhance the understanding of the individual differences that shape current money management stress.

Keywords Consumer behaviour, Consumer attitudes, Financial knowledge, Financial well-being

Paper type Research paper

Introduction

The financial well-being of individuals, defined by the CFPB (2017, p. 6) as “a state of being wherein a person can fully meet current and ongoing financial obligations, can feel secure in their financial future, and is able to make choices that allow them to enjoy life”, is a common goal of governments, policymakers and researchers. To achieve it, financial education programmes have been launched in a number of countries, such as the National Financial Education Strategy, developed by the OECD (2015) in partnership with local governments.

In Brazil, about 70 per cent of the adult population has a bank account. This percentage is higher than the average for Latin America and the Caribbean (55 per cent) and similar to that of South Africa (69 per cent) and Turkey (69 per cent), but much lower than developed economies such as the USA, Germany, the UK, Australia and Singapore, where it exceeds 93 per cent (The World Bank, 2017). The number of Brazilians with access to the products

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and services of financial institutions has been growing in recent years. In the wake of this growth and the development of the consumer market as a whole, the credit market in Brazil jumped from 25 to 50 per cent of gross domestic product (GDP) between 2004 and 2017 (Brazilian Central Bank, 2018). At the same time, at the end of 2017, some 60.2m Brazilians (out of a population of around 208m) had their names blacklisted by a national credit protection agency, representing a growth of 1.3 per cent in relation to the end of 2016 (SPC Brasil, 2018). This is partly a consequence of the high interest rates practised in the country, which, in the form of consumer credit, exceeded 200.0 per cent per annum, with the inflation of around 3.0 per cent in 2017 (Brazilian Central Bank, 2018). Brazil has one of the world’s largest economies with a GDP of around 2tn dollars, but its GDP per capita was approximately $9,800 at the end of 2017, lower than the global average of approximately $10,700 (The World Bank, 2018). Also, Brazilians perform poorly on educational rankings; for example, among the 72 countries that participated in the Program for International Student Assessment, organised by the OECD in 2015, the country’s averages were positioned in the last quartile in all three areas: math, reading and science. The ageing of the Brazilian population and the lack of systematic financial planning for retirement are two other characteristics that make the study of the individual antecedents of financial well-being quite timely and relevant to this society.

In this study, we build on Brüggen et al.’s (2017) framework of financial well-being by advancing knowledge on one of its elements: the influence of personal factors on financial well-being. Those authors proposed a research agenda on financial well-being, arguing, among other topics, that “personal factors are fundamental to financial well-being and need to be acknowledged in a broad manner” (p. 234). They specifically recommend the measurement and comparison of the effects of different personal factors on financial well-being. This stream of literature is relevant because the study of such factors may support the development of tools to enhance personal awareness of and responsibility for one’s financial future. Considering that financial well-being means having control over everyday finances, being able to absorb financial stress, following a plan to achieve financial goals and having the financial freedom to make life-saving choices (CFPB, 2017), an understanding of how personal characteristics affect such actions becomes critical in defining more effective interventions to promote the well-being of the individual. Although our level of discussion is primarily the individual, our findings may broaden the possibilities of delineating better financial education programmes, which, in turn, have practical and societal implications.

Multiple personal factors have been identified as antecedents of financial well-being, with an emphasis on financial knowledge (FK) (Norvilitis and MacLean, 2010; Fernandes et al., 2014), materialism (Dittmar et al., 2014), time perspective (TP) and self-control (Lynch et al., 2010; Drever et al., 2015). There is vast evidence of negative associations between materialism and well-being and satisfaction with life (for further study on these issues, see Burroughs and Rindfleisch, 2002; Richins, 2013; Dittmar et al., 2014). Future orientation has been related to several positive consequences for the individual (Strathman et al., 1994). Future-oriented individuals claim to be less likely to engage in compulsive buying behaviours, more likely to responsibly use money earned and more likely to join a private pension plan (Joireman et al., 2005; Howlett et al., 2008). It is also known that lower-income consumers are more vulnerable to the loss of financial well-being due to their lower levels of financial reserves. Although the literature on consumer behaviour, behavioural finance and economic psychology contains studies with subsets of the aforementioned constructs, the topic remains relevant and has theoretical gaps that need to be filled (Brüggen et al., 2017; Netemeyer et al., 2018).

Given this scenario, the objective of this research is to investigate the impact of personal factors on Brazilian consumers’ perceived financial well-being (PFWB).
Specifically, the following relationships are examined: the direct effects of consumer spending self-control (CSSC), personal saving orientation (PSO), materialism, FK and TP on the PFWB of individuals, and the moderating effect of TP (in the present-fatality dimension) and the mediating effect of CSSC on the relationship between materialism and financial well-being.

The theoretical contribution of this study lies in measuring and testing the collective impact of different personal factors on financial well-being. We use Netemeyer et al.’s (2018) recently developed measures for the present and future dimensions of PFWB and contribute to the stream of literature well-summarised by Brüggen et al.’s (2017) framework of financial well-being. Based on a survey with 1,027 Brazilians not restricted to students, our findings show that a cognitive factor often emphasised in financial education programmes, i.e. FK, was found to be peripheral in the presence of behavioural and attitudinal predictors of financial well-being. Researchers and practitioners can benefit from these findings in order to improve financial education programmes – for example, emphasising financial skills rather than knowledge, and focusing on cultural values and interpersonal dynamics that involve present and future financial well-being-related issues.

Three additional arguments serve to justify the relevance and contributions of this work. The first is that, to date, no studies have been found that examine, in an integrated way, the interrelationships between the aforementioned constructs and financial well-being. No study records were found that investigate the moderating effect of TP on the effect of materialism on financial well-being, or the mediating effect of CSSC on this relationship. To the extent that greater control over spending may serve to soften materialists’ urge for higher standards of consumption, and TP may raise awareness of the negative financial consequences of immediacy, it seems relevant to investigate such relationships. Second, most of the research works on financial well-being have so far focused on North America, Western Europe and Australia (Santos et al., 2016). Scientific research in developing economies such as Brazil’s becomes relevant not only because most of the world’s consumers live in these markets, but also because financial well-being-related matters of an economic, legal, political, socio-cultural, technological and market nature are specific. The established theories and the empirical generalisations derived from data extracted in developed countries are not necessarily applicable to the context of these markets (Burgess and Steenkamp, 2006). The third argument refers to a methodological contribution; the operational definitions of the constructs involved are adapted and validated in the Brazilian context.

This paper is organised as follows: next, we present the conceptual framework and the research hypotheses. Then, the data collection process and the operational definitions of the study constructs are detailed in the methodological procedures section. Finally, we present the results and the conclusion, including the study’s theoretical and practical implications, its limitations and directions for future research.

**Conceptual framework and research hypotheses**

Brüggen et al.’s (2017, p. 231) financial well-being framework is comprised of five groups of elements that influence or are influenced by financial well-being: contextual factors, such as economic development, consumer protection, political stability, culture, population growth, technology and available financial solutions; interventions, such as financial education and financial counselling; financial behaviour, such as breaking financially destructive behaviours and stimulating sound financial behaviours; personal factors, such as sociodemographics, skills, values, attitudes and motivations; and consequences of financial well-being, such as quality of life and happiness, general well-being and mental health. The current paper focuses on one of these groups to empirically test the collective impact of
selected personal factors – CSSC, PSO, materialism, FK and TP – on the PFWB of individuals. Figure 1 provides a pictorial representation of these relationships, which are further explored as follows.

Financial well-being
Recent studies have proposed conceptual definitions of financial well-being considering both the present and future dimensions (Brüggen et al., 2017; Netemeyer et al., 2018). Based on the CFPB’s definition of financial well-being, Netemeyer et al. (2018, p. 4) proposed the PFWB scale. This is a measure formed by two dimensions: current money management stress (present-related dimension), which “encompasses feelings of being stressed/worried about one’s current financial situation, being unable to manage money effectively today to meet financial obligations, and live the life one wants to live”; and the expected future financial security (future-related dimension), which “encompasses perceptions of having a financially secure future and meeting future financial goals”. The authors argue that the antecedents of each dimension are different.
Consumer spending self-control

Self-control represents one’s ability to avoid temptation, maintain self-discipline and control behaviour (Baumeister, 2002; Kivetz and Simonson, 2002; Tangney et al., 2004). In the consumer behaviour literature, most of the studies have linked a lack of self-control to negative outcomes such as compulsive buying (Achtziger et al., 2015), choosing vice over virtue (Siddiqui et al., 2017) and over-indebtedness (Gathergood, 2012). In the domain of financial well-being, self-control is positively associated with security in current and future financial situations (Strömbäck et al., 2017).

Although self-control is a robust measure to predict many behaviours, measures for specific domains of self-control have been developed to better explain outcomes in a variety of areas. In this sense, Haws et al. (2012) proposed that financial decisions are better explained by CSSC than by general self-control. They defined CSSC as “the ability to monitor and regulate one’s spending-related thoughts and decisions in accordance with self-imposed standards” (Haws et al., 2012, p. 697). Consumers with high levels of CSSC are less prone to make unplanned purchases or to pay more for products than those low on CSSC and are more likely to save for retirement (Bearden and Haws, 2012; Haws et al., 2012). Therefore, we hypothesise that:

H1a. Individuals with higher (lower) CSSC will report less (more) current money management stress.

H1b. Individuals with higher (lower) CSSC will report more (less) expected future financial security.

Personal saving orientation

PSO refers to “the individual difference supporting a constellation of activities to save money, some of which are habitual and routinized, while others are opportunistic and intentional, that the consumer performs consistently and incorporates into his or her lifestyle” (Dholakia et al., 2016, p. 137). This construct is formed by two dimensions: day-to-day actions, related to actions that favour savings and that involve a future-oriented saving behaviour such as saving money for a rainy day and achieving personal savings goals; and a saving lifestyle, which relates saving money to a habit. Such saving behaviour is constructed through time and implies long-term behavioural strategies (Shockey and Seiling, 2004; Nenkov et al., 2008).

Saving behaviour has a positive effect on subjective well-being (Shim et al., 2012) as well as on financial well-being (Bagozzi and Warshaw, 1990). High-PSO individuals tend to save more for the future (e.g., for retirement) than low-PSO individuals (Dholakia et al., 2016). Hence, we hypothesise that:

H2a. Individuals with a higher (lower) PSO will report less (more) current money management stress.

H2b. Individuals with a higher (lower) PSO will report more (less) expected future financial security.

Materialism

Materialism is defined as “the importance ascribed to the ownership and acquisition of material goods in achieving major life goals or desired states” (Richins, 2004, p. 210). More materialistic individuals are less satisfied with their lives (Görnik-Durose and Boroń, 2018), more inclined to buy products that confer status (Goldsmith and Clark, 2012) and more likely to be indebted (Nepomuceno and Laroche, 2015). Thus, materialism has been negatively associated with financial well-being (Netemeyer et al., 2018).
Possible explanations are that more materialistic individuals tend to present high levels of financial worry (Garðarsdóttir and Dittmar, 2012) and/or are poor at money management (Donnelly et al., 2012). Additionally, materialism is associated with credit overuse behaviour, such as being behind in making payments, as well as with financial concerns, such as worrying about paying off debts (Richins, 2011). In this sense, we hypothesise that:

\[ H3a. \] Individuals with higher (lower) materialism will report more (less) current money management stress.

\[ H3b. \] Individuals with higher (lower) materialism will report less (more) expected future financial security.

Financial knowledge
One cognitive aspect that impacts financial decision making is FK. Studies have shown that FK (or the lack of it) is a significant predictor of debt (Norvilitis et al., 2006) and may impact individuals’ evaluation and intentions related to retirement investments (Howlett et al., 2008); on the other hand, there is evidence that simply promoting FK is not sufficient to change money management (Shockey and Seiling, 2004), because financial behaviour is influenced, among other aspects, by values and beliefs (Hira, 2012). Thus, evidence of the effectiveness of FK for financial well-being is mixed (Fernandes et al., 2014; Hensley, 2015). We hypothesise that there is a positive and direct impact of FK on financial well-being; as we argue in the results section, this positive and direct impact becomes insignificant when other personal factors are taken into account:

\[ H4a. \] FK will negatively influence current money management stress.

\[ H4b. \] FK will positively influence expected future financial security.

Time perspective
According to Zimbardo and Boyd (1999, p. 1271), TP is “the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events”. The authors state that the perception of temporal periods – past, present and future – influences how the individual makes judgements and decisions. Given our research objective, in this study we focused on the present and future dimensions.

The present dimension of the Zimbardo Time Perspective Inventory (ZTPI) is composed of two subscales: present-hedonistic, which is associated with life pleasure, excitement and indulgence; and present-fatalistic, which relates to the perception of lack of life self-control and a fatalistic, helpless and hopeless attitude towards the future and life. The future dimension is related to planning and achieving goals in the future. In general, a future orientation has been related to several positive consequences for the individual, while the predominance of an orientation towards the present is associated with risk behaviours and negative consequences (Strathman et al., 1994; Wills et al., 2001). Hence, we hypothesise that:

\[ H5a. \] A present-hedonistic orientation will positively influence the current money management stress.

\[ H5b. \] A present-hedonistic orientation will negatively influence the expected future financial security.

\[ H6a. \] A present-fatalistic orientation will positively influence the current money management stress.
H6b. A present-fatalistic orientation will negatively influence the expected future financial security.

H7a. A future orientation will negatively influence the current money management stress.

H7b. A future orientation will positively influence the expected future financial security.

A present-fatalistic orientation has been related to an external locus of control (Milfont and Gouveia, 2006); the literature on locus of control tends to differentiate between an internal locus of control, in which people feel control over outcomes in their environments, and an external locus of control, in which people feel that their outcomes rest with others or are the result of luck. In the consumer behaviour literature, an external locus of control has been associated with high levels of materialism (Hunt et al., 1990) and low levels of well-being (Christopher et al., 2009; Becker and Birkelbach, 2018). Individuals with high levels of materialism tend to judge others and themselves based on material possessions (external cues); from those with an external locus of control, who often use external factors to explain outcomes, we expect high levels of current money management stress. An internal locus of control or causality may function as a buffer against stressful life events (Becker and Birkelbach, 2018). Thus, we hypothesise that:

H8. A present-fatalistic orientation moderates the relationship between materialism and current money management stress. The impact of materialism on current money management stress will be greater (lower) among individuals with an external (internal) locus of causality.

Materialism, CSSC and financial well-being

Materialism has a negative effect on self-control (Kim, 2013), having been linked to self-control failure in many studies (Goldberg et al., 2003; Fitzmaurice, 2008; Richins, 2011). As materialists seek desired states such as happiness by means of acquisition, they are more likely to fail in controlling spending, thus struggling with current money management. Therefore, we hypothesise that:

H9. CSSC mediates the relationship between materialism and current money management stress. More (less) materialistic individuals will have less (greater) control over their spending, which, in turn, will accentuate (decrease) their present financial stress levels.

Methodological procedures

To test the formulated hypotheses, data were collected from adult individuals aged between 25 and 45 years. The age range, while subjective, is important to delineate a sample with participants who are economically active and more likely to manage their own finances. A broader age group, on the other hand, would result in greater heterogeneity in the profile of the respondents, which was avoided given the resulting need to collect a larger sample or to grant statistical power when testing the research hypotheses.

A pre-test with 90 individuals served to analyse the reliability and validity of the scales used. Following the pre-test, the main collection resulted in 1,027 questionnaires completed by consumers from the metropolitan areas of Belo Horizonte, Rio de Janeiro, Salvador and São Paulo (all four are among the largest and most important Brazilian metropolitan areas). The number of respondents in each of these areas was 234, 222, 303 and 268, respectively. These respondents were already registered in the online panel of a multinational market research company with operations in Brazil; the data collection took place in November 2017. The respondents completed a survey containing the scale items for the constructs of
CSSC; PSO; materialism; FK; TP (present-hedonistic, present-fatalistic and future dimensions); PFWB (present and future dimensions); as well as age, gender, education, income, positive and negative financial behaviours, and other items that aided in assessing the validity of the measures of interest.

With the exception of the seven FK items, the participants rated all the scale items, which are available in the Appendix, on a five-point scale ranging from 1 “strongly disagree” to 5 “strongly agree”. With the exception of FK, whose score was derived by means of an item response theory (IRT) model, the scores for the other constructs were defined as the mean response to each of the scales’ items. Their operational definitions are as follows.

Measures

Perceived financial well-being. The ten items of the PFWB scale proposed by Netemeyer et al. (2018) were submitted to confirmatory factor analysis. The parameter estimation method was that of maximum likelihood, and the two latent dimensions of present and future were allowed to be correlated; the calculations were made using the statistical package LISREL 9.2 (Jöreskog and Sörbom, 2015). In order to improve the model fit indicators ($\chi^2$, comparative fit index (CFI), non-normed fit index (NNFI) and root mean square error of approximation (RMSEA)), two items (PFWB_03 and PFWB_04) were excluded and the analyses then repeated. Model fit statistics for each of the four regions and for the sample as a whole show that the data fit well to the theoretical model: the ratio $\chi^2$ by degrees of freedom ranged from 2.16 to 2.83 (19 degrees of freedom); the CFI ranged from 0.946 to 0.972; the NNFI ranged from 0.920 to 0.959; and the RMSEA was below 0.08 on all models. Taken together, these indices are indicators of excellent fit (Hu and Bentler, 1999; Schreiber et al., 2006).

Additional evidence of criterion validity is also available. Table I contains the means of PFWB by dimension and by answer for each of six questions associated with financial behaviours. The $p$-value column contains the statistical significance of $t$-tests for mean comparison between groups. The results of all 12 tests are in line with our theoretical expectation. The means for the future dimension are larger (indicating greater perceived financial security) in the groups that answered “yes” to questions 1, 2, 3 and 5, which represent positive financial behaviours, and are smaller for questions 4 and 6, which represent negative financial behaviours. In the case of the present dimension, the means are smaller (indicating less financial stress and consequently greater financial well-being) in the groups that answered yes to questions 1, 2, 3 and 5, and higher (indicating lower financial well-being) in questions 4 and 6.

Consumer spending self-control. Haws et al.’s (2012) CSSC scale is unidimensional and has ten items of a reflective nature; in that study, several data collections were reported, and the $\alpha$ coefficients for the scale were around 0.90. We performed a pre-test with the ten items in a sample of 90 adults. Because the results of confirmatory factor analyses to check the unidimensionality of the CSSC construct were more robust in the set of four than in the ten items, and to reduce the size of the questionnaire for the main data collection, in this study we adopted a reduced version with four items.

Personal saving orientation. This reflective construct is intended to capture the ongoing cultivation of saving actions and the adoption of a lifestyle that is congruent with saving money. The five items of the day-to-day action dimension (Dholakia et al., 2016) were adopted in this study.

Materialism (MAT). The scale proposed by Richins and Dawson (1992), in the version adjusted by Richins (2004), is the most widely used in the field of consumer behaviour to measure materialism. In the study by Richins (2004), in addition to the complete scale
composed of 15 items, reduced versions of nine, six and three items were analysed. The nine- and six-item versions were translated and adapted for use in the Brazilian context by Ponchio and Aranha (2008). In the present study, we adopted the six-item version of this scale.

Financial knowledge. To measure the participants’ FK, the scale validated by Knoll and Houts (2012) was adapted considering the Brazilian context. The instrument was divided into two blocks, the first with multiple choice questions and the second with true/false statements. The items covered the topics: interest, inflation, time value of money, investment, risk diversification, debt management and retirement savings. Issues that referred to products specific to the North American context, such as the 401 k pension plan, were excluded. After this adjustment phase for content validation, the original 20 items were reduced to 15.

