

Development and validation of financial well-being related scales

FWB 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 precariously, 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);



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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). Brügger *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 (Brügger *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 only 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 Brügger *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, overconsuming 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 Brügger *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 Brügger *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 Brügger *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 Brügger *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; Brügger *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.

Table I.
Scale development
process

Data collection	Aim	Description of studies
Qualitative data collection – conducted in Portuguese language	Construct definition and baseline for item generation	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
	Reduction and refinement of items: establishing content and face validity	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 man; average age 30) Output: refinement to 17 items
Quantitative data collection – conducted in Portuguese language	Scales validation	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

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

(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 χ^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 α (> 0.70) (Cronbach, 1951). However, to overcome a Cronbach's α 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; $\Delta\chi^2$ 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

	Reliability		Convergent Validity AVE	Discriminant validity		
	Cronbach's α	CRI		FPE	RIB	CLB
<i>Study 5 – evaluate set</i>						
FPE	0.75	0.74	0.49	0.70		
RIB	0.89	0.86	0.51	-0.78	0.71	
BCL	0.90	0.90	0.72	-0.11	0.27	0.85
<i>Study 6</i>						
FPE	0.76	0.76	0.52	0.71		
RIB	0.86	0.87	0.64	-0.63	0.80	
BCL	0.91	0.91	0.73	-0.25	0.55	0.85

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 II.
Psychometrics and correlation matrix

	CMIN/df	GFI	CFI	RMSEA
<i>Study 5: evaluate set</i>				
RIB scale	1.58; $p < 0.000$	0.985	0.993	0.043
BCL scale	0.66; $p < 0.000$	0.998	1	0.00
Model fit	1.96; $p < 0.000$	0.942	0.97	0.056
<i>Study 6</i>				
RIB scale	2.58; $p < 0.000$	0.989	0.992	0.048
BCL scale	0.71; $p < 0.000$	1	1	0.00
Model fit	2.21; $p < 0.000$	0.971	0.984	0.041

Notes: RIB, risky indebtedness behaviour; BLC, beliefs of credit limits as additional income

Table III.
Model fit indices

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

Concepts and scale items	Study 5: evaluate set			Study 6		
	Loadings	Mean	SD	Loadings	Mean	SD
<i>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</i>						
FPE1: If I lose my job today, I have enough money to cope with my expenses until I find my next job	0.67	3.88	2.11	0.77	3.76	1.98
FPE2: I am able to cope with financial emergency expenses	0.83	4.15	1.98	0.81	4.26	1.73
FPE3: I manage to save some money every month	0.59	4.16	1.99	0.59	3.76	1.92
<i>Beliefs of credit card limits as additional income is defined as consumers' belief that credit limits serve as an extension of their regular income</i>						
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
<i>Risky indebtedness behaviour is a behavioural tendency to getting into hazardous debt revealed by repetitive debts due to spending more than one can afford</i>						
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; 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 < 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.

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.

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Further reading

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