

The cost of self-protective measures:
psychological predictors of saving money for a financial buffer

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Abstract

With the government increasingly redistributing responsibility to citizens, individuals require resources to take self-protective measures and to recuperate themselves from setbacks with financial consequences. This study examines which psychological constructs are predictive of self-reported saving behaviour. A theoretical model, based on the Theory of Planned Behaviour but with several new and previously unexamined features, is introduced and empirically tested using a heterogeneous sample ($n = 272$). Results supported several assumptions and showed that self-reported saving behaviour was predicted by perceived financial self-efficacy and saving intention. Saving intention was, in turn, predicted by perceived financial self-efficacy, regulatory focus, and financial risk tolerance. An individual's attitude towards financial risk taking (i.e., financial risk tolerance) was predicted by situational economic trust, subjective financial knowledge, and regulatory focus. Implications for stimulating saving behaviour and recommendations for further research are given.

Introduction

The Dutch government is re-inventing its role in preventing and mitigating calamities whereby people are increasingly encouraged to take self-protective measures (Kievik & Gutteling, 2011; Veldheer, Jonker, Van Noije, & Vrooman, 2012). This movement, inspired by ideological and monetary reasons (Veldheer et al., 2012), can be seen in areas ranging from health-care (see the "participation society" in Troonrede, 2013) to flood management (Kievik & Gutteling, 2011) and crime prevention (Van Steden, Van Caem, & Boutellier, 2001).

This increased focus on the responsibility of citizens is not without merit. Empirical findings showed that, when people perceive enough risk and experience a high self-efficacy, they were indeed motivated to take measures into their own hands (e.g., Grothmann & Reusswig, 2006; Kievik & Gutteling, 2011; Martin, Bender, & Raish, 2007; Ter Huurne & Gutteling, 2008; Van Steden et al., 2011). But this greater emphasis on self-reliance also has its drawbacks: bearing more responsibility gives greater financial uncertainties, not only through possible insufficient discretionary income¹ (see Nu.nl, 2013; Veldheer et al., 2012) but also due to (inaccurate) perceptions of costs (see Martin et al., 2007). In addition, governmental risk mitigation strategies have already been criticised for increasing individuals' risks during economic downturns (see Chan, 2006).

Greater self-reliance puts a greater emphasis on financial resources, such as savings. However, 40% of Dutch households had less than 3,550 euros saved and 15% of households even had no savings at all (NIBUD, 2012). Such findings are not atypical for a Western country: 22% of non-retired American households also did not save (see Fisher & Anon, 2012). Furthermore, 25% of Americans reported that they certainly could not come up with \$2,000 in 30 days, with an additional 19% reporting they would only be able to after selling or pawning possessions or taking payday loans (Lusardi, Scheinder, & Tufano, 2011). These findings are alarming: a large group of people are likely not able to withstand financial setbacks. Given that many expenditures related to

¹ Discretionary income is after-tax income minus all payments that are necessary to pay current bills (i.e., the money left over to discretionary spend or save).

adverse events (e.g., job loss, medical costs) happen with an unknown timing (Babiarz & Robb, 2013), this questions how self-reliant people actually are.

To stimulate saving behaviour, the Dutch NIBUD ("Nationaal Instituut voor Budgetvoorlichting"), an organisation aimed at instigating positive financial behaviours, focuses on communicating the minimum requirement for a financial buffer (e.g., see NIBUD 2008, 2012, 2013; Warnaar & Gaalen, n.d.). For example, a household with two children is advised to have at least € 5,000 as a financial buffer (NIBUD, 2012). The idea is that, with such a financial buffer, four things are covered (NIBUD, 2008): bridging expensive months (e.g., December, vacation), replacing inventory (e.g., furniture, household appliances), replacing a car, and maintenance or adornment of the home.

Aim and motivation

In this study, self-reported saving behaviour is attempted to be explained with a psychological model in the hope of identifying promising ideas for interventions aimed at stimulating saving for a financial buffer.

There are several motivations for the current research. First, there is perceived gap in NIBUD's approach, which deliberately excludes psychological variables (see NIBUD, 2008). While calculating a saving target for retirement can increase saving (see Mayer, Zick, & Marsden, 2011), there is no research that shows how communicating a minimum financial buffer requirement for the immediate future impacts psychological variables. If anything, research into self-efficacy shows that people are more motivated when they are told something is easy and effective (see Kievik & Gutteling, 2011) and that saving can be done with small amounts (see Lusardi, Keller, & Keller, 2009). Second, a financial buffer can be an important tool to increase self-reliance by having more financial resources available when needed (see examples below). By researching saving in a comprehensive psychological model, valuable suggestions for interventions aimed at stimulating self-reliance are hopefully generated. Third, a financial buffer brings psychological benefits on its own: individuals with less than \$500 in emergency savings,