Two waves of data collection were conducted for distinct purposes by the researchers in 2016 and 2017. The respective sample sizes were 801 and 378, and they contained these 15 items. From the binary answers (correct or incorrect) to each of the 15 questions about FK, a one-dimensional logistic model of IRT with two parameters (item difficulty and item discrimination level) was adjusted to estimate the latent construct of FK of each of the respondents in both available samples. The function adopted is as follows:

\[ P(U_{ij} = 1|\theta_j, a_i, b_i) = \frac{e^{a_i(\theta_j-b_i)}}{1+e^{a_i(\theta_j-b_i)}}. \]

<table>
<thead>
<tr>
<th>Table I.</th>
<th>Associations between perceived financial well-being and positive financial behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
</tr>
<tr>
<td>1. Have you set aside emergency or rainy day funds that would cover your expenses for three months, in case of sickness, job loss, economic downturn or other emergencies?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>619</td>
</tr>
<tr>
<td>Yes</td>
<td>357</td>
</tr>
<tr>
<td>Missing</td>
<td>51</td>
</tr>
<tr>
<td>2. Have you ever tried to figure out how much you need to save for retirement?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>704</td>
</tr>
<tr>
<td>Yes</td>
<td>282</td>
</tr>
<tr>
<td>Missing</td>
<td>41</td>
</tr>
<tr>
<td>3. Does your household have a budget? A household budget is used to decide what share of your household income will be used for spending, saving or paying bills</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>471</td>
</tr>
<tr>
<td>Yes</td>
<td>492</td>
</tr>
<tr>
<td>Missing</td>
<td>64</td>
</tr>
<tr>
<td>4. Do you usually find yourself with a negative bank balance (at least three times a year)?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>578</td>
</tr>
<tr>
<td>Yes</td>
<td>390</td>
</tr>
<tr>
<td>Missing</td>
<td>59</td>
</tr>
<tr>
<td>5. Do you always pay the full amount of your credit card bills?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>164</td>
</tr>
<tr>
<td>Yes</td>
<td>799</td>
</tr>
<tr>
<td>Missing</td>
<td>64</td>
</tr>
<tr>
<td>6. In the last 12 months, have you borrowed money from relatives, friends or co-workers?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>667</td>
</tr>
<tr>
<td>Yes</td>
<td>331</td>
</tr>
<tr>
<td>Missing</td>
<td>29</td>
</tr>
</tbody>
</table>
where \( P(U_{ij} = 1| \theta_j, a_i, b_i) \) is the probability that individual \( j \) with ability \( \theta_j \) correctly responds to item \( i \); \( b_i \) is the item \( i \) difficulty parameter, measured on the same ability scale; \( a_i \) is the item \( i \) discrimination parameter. The model was generated with the R software irttools package (Partchev, 2010).

The parameters of discrimination and difficulty were taken into account to reduce the scale from 15 to 7 items; the use of IRT has been popular for evaluating educational tools, and its use to assess the quality of measures in the field of psychometrics has grown (Edelen and Reeve, 2007; Knoll and Houts, 2012; Asgeirsdottir et al., 2016). The process of reducing the items prioritised keeping those that helped better discriminate between respondents with less and more FK. In this study, the FK score of the 1,027 participants was obtained using the same IRT model previously presented.

**Time perspective.** The ZTPI, developed by Zimbardo and Boyd (1999), is the most widely used instrument in surveys that measure the TP construct. Leite (2014) adapted and validated the ZTPI to the Brazilian context. In this study, the subscales of present-hedonistic, present-fatalistic and future were applied. The final number of items in each of these constructs was 4, 5 and 4, respectively.

**Results**

**Sample characteristics**
The average age of the 1,027 participants was 32.5 years (SD = 5.6; min. = 25, max. = 45) and the sample was predominantly made up of female respondents (692 or 67.4 per cent). Compared to the Brazilian population, our research sample is well-educated, probably a reflection of the data collection having been conducted online: only 49 (4.8 per cent) respondents did not complete high school, and 535 (52.1 per cent) have a college degree. Also, the average income of the respondents is roughly two times the average income in the metropolitan areas studied; however, the percentage of respondents with a very high income (among the 1 per cent richest in Brazil) was low at 0.7 per cent (seven respondents).

**Construct reliability and validity**
The methodological procedures used to access construct reliability and validity follow recommendations in the measurement literature (MacKenzie et al., 2011; DeVellis, 2012). Three experts analysed the content validity of the Portuguese version of the scale items; then, a pre-test with 90 respondents was conducted to evaluate the ease of comprehension of the wording of the items and the dimensionality of the constructs. After a few adjustments, the main collection was carried out.

Because the scores for FK were obtained using IRT, this construct was left out of part of the convergent and discriminant validity analyses reported herein. Tables II and III present information about the constructs’ reliability and validity.

**Factor loadings and convergent validity of items.** After the removal of two items (PFWB_03 and PFWB_04) from the PFWB-future scale, none of the variables had factor loadings with values below 0.65. The average variance extracted (AVE) of each construct was calculated; these were in accordance with Fornell and Larcker’s (1981) recommendation that the AVE should be equal to or greater than 0.50.

**Reliability tests.** Cronbach’s \( \alpha \): none of the research constructs displayed a value below the reference value of 0.70 (Kline, 2011).

**Discriminant validity.** The discriminant validity test was performed by comparing the average AVE with the square of the correlation coefficients between constructs (Fornell and Larcker, 1981). Discriminant validity was satisfactory in all cases.

**Common method variance (Harman’s test; common marker variable).** A one-factor Harman’s test was applied (Podsakoff and Organ, 1986). No problems of common variance
<table>
<thead>
<tr>
<th>Construct/dimension</th>
<th>Item code</th>
<th>Mean</th>
<th>SD</th>
<th>Factor loading</th>
<th>Mean</th>
<th>SD</th>
<th>AVE</th>
<th>Coeff. α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived financial well-being</td>
<td>PFWB_01</td>
<td>3.05</td>
<td>1.16</td>
<td>0.87</td>
<td>2.96</td>
<td>1.03</td>
<td>0.72</td>
<td>0.803</td>
</tr>
<tr>
<td>Expected future financial security</td>
<td>PFWB_02</td>
<td>2.99</td>
<td>1.21</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current money management stress</td>
<td>PFWB_05</td>
<td>2.82</td>
<td>1.28</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PFWB_06</td>
<td>2.54</td>
<td>1.27</td>
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<tr>
<td></td>
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<td>1.23</td>
<td>0.79</td>
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<td>Future</td>
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**Table II.**
Items’ summary statistics and construct reliability indicators

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<th>Construct</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>1. Consumer spending self-control</td>
<td>–</td>
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<td>2. Personal saving orientation</td>
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<td></td>
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<tr>
<td>3. Materialism</td>
<td>−0.106</td>
<td>−0.017 (ns)</td>
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<td></td>
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<tr>
<td>4. Financial knowledge</td>
<td>0.075*</td>
<td>0.109</td>
<td>−0.076*</td>
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<td></td>
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</tr>
<tr>
<td>5. Time perspective – present-hedonistic</td>
<td>−0.348</td>
<td>−0.298</td>
<td>0.295</td>
<td>−0.125</td>
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<tr>
<td>6. Time perspective – present-fatalistic</td>
<td>−0.099</td>
<td>−0.055 (ns)</td>
<td>0.305</td>
<td>−0.298</td>
<td>0.432</td>
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<td>7. Time perspective – future</td>
<td>0.376</td>
<td>0.367</td>
<td>0.055 (ns)</td>
<td>0.104</td>
<td>−0.089</td>
<td>0.058 (ns)</td>
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<tr>
<td>8. Current money management stress</td>
<td>−0.209</td>
<td>−0.138</td>
<td>0.438</td>
<td>−0.105</td>
<td>0.376</td>
<td>0.382</td>
<td>−0.076*</td>
<td></td>
</tr>
<tr>
<td>9. Expected future financial security</td>
<td>0.470</td>
<td>0.589</td>
<td>0.091</td>
<td>0.133</td>
<td>−0.075*</td>
<td>−0.050 (ns)</td>
<td>0.293</td>
<td>−0.129</td>
</tr>
</tbody>
</table>

**Table III.**
Correlation coefficients between constructs

**Notes:** *0.01 < p-value < 0.05; (ns) not significant at the 0.05 level
were identified, but, aware of the weakness of the Harman’s test in a context with many scale items, an additional test was conducted. We used the common marker variable technique, which involves selecting a variable (called a “marker”) with no expected theoretical relationship with the substantive variables of the study. Bivariate correlation coefficients are calculated between the substantive variables of the study, and then partial correlation coefficients between the same variables are calculated, deducing the effect of the marker variable. If the partial correlation coefficients remain close to the values obtained in the previous step, then there is no evidence of the presence of common variance in the method (Lindell and Whitney, 2001). We adopted the construct of socially desirable responses for this analysis, since there is no theoretical expectation that it should correlate with the constructs of PFWB (in its two dimensions), CSSC, PSO, MAT, FK and TP (in its three dimensions). When respondents, as in this study, fill out the questionnaires anonymously and online, the negative effect of socially desirable responses is expected to be insignificant. Indeed, our analyses indicate that there is no significant correlation between this construct and the others.

**Personal factors as antecedents of PFWB**

Multiple linear regression models were used to test \( H1a–H7b \). Table IV shows the outputs of four models: two baseline models, which include only age, gender, education and income as predictors, and two models that, in addition to these socio-demographic predictors, include this study’s constructs.

In the case of the current money management stress dimension, the model shows that greater spending self-control reduces the perceived financial stress (supporting \( H1a \)), and more materialistic individuals will experience greater financial stress (supporting \( H3a \)). The temporal dimensions of present-hedonistic, present-fatalistic and future orientation are also significant, supporting \( H5a–H7a \), respectively: individuals who are more oriented to the present have external locus of causality and are less oriented to the future tend to experience more current financial stress. The constructs of PSO and FK are not statistically significant in the complete model. To better investigate \( H2a \) and \( H4a \), hierarchical multiple

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>Current money management stress</th>
<th>Expected future financial security</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline model</td>
<td>Complete model</td>
</tr>
<tr>
<td></td>
<td>( \beta ) (p-value)(^a) VIF</td>
<td>( \beta ) (p-value)(^a) VIF</td>
</tr>
<tr>
<td>Consumer spending self-control</td>
<td>(-0.107 (0.018)) 2.57</td>
<td>(0.138 (0.001)) 2.57</td>
</tr>
<tr>
<td>Personal saving orientation</td>
<td>(0.024 (0.592)) 2.51</td>
<td>(0.475 (0.000)) 2.51</td>
</tr>
<tr>
<td>Materialism</td>
<td>(0.300 (0.000)) 1.25</td>
<td>(0.088 (0.003)) 1.25</td>
</tr>
<tr>
<td>Financial knowledge</td>
<td>(0.022 (0.483)) 1.26</td>
<td>(0.011 (0.699)) 1.26</td>
</tr>
<tr>
<td>Time perspective – present-hedonistic</td>
<td>(0.133 (0.000)) 1.63</td>
<td>(0.129 (0.000)) 1.63</td>
</tr>
<tr>
<td>Time perspective – present-fatalistic</td>
<td>(0.230 (0.000)) 1.45</td>
<td>(-0.070 (0.026)) 1.45</td>
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<tr>
<td>Time perspective – future</td>
<td>(-0.096 (0.002)) 1.23</td>
<td>(0.067 (0.020)) 1.23</td>
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<tr>
<td>Age</td>
<td>(0.051 (0.141)) 1.09</td>
<td>(0.096 (0.001)) 1.12</td>
</tr>
<tr>
<td>Gender</td>
<td>(0.010 (0.776)) 1.07</td>
<td>(0.014 (0.630)) 1.12</td>
</tr>
<tr>
<td>Education</td>
<td>(-0.076 (0.033)) 1.14</td>
<td>(-0.012 (0.692)) 1.22</td>
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<tr>
<td>Income</td>
<td>(-0.115 (0.002)) 1.24</td>
<td>(-0.088 (0.007)) 1.32</td>
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<tr>
<td>(R^2) (%)</td>
<td>(2.4)</td>
<td>(31.8)</td>
</tr>
</tbody>
</table>

Table IV. Regression results

\(^a\)Values are standardised \( \beta \) estimates with \( p \)-values in parentheses.
regression analyses were conducted, and these constructs were statistically significant to explain PFWB-present when left alone with the control variables. This represents support for $H2a$ (s.t. $\beta$ coeff. = $-0.088$, $p$-value = 0.014) and $H4a$ (s.t. $\beta$ coeff. = $-0.151$, $p$-value < 0.001), although it seems relevant to emphasise their diminished relative importance (in the presence of the other personal factors) to explain PFWB-present.

In the case of the expected future financial security dimension, more spending self-control, more PSO, less present-fatalistic orientation and greater orientation towards the future are associated with greater financial well-being. This evidence supports the research $H1b$–$H7b$, respectively. There was a weak but positive influence of materialism and present-hedonistic orientation on this financial well-being dimension, contrary to what was postulated in $H3b$ and $H5b$; these issues should be further addressed in future research.

There is no evidence to support $H4b$, since the FK construct is statistically insignificant in explaining PFWB-future in the context of the complete model (FK is also statistically insignificant when left alone with the control variables of the baseline model).

**Moderation and mediation hypotheses ($H8$ and $H9$)**

To test the moderation $H8$, we used model 1 of the PROCESS macro (Hayes, 2017). In this simple moderation model, present-fatalistic orientation was the moderating variable, materialism was the predictor variable and current money management stress was the response variable. Age and income served as covariates. The product term variables were mean centred for this analysis.

The interaction term between materialism and present-fatalistic orientation was found to be statistically significant ($p$-value = 0.016; $R^2$ change due to interaction term of approximately 1 per cent). The Johnson–Neyman technique was applied to probe the present-fatalistic moderating effect on the relationship between materialism and current financial management stress. The moderating effect was found to be statistically significant throughout the observed data range; there were no statistically significant transition points. At three different levels of the moderator ($-1$ SD, mean, $+1$ SD), the conditional effects of materialism on current money management stress are 0.2690 ($95\%$ CI: 0.1879, 0.3502), 0.3323 ($95\%$ CI: 0.2736, 0.3910) and 0.3955 ($95\%$ CI: 0.3207, 0.4703), respectively. The substantial meaning of these relationships is that the effect of materialism on individuals’ current money management stress gets larger as the individual perception of fatalism and an attitude of lack of hope about life and the future increase, supporting our research hypothesis.

The mediation $H9$ was tested with model 4 of the PROCESS macro (Hayes, 2017). In this simple mediation model, CSSC was the mediating variable, materialism was the predictor variable and current money management stress was the response variable. Age and income served as covariates.

An analysis of the mediation model reveals that the direct effect of materialism on current money management stress is positive ($\beta$ coeff. = 0.40, $p$-value < 0.01). Yet the higher the materialism, the lower the CSSC ($\beta$ coeff. = $-0.13$, $p$-value < 0.01) and the greater the CSSC, the lower the current money management stress ($\beta$ coeff. = $-0.19$, $p$-value < 0.01). The indirect effect (mediated by CSSC) of materialism on current money management stress is positive and significant, indicating an effect of mediation in line with our theoretical expectation. The $95\%$ CI for the indirect effect, generated by the bootstrapping procedure with 10,000 bootstrap samples, was 0.010, 0.042. The completely standardised indirect effect was 0.025 ($95\%$ CI: 0.011, 0.043). These results strongly support our prediction that more (less) materialistic individuals will have less (greater) control over their spending, which, in turn, will accentuate (decrease) their present financial stress levels. This finding suggests that consumers’ spending control provides a necessary behavioural ingredient to prevent their material desires from affecting their financial health.
Conclusion
Based on Brüggen et al.’s (2017) conceptual framework and previous research, relationships between personal factors and financial well-being were hypothesised and tested. The results, summarised in Table V, contribute towards advancing the existing knowledge on the topic; specifically, the following findings deserve attention:

(1) We demonstrated that greater spending self-control reduces current money management stress and that those who are more materialistic, more present-hedonistic, more present-fatalistic and less future-oriented tend to experience more current money management stress. Also, more spending self-control, more PSO, less present-fatalistic and greater orientation towards the future are associated with greater expected future financial security. Contrary to expectations, there was a weak but positive influence of materialism and of the present-hedonistic dimension on the latter PFWB dimension; it may be that more immediatist people have more difficulty accessing the consequences of their present behaviours on their future. Nevertheless, this interpretation should be further addressed in future research.

(2) FK only influenced the individuals’ current money management stress and not their expected future financial security. Moreover, when other personal factors were jointly analysed, the incremental importance of FK on the understanding of financial well-being was insignificant. This finding has important implications for practitioners, policymakers and researchers, since it means that behavioural and attitudinal predictors are more relevant than the often-emphasised cognitive factor of FK in understanding financial well-being. Financial education initiatives may stress financial skills, cultural values and interpersonal dynamics rather than, or in addition to, knowledge.

<table>
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<tr>
<th>Hypothesis</th>
<th>Personal factor</th>
<th>Perceived financial well-being dimension</th>
<th>Expected relationship</th>
<th>Result</th>
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<td>Cons. spending self-control</td>
<td>Current money management stress</td>
<td>–</td>
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<td>H2a</td>
<td>Personal saving orientation</td>
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</tr>
<tr>
<td>H3a</td>
<td>Materialism</td>
<td>+</td>
<td>Supported</td>
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<td>H4a</td>
<td>Financial knowledge</td>
<td>–</td>
<td>a</td>
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<tr>
<td>H5a</td>
<td>TP. Present-hedonistic</td>
<td>+</td>
<td>Supported</td>
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<tr>
<td>H6a</td>
<td>TP. Present-fatalistic</td>
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<tr>
<td>H7a</td>
<td>TP. Future</td>
<td>–</td>
<td>Supported</td>
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<td>H1b</td>
<td>Cons. spending self-control</td>
<td>Expected future financial security</td>
<td>+</td>
<td>Supported</td>
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<td>Personal saving orientation</td>
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<td>Supported</td>
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<tr>
<td>H3b</td>
<td>Materialism</td>
<td>–</td>
<td>b</td>
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<tr>
<td>H4b</td>
<td>Financial knowledge</td>
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</tr>
<tr>
<td>H5b</td>
<td>TP. Present-hedonistic</td>
<td>–</td>
<td>b</td>
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<tr>
<td>H6b</td>
<td>TP. Present-fatalistic</td>
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<td>H7b</td>
<td>TP. Future</td>
<td>+</td>
<td>Supported</td>
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<tr>
<td>H8</td>
<td>MAT and TP_PF</td>
<td>Current money management stress</td>
<td>moderation</td>
<td>Supported</td>
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<td>H9</td>
<td>MAT and CSSC</td>
<td>mediation</td>
<td>Supported</td>
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</tr>
</tbody>
</table>

Notes: aThe relationships between PSO and PFWB-present and between FK and PFWB-present were only statistically significant when these constructs were first entered to the baseline model presented in Table IV. In the presence of other personal factors as regression predictors, they were not significant. bThere was a weak but positive influence of materialism and of present-hedonistic on expected future financial security, contrary to what was postulated.
TP moderates the effect of materialism on current money management stress, and CSSC mediates this relationship. To the best of our knowledge, these two mechanisms have not been previously reported. These findings constitute novelties that contribute towards uncovering and further understanding the mechanisms that shape individual differences in financial well-being. Measuring and comparing the effects of different personal factors on financial well-being are relevant to support the development of tools to enhance personal awareness and responsibility over one's financial future. Personal factors may serve as a basis for client segmentation, so that financial advisors can implement targeted marketing efforts.

Taken together, the results showed that financial behaviours and personal characteristics affect the financial well-being of individuals. The weak role of FK in predicting financial well-being in the presence of the psychological variables investigated has important implications for financial education efforts. In accordance with Dholakia et al. (2016, p. 152), “simply teaching factual knowledge about how personal finance works as is done in conventional financial literacy programs may not be enough; it may be necessary to teach people habits that encourage consistent saving and ways to create and maintain a saving-oriented lifestyle”. Though materialism is a value likely internalised early in life (Richins, 2004, 2011), there is evidence that some traits and skills could be trained in order to improve financial behaviour (Nenkov et al., 2008; Meier and Sprenger, 2013; Dholakia et al., 2016). Put another way, financial education programmes that are focused on the development of interpersonal skills may be more effective than acquiring content knowledge about interest rates, inflation and the like (Fernandes et al., 2014).

From a practical perspective, this study also offers contributions to financial service providers. Banks and other financial institutions can create tools to stimulate control of their customers’ day-to-day spending and try to show assertive projections to evidence the impact of their present actions on their financial future, enhancing personal awareness and responsibility. Such initiatives are critical for reducing the potential negative effects of consumption, increasing customer satisfaction with the service provided and promoting overall well-being.

Finally, there is a methodological contribution regarding the operational definitions of the constructs involved, which were adapted and validated in the Brazilian context. The availability of the PFWB scale for use in other contexts allows comparative international surveys to be conducted.

Limitations and future research

Two limitations of this study deserve attention. First, the use of survey data alone limits our research findings. The cross-sectional nature of the study design does not allow for causal inferences to be made. The advocated causal relationships are solely based on theory; gathering experimental data to further support our findings is a possibility for future research. Second, the survey sample is restricted to adult Brazilians who possess internet access and were already registered in the online panel of a multinational market research company with operations in Brazil. Thus, the study findings are not generalisable to the entire Brazilian population. Further data collection waves are encouraged to help overcome this limitation.

Future studies should also consider objectively measuring individuals’ financial indicators, for example, the level of financial reserves and the existence of overdue debts and incorporate such measures in the analyses reported herein. Differences between the Brazilian setting, other developing countries and developed countries could also shed light on how personal factors interact with contextual factors in shaping financial well-being.
References


Appendix. Scale items
Original scale items selected for this research and their versions in Portuguese.

Netemeyer et al.’s (2018) perceived financial well-being scale

PFWB_01. I am becoming financially secure./Estou me tornando financeiramente seguro.
PFWB_02. I am securing my financial future./Estou garantindo meu futuro financeiro.
PFWB_03. I will achieve the financial goals that I have set for myself./Eu alcançarei os objetivos financeiros que estabelei para mim.
PFWB_04. I have saved (or will be able to save) enough money to last me to the end of my life./Eu economizei (ou serei capaz de economizar) dinheiro suficiente para durar até o final da minha vida.
PFWB_05. I will be financially secure until the end of my life./Eu serei financeiramente seguro (protegido) até o final da minha vida.
PFWB_06. Because of my money situation, I feel I will never have the things I want in life./Por causa da minha situação financeira, sinto que nunca terei as coisas que quero na vida.
PFWB_07. I am behind with my finances./Não estou em dia com minha vida financeira.
PFWB_08. My finances control my life./Minhas finanças controlam minha vida.
PFWB_09. Whenever I feel in control of my finances, something happens that sets me back./Sempre que sinto possuir controle sobre minha vida financeira, acontece algo que atrapalha esse controle.
PFWB_10. I am unable to enjoy life because I obsess too much about money./Não consigo aproveitar a vida porque me preocupo demais com dinheiro.

Haws et al.’s (2012) consumer spending self-control scale
CSSC_01. I am able to work effectively towards long-term financial goals./Consigo seguir metas financeiras de longo prazo.
CSSC_02. I often delay taking action until I have carefully considered the consequences of my purchase decisions./Considere cuidadosamente as consequências das minhas decisões de compra antes de gastar.
CSSC_03. I am able to resist temptation in order to achieve my budget goals./Consigo resistir a tentaçôes para alcançar meus objetivos orçamentários.
CSSC_04. I know when to say when regarding how much I spend./Eu sei quando “dizer chega” em relação aos meus gastos.

Dholakia et al.’s (2016) personal saving orientation scale
PSO_01. I keep a careful watch over my spending on a daily basis./No dia a dia, monitoro com cuidado os meus gastos.
PSO_02. I do not spend money thoughtlessly, I would rather save it for a rainy day./Não gasto dinheiro sem pensar, prefiro economizar para um imprevisto.
PSO_03. Putting money into personal savings is a habit for me./Tenho o hábito de poupar e aplicar dinheiro.
PSO_04. I actively consider the steps I need to take to achieve my personal savings goals./Eu penso com frequência sobre o que é preciso para atingir meus objetivos de poupar dinheiro.
PSO_05. I like to discuss the topic of saving money with my family and friends. /Eu gosto de discutir o tópico “poupar dinheiro” com minha família e meus amigos.

Richins (2004) materialism scale and items adapted to the Brazilian context by Ponchio and Aranha (2008)
MAT_01. I admire people who own expensive homes, cars and clothes./Eu admiro pessoas que possuem casas, carros e roupas caras.
MAT_02. The things I own say a lot about how well I’m doing in life./Gastar muito dinheiro está entre as coisas mais importantes da vida.
MAT_03. Buying things gives me a lot of pleasure./Comprar coisas me dá muito prazer.
MAT_04. I like a lot of luxury in my life./Gosto de comprar coisas para mostrar minha conquista.
MAT_05. My life would be better if I owned certain things I don’t have./Minha vida seria melhor se eu tivesse muitas coisas que não tenho.
MAT_06. I’d be happier if I could afford to buy more things./Eu ficaria muito mais feliz se pudesse comprar mais coisas.

Knoll and Houts’ (2012) financial knowledge scale
FK_01. Suppose you had $100 in a savings account and the interest rate was 2 per cent per year. After five years how much do you think you would have in the account if you left the money to grow?/Suponha que você tenha R$ 100 em uma conta de poupança e a taxa de juros seja de 6% ao ano. Caso você mantenha o dinheiro nessa conta, após 5 anos quanto você acha que será o saldo: [mais que R$ 112; menos que R$ 112; R$ 106; não sei]
FK_02. Imagine that interest rate on your saving account was 1 per cent per year and inflation was 2 per cent per year. After one year, how much would you be able to buy with the money in this account?/Imagine que a taxa de juros em sua conta poupança seja de 6% ao ano e a inflação seja 8% ao ano. Após 1 ano, quanto você seria capaz de comprar com o dinheiro nesta conta? [exatamente o que consigo comprar hoje; mais do que compro hoje; menos do que compro hoje; não sei]
FK_03. Assume a friend inherits $10,000 today and his sibling inherits $10,000 three years from now. Who is richer because of the inheritance?/Suponha que um amigo herde R$ 10.000 hoje e o irmão dele...
herde R$ 10.000 daqui a três anos. Quem é mais rico por causa da herança? [há empate; o irmão dele; seu amigo; não sei]
FK_04. Normally, which asset displays the highest fluctuations over time?/Normalmente, qual ativo exibe as maiores flutuações de valor ao longo do tempo? [poupança; renda fixa; ações; não sei]
FK_05. When an investor spreads his money among different assets, does the risk of losing money?/Quando um investidor distribui seu dinheiro entre diferentes ativos, faz o risco de perder dinheiro: [diminuir; aumentar; não sei]
FK_06. Suppose you owe $3,000 on your credit card. You pay a minimum payment of $30 each month. At an Annual Percentage Rate of 12 per cent (or 1 per cent per month), how many years would it take to eliminate your credit card debt if you made no additional new charges?/Suponha que você deve R$ 3.300 em seu cartão de crédito. Você paga uma parcela mínima de R$ 300 cada mês. A uma taxa de juros de 10% ao mês, quantos anos levaria para eliminar essa dívida? [menos de um ano; cerca de dois anos; a dívida nunca será paga; não sei]
FK_07. Buying a company stock usually provides a safer return than a stock mutual fund./Comprar ações de uma companhia é normalmente menos arriscado que investir num fundo de ações” [verdadeira; falsa; não sei]

Zimbardo and Boyd’s (1999) time perspective inventory
TP_PH_01. I do things impulsively./Faço as coisas impulsivamente.
TP_PH_02. I make decisions on the spur of the moment./Tomo minhas decisões no impulso do momento.
TP_PH_03. Taking risks keeps my life from becoming boring./Assumir riscos evita que minha vida seja entediante.
TP_PH_04. I take risks to put excitement in my life./Eu me arrisco para ter excitação na minha vida.
TP_PF_01. Fate determines much in my life./Acredito que o destino determina a maior parte da minha vida.
TP_PF_02. Since whatever will be will be, it does not really matter what I do./Não importa o que eu faça, o que tiver de acontecer vai acontecer.
TP_PF_03. You cannot really plan for the future because things change so much./Não podemos de fato planejar o futuro porque as coisas estão sempre mudando.
TP_PF_04. My life path is controlled by forces I cannot influence./A trajetória da minha vida é controlada por forças que eu não posso controlar.
TP_PF_05. It does not make sense to worry about the future, since there is nothing that I can do about it anyway./Não faz sentido se preocupar com o futuro, já que não há nada a fazer.
TP_F_01. When I want to achieve something, I set goals and consider specific means for reaching those goals./Quando eu quero algo, determino metas e utilizo meios específicos para alcançar esses objetivos.
TP_F_02. Meeting tomorrow’s deadlines and doing other necessary work comes before tonight’s play./As tarefas para o dia seguinte e outros trabalhos necessários devem vir antes da diversão de hoje à noite.
TP_F_03. I complete projects on time by making steady progress./Termo meus projetos no tempo certo, avançando e progredindo em ritmo constante.
TP_F_04. I am able to resist temptations when I know that there is work to be done./Resisto às tentações quando sei que há trabalho a fazer.

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Development and validation of financial well-being related scales

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Abstract

Purpose – The purpose of this paper is to develop valid and reliable scales for assessing a driver and two obstacles potentially related to financial well-being (FWB): financial preparedness for emergency, beliefs of credit limits as additional income and risky indebtedness behaviour.

Design/methodology/approach – The scales were developed from scratch across six studies, employing a two-step methodology, which encompassed both qualitative (e.g. focus group, interviews) and quantitative (i.e. online surveys) data collection. Exploratory and confirmatory factor analyses were employed to test and validate the proposed scales.

Findings – This study provides a set of three parsimonious, self-reported behavioural measures that could be employed in conjunction with objective economic indicators to identify individuals who are financially ill prepared and potential candidates for delinquency. The three proposed scales achieved satisfactory levels of reliability and convergent and discriminant validity.

Research limitations/implications – The resulting scales still need to be tested for predictive validity and in different consumer groups. The scales were validated in a single culture population (Brazil, a country that presents extraordinarily high credit card interest rates), and they should be tested cross-culturally in countries with different economic and credit policies.

Originality/value – The literature on FWB has traditionally employed objective financial indicators as an attempt to measure the concept of FWB and its elements. Self-reported behavioural measures of such constructs are scant to the point of being non-existent for some elements. This study is the first to offer scales for measuring the elements of financial preparedness for emergency, beliefs of credit limits as additional income and risky indebtedness behaviour.

Keywords Scale development, Consumer credit, Indebtedness, Financial well-being, Financial preparedness for emergency

Paper type Research paper

Introduction

A growing consensus among academic experts and policymakers is that finances are the ultimate measure of success for individuals’ overall well-being (Consumer Financial Protection Bureau, 2015; Netemeyer et al., 2017). A society that faces financial constraints also faces profound consequences for its overall welfare. The state of living in financial instability, in poverty, or having financial problems has a detrimental impact for single individuals, their families and society collectively. Financial vulnerability reduces cognitive capacity (Mani et al., 2013) and seriously distresses workers’ productivity (Brown, 1999). The lack of “financial well-being” (FWB) leads individuals to live preciparously, affects their economic mobility and may transform a small financial problem into an ongoing financial constraint (Gennetian and Shafir, 2015).

Brüggen et al. (2017) proposed a broad framework that categorises the key elements of FWB in terms of contextual factors (e.g. economic development, consumer protection, tax policies);
interventions (e.g. financial education and counselling); financial behaviour (e.g. breaking financially destructive behaviours and habits, stimulating financially sound behaviours); personal factors (e.g. traits, skills, attitudes, and motivations, life events, socio-demographics); and consequences (e.g. quality of life, mental health). Brüggen et al.’s (2017) framework introduces an agenda of variables that should be investigated to understand their effect on individuals’ FWB. The comprehensiveness of this framework makes it clear that not only is FWB a multifaceted, complex and dynamic construct, but also that the framework warrants further investigation.

Research on FWB is still in its early stage, and there are no widely accepted measures to capture it or its key elements (Brüggen et al., 2017), so much so that the FWB literature predominantly employs financial indicators to gauge them (Netemeyer et al., 2017), such as income, debt–income ratio, low–high credit limits, debt level or savings (e.g. Soman and Cheema, 2002; Wang et al., 2011, 2014). Furthermore, not only research scholars but also companies, such as credit card companies, when determining consumers’ credit card limits, for instance, often ground their analysis on past actual behaviour, employing no self-reported behavioural measures. A challenge in relying on financial indicators is that some FWB core elements, such as individuals’ psychological traits and attitudes, cannot be captured with objective measures alone. When such objective indicators are unknown or unknowable, researchers, businesses and policymakers do not count on alternative trustworthy means to assess the concept of FWB and the elements of it. We posit that employing both financial objective indicators and self-reported behavioural measures could be a widespread and most adequate approach to measure FWB overall. This study focusses on subjective perceptions of FWB and overviews the thorough process for developing measure scales that could be used in conjunction with financial objective indicators both in future academic research and in the practice of financial industry and public policy institutions.

The development of a comprehensive measure of FWB is undoubtedly important; however, it is equally important to make an effort to measure separately its elements, because FWB belongs to an intricate nomological net. We attempt to close this gap by proposing reliable and valid scales for the measurement of a potential driver (i.e. financial preparedness for emergency) and two obstacles (i.e. beliefs of credit limits as additional income and risky indebtedness behaviour) to FWB. This driver and these obstacles were inspired by Brüggen et al.’s (2017) FWB framework and can be seen as facets of its key elements, as explained in the conceptual section of the paper.

Our choice for creating scales specifically for these three constructs derived from three main reasons. First is the profound impact that these constructs are alleged to exert over FWB. Not being able to cope with an unexpected financial emergency can bring overwhelming harmful consequences for individuals’ personal lives. Analogously, over-consuming as a result of self-deceptive beliefs about counting credit as income or recurrently having debt problems predicts the potential to drop into poor FWB, the aftermath being lasting life damage. Second, we infer from the literature that these constructs are potentially related not only to FWB but also to each other. For example, FWB encompasses the capability of being able to absorb a financial shock (Consumer Financial Protection Bureau, 2015), and this probably depends on the extent to which one is financially prepared to overcome the shock, which can be a challenge for seriously over-indebted consumers. The literature relates an increase in consumer credit in the past decade (IMF, 2013; Kirchler et al., 2008) with an extraordinary growth in consumer debt (Vieira et al., 2016). High credit card limits (Bethune et al., 2015) have been associated with higher levels of debt, which in turn are associated with financial vulnerability (Nepomuceno and Laroche, 2017; Anderloni et al., 2012). Creating independent scales for three related constructs can be useful for model development and testing in future research on FWB, especially if the research addresses the relations among these constructs in the model, which has never been done before. Third, and to the best of our knowledge, there are no previous scales available specifically for such constructs, perhaps because although they are of utmost
importance, only a few previous studies have approached one of them, such as financial preparedness for emergency (e.g. Bhargava and Lown, 2006), or akin constructs such as financial preparedness for retirement (e.g. Hershey and Mowen, 2000; see the conceptual section of the paper for a detailed discussion). Offering new scales for these three important and understudied constructs is a beneficial contribution to enhance knowledge in the field.

The empirical research was undertaken in Brazil. We have chosen Brazil for a few reasons. First, consumer researchers have been encouraged to “break out of the North American box” (Gorn, 1997, p. 6). Wong et al. (2003) asserted that the majority of concepts and measures have been designed and tested by Americans and within the American population. This raises the risk that measures are not necessarily cross-culturally valid. Second, Brazil is one of the main global economies, representing a population of over 201.5m (OECD, 2016). Due to its historic economic instability and a recent economic recession, Brazil is an environment where the overall population is vulnerable to any financial emergency (BACEN, 2017). Furthermore, credit cards are one of the main sources of consumer credit and the main source of consumer debt in the country. Overall, 20 per cent of a household’s consumption is bought with credit cards in Brazil (ABECS, 2018), while 60 per cent of the average Brazilian household debt stems from credit cards (CNC-PEIC, 2018). Over 52m Brazilians have at least one of the 150m credit cards in circulation (Euromonitor, 2017). Credit card interest rates are extraordinarily high in the country: the annual percentage rate of revolving credit is 422.5 per cent and of instalment credit is 161.6 per cent (BACEN, 2018). The World Credit Card Rates website (www.deposits.org/world-credit-card-rates.html) does not reveal the credit card’s annual percentage rate for Brazil but does so for some developed countries (e.g. USA: 7.49–18 per cent; UK: 5.69 per cent), other BRICS economies (e.g. Russia: 23.9–27.9 per cent; India: 30 per cent; South Africa: 19.65 per cent), and other Latin American countries (e.g. Venezuela: 29 per cent; Costa Rica: 32 per cent). Based on this data, one surely may conclude that Brazil’s credit card interest rates are probably among the highest in the world. Therefore, using a non-North American context of an economy with a usurious credit card interest rate makes Brazil a particularly interesting environment for investigation.

This paper starts with a brief discussion of the theoretical foundations employed to conceptualise and operationalise the three constructs under consideration. Then we explain in detail how distinct scales for measuring these constructs were developed from scratch, in such a way that we describe all the methodological procedures involved in four qualitative studies and two online surveys. Finally, we summarise our findings and discuss their implications for academia and the larger society.

The concept and measures of FWB
There have been recent calls for a standardized concept and measures of FWB. FWB is a multifaceted concept that encompasses several dimensions: control over day-to-day, month-to-month finances, the capacity to absorb a financial shock, the capability to meet financial goals and financial freedom (Consumer Financial Protection Bureau, 2015). It is defined as “the perception of being able to sustain current and anticipated desirable living standards and financial freedom” (Brüggen et al., 2017, p. 229). One of the noteworthy aspects of FWB is that it is not inherently allied to low income only, but to a set of several conditions that any individual should achieve in pursuing FWB[1]. Thus, although low-income people may be more susceptible to a lack of FWB, it does not mean that they necessarily lack FWB if they are able to maintain themselves with whatever income they have. On the other hand, even a highly educated and high-income individual may be susceptible to a lack of FWB if an incident renders the individual unable to make ends meet.

In measuring FWB, Anderloni et al. (2012) proposed an index of financial vulnerability that circumscribes both economic and demographic indicators. Campara et al. (2017) developed a FWB scale specifically to measure feelings related to life at the present.
And Netemeyer et al. (2017) proposed a measure of perceived FWB that encompasses two dimensions: current money management stress and expected future financial security. In this section, we define the concepts of financial preparedness for emergency, the beliefs of credit limits as additional income, and risky indebtedness behaviour and provide grounds that show how distinct they are from other constructs that in a sense may be taken as somehow similar. We also describe how these latter constructs have been previously measured in the literature.

Financial preparedness for emergency
As the concept of FWB implies, individuals need to be able to absorb a financial disruption to achieve FWB (Consumer Financial Protection Bureau, 2015). We propose the concept of “financial preparedness for emergency” and argue that it is likely to work as a driver of FWB, being linked to the key element of Brüggen et al.’s (2017) framework called “financial behaviour”.

Bhargava and Lown (2006) investigated a concept similar to ours, named “preparedness for financial emergencies”, but they neither provided a definition for it nor measured it using self-reported scales. They employed financial indicators, such as the amount of savings, money market accounts and other funds, to measure such preparedness. Behling and Merves (1985), Hershey and Mowen (2000) and Segel-Karpas and Werner (2014) specifically investigated financial preparedness for retirement. Behling and Merves (1985) measured financial preparedness for retirement by employing a set of financial planning variables (e.g. stocks, social security and pensions). The existing scale that measures any financial preparedness is the one provided by Hershey and Mowen (2000), named the “perceived financial preparedness scale”, which was also used by Segel-Karpas and Werner (2014). However, this scale is also concerned with measuring financial preparedness for retirement, which is not our proposal. The behavioural scale for financial preparedness, which we propose here, is solely concerned with the state of an individual to cope with any financial shock. Therefore, it involves having enough resources, such as through a monthly income that permits saving, to provide the ability to deal with the expenses of financial emergencies.

We define financial preparedness for emergency as “an individual’s state of being financially prepared to cope with a financial shock that could prevent him/her to conduct their regular activities”. Therefore, the kind of financial disruption we mean is the one that has a negative impact on individuals’ lives by preventing them from conducting their regular activities. Our concept addresses the minimum conditions for coping with a financial trouble, such as an unexpected health expense or a job loss. An example of financial disruption is the situation wherein individuals who use their car to work and make their living suddenly have their car break down, causing difficulty for their work and livelihood. In such a situation, individuals with financial steadiness and assured conditions to meet their financial obligations are likely to have a better FWB (Hagerty and Veenhoven, 2003). To prevent such a loss, such individuals would need to be financially prepared (e.g. through savings) not only to pay for the broken car to be fixed, but also to pay for an interim car to continue working. In our understanding, financial preparedness for emergency matches what Brüggen et al. (2017) called a “stimulating financially sound behaviour”.

Beliefs of credit limits as additional income
Soman and Cheema (2002, p. 33) argued that “consumers use external information such as the availability of credit to infer their future earnings”. They investigated how this availability and credibility of credit limits affected the propensity to spend and conducted a series of experiments where they manipulated the level of credit limit (i.e. high vs low). To the best of our knowledge, there is no scale in the literature that measures the beliefs that credit limits serve as individuals’ extra income. Past studies that explored the issue
(e.g. Soman and Cheema, 2002; Wang et al., 2011, 2014) have employed the actual credit card limits (e.g. $1,000 low credit limit vs $5,000 high credit limit) as the measure.

Grounded on Soman and Cheema’s (2002) argument and on the fact that “beliefs” are thoughts about the likelihood that an object (e.g. credit limits) is associated with a given attribute (e.g. income) (Ajzen and Fishbein, 1975), we propose and define the concept of “beliefs of credit limits as additional income” as the belief that credit limits serve as extensions of an individual’s regular income. This means, for example, that if an individual’s income is $1,000 monthly and his/her credit card limit is $800, he/she could mistakably infer (or believe) that his/her current income is $1,800. Using Brüggen et al.’s (2017) framework as a guideline, beliefs of credit limits as additional income could be regarded as a “personal factor” that is likely to affect negatively individuals’ FWB. By counting the credit limit as additional income, individuals would have their income illusionary inflated and might enter into a higher level of spending that they cannot afford, thus being an obstacle to FWB.