compared to those who have more than this amount, are more likely to frequently worry, lose sleep, have a worse health, and lower work productivity (Brobeck, 2008). These psychological responses have already been related to a poor retainment of risk information (see Turner, Rimal, Morrison, & Kim, 2006) and worse self-efficacy (see Tahmassian & Jalali Moghadam, 2011). Conversely, positive financial behaviours (e.g., saving) are predictors of improved subjective well-being (Shim, Serido, & Tang, 2012). Fourth and finally, the literature on risk psychology has strongly focused on psychological constructs, like self-efficacy (e.g., Grothmann & Reuswig, 2006; Kievik & Gutteling, 2011), fear appeals (e.g., Gore & Bracken, 2005; Witte & Allen, 2000), and trust (e.g., Midden & Huijts, 2009; Ter Huurne & Gutteling, 2009). Psychological research into practical precursors of dealing with risks, such as financial resources, have received considerably less research attention, even though a financial buffer can be of great importance when dealing with risks.

The importance of a financial buffer

A financial buffer serves as a protection against a range of financial setbacks, ranging from unemployment, unexpected medical costs, or necessary expenditures on a home or vehicle (Babiarz & Robb, 2013). Three examples highlighting the importance of a financial buffer are discussed below.

First, a financial buffer can facilitate self-protective measures. A significant part of The Netherlands is at risk of flooding, and even though citizens perceive these risks as low (see Kievik & Gutteling, 2011; Terpstra & Gutteling, 2008), the financial risks are large (see Consumentenbond, 2011; Evenhuis, Morselt, Bernardini, & Jonkman, 2007), due to limited and discretionary governmental compensation (Consumentenbond, 2011) and private insurers maintaining a low compensation cap (see Vereniging Eigen Huis, n.d.). Private precautionary measures can, however, reduce the costs of flooding significantly (see Grothmann & Reuswig, 2006; Kreibich, Thieken, Petrow, Müller, & Merz, 2005), though these are expensive: waterproofing cellar walls costs € 18,531.50 (for 65 m²) and mobile water barriers cost € 610 per

meter (Kreibich, Christenberger, & Schwarze, 2011; based on German costs). Flooding risk thereby poses a significant risk for households without a financial buffer, who are likely to experience difficulty with both replacing damaged items and with implementing self-protective measures.

Second, a financial buffer helps in dealing with unexpected expenditures. Health-care costs, often unexpected, have risen rapidly (for The Netherlands, see Van den Berg, Heijink, Zwakhals, Verkleij, & Westert, 2010) and already pose a serious threat at accessible health-care (Fisher, Bynum, & Skinner, 2009). While a large part of Dutch health-care costs are reimbursed by health insurance, both monthly insurance premiums (see BS&F, 2012) and the uncompensated amount (i.e., "eigen risico zorgverzekering") (see Wegwijs, 2013) have risen considerably. Furthermore, the number of people who have defaulted on their health insurance (i.e., not paid a premium in the last six months) has increased substantially (see CBS, 2013; NOS, 2013). While defaulters are not fully expelled from health insurance, they are excluded from additional insurance, faced with a 30% increase in monthly premiums for basic health insurance, and any monthly wages or benefits are seized to ensure payment; and these measures are also enforced if one is already living on welfare (Rijksoverheid.nl, n.d.). Unexpected health costs, coupled with no financial buffer, therefore have the potential to make financial setbacks even worse.

Third, a financial buffer also proves its value during economic setbacks. While unemployed, 90% of Dutch individuals with less than 1,000 euros in net capital (excluding mortgage) experienced at least one indicator of material hardship (e.g., running behind on rent or mortgage payments, having utilities cut off, having their benefits seized by a creditor) while this percentage for those with more than 10,000 euros in capital was only 41% (NIBUD & CentiQ, 2010). American data showed a similar picture: when faced with involuntarily job loss, 44% of households without a financial buffer (i.e., enough money to finance consumption for three months at the poverty level) experienced at least two indicators of material hardship (e.g., food insecurity, utilities cut off, eviction from home, inability to pay medical bills), while this was only the case for 16% of households that did have such a financial buffer (McKernan, Ratcliffe, & Vinopal, 2009).

Furthermore, American households without emergency savings (i.e., enough funds to cover three months of expenses) are 3,1 times as likely to make late mortgage payments and 1,7 times as likely of being foreclosed on when faced with a significant, unexpected drop in income compared to households who had that amount of emergency savings (see Mottola, 2013).