**Risky indebtedness behaviour**

Typically, research on debt has measured indebtedness based on financial indicators, as opposed to measuring it by employing behavioural scales. Hojman et al. (2016), for example, measured debt burden employing the amounts of consumer debt (e.g. bank loans) and mortgage debt. Wang et al. (2014) measured debt by computing the revolving credit debt from a database of credit card users. Anderloni et al. (2012) measured the level of debt servicing employing the ratio between debt instalment payments to income. In reviewing the extant literature, we identified a solely behavioural scale related to indebtedness: the propensity towards debt scale by Flores and Vieira (2014), which evaluates the tendency to assume debt of any type.

In this study, we understand that debt is a commonplace. Most people have some kind of debt. This study is not concerned with any kind of debt level or the habit of acquiring debt in itself. Instead we propose a scale that is able to capture the kind of indebtedness that becomes unaffordable, consequently damaging individuals’ financial stability and goals. Therefore, while Flores and Vieira (2014) addressed the propensity to indebtedness of any kind, we address a specific hazardous type of debt behaviour, which we call here “risky indebtedness behaviour” and define as “a behavioural tendency to getting into hazardous debt revealed by repetitive debts due to spending more than one can afford”. Employing Brüggen et al.’s (2017) framework, risky indebtedness could be taken as a “destructive financial behaviour”, in other words, an element that potentially hinders individual FWB.

**Scale development and validation procedure**

No studies in the literature have provided scales that could be applied to assess the FWB driver of financial preparedness for emergency and the obstacles to FWB, namely, beliefs of credit limits as additional income and risky indebtedness behaviour. This section describes the procedures for scale development and validation of the three self-reported behavioural measures created for assessing these constructs.

This research primarily followed Churchill’s (1979) and DeVellis’ (2012) scale development and validation guidelines. Therefore, to develop the scales, we began with a review of the literature on FWB (e.g. Anderloni et al., 2012; Consumer Financial Protection Bureau, 2015; Brüggen et al., 2017; Netemeyer et al., 2017), credit cards and indebtedness (e.g. Wang et al., 2014; Flores and Vieira, 2014; Soman and Cheema, 2002).

The literature review was followed by a comprehensive qualitative approach (i.e. focus group and interviews with experts, judges and consumers) to establish a baseline for the definition of the constructs and for item generation; then we proceeded through item reduction and refinement; and finally we undertook two confirmatory studies. Table I provides an overview of the entire methodological research process, which encompassed data collection from four qualitative and two quantitative sources.
All six studies were conducted in Portuguese, which is the native language of Brazil. The scales were built originally in Portuguese and later translated into English by native English professional translators.

Construct definition and baseline for item generation

Study 1: focus group. Focus group participants were recruited from a large business school directed towards the mid- to low-income population, located in the south-eastern part of Brazil. A convenience sample of ten graduate students (six women and four men; average age 25) volunteered. The focus group session was conducted following Krueger and Casey’s (2009) questioning route. One researcher and one assistant conducted the procedure in one of the business school classrooms. The transcripts revealed preliminary themes related to credit card use, indebtedness and their hazardous consequences. We were able to identify the main aspects of credit card usage that led consumers to risky indebtedness (e.g. unawareness as regards the rules of using credit limits offered by credit card companies). In addition, we identified the main aspects of severe indebtedness (e.g. constantly paying credit card fees, often having to borrow from others to pay debts). The focus group also provided us with the first insights on how high levels of debt would affect one’s FWB and how important it is for individuals to be financially prepared for any eventuality.

Study 2: in-depth interviews. Following the literature review and focus group, eight in-depth interviews (three men, five women; average age 28) were conducted (Table I) to support the construct definitions and item generation (Churchill, 1979; DeVellis, 2012). A convenience sample of respondents was recruited among graduates from one of the major business schools of Brazil located in the south-eastern part of the country. Participants were required to have experience with credit cards, since in Brazil credit limits provided by credit cards are by far the most common opportunity to obtain credit (see more details in the Introduction section).

Before each interview, respondents were informed of the overall purpose of the research; they were requested to authorise the recording of the interview and assured of confidentiality. The interviews were conducted in an environment familiar to the respondents.

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<td>Study 1: ten graduate students volunteered (six women and four men; 25 average age) Study 2: eight in-depth interviews (five women, three men; average age 28) Output: construct definitions and generation of 49 items</td>
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<td></td>
<td>Reduction and refinement of items: establishing content and face validity</td>
<td>Study 3: ten judges (six marketing professors and four marketing doctoral students; seven women, three men; average age 32) Study 4: expert and consumers review: five interviews with field experts who were senior executives from the credit card and financial services industry (three women, two men; average age 45); two sorting tasks (two men; average age 30); three in-depth interviews (two women, one men; average age 30) Output: refinement to 17 items</td>
</tr>
<tr>
<td>Quantitative data collection – conducted in Portuguese language</td>
<td>Scales validation</td>
<td>Study 5: establishing the proposed scales. 586 usable responses (45.1% women; average age 36) Study 6: validating the proposed scales. 702 respondents (57.5% women; average age 39.6) Output: three scales with total of 13 items</td>
</tr>
</tbody>
</table>

Table I. Scale development process
(i.e. their classroom at the university), thus leaving them more at ease. Interviews were guided by general questions relating to each of the concepts under investigation (McCracken, 1988). Thus, we asked questions such as: Could you please elaborate on the minimum conditions necessary for you to cope with a financial emergency? Could you please describe your experience with credit cards? What is your view of credit card limits? Could you please think about a debt situation that would put your goals in danger? It was the interviewee who established the larger part of the course of the interviews. The inquiries were framed along with the participant’s thoughts and focussed on gaining in-depth reports of particular experiences (McCracken, 1988). Our goals were to gain insights into individuals’ views of what the essential elements constituting vulnerability during a financial shock might be, what credit card limits were, and what a debt level that undermined their future goals might be. Each interview lasted from 40 to 50 min.

**Generation of items**

Using the literature review, the construct definitions, the result of the focus group and the first set of interviews as a basis, a pool of 49 items was created to tap financial preparedness (18 items), beliefs of credit limits as additional income (20 items) and risky indebtedness behaviour (11 items). Some of the items were adapted from previous scales to the context of debt (e.g. for consumer attitudes to debt, see Lea et al., 1995) and credit card attitudes (e.g. for credit card use scale, see Roberts and Jones, 2001).

Item generation included choosing items that adhered to the scale’s purpose and could be expected to show consistency and reliability (DeVellis, 2012). Therefore, we followed a set of guidelines for generating items for the scales. For instance, multiple item measures were applied to minimise the high levels of measurement error related to a single item, and the items were developed to address only a single issue. We avoided double-barrelled items to prevent misunderstandings and confusion. Finally, we decided not to make use of negatively worded or reverse-scored items because they may create a harmful effect on the scales’ psychometric properties (DeVellis, 2012; Harrison and McLaughlin, 1991; Hinkin et al., 1997).

**Reduction and refinement of items**

**Study 3: content validity.** Ten expert judges (six marketing professors and four marketing doctoral students; seven women, three men; average age 32) were requested to assign a code (i.e. the definition of the construct under investigation) for each of the 49 items. This procedure is termed a sorting task (Harrison and McLaughlin, 1991; Hinkin et al., 1997) and was used to classify each scale deductively. Our participants were offered the specific definition of financial preparedness for emergency, beliefs of credit limits as additional income and risky indebtedness behaviour and were given all the items of all scales separately on small cards. They were then requested to employ these definitions as the grounds for coding the 49 items and to link these items to each scale.

Only those items that achieved full agreement by at least five of the ten judges remained in the pool of prospective items to be included in the final scales. Grounded on the judges’ assessments, 16 items were excluded from the initial pool, with 33 items thus remaining as a result. The judges allocated 11 items to financial preparedness for emergency and 11 to beliefs of credit limits as additional income. Risky indebtedness behaviour remained with the initial 11 items. This judging procedure allowed for content validity (Churchill, 1979).

**Study 4: face validity and item refinement.** To establish face validity and adequate refinement of the scales (Churchill, 1979), we conducted additional procedures that encompassed: five interviews (one of them held by Skype) with field experts who were senior executives from the credit card and financial services industry (three women,
two men; average age 45); three interviews (two of them held by Skype) with ordinary consumers who were holders of credit cards (two women, one man; average age 30); and two sorting tasks with Brazilian graduate students recruited from one major business school in Brazil and one in the USA (two men; average age 30). In summary, Study 4 encompassed three research stages, which were conducted with different profiles of individuals with the purpose of achieving face validity, as recommended by DeVellis (2012). The sorting task employed in Study 4 followed the same procedures as described in Study 3.

At this stage, we decided to retain items that were rated as clearly representative of each scale (Hardesty and Bearden, 2004). We also deleted items considered to be double-barrelled and ambiguous (DeVellis, 2012). As a result, 16 items were removed from the initial pool; hence 17 items remained. Some of the 17 items had been revised. Four items were assigned to financial preparedness for emergency, six to beliefs of credit limits as additional income and seven to risky indebtedness behaviour.

Scale validation
The revised remaining 17 items were measured in a seven-point Likert-type scales ranging from totally disagree (1) to totally agree (7) and were randomly ordered in an online questionnaire. Using Qualtrics software, we conducted two online surveys to establish and validate the proposed scales. The target population for both online surveys was the typical adult aged 18 years and above, a holder of at least one credit card. The methodological procedures involved in the two surveys are described next in Studies 5 and 6.

Study 5: establishing the proposed scales. Sample. The first online survey consisted of a convenience sample of individuals who were customers of two institutional Brazilian providers of financial services. Data preparation procedures and safeguards were conducted to ensure the integrity of the sample (e.g. we checked on whether the time employed to complete the questionnaire was insufficient and set software settings to prohibit people from participating more than once). The online questionnaire was accessed by 1,316 respondents, 954 of whom started the survey. A complete case approach to the data was employed; incomplete questionnaires were excluded, providing a total of 655 answers. Of those, 69 were excluded from the analysis for not having had credit cards or not answering this question, or for displaying an erratic response pattern (SD = 0 and <0.5), resulting in a usable sample of 586 responses, 45.1 per cent by women (the Brazilian population gender distribution is 51.5 per cent women; IBGE, 2010). The average age of participants was 36 (the Brazilian population age range distribution is as follows: 24 per cent 0–14 years old; 69 per cent 15–64 years old; 7 per cent 65+; IBGE, 2010). Around half of the respondents (45.9 per cent) belonged to the medium-income bracket (65 per cent of the overall Brazilian population possesses an annual income range from $10,000 to $34,000; ABEP, 2016); 44.9 per cent belonged to the low-income bracket (vs 27 per cent of the overall Brazilian population, who possess an annual income less than to $10,000; ABEP, 2016); and 9.2 per cent represented a high income (vs 8 per cent of the overall Brazilian population, who possess an annual income superior to $34,000; ABEP, 2016). The sample was biased towards high-degree holders; 62.6 per cent had at least a college degree (vs 14 per cent of the overall Brazilian population; OECD, 2016).

Assessment. In Study 5, we followed Miller’s (2013) recommendation and randomly split the sample in half, producing two sets of samples: a test set (n = 293) and an evaluation set (n = 293).

Using the test set to pre-test and explore the data, we conducted an exploratory factor analysis (EFA) (principal component factor analysis with varimax rotation) and tested for data suitability. The EFA was conducted using SPSS version 22. The EFA was evaluated employing the Kaiser–Meyer–Olkin (KMO) test for sampling adequacy (> 0.8; Cerny and
Kaiser, 1977) and Bartlett’s test of sphericity that should be statistically significant (Hair et al., 2014). In addition, we examined the total variance that explained (> 0.5) factor loadings (> 0.7) and cross-loadings (< 0.4) (Hair et al., 2014).

The evaluation set was used to assess each scale separately and the three scales together, employing a maximum likelihood confirmatory factor analysis (CFA) (Gerbing and Anderson, 1988). The CFA evaluated the relationships among items and scales and each scale’s dimensionality (Churchill, 1979; Hinkin et al., 1997). CFA was conducted by employing SPSS AMOS Graph version 22. We assessed model fit by employing the normed $\chi^2$ (CMIN/df < 5) (Marôco, 2010), the goodness-of-fit index (GFI > 0.9) (Kline, 2005), the comparative fit index (CFI > 0.95) (Brown, 2006), and the root mean square error of approximation (RMSEA < 0.08) (Steiger, 1990; Browne and Cudeck, 1993).

Reliability was evaluated using Cronbach’s $\alpha$ (> 0.70) (Cronbach, 1951). However, to overcome a Cronbach’s $\alpha$ limitation (i.e. it can inflate as the number of similar items and the number of items in a scale increase), we further evaluated reliability employing Fornell and Larcker’s (1981) composite reliability index (CRI) (> 0.70). Convergent validity was evaluated employing the average variance extracted (AVE > 0.5) (Fornell and Larcker, 1981). Discriminant validity was assessed comparing the square root of each AVE with the inter-construct squared correlation (Fornell and Larcker, 1981) (the AVE estimates for two factors need to be greater than the square of the correlation between the two factors) and by examining the correlations among the constructs (< 0.85) (Kline, 2005). In order to consider any exclusion of items, we examined modification indices (Kline, 2005), standardized residuals (> 2.58) (Byrne, 2010; Brown, 2006), factor loadings and cross-loadings, but above all we took into account the theoretical underpinnings of the constructs. The ideal minimum value of factor loadings is 0.7 (Hair et al., 2014). Nevertheless, we also considered loadings ranging from 0.5 to 0.6 as acceptable (Esposito et al., 2010).

Results. The EFA outcome showed that the factor analysis was suitable for the data and suggested that there were sufficient correlations among the variables. The KMO was 0.905, and Bartlett’s test of sphericity was significant ($p < 0.000$). Three factors emerged from the data with 64.99 per cent of total variance explained. Factor loadings were all above 0.7 (ranging from 0.707 to 0.877). There were no cross-loadings above 0.4. Two items had cross-loadings of 0.38, and all others had cross-loadings below 0.25. Therefore, we decided not to exclude any item at this stage and to proceed with conducting the CFA with the evaluation set.

We report the CFA results beginning with the assessment of each scale separately. CFA shows that the initial model fit of the financial preparedness for emergency scale was satisfactory but with some room for improvement, as RMSEA (0.084) did not reach the ideal threshold. As we inspected modification indices, we excluded one item (i.e. MI 5.78; “very often my monthly income leaves me with a surplus at the end of the month”). Thus, the final scales retained three items. The initial model fit of risky indebtedness behaviour was very good (CMIN/df: 2.1, $p < 0.000$; GFI: 0.973; CFI: 0.984; RMSEA: 0.061). However, we decided to exclude one item due to redundancy and a high modification index (i.e. MI 7.13; “I have debt to much more than I can afford”). Thus, a final measurement model was estimated that provided a better fit (CMIN/df: 1.58, $p < 0.000$; GFI: 0.985; CFI: 0.993; RMSEA: 0.043). The initial model fit of beliefs of credit limits as additional income was not acceptable, since CMIN/df (6.04, $p < 0.000$) and RMSEA (0.131) did not reach the ideal threshold. As we inspected modification indices, we decided to exclude two items with the highest modification indices (i.e. MI 26.87; “the way I see credit limits is that they facilitate purchasing as if they were part of my income”; and MI 8.24; “when I am going to make purchasing decisions, I always consider my credit limits as part of my income”). The exclusion provided the model with a very good fit for the beliefs of credit limit scale as additional income (CMIN/df: 0.663, $p < 0.000$; GFI: 0.998; CFI: 1; RMSEA: 0.00). After analysing each scale separately, we
conducted a CFA of the measurement model (i.e. the three scales were assessed altogether), so we could test for reliability and convergent and discriminant validity.

Reliability and validity. Using the results of the three-factor CFA model, we assessed reliability and validity. The values for Cronbach’s α and CRI (Fornell and Larcker, 1981) were greater than the threshold (0.70), indicating high internal consistency and reliability (Table II). The results also provided support for convergent validity, as all scales approached or exceeded the AVE threshold (0.50). All but one pair of constructs reached discriminant validity, as AVE surpassed the squared multiple correlation between the constructs. Discriminant validity was not reached (when comparing AVE and square multiple correlation between constructs) for risky indebtedness and financial preparedness. The inter-construct squared correlation (−0.78) was slightly higher than the square root of the indebtedness behaviour scale’s AVE (0.71). Thus, we further tested discriminant validity for these two scales using the test of Bagozzi et al. (1991). The outcome indicates discriminant validity between these two scales (unconstrained model CMIN 64.404, df: 26; constrained model CMIN: 326.474, df: 27; Δχ² 262 > 4; the threshold is 4). Therefore, discriminant validity was achieved for all scales (Table II). The three-factor CFA model achieved a very good fit (CMIN/df: 1.96; p < 0.000; GFI: 0.942; CFI: 0.97; RMSEA: 0.056). See Table II for a summary of model fit, Table III for a summary of reliability and convergent and discriminant validity indices (i.e. psychometric properties and correlation matrix), and Table IV for standardized factor loadings of the three-factor CFA model and descriptive statistics.

Study 6: validating the proposed scales. Sample. To further establish external validity of the scales, we ran a second online survey with a broader profile of consumers. The

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Convergent Validity</th>
<th>Discriminant validity</th>
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</thead>
<tbody>
<tr>
<td>Cronbach’s α</td>
<td>CRI</td>
<td>AVE</td>
</tr>
<tr>
<td>Study 5 – evaluate set</td>
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<td></td>
</tr>
<tr>
<td>FPE</td>
<td>0.75</td>
<td>0.74</td>
</tr>
<tr>
<td>RIB</td>
<td>0.89</td>
<td>0.86</td>
</tr>
<tr>
<td>BCL</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Study 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPE</td>
<td>0.76</td>
<td>0.76</td>
</tr>
<tr>
<td>RIB</td>
<td>0.86</td>
<td>0.87</td>
</tr>
<tr>
<td>BCL</td>
<td>0.91</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Notes: Study 5: Off-diagonal elements are the correlations among constructs. Diagonal elements (italic) are the square root of the variance shared between the constructs and their measures (AVE). Study 6: FPE, financial preparedness for emergency; RIB, risky indebtedness behaviour; BLC, beliefs of credit limits as additional income.

<table>
<thead>
<tr>
<th>Model fit indices</th>
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<tbody>
<tr>
<td>CMIN/df</td>
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<tr>
<td>Study 5: evaluate set</td>
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<tr>
<td>RIB scale</td>
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<td>BCL scale</td>
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<tr>
<td>Model fit</td>
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<tr>
<td>Study 6</td>
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<tr>
<td>RIB scale</td>
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<td>BCL scale</td>
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<tr>
<td>Model fit</td>
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</table>

Notes: RIB, risky indebtedness behaviour; BLC, beliefs of credit limits as additional income.
convenience sample of the second survey consisted of consumers who were enrolled on the panel of an online market research firm with demographics matching the current Brazilian gender and region distribution. Sampling requirements and procedures were the same as those applied in Study 5. The online questionnaire was accessed by 1,160 respondents, 810 of whom started the survey. Incomplete questionnaires were excluded, providing a total of 786 answers. Of those, 84 respondents were excluded from the analysis for either not having had credit cards or not answering this question, or for exhibiting an erratic response pattern (SD = 0 and ω ≤ 0.5), resulting in a usable sample of 702 respondents, 57.5 per cent of them women. The average age of participants was 39.6. As in Study 5, around half of the respondents (48 per cent) belonged to the medium-income bracket, 41.7 per cent to the low-income bracket and 10.3 per cent to the high-income bracket. The sample was biased towards high-degree holders, as 75.5 per cent had at least a college degree. Although more educated, most of the respondents of Studies 5 and 6 belonged to the mid- and low-income population, which is quite representative of the overall Brazilian population income distribution.

Assessment. We understood that there was no need to perform another split-half operation in Study 6, since the results of Study 5 were sufficient for exploratory results. It was thus decided that Study 6 would be a 100 per cent confirmatory study. Therefore, in Study 6 we employed a maximum likelihood CFA (Gerbing and Anderson, 1988) to assess the relationships among items and scales and each scale’s dimensionality (Churchill, 1979; Hinkin et al., 1997). In Study 6, we employed the same procedures for assessing the CFA model fit, reliability, convergent validity and discriminant validity as described in Study 5.

<table>
<thead>
<tr>
<th>Concepts and scale items</th>
<th>Study 5: evaluate set</th>
<th>Study 6</th>
<th></th>
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<tbody>
<tr>
<td>Financial preparedness for emergency is an individual’s state of being financially prepared to cope with a financial shock that could prevent him/her to conduct their regular activities</td>
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<tr>
<td>FPE1: If I lose my job today, I have enough money to cope with my expenses until I find my next job</td>
<td>0.67 3.88 2.11 0.77 3.76 1.98</td>
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<tr>
<td>FPE2: I am able to cope with financial emergency expenses</td>
<td>0.83 4.15 1.98 0.81 4.26 1.73</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>FPE3: I manage to save some money every month</td>
<td>0.59 4.16 1.99 0.59 3.76 1.92</td>
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Beliefs of credit card limits as additional income is defined as consumers’ belief that credit limits serve as an extension of their regular income

| BCL1: I see credit limits as part of my regular income                                  | 0.89 2.79 2.02 0.82 2.72 1.86 |         |            |            |
| BCL2: I add my credit limits to my budget as if they were part of my regular income     | 0.90 2.60 1.97 0.93 2.43 1.71 |         |            |            |
| BCL3: My credit limits serve as part of my regular income                               | 0.90 2.58 1.92 0.92 2.56 1.79 |         |            |            |
| BCL4: When I am planning my budget, I consider my credit limits to be extra cash (i.e. cash buffer) | 0.68 2.58 1.84 0.73 2.49 1.67 |         |            |            |

Risky indebtedness behaviour is a behavioural tendency to getting into hazardous debt revealed by repetitive debts due to spending more than one can afford

| RIB1: I am often in debt to much more than I can pay                                     | 0.71 2.51 1.78 0.71 2.62 1.79 |         |            |            |
| RIB2: I often have to pay fines (or interest) for paying overdue bills                   | 0.74 2.92 1.87 0.70 2.61 1.80 |         |            |            |
| RIB3: I often borrow money to pay off my debts                                          | 0.73 2.25 1.72 0.71 2.06 1.54 |         |            |            |
| RIB4: I am often in debt to much more than my monthly income                             | 0.82 2.39 1.73 0.85 2.45 1.64 |         |            |            |
| RIB5: I am frequently in debt                                                          | 0.59 2.77 1.74 0.69 2.77 1.70 |         |            |            |
| RIB6: My debts damage my life goals, such as saving money, investing in education, or buying my own home | 0.68 3.67 2.13 0.64 3.62 2.01 |         |            |            |

Notes: FPE, financial preparedness for emergency; RIB, risky indebtedness behaviour; BCL, beliefs of credit limits as additional income

Table IV. Standardized factor loadings, scale items and descriptive statistics

FWB related scales
Results. The same steps performed in the evaluation set in Study 5 were also performed in Study 6, resulting in the deletion of the same items (i.e. the initial 17 items were reduced to 13 items), providing a good model fit for each scale separately, and for the three-factor CFA model. Like in Study 5, financial preparedness for emergency resulted in a three-item scale. The model fit results for risky indebtedness behaviour (CMIN/df: 2.58, $p < 0.000$; GFI: 0.989; CFI: 0.992; RMSEA: 0.048) and for beliefs of credit limits as additional income (CMIN/df: 0.71, $p < 0.000$; GFI: 1; CFI: 1; RMSEA: 0.00) were both good. The three-factor CFA model also achieved excellent fit (CMIN/df: 2.21, $p < 0.000$; GFI: 0.971; CFI: 0.984; RMSEA: 0.041).

Reliability and validity. The results also provided support for reliability and convergent and discriminant validity, exceeding all the required thresholds (see Tables II–IV). In summary, Study 6 ratified the results of Study 5, allowing for greater confirmation of the scales, their reliability, and their validity.

Discussion, limitations and future research
FWB is a topic of increasing relevance for academia and society. The proposal of new scales for measuring key elements of FWB is an important contribution to the growing body of literature. Here we conceptually distinguish amongst three constructs (i.e. financial preparedness for emergency, beliefs of credit limit as additional income and risky indebtedness behaviour) and propose three new parsimonious valid and reliable scales that could be used as a complement of financial indicators, both in research and practice, in order to assess the minimum conditions necessary to cope with a financial shock; individuals’ mistaken beliefs that credit limits are part of their income; and the risky ways in which individuals act or conduct themselves that can bring on hazardous indebtedness.

The proposed scales could be applied to identify individuals who are ill prepared for any financial disruption, do not understand how credit limits work, or behave impudently as regards debts. The proposed scales provide grounds for the development of public policies targeting this specific population, with the aim of improving their levels of financial education and awareness on how important it is to save money or to be economically prepared for any emergency. Financial institutions could use the proposed scales to segment customers who are less likely to default, thus reducing their delinquency rates. For example, credit card companies could use the three proposed scales in combination, and alongside objective financial indicators (e.g. past actual debt behaviour, current invoice balance, income, income/debt ratio), to build a “default score” (i.e. the probability of a client not paying his/her credit card invoice). Additionally, personal money management platforms (e.g. Mint, Wallet, GuiaBolso) could build a “financial preparedness score” and a “debt score” based on the self-reported behavioural measures proposed here to provide guidance on how to increase financial resources and negotiate debt.

Despite its strengths, this paper has limitations that could restrict the generalisability of the findings and that indicate opportunities for research projects to come. First, sampling from online consumer databases may not be representative of the general population (Zhou and Fishbach, 2016). Online samples are potentially biased, and further bias arises from self-selection and dropouts (Kraut et al., 2004). In this study, we used convenience online sampling in the scales validation. Convenience sampling is weaker than sampling techniques that select participants randomly from the population, but it is a common approach in academia due to budgetary and time constraints. We attempted to overcome the drawbacks of using convenience online samples by pursuing a large sample, as studies in the literature recommend (DeVellis, 2012), and by putting a significant effort on having non-student adult respondents’ samples in Studies 5 and 6.

Second, the use of a generally all-Brazilian sample could affect the external validity of the scales. Given that the research was conducted within a single culture context, future research could seek validation of the proposed scales across cultures. The Brazilian
economy is known for its constant instability (e.g. economic turmoil and recession), which often makes its mid- and low-income population uncertain of future employment. By exploring cross-cultural differences, we could understand how the proposed scales perform in more financially stable economies where the offer of consumer credit has low interest rates, consumer credit has been established for a long time, or the population does not fear unemployment due to recession. Furthermore, a feature of the Brazilian financial industry is that credit cards do not relate solely to high-income individuals. There are several Brazilian credit card companies that target the bottom-of-the-pyramid market. However, we acknowledge that in other countries, such as the USA, many low-income individuals are “underbanked”, i.e., unable to access such typical financial services as credit cards. As regards this scenario, we suggest that the scale “beliefs of credit limits as additional income” should be adapted and tested to take into account other opportunities to obtain credit, such as payday loans and title loans.

Third, we believe that the risky indebtedness behaviour scale may be subject to a socially desirable bias, as people may lie about their real debt behaviour to position themselves in a favourable light compared to others. Thus, financial institutions should apply the risky indebtedness behaviour scale with caution, as consumers who are expected to score high in this scale could deliberately conceal the truth about their actual debt behaviour. We believe that this scale may provide a more trustworthy result when employed in conjunction with objective financial indicators.

Fourth, this study did not consider how far the subjective evaluations proposed here relate to the objective financial situation of consumers. This could be done, for example, by requesting consumers who answer the scales to also provide data to build debt-to-income and debt-to-credit-card-limits ratios. Questions could focus on self-assessments of debt level (e.g. What is your current overall debt?), credit card debt (e.g. What is your current credit card debt? How much do you owe on your credit card for the coming invoice?) and credit card limits (What is your current credit card limit?). These parameters could also be assessed by reaching agreements with institutional providers of financial services to supply data on the current credit card debt and credit limits of their customers who answer the scales. The challenge of both approaches is that consumers often deem this type of data as personal and sensitive information, thus feeling uncomfortable to share it themselves and not authorising the financial companies to do so on their behalf.

Fifth, in this study, we did not consider how the three constructs approached here relate to other constructs belonging to the nomological net of FWB. Further research should address this essential step to establish the construct validity of the scales proposed and also to test them for predictive validity. Finally, we encourage future researchers to propose and test new measures of other FWB dimensions based on Brüggen et al.’s (2017) framework. We still need self-reported behavioural scales that measure optimal financial behaviours, such as financial socialisation and propensity to savings.

Note
1. This was one of the main discussions at the ACR TCR (Association of Consumer Research–Transformative Consumer Research Conference) held at Cornell University (Ithaca, New York) in July 2017.

References


Further reading


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**Income security, social comparisons and materialism**

**Determinants of subjective financial well-being among Indian adults**

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Mahendra Kumar  
*Department of Industrial and Management Engineering, Indian Institute of Technology Kanpur, Kanpur, India,* and  
Kapil K. Dayma  
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**Abstract**

**Purpose** – The purpose of this paper is to understand the effect of perceived income security (IS), materialistic values and socially driven aspirations on the financial well-being (FWB) of young Indian adults.

**Design/methodology/approach** – A questionnaire was designed using available scales for FWB and materialism. Questions were incorporated to measure social comparison and IS. A structural equation approach using data from 327 respondents was used to test a hypothesized model of FWB.

**Findings** – The IS has the largest positive effect, while unemployment has the largest negative effect on FWB. Overt materialism (OM) negatively affects FWB. Socially motivated aspirations have an indirect negative effect mediated by OM. Among demographic variables, income, education and stable employment increase FWB. Males have lower levels of FWB.

**Research limitations/implications** – The data includes 327 respondents that were polled using convenience sampling. The results may not be generalizable to India at large.

**Social implications** – A common consideration when choosing a job is the salary. However, we find that IS affects subsequent FWB to a much greater extent than income level and materialistic aspirations.

**Originality/value** – This is the first study to look at the relative importance of materialistic aspirations vs IS in determining FWB. The results will help policy makers in devising policies and financial service providers in designing products and services that will increase the FWB of Indians.

**Keywords** Social comparison, Demographic factors, Materialism, Financial well-being, Income security, Structural equation models

**Paper type** Research paper

**Introduction**

Significant socio-economic and cultural changes have occurred within India in the last 70 years. In the first two decades after independence, Prime Minister Jawaharlal Nehru implemented several economic policies that led to the creation of a large and strong public sector industrial base (Balakrishnan, 2007; Nayyar, 2006). The establishment of several public sector enterprises, with assurance of jobs and steady employment, led to the emergence of a new middle class. Salaries and living standards were somewhat moderate, but educational and economic aspirations were high. Because of high import duties and low growth of private enterprise, the availability of material goods for consumption was low, and the propensity to consume was not high.

**JEL Classification** — G20, I31, C31, C38

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With economic liberalization in 1991, several multinational companies began to establish operations in India (Pedersen, 2000). Outsourcing of jobs from the USA and other western countries in the early 2000s led to tremendous growth in employment opportunities and salaries and the overall affluence of the middle class (Fernandes, 2000; Beinhocker, 2007). In the 1990s and early 2000s many young adults earned starting salaries that were greater than their parents’ salaries at retirement (Taylor et al., 2013). As a result of this new found affluence, conspicuous consumption grew rapidly (Mathur, 2010). While per capita, GDP has been increasing steadily and today’s Indian middle class is far more affluent than previous generations, it is not clear whether this affluence has led to a rise in overall well-being.

After the global economic downturn of 2008, inflation adjusted salaries and benefits have not grown at the original pace in private companies and have shrunk in some cases. Stagnant salaries, longer working hours and lack of job security has led to high rates of attrition in companies in the ITes and business process outsourcing sector (Kaur, 2014). The last ten years have seen public sector and government jobs return to favor (Muralidharan, 2015), since these offer job security and greater work life balance. These changes in employment conditions and job preferences in India motivate the present paper.

Financial well-being (FWB) is one of the key factors that affects overall subjective well-being of individuals. FWB can be assessed based on relative or absolute benchmarks. Relative well-being is driven by social comparisons to a reference group (Hagerty, 2000; Brown and Gray, 2016). Absolute well-being is driven by an individual’s independent assessment of their ability to meet their current and future financial needs which are objectively determined (Greninger et al., 1996).

Social comparisons and a materialistic world view might prompt individuals to maximize their wealth, which would improve their relative FWB. An objective assessment of financial needs may lead to the goal of “wealth satisficing” rather than “wealth maximizing.” Wealth satisficing approach allows the consideration of other aspects such as leisure time and income security (IS) that may also affect subjective well-being. Researchers have studied the choice between wealth maximization and risk minimization motives in the context of investment decisions (Nagy and Obenberger, 1994). However, a comparative assessment of these two different objectives has not been attempted in the context of overall FWB. This is the research gap that we attempt to address in this study.

We are interested in the following research questions:

**RQ1.** Does IS play a large role in FWB in a society that has progressively become more affluent and more materialistic?

**RQ2.** How do socially motivated aspirations (SMA) (or upward social comparisons) affect FWB of Indian adults?

**RQ3.** How are SMA related to materialism?

**RQ4.** How does materialism affect FWB?

The scope of this study is as follows. First, we are considering only subjective perceptions of FWB, and are not including objective evaluations of FWB (such as amount of savings, amount of debt, etc.). Second, we are constraining the scope of this study to include dispositional factors and are not considering situational factors such as the socio-cultural factors and financial burden that might affect FWB.

The rest of the paper is organized as follows. In second section, we give a detailed review of the literature with respect to all of the main constructs considered in this study. We also formulate research hypotheses based on the literature and propose a conceptual model. In third section, we outline the methodology which includes the development of the questionnaire, the data collection as well as the statistical analysis tools used in the study.

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In fourth section, we give the results of the models and discuss the findings with regard to the original hypotheses. Fifth section concludes the study and provides some directions for future research.

**Literature review**

We present below a review of the literature related to the main covariates included in this study. First, we present the conceptual framework developed to study FWB. Then, we review the literature that looks at the effect of social comparisons, materialism, IS and demographic variables on FWB.

**FWB – conceptual framework**

Subjective well-being has been studied extensively since the 1980s (Diener et al., 1999; Diener and Oishi, 2000; Dolan et al., 2008). Subjective well-being is considered to consist of satisfaction in many domains, such as overall, interpersonal, community, occupational, physical, psychological and economic well-being (Prilleltensky et al., 2015). FWB is one of the sub-domains of subjective well-being that is mainly concerned about whether individuals feel happy and content about their financial state. This happiness or contentment could be related to a feeling of security, having enough for one’s needs, or having enough to achieve a desired standard of living.

Conceptual frameworks of FWB have been specified by several researchers (e.g. Porter, 1990; Joo and Grable, 2004; Shim et al., 2009; Xiao and Porto, 2017; Brüggen et al., 2017). In an early study on FWB, Porter (1990) empirically tested a conceptual model of FWB which included personal characteristics, objective attributes, perceived attributes and evaluations of financial situation. She found that perceived attribute index, a wellness index and full-time employment were the most significant determinants of FWB. Joo and Grable (2004) tested the effect of several antecedents, such as financial behaviors, financial stress levels, income, financial knowledge, financial solvency, risk tolerance and education on financial satisfaction.

Shim et al. (2009) found that financial socialization, values related to self-actualization, parental expectations (norms) and perceived behavioral control were positively connected with FWB. In a similar study, Sabri (2011) studied the effect of several background characteristics of an individual, including early childhood financial experience, financial socialization and financial knowledge on FWB. Kalra Sahi (2013) in a study of 374 Indian adults found that age, income, marital status, being employed in a government or public firm, propensity to save and invest all had a positive effect on financial satisfaction.

Brüggen et al. (2017) propose a new definition of FWB as the follows: “FWB is defined as the perception of being able to sustain current and anticipated desired living standards and financial freedom.” Two important aspects of this definition are that an individual should be able to sustain their desired living standards in the future and that they should be able to enjoy financial freedom. Thus, there is a temporal aspect in terms of expected financial state in the future, as well as the aspect of freedom in making one’s own decisions. An appropriate scale including these dimensions has not been developed yet and, hence, we did not include these aspects in the current study. However, the results of our study point to the importance of IS which ties in with the reference to the future provided by this definition, as in “being able to sustain.”

**Income and IS**

Income is one of the key determinants of FWB. However, several researchers have found that FWB does not keep increasing linearly with levels of income. In one of the earliest studies on the effect of income on FWB, Diener and Oishi (2000) used the data from a large, heterogeneous, nationally representative sample in the USA and found that while income does affect FWB, this relationship is non-linear with the largest increases evident at low levels of income.
Surprisingly, they also found that there were no relative standard or social comparison effects. That is, the well-being of individuals was not affected by the differences in incomes or wealth of their comparison groups. Diener and Biswas-Diener (2002) found that increases in income increased the subjective well-being of poor people but has no significant effect on the well-being of middle or high-income individuals especially in high-income countries. The effect of income has been studied by several authors (e.g. Howell et al., 2013; Kushlev et al. 2015). McBride (2001) and Clark et al. (2008) both looked at how relative income (and not absolute income) may affect happiness or life satisfaction. Scott et al. (2004) found that unstable work and unstable income has a high negative effect on the family welfare. This finding is in consonance with the finding of our study, namely, that IS is a very important predictor of FWB.

To summarize, while there have been many studies of FWB, where the role of income was clear, yet the strength of this effect was not unequivocal across studies of different groups in different economies. Based on this literature, we form the following research hypothesis:

**H1.** IS is positively correlated with FWB.

**Social comparison theory.** Social comparison theory, originally proposed by Festinger (1954), postulates that human beings have an intrinsic need to evaluate their abilities and opinions in order to gain a better understanding of themselves. In the absence of objective benchmarks, they compare themselves with others in their reference groups. The reference groups may consist of individuals in their social circle that are similar to themselves (similarity hypothesis) in terms of age, education, income and ability. Festinger further proposed that human beings have a “unidirectional drive upward” based on social comparisons which pushes them to improve their abilities and do better.

Wood (1989) modified Festinger’s original theory by suggesting that self-evaluations are not always unbiased and rational, individuals evaluate themselves in a manner that serves to enhance their self-image. She also suggested that social comparisons may not always be made voluntarily but externally imposed by society (say, by friends and family). Wood also indicated the bidirectional nature of these comparisons with both upward comparisons (comparing with those who are better than oneself) and downward comparisons (comparing with those who are worse than oneself) made according to the personality and individual needs of the person.

**Upward social comparisons**

Upward social comparisons and their influence on an individual’s educational, financial or career performance and aspirations have been researched by several authors (Marsh, 1987; Hessels et al., 2008; Hofer et al., 2006; Kulkarni and Nithyanand, 2012; Bendor et al., 2015). Marsh (1987) and Huguet et al. (2009) tested the negative effects of upward social comparison in the big-pond-little-fish-effect in the context of academic self-concept and performance. Stutzer (2004) found that income aspirations increase with income due to adaptation and upward social comparison effects. As incomes rise, the individual’s reference group changes and their income aspirations rise simultaneously.

Social comparisons and its effect on subjective well-being has been researched by several authors (Hagerty, 2000; White et al., 2006; Corazzini et al., 2012; Brown and Gray, 2016; Zhang et al., 2016). Several researchers have indicated that social comparisons lead to higher levels of stress and dissatisfaction among adults. White et al. (2006) found that individuals who made frequent comparisons were more likely to suffer from envy, guilt and regret, and more likely to have unmet cravings. Hagerty (2000) and Brown and Gray (2016) explored the importance of the household’s absolute and relative financial position in the household’s FWB. Hagerty (2000) used data from a nationally representative sample in the USA and also from eight nations over a 25 year period. He found that income comparison effects (proxied by high levels of income inequality) had a negative relationship with subjective well-being. However, the absolute income effect was larger than the comparison effect.
Corazzini et al. (2012) used a hypothetical situation in a questionnaire administered to 3,883 students across eight countries to understand the importance of relativistic vs absolutist perceptions of FWB. They found that well-being is mainly viewed in relativistic terms and this effect is more pronounced in wealthier countries. However, at income levels close to those that just meet the basic survival needs, individuals perceive their well-being in more absolute terms.

Brown and Gray (2016) used data from a nationally representative survey in Australia[1]. The study found that both absolute levels of financial wealth and prosperity as well as relative position in the comparison group are important determinants of the household’s FWB and life satisfaction. Using data from 2700 respondents from the USA, Zhang et al. (2016) found that high neighborhood socio-economic status had a positive correlation with materialism, lower savings and compulsive buying. Their study indicates the positive correlation between social comparison effects and maladaptive materialism.

To summarize, several studies have found empirical evidence of the negative effects of social comparison on the subjective and FWB of individuals. In today’s more connected world where social comparison is ubiquitous through social media, this might have a further negative effect on individual well-being. Based on a review of the literature, we form the following hypothesis:

- H2a. Upward social comparisons are positively correlated with overt materialism (OM).
- H2b. Upward social comparisons are negatively correlated with non-materialistic values (NMV).
- H3. Upward social comparisons are negatively correlated with FWB.