To summarise, a financial buffer helps to deal with unexpected costs and creates possibilities to take self-protective measures. As these examples implicitly showed, a financial buffer is not only important from a financial perspective but might also help people psychologically cope with financial misfortunes by reducing material hardship and financial concerns.

This thesis will examine saving behaviour from a psychological standpoint. First, saving behaviour will be discussed followed by the formulation of a psychological model to explain saving behaviour. Then the methods and data collection are examined, followed by the results and discussion. In the final part, a conclusion and accompanying implications are offered.

Theory

The Theory of Planned Behaviour

The theory of planned behaviour (TPB) is an extension of Fishbein and Ajzen's theory of reasoned action that includes measures of control belief and perceived behavioural control to deal with behaviours over which people have incomplete volitional control (Ajzen, 1991, 2002; Armitage & Conner, 2001; Conner & Armitage, 1998). In general, the more favourable the attitude and subjective norm is towards a certain behaviour, and the greater the perceived behavioural control (PBC) over that behaviour, the stronger an individual's intention to perform the behaviour under consideration (Ajzen, 1991). The TPB further proposes that attitude, subjective norm, and PBC are determinants of behavioural intention, which subsequently influences behaviour. These three determinants are influenced by three different antecedents, namely behavioural beliefs, normative beliefs, and control beliefs respectively, which together reflect the underlying cognitive

structure (Ajzen, 1991, 2002; Armitage & Conner, 2001). The relative importance of these three determinants is expected to vary across behaviours and situations (Ajzen, 1991).

Substantial bodies of theory and research support the validity of the TPB in a wide range of domains (for an overview, see Ajzen, 1991; Armitage & Conner, 2001; Conner & Armitage, 1998). For instance, in their broad meta-analytical study, Armitage and Conner (2001) found that the TPB accounted for 27% and 39% of the variance in self-reported behaviour and intention, respectively. Furthermore, the TPB explained 20% of the variance in actual, observed behaviour (Armitage & Conner, 2001).

When applied to financial and saving behaviour, TPB-based models also showed good results, with 51% (financial budget keeping; Kidwell & Turrisi, 2004) to 72% (retirement saving; Croy, Gerrans, & Speelman, 2010) of variance in intention explained. The model further explained 41% of variance in self-reported saving deposits (Loibl, Kraybill, & DeMay, 2011) and also predicts negative financial behaviours (e.g., not paying bills, using payday loans) (see Xiao, Tang, Serido, & Shim, 2011). Furthermore, the TPB has even been found predictive of self-reported future financial behaviours, such as saving (see Shim et al., 2012).

Proposed theoretical model. Based on the studies discussed above that empirically validated the TPB, the following theoretical model derived from the TPB is proposed to explain self-reported saving behaviour:

[Insert figure A1 here]

In the remainder of this section, the rationales for the proposed constructs and the hypothesised relations are given.

Saving intention

Intention is a central construct of the TPB and is assumed to directly influence a given

behaviour due to its indication of how much effort people are willing to exert to perform the behaviour in question (Ajzen, 1991; Armitage & Conner, 2001). Intention is therefore assumed to capture the motivational factors that influence a behaviour, and the stronger the intention to engage in a behaviour, the more likely should be its performance (Ajzen, 1991). Meta analytical findings indeed show a moderate positive correlation between intention and behaviour ($r = .47$; Armitage & Conner, 2001). TPB-based research into financial behaviour confirmed the predictive value of intention on self-reported saving behaviour ($\beta = .29$; Davis & Hustvedt, 2012) and on self-reported financial behaviours a year later ($\beta = .25$; Shim et al., 2012). Furthermore, a range of self-reported negative financial behaviours (e.g., max out credit card limit, taking payday loans) is predicted by positive intention (β range = $-.13$ till $-.67$; Xiao et al., 2011).

However, the amount of variance in self-reported saving behaviour explained by intention in TPB-based models tends to be low (e.g., $R^2 = .08$; Davis & Hustvedt, 2012). Two potential explanation for this are the following. First, saving barriers, such as economic conditions (see Fisher, 2010; Lunt & Livingstone, 1991), rules and regulations with tax-deferred retirement saving (see Davis & Hustvedt, 2012), and perceived obstacles such as a felt lack of money or informational barriers (see Lusardi et al., 2009), might negatively impact the relation between saving intention and saving behaviour. To test this assumption, perceived barriers (discussed below) were added to the model. Second, people could experience different, conflicting intentions towards saving (e.g., see LeBoeuf, Shafir, & Bayuk, 2010, for how conflicting intentions influence goal-related behaviour), though the TPB assumes a single, non-conflicting, and general intention towards a behaviour (see Ajzen, 1991; Armitage & Conner, 2001).