Materialism
Belk (1985) defined materialism as a trait that “reflects the importance a consumer attaches to worldly possessions. At the highest levels of materialism, such possessions assume a central place in a person’s life and are believed to provide the greatest sources of satisfaction and dissatisfaction in life.” The effect of materialism on well-being has been studied extensively. Researchers have found that a materialistic outlook is associated with lower levels of financial and subjective well-being (Kasser and Ryan, 1993; Sirgy, 1998; Vargas and Yoon, 2006; Kashdan and Breen, 2007; Gardarsdóttir and Dittmar, 2012; Dittmar et al., 2014).

In one of the earliest studies of materialism and FWB, Kasser and Ryan (1993) found that centrality of money-related values led to lower levels of well-being and good mental health. Sirgy (1998) found that materialists experience higher levels of dissatisfaction with their standards of living than do non-materialists. This is partially due to the fact that they form unrealistic expectations for their standard of living based on social comparisons with remote referents rather than those who are close to them. Vargas and Yoon (2006) provided a comprehensive and clear review of the extant literature on materialism including definitions, measures of materialism and the mostly negative effect of a materialistic outlook on happiness or subjective well-being. Dittmar et al. (2014) present a meta-analysis of 259 different studies. They find a clear, consistent, negative association between a materialistic outlook and personal well-being. The range of values for this negative correlation was between −0.13 and −0.15. Gardarsdóttir and Dittmar (2012) used data from two separate samples with 271 and 191 respondents each and found that people who endorse materialistic values have worse money-management skills, more financial worries and a greater tendency toward compulsive buying and spending.

Based on a review of the literature, we form the following hypothesis:

- H4a. OM is negatively correlated with FWB.
- H4b. NMV are positively correlated with FWB.
Demographic factors

Demographic and socio-economic factors such as age, gender, education, occupation, marital status and income and their effect on FWB have been studied by several authors (Hira and Mugenda, 1998; Hong and Swanson, 1995; Hsieh, 2003; Joo and Grable, 2004; Delaney et al., 2006; Vera-Toscano et al., 2006; Delafrooz and Paim, 2011; Gutter and Copur, 2011; Sabri et al., 2012; Kalra Sahi, 2013; Gerrans et al., 2014).

Some authors have found that FWB increases with age (Hira and Mugenda, 1998; Delaney et al., 2006). Others have found that the FWB decreases with age but there is a non-linear relationship where it increases after a certain age (Hsieh, 2003; Vera-Toscano et al., 2006).

Many authors have researched the effect of gender on FWB. Most authors found that females had higher levels of financial anxiety and lower levels of FWB compared to males (Delaney et al., 2006; Delafrooz and Paim, 2011; Gutter and Copur, 2011; Gerrans et al., 2014). Unlike these authors, Hsieh (2003) and Vera-Toscano et al. (2006) found that males had lower levels of FWB.

Higher levels of education and income had a positive effect on FWB in all of these studies, possibly due to the increased financial efficacy. Marital status was found to have a positive effect on FWB by some authors (Hong and Swanson, 1995; Hsieh, 2003), but a negative effect in some other studies (Delaney et al., 2006; Gutter and Copur, 2011). FWB was found to be lower for individuals that had a large number of children or dependents (Joo and Grable, 2004; Vera-Toscano et al., 2006). Kalra Sahi (2013) found that in the Indian context, whether a person lived in a nuclear or joint family did not affect their financial satisfaction.

Based on a review of the demographic variables that affect FWB, we form the following research hypothesis (Figure 1):

\[ H5. \] Income is positively related to FWB.
\[ H6. \] Age is positively related to FWB.
\[ H7. \] Gender (being a male) is negatively related to FWB.
\[ H8. \] Education is positively related to FWB.
\[ H9. \] Occupation (being employed) is positively related to FWB.
\[ H10. \] Family structure (living in a larger family) is negatively related to FWB.

Figure 1.
Conceptual model
Methodology

Questionnaire development and administration

Prawitz et al. (2006) developed a scale called IFDFW to measure an individual's perceived FWB – ranging from overwhelming financial distress (very low levels of well-being) to no financial distress (high levels of FWB). This scale has been used by several other authors (e.g. Gutter and Copur, 2011; Howell et al., 2013). We adopt this scale to measure FWB (or lack of financial distress). A small modification was made to the scale to include a rupee equivalence for a dollar amount mentioned in the IFDFW scale. Brüggen et al. (2017) had indicated that while the IFDFW scale has been used by many researchers, it primarily measures financial distress and not FWB. We agree with this view in theory, however in the Indian context where income levels are lower compared to developing countries, an absence of financial distress was considered to be an indicator of FWB.

We adopted the Richins and Dawson (1992) scale for materialism. We added some other questions specific to our own research goals. These included some questions that were relevant to the propensity for social comparisons, and perception of IS. Finally, we collected several demographic and socio-economic characteristics, such as age, gender, education, occupation, marital status and information about social media usage. The questionnaire used for the survey has been given in Figure A1. Data were collected using a Google web based survey. The validity of web-based surveys has been confirmed by Krantz and Dalal (2000) and Gosling et al. (2004).

Sample size and sample selection

Several studies have indicated that the minimum sample size for conducting structural equation models is about 150. Some researchers have recommended a minimum sample size of 100–150 for conducting SEM (Anderson and Gerbing, 1988). Wolf et al. (2013) conducted simulation studies to find the minimum sample sizes required for adequate power of SEM studies. They recommended a range between 30 and 460 respondents. As the number of indicators per latent factor increases, the required sample size becomes smaller (Marsh et al., 1988). In this study, there are four main factors, with the ratio of indicator variables to latent variables ranging from 5 to 8, which is quite high. Our conceptual model had 12 free parameters that needed to be estimated. Using a 20:1 ratio for number of observations to number of free parameters, as recommended by Wang and Wang (2012), we find that a sample size of 240 might be considered adequate for this study. The actual sample size used was 327, which is adequate by these benchmarks.

The questionnaire was shared through social media (Facebook and WhatsApp groups) and individual e-mails with 27,500 individuals. The targeted sample was spread over metropolitan cities in India including Delhi NCR[2], Mumbai, Bangalore, Chennai, Hyderabad, Pune, Ahmedabad, Surat, Kanpur, Lucknow and some villages in Balrampur district in Uttar Pradesh. The sampling method was convenience sampling. Within one month, 329 responses were received, i.e. the response rate was about 1.2 percent. Out of these, two responses had missing values and had to be dropped. The final sample size was 327. Since the number of respondents met our criteria for adequacy of sample size, it was used for our analysis.

Statistical analysis and structural equation modeling

Structural equation modeling is often used when one is interested in testing structural relationships among latent constructs that cannot be measured directly. SEM takes a confirmatory approach to the testing of several hypotheses at the same time (Hox, 2009). A structural equation model consists of a measurement model and a structural model. The confirmatory factor analysis allows one to build the measurement model. The structural model or path model allows one to estimate the relationships between these latent constructs.

Since we were primarily interested in testing a conceptual model of different psychographic variables (latent constructs) on FWB (another latent construct), structural
equation modeling was considered to be the most appropriate approach. We used a factor loading cutoff of 0.5 for retaining an item as recommended by Anderson and Gerbing (1988). Cronbach’s α values were reported for the factors identified in the exploratory factor analysis (EFA) model. Several goodness of fit indices, such as the comparative fit index (CFI), Tucker Lewis Index (TLI) and RMSEA, are reported as per Hooper et al. (2008).

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Analysis and results
Factors identified
The factors identified through EFA, with the factor loadings of each item on the factors are given in Tables I and II. Based on the items that load on each factor, the factors have been named FWB, SMA, OM, NMV and IS. These have been described in greater detail below.

<table>
<thead>
<tr>
<th>Factor</th>
<th>FL</th>
<th>SE</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial well-being (FW)</td>
<td>0.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you worry about your current financial situation?</td>
<td>0.88</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>How stressed do you feel about your personal finances in general?</td>
<td>0.88</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>How often do you worry about being able to meet normal monthly living expenses?</td>
<td>0.82</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>How often does this happen to you? You want to go out to eat, go to a movie or do something else and don’t go because you feel you can’t afford it?</td>
<td>0.80</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>How frequently do you find yourself just managing somehow financially and waiting for next salary/payments?</td>
<td>0.79</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>What do you feel is the level of your financial stress today?</td>
<td>0.79</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>How satisfied are you with your financial situation?</td>
<td>0.64</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>If the need arises, how confident are you that you will be able to find money to pay for a financial emergency of about Rs. 1 lakh?</td>
<td>0.57</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>Overt Materialism (OM)</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be happier if I could afford to buy more things</td>
<td>0.79</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Buying things gives me a lot of pleasure</td>
<td>0.78</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I like a lot of luxury in my life</td>
<td>0.71</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>It sometimes bothers me quite a bit that I can’t afford to buy all the things I’d like</td>
<td>0.56</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Socially Motivated Aspirations (SMA)</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My career/financial goals are based on what some of my friends or family members have achieved</td>
<td>0.83</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>I want my children (now or in future) to match the achievements of my friends or relatives’ children</td>
<td>0.68</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>I feel that my prestige depends on my financial situation compared to my friends or family</td>
<td>0.63</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I like to own things that impress people</td>
<td>0.55</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>If I hear of some friends earning a lot of money, I wish I could also succeed like them</td>
<td>0.54</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Non-Materialistic Values (NMV)</td>
<td>0.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I put less emphasis on material things than most people I know</td>
<td>0.67</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>I don’t pay much attention to the material objects other people own</td>
<td>0.67</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I don’t place much emphasis on the amount of material objects people own as a sign of success</td>
<td>0.65</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I try to keep my life simple, as far as possessions are concerned</td>
<td>0.61</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>I don’t care about the opinion of others (family or friends) when it comes to my salary (income)</td>
<td>0.54</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>The things I own aren’t all that important to me</td>
<td>0.53</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Income Security (IS)</td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel confident that my income will not become less in the near future</td>
<td>0.80</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>I feel confident that if I lose my job (or business), I will recover soon</td>
<td>0.72</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>I can always earn enough to take care of my family</td>
<td>0.70</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>I feel confident that I will not lose my job (or business)</td>
<td>0.65</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I have a stable source of income</td>
<td>0.58</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>I am earning enough to take care of my future needs</td>
<td>0.56</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

Table I. Factor loadings and cronbach’s α for five latent constructs

Notes: “These questions are negatively scaled – that is high values indicate lack of this feeling; FL, factor loading, SE, standard error; CA, Cronbach’s α
Factor 1: financial well-being (FWB). The items in the original IFDFW scale used to measure FWB load on Factor 1. This factor has a Cronbach’s α of 0.91 indicating a high level of internal consistency. Since we are interested in the antecedents of FWB, this was the dependent variable in the subsequent path analysis.

Factor 2: overt materialism (OM). The Richins and Dawson (1992) scale for materialism was adopted within our survey. When we performed exploratory analysis of the responses obtained, the questions loaded on two independent factors. The first of these factors was related to positive manifestations of materialistic behavior (or wants). We name this factor OM. The Cronbach’s α for this factor was 0.73. The other factor (ranked a little lower in terms of variance explained) is discussed as Factor 4 below.

Factor 3: socially motivated aspirations (SMA). We had included several questions in the questionnaire designed to measure the extent to which individuals were influenced by upward social comparisons for deciding on their career or financial goals. In a collectivistic country, such as India, upward social comparisons are commonly prevalent, affecting self-evaluation of individuals and establishing social standing. A latent construct was identified which we called “SMA.” The upward social comparisons were more along the lines of aspirations than material possessions. This factor had a Cronbach’s α of 0.75.

Factor 4: non-materialistic values (NMV). Some of the original questions in the materialism scale that were negatively worded loaded on a different factor in our study. Based on the questions that loaded on this factor that indicate the value system that the respondent held, we called this factor “NMV.” The Cronbach’s α was 0.69 (slightly low but within acceptable range).

Factor 5: Income Security (IS). We had devised some questions to evaluate the perception of IS among our respondents. These questions loaded on the final factor, which we called IS. The Cronbach’s α for this factor was high at 0.81.

Reliability and validity
Each of the constructs measured in this study passes commonly accepted criteria for reliability and validity. The Cronbach’s α for all of the latent constructs were above 0.7 (including one that was rounded to 0.7 from 0.69), indicating acceptable levels of internal consistency (Tavakol and Dennick, 2011).

Convergent validity can be checked using the composite reliability (CR) and average variance extracted (AVE). These values have been calculated for each latent construct in the measurement model and presented in Table II. As can be seen from this table, the values of CR are all greater than 0.7 which is recommended as a threshold (Hooper et al., 2008). The AVE is not very high for the models, with the highest AVE being 0.61 but all others being lower than the recommended 0.5 level. The reason for this may be that the latent constructs used here may not be the only factors that contribute to FWB (lack of financial distress[3].

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean</th>
<th>SD</th>
<th>CR</th>
<th>AVE</th>
<th>√AVE</th>
<th>FW</th>
<th>IS</th>
<th>OM</th>
<th>SMA</th>
<th>NMSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial well-being (FW)</td>
<td>6.197</td>
<td>2.679</td>
<td>0.923</td>
<td>0.605</td>
<td>0.778</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income security (IS)</td>
<td>3.804</td>
<td>1.148</td>
<td>0.831</td>
<td>0.455</td>
<td>0.675</td>
<td>0.405</td>
<td>1.000</td>
<td></td>
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<tr>
<td>Overt materialism (OM)</td>
<td>3.010</td>
<td>1.265</td>
<td>0.803</td>
<td>0.457</td>
<td>0.676</td>
<td>−0.175</td>
<td>−0.037</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socially motivated aspirations (SMA)</td>
<td>2.857</td>
<td>1.327</td>
<td>0.783</td>
<td>0.386</td>
<td>0.621</td>
<td>0.004</td>
<td>−0.009</td>
<td>0.406</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Non-materialistic self-image (NMSI)</td>
<td>3.481</td>
<td>1.200</td>
<td>0.787</td>
<td>0.351</td>
<td>0.592</td>
<td>0.196</td>
<td>0.198</td>
<td>−0.155</td>
<td>−0.187</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Notes: Extraction method, principal component analysis; rotation method, promax with Kaiser normalization; CR, composite reliability; AVE, average variance extracted

Table II. Reliability and validity of latent constructs
Divergent validity is checked by comparing the square root of the AVE with the factor correlation scores. The highest correlation between two constructs is 0.6 – so the squared factor correlations are all less than 0.36.

**FWB in different demographic and socio-economic categories**

Table III gives descriptive statistics of the percentages of respondents in different categories that report high or low levels of FWB. We see from this table that the percentage of respondents reporting high levels of financial well-being is highest in the age group of 30–40. As age increases from 30 to 60, this percentage decreases. Among young adults less than 30 years old, few report high financial well-being. Among older adults above 60, many reported higher levels of well-being. Fewer males reported having FWB as compared to females.

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Overall sample</th>
<th>Low (%)</th>
<th>High (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
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<td></td>
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<tr>
<td>20–30</td>
<td>233</td>
<td>54.5</td>
<td>45.5</td>
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<tr>
<td>30–40</td>
<td>69</td>
<td>37.7</td>
<td>62.3</td>
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<tr>
<td>40–50</td>
<td>16</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>50–60</td>
<td>3</td>
<td>66.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Above 60</td>
<td>6</td>
<td>16.7</td>
<td>83.3</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>44.7</td>
<td>55.3</td>
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<tr>
<td>Male</td>
<td>280</td>
<td>51.1</td>
<td>48.9</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<tr>
<td>Class 12 pass</td>
<td>1</td>
<td>100.0</td>
<td>0.0</td>
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<tr>
<td>Bachelor’s degree</td>
<td>185</td>
<td>50.8</td>
<td>49.2</td>
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<tr>
<td>Master’s degree</td>
<td>128</td>
<td>49.2</td>
<td>50.8</td>
</tr>
<tr>
<td>Doctorate</td>
<td>13</td>
<td>46.2</td>
<td>53.8</td>
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<tr>
<td><strong>Income</strong></td>
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<tr>
<td>Below Rs. 25,000/month</td>
<td>116</td>
<td>67.2</td>
<td>32.8</td>
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<tr>
<td>Rs. 25,000–Rs. 50,000/month</td>
<td>83</td>
<td>47.0</td>
<td>53.0</td>
</tr>
<tr>
<td>Rs. 50,000–1 Lakh/month</td>
<td>55</td>
<td>30.9</td>
<td>69.1</td>
</tr>
<tr>
<td>More than Rs. 1 Lakh/month</td>
<td>31</td>
<td>29.0</td>
<td>71.0</td>
</tr>
<tr>
<td>Would rather not say</td>
<td>42</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Student</td>
<td>106</td>
<td>60.4</td>
<td>39.6</td>
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<tr>
<td>Housewife (homemaker)</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
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<tr>
<td>Government/PSU employee</td>
<td>68</td>
<td>30.9</td>
<td>69.1</td>
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<tr>
<td>Private sector employee</td>
<td>107</td>
<td>46.7</td>
<td>53.3</td>
</tr>
<tr>
<td>Self-employed/freelancer</td>
<td>13</td>
<td>53.8</td>
<td>46.2</td>
</tr>
<tr>
<td>Owns a business</td>
<td>16</td>
<td>68.8</td>
<td>31.3</td>
</tr>
<tr>
<td>Looking for work</td>
<td>11</td>
<td>81.8</td>
<td>18.2</td>
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<tr>
<td>Retired</td>
<td>4</td>
<td>25.0</td>
<td>75.0</td>
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<tr>
<td><strong>Family structure</strong></td>
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<tr>
<td>Living alone</td>
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<td>49.1</td>
<td>50.9</td>
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<tr>
<td>Living with friends</td>
<td>56</td>
<td>41.1</td>
<td>58.9</td>
</tr>
<tr>
<td>Living in nuclear family</td>
<td>127</td>
<td>44.9</td>
<td>55.1</td>
</tr>
<tr>
<td>Living in joint family</td>
<td>89</td>
<td>50.6</td>
<td>49.4</td>
</tr>
</tbody>
</table>

**Table III. Financial well-being across demographic, socio-economic and family structures**

**Note:** aRs. 1 lakh is equivalent to about $5,612 in terms of purchasing power; using a PPP exchange rate of about Rs.17,818/$ for India vs USA in 2017

**Source:** OECD (https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm)
This could possibly be attributed to the fact that in our sample, a larger percentage of males may have the primary financial responsibility in the household. The level of education does not affect FWB in a significant manner, except in the case of those with doctorate degrees.

As might be expected, respondents with higher levels of income reported higher FWB. In terms of occupation, a large proportion of respondents who were government employees (with a steady job and high levels of job security) reported high levels of well-being while a smaller proportion of individuals having their own business reported high levels of FWB. Higher percentage of individuals employed in the private sector reported having financial well-being. Even though the number of respondents who were retired was small, a larger proportion of them indicated higher levels of FWB.

Results of SEM model and testing individual hypotheses
To test the hypotheses and the conceptual model proposed above, we built structural equation models using AMOS in SPSS. Factor scores were computed for each of the latent constructs. The hypothesized model was tested and path coefficients were estimated. The results of the SEM model have been depicted in a graphical form in Figure A1. The estimated model coefficients have been reported in Table AI. The results have been summarized and the main path coefficients along with their statistical significance have been depicted graphically in Figure 2.

We discuss below each of the proposed hypotheses and the result of the tests in our model:

**H1.** IS is positively correlated with FWB.

This hypothesis is supported since the path coefficient is highly statistically significant. The effect size is the largest at 1.686:

**H2a.** Upward social comparisons are positively correlated with OM.

This hypothesis is supported since the path coefficient is highly statistically significant. The size of the effect is also large at 0.49:

**H2b.** Upward social comparisons are negatively correlated with NMV.

![SEM model for antecedents of financial well-being](image)

**Notes:** Standardized regression coefficients are shown (critical ratio in parentheses). ns, not significant; dashed line, not statistically significant. *p<0.05; **p<0.01; ***p<0.001
This hypothesis is supported since the path coefficient is statistically significant. The effect size is around –0.30:

\[ H_3. \] Upward social comparisons are negatively correlated with FWB.

This hypothesis was not supported. In fact, though the path coefficient was not statistically significant, we found a positive correlation between upward social comparisons and FWB. This finding was somewhat contrary to our expectations:

\[ H_{4a}. \] OM is negatively correlated with FWB.

This hypothesis is supported since the path coefficient is statistically significant at the 90% confidence level. The effect size is –0.309:

\[ H_{4b}. \] NMV are positively correlated with FWB.

This hypothesis is not supported in our data. While the relationship is positive and the effect size is 0.157, this effect is not statistically significant:

\[ H_5. \] Income is positively related to financial well-being.

This hypothesis is supported, the path coefficient being statistically significant at 90% confidence level. The size of the effect is, however, very small:

\[ H_6. \] Age is positively related to FWB.

This hypothesis is not supported, since the path coefficient is not statistically significant:

\[ H_7. \] Gender (being a male) is negatively related to FWB.

This hypothesis is supported. The path coefficient is highly statistically significant at 99% confidence level. The effect size is also very large at –0.802:

\[ H_8. \] Education is positively related to FWB.

This hypothesis is supported. The path coefficient is 0.154 and is statistically significant at a 95% confidence level:

\[ H_9. \] Occupation (being employed) is positively related to FWB.

This hypothesis is also supported. Individuals who were looking for work had lower FWB, the effect size was –1.704 and it was statistically significant at 99.5% confidence level. Individuals in government jobs who had high level of job security had higher levels of FWB, the effect size was 0.838 and it was statistically significant:

\[ H_{10}. \] Family structure (living in a large family) is negatively related to FWB.

This hypothesis was not supported since the path coefficient was not statistically significant.

**Model Fit**

The fit of the SEM model have been given in Table IV. As we can see, the values of CFI and TLI meet the recommended threshold values. Thus, the model has acceptable fit.

**Discussion of results and conclusions**

FWB is one of the important predictors of subjective well-being and quality of life of individuals. Financial inclusion, financial literacy and financial efficacy have often been the primary concerns of policy makers in developing countries. However, these are all means to an end, i.e. improvement of overall FWB. There are several factors that affect FWB, including environmental factors, such as a strong economy, low unemployment and availability of ready money for consumption as well as investment (liquidity).
At an individual level, socio-economic and demographic factors, individual personality traits, cultural values, money attitudes and money-management behaviors affect FWB of individuals.

In this study, we were primarily interested in the personal aspirations and motives that affect an individual’s FWB. In the wake of economic liberalization and globalization, many young Indians aspire to high salaries and material affluence. As the Indian economy grows and Indians find employment in higher paying jobs, increase in material standards of living does increase financial satisfaction. However, as has been seen in economically developed countries, income does not have a linear relationship with FWB (Deaton, 2008) and high levels of materialism reduces well-being.

As per the definition given by Brüggen et al. (2017), FWB is a sense of contentment with one’s finances which include current consumption as well as a feeling of security about the future. That is, it encompasses the temporal aspect of being able to sustain desired living standard in the future. This will happen when one is assured of a stream of steady income in the future. That is changes in income (especially negative changes) rather than the level of income itself has a greater effect on well-being. We see that IS has a greater effect on FWB than SMA in India.

We find that socially driven aspirations has an indirect negative effect when such aspirations are mediated by higher levels of materialistic desires. The direct effect of SMA on FWB is positive even though not highly statistically significant. It was somewhat significant in a previous model. However, after accounting for other more important predictors, such as employment status, etc., it became statistically insignificant. Individuals who are motivated by the achievements of others, rather than their material possessions have better levels of FWB. This finding is in consonance with similar findings by Sheldon et al. (2004) and Gardarsdóttir et al. (2009).

Gardarsdóttir et al. (2009) found that individuals that have a happiness motive in pursuing money (that is they expect money to make them happier) do not have greater FWB. This translates to the common wisdom that "money cannot buy happiness." However, if individuals have a success motive, they are likely to be happier overall. In the current study, we have a similar finding. We find that SMA that are driven by materialistic desires will not lead to FWB. But SMA can in fact increase FWB. This direct effect (not mediated via materialism) possibly indicates non-materialistic aspirations geared toward achievements and success in career or pursuits outside one’s career.

The most important finding of this study is the fact that IS and steady employment are far more important drivers of FWB than social aspirations and the wish for a higher standard of living. If one were to put this in the framework of Maslow’s hierarchy of needs, we can explain our results as follows. India has a large number of poor people and high levels of unemployment or underemployment. In this kind of socio-economic environment, many Indians are more concerned about meeting lower level security needs rather than higher level self-esteem needs.

<table>
<thead>
<tr>
<th>Determinants of subjective financial well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results from SEM model</td>
</tr>
<tr>
<td>CFI</td>
</tr>
<tr>
<td>IFI</td>
</tr>
<tr>
<td>TLI</td>
</tr>
<tr>
<td>RMSEA</td>
</tr>
<tr>
<td>SRMR</td>
</tr>
<tr>
<td>$\chi^2$/df</td>
</tr>
</tbody>
</table>

Table IV. Measures of model fit
Policy implications

Since IS is one of the main predictors of FWB, government policies encouraging long-term saving and saving for retirement, as well as financial education might help in increasing the levels of well-being among young Indians. Hill et al. (2017) have indicated how social policy can be used to buffer economic instability of individuals. The implementation of appropriate monetary and fiscal policies by the government would increase overall societal welfare. Unemployment insurance, governmental social security programs and socially progressive policies as well as financial education programs in schools that lead to higher savings rates and better financial management practices will enhance the overall well-being of Indians.

Limitations and scope for future research

In this study, we have considered only subjective well-being and have not included objective well-being. We are not considering many other factors that might affect FWB, which may include situational (or external) factors such as the amount of financial burden on the individual, the macro-economic conditions such as inflation, unemployment and taxes, financial inclusion, investment opportunities, health factors and the extent to which inclusive policies are followed by the government.

The sample includes respondents from mostly urban areas and from socio-economic classes that were neither extremely affluent nor extremely poor. Since the sampling method is convenience sampling, the model may not be representative of all Indians. However, it does include respondents from young middle-class Indians that form a large section of the population. The questions addresses in this study are of relevance to middle-class Indians who aspire for a better way of life and have become more materialistic in recent decades.

As one of the first such studies in India, the results are indicative of the way Indians think and feel about money. Future research may include some of the other factors that have not been included in this study – as outlined above. Larger sample sizes that are randomly selected may be chosen for conducting a more comprehensive analysis that may be more generalizable to the overall population. One may also attempt to use scales that have been developed in India which may have greater relevance for this country.

Notes

1. The survey was called HILDA (Household, Income and Labour Dynamics in Australia).
2. NCR – National Capital region, including Delhi, Gurugram and Noida.
3. Our aim in this paper was to look at the relative importance of materialistic values and income security on financial well-being. Our aim was not to build a model that captured most of the variance in financial well-being among individuals. There may be many other aspects which may affect FWB. However, since that is not the focus of this study, the researchers decided to not use this criteria to evaluate the relevance of the model.

References


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IJBM
37,4


Determinants of subjective financial well-being
Table Al.
Regression results of SEM model

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>SE</th>
<th>CR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM</td>
<td>← AGE</td>
<td>-0.027</td>
<td>0.008</td>
<td>-3.461</td>
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<td>NMV</td>
<td>← INCOME</td>
<td>0</td>
<td>0.001</td>
<td>0.562</td>
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<tr>
<td>NMV</td>
<td>← AGE</td>
<td>0.005</td>
<td>0.006</td>
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<td>SMA</td>
<td>← NMV</td>
<td>-0.301</td>
<td>0.103</td>
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<td>SMA</td>
<td>← OM</td>
<td>0.49</td>
<td>0.071</td>
<td>6.883</td>
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<td>FW</td>
<td>← SMA</td>
<td>0.263</td>
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</tr>
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<td>FW</td>
<td>← NMV</td>
<td>0.157</td>
<td>0.25</td>
<td>0.628</td>
</tr>
<tr>
<td>FW</td>
<td>← IS</td>
<td>1.686</td>
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</tr>
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<td>FW</td>
<td>← OM</td>
<td>-0.309</td>
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<td>0.002</td>
<td>2.103</td>
</tr>
<tr>
<td>FW</td>
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<td>0.315</td>
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<tr>
<td>FW</td>
<td>← AGE</td>
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</tr>
<tr>
<td>FW</td>
<td>← OC_RET</td>
<td>1.538</td>
<td>1.207</td>
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<td>0.537</td>
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<td>0.612</td>
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<tr>
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<tr>
<td>IS2</td>
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<td>10.103</td>
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</tr>
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<tr>
<td>IS6</td>
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<td>9.399</td>
</tr>
<tr>
<td>MS12</td>
<td>← OM</td>
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<tr>
<td>MS9</td>
<td>← OM</td>
<td>0.76</td>
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<td>0.675</td>
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<tr>
<td>IP3</td>
<td>← SMA</td>
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<td>← SMA</td>
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<tr>
<td>MS11</td>
<td>← NMV</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS4</td>
<td>← NMV</td>
<td>1.313</td>
<td>0.191</td>
<td>6.876</td>
</tr>
<tr>
<td>MS7</td>
<td>← NMV</td>
<td>1.166</td>
<td>0.172</td>
<td>6.775</td>
</tr>
<tr>
<td>MS5</td>
<td>← NMV</td>
<td>0.944</td>
<td>0.15</td>
<td>6.297</td>
</tr>
<tr>
<td>IP9</td>
<td>← NMV</td>
<td>1.007</td>
<td>0.177</td>
<td>5.684</td>
</tr>
<tr>
<td>MS6</td>
<td>← NMV</td>
<td>0.634</td>
<td>0.154</td>
<td>4.118</td>
</tr>
</tbody>
</table>

Note: ***p < 0.001
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Investigating the transformative impact of bank transparency on consumers’ financial well-being

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Abstract

Purpose – Grounded in Transformative Service Research, the purpose of this paper is to explore the mechanisms by which bank information transparency influences consumer’s financial well-being (FWB). The authors propose that customer attitudes toward the brand and the subjectively perceived ability of individuals to deal with the financial challenges explain the enhancement of FWB driven by bank information transparency.

Design/methodology/approach – A survey was conducted to test the proposed hypotheses. In total, 400 bank customers of five commercial banks in Colombia were approached and asked to fill out a pen and paper questionnaire. Serial mediation analysis was applied to test the hypotheses.

Findings – This research shows that bank information transparency can uplift the FWB of customers. Furthermore, the positive effect of bank information transparency on the FWB occurs because the shared information improves the positive attitudes toward banks and the perceived financial self-efficacy of customers.

Research limitations/implications – This paper heeds the call of current literature for improved explanations of the relationship between attempts to inform consumers about financial services and their FWB.

Practical implications – This research shows that managers who embrace the challenging task of improving the FWB of their customers should design strategies for more transparent information sharing with their customers. However, these strategies should be designed not only to deliver information to customers but also to increase the perceived disclosure, accuracy and clarity of shared information.

Originality/value – This pioneering study aims to explain the effects of bank information transparency on the FWB of consumers by drawing on interdisciplinary literature. This research is important as many banks aim to increase their information transparency without a clear understanding of the effects of these actions on consumers and therefore in many instances their efforts fail. A key contribution of this study is identifying concrete mechanisms (i.e. brand attitudes and self-efficacy) that help managers to improve customers’ FWB via information transparency. Accordingly, the authors offer suggestions for better information transparency strategy implementation.

Keywords Banking industry, Transformative service research, Financial services, Financial well-being, Bank transparency

Paper type Research paper

Introduction

Financial well-being (FWB) has recently emerged as an important understudied topic. The Transformative Service Research (TSR) movement calls for research that centers on creating uplifting changes and improvement in the well-being of individuals and societies (Anderson and Ostrom, 2015; Rosenbaum, 2015). Inspired by this movement, the foundational paper of Brüggen et al. (2017) sets the scene for the overlooked concept of FWB. In this respect, FWB is defined “as the perception of being able to sustain current and anticipated desired living standards and financial freedom” (Brüggen et al., 2017, p. 229).

Among the various important avenues that require researchers’ attention within the area of FWB, a prominent question is: what can banks do to improve individuals’ and societies’ well-being? This question becomes critical in light of the recent financial crises and scandals and the resulting loss of trust in the banking sector (Hurley et al., 2014; Järvinen, 2014).
In the banking sector, bank information transparency, defined as the perceived quality of information voluntarily shared by banks (Schnackenberg and Tomlinson, 2016), has emerged as a mechanism to enhance the FWB of individuals and families. For instance, some regulators demand more transparency from the banking sector (Bouvard et al., 2015; Mendonça et al., 2012) as a way to protect the FWB of individuals and families against the devastating effects of financial crises. Likewise, some banks integrate elements of information transparency into their business activities as a response to the “stringent” scrutiny of consumers and society (Bonsón Ponte et al., 2006; Chen, 2013). This increasing demand for greater transparency within the banking sector is based on the belief that if consumers receive information from their financial providers, they can make better financial decisions (Lusardi, 2008; Rutledge, 2010). In turn, many expect informed consumers will make decisions to improve their overall well-being (Lusardi and Mitchell, 2011; OECD, 2005; Serido et al., 2013). Surprisingly, just sparse research evidence supports this claim (Fernandes et al., 2014; Hensley, 2015). As such, the effectiveness of bank transparency (e.g. sharing relevant information) in improving the FWB remains somewhat nebulous, and the mechanisms by which bank transparency triggers consumer well-being are not well understood (Alsemgeest, 2015).

To fill this gap in the literature, this paper addresses the following questions:

**RQ1.** Can bank information transparency positively affect consumers’ FWB?

**RQ2.** What mechanisms, if any, explain the effect of information transparency on FWB?

In order to answer these research questions, we develop a theoretical framework grounded in TSR linking bank transparency to FWB. Consistent with TSR, we suggest that banks may use information transparency to uplift the FWB of their customers. Moreover, we propose that customers’ attitudes toward the brand and the perceived ability of individuals to deal with financial challenges explain the effects of information transparency on FWB.

This paper makes four important contributions. It responds to the research agenda of Brüggen et al. (2017) calling for more research on possible interventions aimed at improving the financial behavior and subsequently FWB. In particular, this paper proposes and tests “bank transparency” as an important intervention for improving FWB. It heeds the call of current literature (Hensley, 2015) for improved explanations of the relationship between attempts to inform consumers about financial services and FWB. It identifies concrete mechanisms (i.e. brand attitudes and perceived self-efficacy) that explain the effects of information transparency on FWB. These mechanisms are viewed as essential elements for the improvement of FWB. Finally, this research suggests practical managerial implications.

The remainder of this paper is organized as follows: first, we review the literature on FWB and bank transparency. Second, we develop a theoretical model and hypotheses. Subsequently, we empirically examine the relationships between FWB and bank transparency. Next, we describe the methodology. We then provide details about the paper’s theoretical contributions and managerial implications. Finally, we propose recommendations for future research.

**Literature review**

*Financial well-being*

FWB is becoming a topic of greater importance to academics, public policymakers, financial managers and employers. This interest has recently skyrocketed because of increased awareness of the multifaceted impacts FWB can have on individuals, societies, and organizations (Brüggen et al., 2017). For instance, it has been found that financial difficulties lead not only to financial strain but also to psychological and emotional problems (Alsemgeest, 2015; Hojman et al., 2016). Similarly, Dunn and Miranda (2012) propose that unhealthy FWB does not only affect the individual but also their families and societies at
large resulting in reduced physical health or weaker job performance. Finally, individual hardships are costly for companies as poor employees’ FWB lead to greater absenteeism, poor concentration, and lower job performance (Kim and Garman, 2003). For instance, PWC (2017) estimates that financial hardships of employees may cost up to $3.3m dollars for a company of 10,000 workers.

Although aspects of FWB are explored in different fields through multiple lenses, there is no universally accepted approach for studying this construct (Brüggen et al., 2017; Netemeyer et al., 2017). For instance, Shim et al. (2009) define FWB as the result of the assessment of the current financial situation reflected by indicators such as credit score or perceived satisfaction with standards of living. Greninger et al. (1996) define FWB as the individual performance on ratios such as housing expenses and saving, proposing that the better the ratios, the superior is the FWB. Others define FWB from a purely subjective perspective as the perceived adequacy, security, and stability of income (Walson and Fitzsimmons, 1993). A recent review of literature performed by Netemeyer et al. (2017) posits that the wide array of current definitions of perceived FWB have two key commonalities regarding its impact: current money management stress (e.g. feelings of being stressed/worried about one’s current financial situation) and expected future financial security (e.g. feelings about the future trajectory of one’s financial state).

As definitions in the preceding paragraph show, FWB has an objective (e.g. credit score) and subjective dimension (e.g. perceived financial stress). However, as stated by Diener (1984), well-being, whether overall or FWB, cannot be depicted with objective measures alone since well-being encompasses one’s experiences in life, which include the cognitive judgments and the affective reactions. Similarly, Judge et al. (2010) found that subjective FWB has a bigger impact on the quality of life when compared to objective measures. Finally, Brüggen et al. (2017), based on an in-depth review of the literature, suggest that a subjective approach to studying FWB is more comprehensive and can also depict non-financial issues. Therefore a subjective rather than an objective approach is more appropriate to exploring the complex nature of FWB.

Based on the above arguments, this paper follows a subjective approach to studying FWB. Consequently, this paper adopts the definition of subjective financial well-being (SFWB) as the perceived level of stress and satisfaction related to the financial situation and the perceived ability to meet the financial requirements to cover the planned and unexpected financial demands in the future. This adopted definition gathers some of the most relevant indicators of FWB covered in the literature. For instance, the level of stress (e.g. Kim et al., 2006) and satisfaction (e.g. Joo and Grable, 2004) from the financial situation are identified as key indicators of FWB in prior literature. In the same vein, researchers recognize financial freedom as a cornerstone of FWB as it allows individuals to allocate money for covering current or future expenses without monetary constraints (Brüggen et al., 2017; Walson and Fitzsimmons, 1993).

In the proposed “Financial Well-being Framework”, developed by Brüggen et al. (2017), one of the key interventions they identify for improving FWB is communication. Communication tactics such as training and financial education aim to change participant knowledge or perceptions (Wiener and Doescher, 2008). We propose bank information transparency as an important understudied communication tactic for FWB improvement.

Bank information transparency

Based on prior literature (e.g. Schnackenberg and Tomlinson, 2016), this paper approaches bank information transparency as the perceived quality of information that banks share intentionally with their customers. Four aspects of this definition of transparency deserve special attention. First, information sharing is at the core of bank information transparency given that without the flow of information it is difficult to establish how transparent the relationship is. Second, the decision of intentionally sharing or hiding information impacts
the degree/level of transparency. For instance, Rosengren (1999) suggests the deliberate
decision of sharing information increases the transparency of the relationships banks have
with their customers. Third, information transparency is a perception of the shared
information attributed to the sender of that information. Finally, perceptions of information
transparency depend on the quality of information a bank shares with their customers
(Rawlins, 2008). Each of these four aspects provides a unique approach to the transparency
concept and jointly, these four aspects provide a holistic view of what information
transparency means in the banking sector.

Research suggests that perceptions of quality of information depend on how much
disclosure, clarity and accuracy consumers assign to the information shared by a bank
(e.g. Schnackenberg and Tomlinson, 2016). The ease of which consumers may gather
relevant information from banks form the perceptions of disclosure such that the
perceptions of disclosure increase if it is easy to find relevant information about a bank
(Zhu, 2004). The perceptions of clarity depend on the level of comprehensibility of the shared
information by the bank in a way that if it is easy for external/internal stakeholders to
understand the information banks share with them (Nicolau and McKnight, 2006). Finally,
perceptions of accuracy increase if customers believe that shared information
reflects the truth and precise information about the bank (O'Toole and Bennis, 2009).
Perceptions of disclosure, clarity and accuracy are the basis for evaluating the quality of the
shared information. By increasing the perceived level of each one of these characteristics,
the perception of bank information transparency also increases.

Attitudes toward banks
Studying attitudes has been a major practice to understand human (Ajzen, 1987) and
consumer behavior (Mitchell and Olson, 1981). However, the definition of attitude varies
across studies. For instance, Thurstone (1931) define attitude as the affect for or against a
psychological object, while Fishbein and Ajzen (1975) conceptualize attitude as a person’s
general feeling of favorableness or unfavorableness toward some object. Others define
attitude as a disposition to respond in particular ways to a stimulus (Chen and Bargh, 1999).

In the realm of marketing, attitudes have been analyzed especially in the context of
evaluating products and brands. For instance, Mitchell and Olson (1981) propose that an
attitude toward a brand is the individual internal evaluation of the brand. Others define
brand attitude as the degree of favorability toward a specific brand (Park and Young, 1986),
and such favorability is summarized in attributes such as good/bad, positive/negative, like/
dislike, etc. (Batra and Stayman, 1990; Mazodier and Merunka, 2014).

Based on these prior definitions of “attitude”, this paper explores the attitude toward a
bank as the resultant emotion in favor or disfavor of a bank after a summary evaluation by
the customer (Vinhil and Barreiros, 2010). This definition synthesizes some of the
contributions of prior literature on attitudes. First, this definition refers to attitudes as an
evaluative process about a bank based on some stimuli (information). Second, the result of the
evaluation toward the bank (attitude) is an affective response that may be positive or negative.
Finally, although attitudes may be relatively stable, they may change if the evaluated object
(bank) or object-related-stimuli (information) changes (e.g. Schwarz, 2007). In this context, it is
important to mention that the adopted definition emphasizes that bank attitudes are affective
responses elicited by the cognitive processing of information about the bank (Fishbein and
Middlestadt, 1995, 1997) and that the emotional responses may vary across time depending on
multiple factors such as the context in which the evaluation occurs (Schwarz, 2007).

Bank information transparency and the formation of attitudes toward banks
Literature suggests that attitudes are formed through cognitive and affect-based information
processing (Ajzen, 2001; Argyriou and Melewar, 2011). However, this paper analyzes the

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formation of attitudes uniquely based on the cognitive processing because to elicit an affective response based on the perceptions of information transparency, individuals need to cognitively evaluate the degree of disclosure, clarity and accuracy of the information that banks share with them. This contention, however, does not suggest that the formation of attitudes always involves a great deal of deliberation, because in many cases attitudes are formed through spontaneous and automatic information processing (Fishbein and Ajzen, 2010).

Information integration theory sheds additional light on the formation of bank-related attitudes. This theory proposes that attitudes are formed and modified by people when they receive, interpret, evaluate and integrate informational stimulus within the existing set of attitudes (Anderson, 1981). According to this theory, it is likely that the bank’s information transparency activities affect the formation of bank attitudes by customers as the access to new information provides them with new inputs for evaluating the bank.

The cognitive evaluation of the informational stimulus starts when customers access a piece of information related to a bank. Although this evaluation is cognitive in nature, this process elicits affective reactions (i.e. bank attitudes) synthesized in terms of favorable or unfavorable (Yeung and Wyer, 2004). Furthermore, this paper contends that by increasing the perceived disclosure, accuracy and clarity of shared information, the bank is evaluated more favorably. For instance, customers may interpret highly transparent information as evidence that the bank does not have anything to hide and trigger positive attitudes (i.e. positive affective evaluations) toward the bank. On the other hand, poor levels of disclosure, accuracy, and clarity of the information shared by the bank may trigger negative attitudes (i.e. negative affective evaluations) toward the bank. Accordingly, this paper hypothesizes:

**H1.** Greater perceived bank transparency results in positive attitudes toward the bank.

**Bank attitudes and perceived financial self-efficacy**

Perceived self-efficacy refers to belief in one’s capabilities to mobilize the motivation, cognitive resources and course of action needed to meet given situational demands (Wood and Bandura, 1989). Generally, self-efficacy refers to one’s sense of self-agency, based on a belief in the ability to achieve a task and, more broadly, cope with life’s challenges (Bandura, 2006). In the financial realm, self-efficacy depicts the confidence in one’s ability to use financial services (Mindra et al., 2017). Specifically, financial self-efficacy can be described as the perceived capacity of individuals to manage their finances (Farrell et al., 2016) and their confidence in their ability to obtain relevant information, make financially wise decisions and be disciplined with their finances (Netemeyer et al., 2017).

Prior literature suggests that self-efficacy judgments are dependent, at least partially, on the individual’s self-assessment of whether his or her abilities are enough for accomplishing a task (Gist and Mitchell, 1992). These judgments of self-efficacy may be influenced by the affective arousal that individuals experience when confronted with a specific task (Bandura, 1997). For instance, empirical evidence suggests that a positive affective state (e.g. favorable affective responses toward an object or a task) results in higher self-efficacy scores when compared to negative affective states (Kavanagh and Bower, 1985).

Bank attitudes are a source of financial self-efficacy judgement as attitudes are an affective response toward the bank. In this case, if information transparency triggers a positive favorable affective reaction toward the bank (i.e. positive attitude), it will increase individuals’ sense of competence in managing financial challenges. On the contrary, if information transparency triggers a negative affective reaction, it is likely that the negative attitude toward the bank reduces the sense of financial competence of individuals.

Scant studies have examined the effect of affective responses on self-efficacy (Kavanagh and Bower, 1985); however, prior literature suggests that affective responses
to stimuli may influence the individual’s level of self-efficacy for a task. For instance, the affect priming model posits that the affective responses to a stimulus influence the type of information that individuals recall to evaluate their capabilities for performing a task (Bower, 1981; Forgas and Bower, 1987), and that recalled information influences their judgments of self-efficacy for a task.

In other words, positive affective responses toward an object (i.e. a positive or favorable attitude toward a bank) prompt the recall of positive task-related information. While on the other hand, negative affective reactions (i.e. a negative or unfavorable attitude toward a bank) prompt the recall of negative task-related information. If the recalled information is positive, the sense of financial self-efficacy will increase, and if the recalled information is negative, the sense of financial self-efficacy will decrease.

For instance, as high levels of disclosure, clarity and accuracy of information shared by banks elicit positive affective responses toward banks (positive attitude), positive affect increases the likelihood of recalling positive memories about financial services, which increases the feeling of competence for facing financial challenges. On the other hand, if shared information elicits negative affective responses (unfavorable attitude toward the bank), it will increase the recall of negative memories about financial services and reduce the perceived ability for managing financial tasks (financial self-efficacy). The effect of affective responses (positive or negative) on perceived financial self-efficacy occurs because people tend to generate judgments congruent with affective states related to an object (bank attitude).

Based on the established link between attitudes as affective responses and self-efficacy judgments, and on the proposed relationship between bank information transparency and bank attitudes, this paper hypothesizes:

**H2.** Higher perceived bank transparency results in high levels of perceived financial self-efficacy through the mediating effect of a positive attitude toward the bank.

The most important capability of bank information transparency is to create uplifting changes in individuals’ lives (i.e. improve the SFWB of individuals). As was discussed above, information transparency may trigger positive attitudes toward banks (positive affective responses), which in turn may increase the feeling of self-efficacy in managing financial challenges. The chain from bank attitude to perceived financial self-efficacy reflects the transformation that may occur at the individual level as triggered by bank information transparency.

Perceived financial self-efficacy is the result of a transformation at the individual level that may improve that person’s FWB. For instance, the literature shows that high levels of perceived self-efficacy when making financial decisions render people more likely to avoid financial products that may potentially harm their financial situation (Farrell et al., 2016). Similarly, high levels of self-efficacy may increase satisfaction with the financial situation and reduce the stress related to covering current and future financial demands. In summary, this paper suggests that bank attitudes triggered by information transparency may positively influence the perceived financial self-efficacy. Which in turn may enhance FWB, therefore this paper hypothesizes:

**H3.** Higher perceived bank transparency results in high levels of FWB, preceded by the sequential mediating effects of a positive attitude toward the bank and enhanced financial self-efficacy.

Figure 1 summarizes our theoretical model.
Methodology

Data collection

A survey was conducted to test the proposed hypotheses. The participants in the research were customers of five Colombian banks. The survey was administered by interviewers of a market research company that selected the potential respondents through convenience sampling. In total, 480 potential respondents were approached and asked for a few minutes of their time to fill out a paper and pencil questionnaire. Because of 30 participants abandoned the survey and 50 questionnaires were incomplete, 400 usable responses were collected. First, the interviewers asked a screening question to verify that the potential respondents had at least one financial product in one of the five banks. Then, if potential respondents agreed to take part in the research, the interviewers administered the paper-and-pencil questionnaire. The respondents were not incentivized and were intercepted by interviewers after leaving the bank branch of one of the five banks selected for this study.

Although random sampling is preferred for statistical inference, the application of random sampling in this research was difficult to achieve because of the costs and the difficulty of accessing a well-defined and finite population (e.g. sampling frame) (Hubbard, 2017).

An analysis of the demographic variables showed that 36 percent of the sample were young adults aged between 18–30 years old, and 55.8 percent were female. Almost 88 percent of respondents had completed secondary education and only 13 percent had completed tertiary education. Almost 72 percent had income below 2m pesos (US 689), and barely 1.5 percent had income above 8m (US 2.758). The average time using the services of each bank was 4.8 (SD = 4.9) years, the average of financial products used was 1.9 (SD = 1.28) and the most prevalent bank in the sample was bank number one.

The sample of this research reflects some of the characteristics of the Colombian population that uses financial services and that had taken part in prior research. For instance, the values of the demographic variables of this research are similar to the one obtained for Colombia by the World Bank (2014), and for other low- and middle-income countries (e.g. Kempson et al., 2013). The similarities of this sample to samples of prior studies, in similar contexts, support the quality of the results of this study.

Measurement scales

In order to measure the main constructs of this research, various existent scales in the literature were adapted. The scale of Gerrans et al. (2014) was adapted for measuring the dependent variable “subjective financial well-being (SFWB)”. Four items were adapted from Liu et al. (2015) for measuring the independent variable “bank information transparency” (BITransp). Each item of this scale measures the quality of shared information regarding its accuracy (first and fourth item), clarity (second item) and disclosure (third item). For measuring attitudes toward banks (ATBank), a four-item scale was developed by adapting the bipolar measures developed by Wagner et al. (2009). For measuring financial self-efficacy (FINSELF) a five-item scale was adapted from Mindra et al. (2017).

In addition to main variables, this research included a series of control variables that may impact the dependent variable of this research (SFWB). In particular, this paper controls for age (Age), income (Income), gender (Gender), education (Educ), number of financial products of the customer (NProd), Bank (Bank) and experience (e.g. number of years) in the same bank (Exp) and satisfaction (Sat). The scales of the questionnaire were translated from English to Spanish following the back translation procedures suggested by Brislin (1970).

Before conducting the main survey, a pre-test was performed to validate the instrument. Respondents were asked to comment on the instrument such as the sentence structure, format, length, language used and the wording of the scales. As a result, the content validity of the instrument was confirmed.
**Results**

*Measurement assessment*

A Confirmatory Factor Analysis (CFA) with four factors (transparency, subjective FWB, attitudes toward banks, and financial self-efficacy) was applied in AMOS to verify the quality of the scales. The CFA indicated that the model fit well the data $\chi^2 = (112) = 273.27$; CFI = 0.944; GFI = 0.925; and RMSEA = 0.060 (Byrne, 2009). For all scales, the composite reliability and the alpha values were above 0.7, and the average variance extracted (AVE) was above 0.5 indicating convergent validity (Hair *et al.*, 2017). At this stage, the fourth item of the scales of information transparency and bank attitude were deleted because of its low standardized loading (see Table I).

The common method bias does not appear to be a threat to the results of this research as a CFA with one single factor does not fit the data well ($\chi^2 = (119) = 1,618.37$; CFI = 0.477; 

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>$\lambda$</th>
<th>$\alpha$</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective financial wellbeing (Gerrans <em>et al.</em>, 2014)</td>
<td>On a scale of 1 to 10 where one is “all the time” and ten is “never,” how frequently do you find yourself just getting by financially and living from payslip to payslip?</td>
<td>0.60</td>
<td>0.866</td>
<td>0.52</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>On a scale of 1 to 10 where one is “worry all the time” and ten is “never worry,” how often do you worry about being able to meet normal monthly living expenses?</td>
<td>0.73</td>
<td></td>
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<tr>
<td></td>
<td>On a scale of 1 to 10 where one is “feel completely overwhelmed” and ten is “feel very comfortable,” how do you feel about your current financial situation?</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>On a scale of 1 to 10 where one is “completely dissatisfied” and ten is “completely satisfied,” how satisfied are you with your present financial situation?</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>On a scale of 1 to 10 where one is “overwhelmingly stressed” and ten is “no stress at all,” what do you feel is the level of your financial stress today?</td>
<td>0.74</td>
<td></td>
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<tr>
<td></td>
<td>On a scale of 1 to 10 where one is “no confidence” and ten is “high confidence,” how confident are you that you could find the money to pay for a financial emergency that costs about twice your weekly income?</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank transparency (Liu <em>et al.</em>, 2015)</td>
<td>This bank compares the pros and cons of its services vs competitor offerings (accuracy)</td>
<td>0.78</td>
<td>0.731</td>
<td>0.56</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>Information provided by this bank about its services is easily understood (clarity)</td>
<td></td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information about this bank’s services is easily accessible (disclosure)</td>
<td></td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This bank offers access to other customers’ comments or ratings of its services (accuracy)</td>
<td></td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward bank (Wagner <em>et al.</em>, 2009)</td>
<td>Unfavorable/favorable</td>
<td>0.82</td>
<td>0.834</td>
<td>0.63</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>Bad/good</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Unpleasant/pleasant</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Positive/Negative (reverse coded)</td>
<td></td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial self-efficacy (Mindra <em>et al.</em>, 2017)</td>
<td>I am confident that I can manage my finances</td>
<td>0.74</td>
<td>0.812</td>
<td>0.50</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>I can easily spend less than my income each month</td>
<td>0.80</td>
<td></td>
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<td></td>
<td>I can confidently deposit money in the bank to plan for the future</td>
<td>0.76</td>
<td></td>
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<td></td>
<td>I have the ability to borrow money from the bank</td>
<td>0.67</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>I have what it takes to use financial services to manage my financial goals</td>
<td>0.51</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Deleted items

*Table I.* Measures assessment

*Note:* **p < 0.05
GFI = 0.596; and RMSEA = 0.178). In addition, one single factor fits the data significantly worse than the four-factor model ($\chi^2 = 1,345.09; p < 0.000$). These results imply that common method bias effects are not a likely contaminant of the results of this research.

### Hypotheses testing

Table II shows the descriptive statistics and the correlations of the variables included in the study. $H1$ was tested using multiple regression. The mediational model for $H2$ was tested using the PROCESS macro (model 4) into SPSS 24 developed by Hayes (2013). The serial mediation of $H3$ was tested using PROCESS macro (Model 6) (see templates at http://afhayes.com/public/templates.pdf). Also, a resampling strategy was used to test the indirect effects with a 95% confidence interval (bootstrapping = 5,000 samples).

$H1$ predicted that greater perceived bank information transparency relates positively to bank attitude. Results of the multiple regression column in Table III (Section A) show that bank information transparency predicts well the attitudes toward banks. Satisfaction is the only control variable that relates positively to attitudes toward banks. Hence, $H1$ is supported.

$H2$ predicted that attitudes toward banks mediates the relationship between perceived bank information transparency and perceived financial self-efficacy positively. Results of the column Hayes’ Model 4 in Table III (Section A) show that the direct path from bank information transparency to attitudes toward banks was significant and satisfaction is the only control variable that relates positively to attitudes. Also, the effect of both attitudes toward banks and bank information transparency on financial self-efficacy are significant (Section B). The specific indirect effect from bank information transparency to financial self-efficacy through attitudes toward banks was significant (Section E). However, the direct effect of bank information transparency on financial self-efficacy remains statistically significant (Section C). Therefore, $H2$ is partially supported (partial mediation).

$H3$ predicted that perceived bank information transparency relates positively to FWB through the sequential mediation of attitudes toward banks and financial self-efficacy. Results of the column Hayes’ Model 6 in Table III (Section A) show that bank information transparency and satisfaction are the only significant predictors of attitudes toward banks. Section B shows that both attitudes toward banks and bank information transparency predict financial self-efficacy significantly and positively. Section C shows, on the other hand, that financial self-efficacy, bank and satisfaction predict SFWB.

Also, column Hayes’ Model 6 (Section E) shows that the indirect path from bank information transparency to SFWB through the serial mediation of attitudes toward banks and financial self-efficacy is significant. Furthermore, section D of the column shows that the direct path from bank transparency to subjective FWB is non-significant after introducing the mediating variables. Hence, $H3$ is supported (full mediation).

### Discussion

In light of the increasing pressure on banks to implement interventions improving the well-being of their customers, the purpose of this research was to explore if and how bank information transparency relates to FWB. This paper contributes to the debate on the impact of information transparency on consumers’ FWB (Alsemgeest, 2015), and shows that bank information transparency has an uplifting effect on consumer well-being.

Consistent with TSR, this research confirms that banks may use information transparency to uplift the FWB of their customers. This expands the work of van Praag et al. (2003) proposing that a healthy FWB is crucial for sustaining long-term financial and personal well-being, by providing concrete mechanisms to explain this relationship. Similarly, this research complements the work of Arendt and Brettel (2010), who found that supporting the FWB of customers contribute to the corporate social responsibility goals of organizations and help at improving the company’s image.
### Table II

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**Notes:** *p < 0.1; **p < 0.05; ***p < 0.01
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**Notes:** aInd1: BITransp → ATBank → SFWB; Ind2: BITransp → ATBank → FINSELF → SFWB; Ind 3: BITransp → FINSELF → SFWB. *p < 0.1; **p < 0.05; ***p < 0.01
Furthermore, the results of this research show the positive effect of bank information transparency on FWB is fully and sequentially mediated by brand attitudes and perceived financial self-efficacy. This is in accordance with Garbarino and Strahilevitz (2004), who point out that the transparency of information, when facilitated by access, provides an advantage to the company. This finding means that the effect of bank information transparency on FWB is dependent on how transparency influences the customer attitudes toward the banks and the subjective perceived ability of individuals to deal with the financial challenges steamed from the positive attitude toward banks. Hence, bank attitudes and financial self-efficacy are mechanisms by which bank information transparency improve the FWB of their customers. Consequently, this research confirms the claim of Brüggen et al. (2017) suggesting that the stronger a person’s confidence in his/her financial ability, the more positive future outcomes accrue. This also agrees with Hadar et al. (2013), who found that improved perceived financial self-efficacy lead to an avoidance of negative financial behaviors and subsequently reduces the stress and financial anxiety.

The findings of this research confirm there is a need for more research that provides service entities (banks) with guidelines to improve the well-being of financial consumers (Fisk et al., 2016; Mende and Doorn, 2015). Although improving FWB of customers is a complex process, the findings of this research suggest that by sharing high-quality information (i.e. accurate, clear, and accessible information), banks will progress toward their goal of improving the well-being of their customers. Particularly, high-quality information improves customers’ attitudes toward the banks which in turn increases the perceived customers’ abilities to manage financial challenges. The positive attitudes toward banks and increased levels of perceived financial self-efficacy triggered by high-quality information will result in an enhanced customers’ well-being. This result is in accordance with Diener (2000), who found that consumers who manage their financial needs effectively are better credit risks, contribute to a healthier economy and are more productive at work.

Managerial implications
Bank managers, policymakers or institutions that work with financial services can use the results of the current study to improve the FWB of their customers. As such, managers who embrace the challenging task of improving the FWB of their customers should design strategies for more transparent information sharing with their customers. However, these strategies should be designed not only to deliver information to the customers but also to increase the perceived disclosure, accuracy and clarity of shared information. The advent of technology and big data can help banks visualize complex data and procedures to make it more accessible and understandable by customers. Moreover, IT innovations such as apps and wearables can help enhance the transparent communication with customers. Similarly, design thinking can be used to come up with creative ways to communicate in more transparent ways with customers (Sangiorgi et al., 2017) across different channels and platforms. If correctly implemented, managers will be putting the customers in the driving seat by increasing their positive responses toward banks and triggering a sense of competence for managing financial issues. A well-conceived strategy for providing customers with transparent information designed to increase self-control with money (Zimmerman et al., 2011) directly impact these two factors and result in uplifted FWB.

Managers should also work on increasing the overall transparency of their internal actions by making changes at the institutional level by encouraging contrarian thinking, board diversity and enhancing whistleblower protection. This action could result in improved FWB of the internal customers (i.e. the employees), which will generate a happier and more productive workforce. Finally, open communication and information sharing should become second nature for financial institutions to ensure a more stable, secure and transformative banking system. With banks becoming more transparent, banks will gain a
firmer grip on their operations, making potential malpractice and system flows easier to spot. A more open and transparent banking system could make financial scandals a thing of the past, as well as the heavy fines and reputation loss that come with it.

**Limitations and suggestions for future studies**
This study has a number of limitations that suggest potential avenues for further research. This paper focuses on the cognitive side of attitude formation; however, as the literature suggests, attitude formation is also an affect based-information process. Thus, future research could evaluate the affective response of customers based on the affective evaluation of the degree of perceived disclosure, accuracy and clarity of shared information. In addition, future research could evaluate the interaction of the cognitive and affective evaluation of the shared information in shaping attitudes toward banks and the perceived financial self-efficacy of the customers.

Additional opportunities for developing theory are the exploration of potential moderators in the sequential mediation of attitudes toward banks and financial self-efficacy in the relationship of bank information transparency and FWB. Future research could, for instance, include moderators such as trust or consumer engagement in the sequential paths of the sequential mediated model depicted in Figure 1. By including moderators, researchers could provide a more fine-tuned explanation of the impact of information transparency on consumer’s FWB.

Finally, we acknowledge that a number of factors can affect a person’s assessment of his/her FWB such as contextual (economic, market, legal, political socio-cultural, etc.) and personal factors (socio-demographic, skills, attitudes, motivations, traits, financial practices and life events, Brüggen et al., 2017). As such, future research should consider the impact of transparency on the dynamics of FWB and track it over time.

**References**


Further Reading


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