This study proposes that saving intention is better measured with a broader scope, by including saving intention statements together with potentially conflicting intentions. These latter were operationalised with statements derived from Instrumental Risk Taking (IRT) and Stimulating Risk Taking (SRT): IRT is thoughtfully taking financial risks to achieve relatively distant goals (Rogers, Viding, & Chamorro-Premuzic, 2013; Markiewicz & Weber, 2013; Zaleskiewicz, 2001) while being aware that more risks also bring a higher potential of losses

(Lampenius & Zickar, 2005). On the other hand, SRT is risk taking due to the liking of risks with a strong emotional excitement (Vong, 2007; Zaleskiewicz, 2001), coupled with poor risk and reward estimates (Rogers et al., 2013). Empirical results show that IRT is associated with more self-reported savings ($r = .13$), while SRT displays a negative correlation with saving ($r = -.15$) and relates positively to negative financial behaviours ($r = .17$), like running up debt (see Rogers et al., 2013). Both have not yet been associated with (saving) intention.

In the model tested in this study (see Figure A1), IRT (e.g., "I primarily save to achieve my future goals") and SRT (e.g., "I occasionally take financial risks for fun or to satisfy curiosity") are assumed to measure, together with general statements (e.g., "I plan to save money in the coming months"), saving intention. This aims to take conflicting goals into account with the aim of providing a more accurate measure of financial intentions. Following the TPB model, the model assumes that saving intention positively predicts self-reported saving behaviour: individuals with a stronger saving intention are expected to report more saving behaviour.

Perceived barriers to saving

The amount of volitional control determines, according to the TPB, to what degree intentions are translated into behaviour (see Ajzen, 1991; Armitage & Conner, 2001). Like most behaviours, saving money is not under complete volitional control, since the availability of opportunities and resources (e.g., time, money) influence the ability of being able to perform the behaviour (see Ajzen, 1991). This makes solely the intention to save money explain only 8% of variance in self-reported retirement saving behaviour (see Davis & Hustvedt, 2012), while economic variables (like disposable income and spending behaviour) explain 48% of variance in self-reported recurring saving behaviour (Lunt & Livingstone, 1991). Not surprisingly, people with more income also save more (e.g., see Davis & Hustvedt, 2012; Hershey, Jacobs-Lawson, McArdle, & Hamagami, 2008; Lunt & Livingstone, 1991; Lusardi, 2008), but perceptions of barriers also influence saving behaviour: individuals who believe that they do not have enough

money to save, are reluctant to save at all (see Lusardi et al., 2009). Furthermore, 38% of employees considers lack of knowledge the most difficult part of saving decisions, while 18% do not save due to not knowing where to start with an employee saving plan (Lusardi et al., 2009).

In the proposed model (Figure A1), the assumption is made that perceived barriers to saving (operationalised as perceived lack of income or information) influence the relationship between saving intention and self-reported saving behaviour: individuals who experience more saving barriers are anticipated to have more difficulty translating their intentions into behaviour.

Financial risk tolerance

Attitude towards a behaviour influences the intention to perform the behaviour, and reflects the individual's global positive or negative evaluation of the behaviour in question (Ajzen, 1991; Armitage & Conner, 2001), and meta-analytical findings indeed show a moderate relationship between attitude and behavioural intention ($r = .49$, Armitage & Conner, 2001). The TPB's attitude furthermore influences intentions of financial behaviours, like budget keeping ($\beta = .10$, Davis & Hustvedt, 2012; $\beta = .44$, Kidwell & Turrisi, 2004), saving ($\beta = .25$, Croy et al., 2010), and multiple positive financial behaviours ($\beta = .36$, Shim et al., 2012). However, these results also show that the influence of attitude on intention varies considerably. There are several possible reasons for this. First, attitude, the global evaluation towards a specific behaviour (Ajzen, 1991), is not always operationalised as such (cf. Shim et al., 2012). Second, attitude runs the risk of being more a measure of general knowledge rather than being a predictor of a particular intention (Ajzen et al., 2011). Third, measuring a general attitude towards saving might be misplaced: at any point in time, there are multiple, conflicting options for what to do with money and, psychologically speaking, money is often not just money (e.g., see Koonce, McAnally, & Mercer, 2005; Tversky & Kahneman, 1992). To address these points and to measure financial attitude potentially more accurately, this study uses financial risk tolerance to operationalise attitude.

Financial risk tolerance is the willingness to engage in financial behaviours in which the

outcomes remain uncertain with the possibility of an identifiable negative outcome, and thereby gives an indication of the amount of financial uncertainty someone is willing to accept (Grable, 2000; Grable & Lytton, 1999, 2003; Grable, Lytton, & O'Neill, 2004; Grable, Roszkowski, Joo, O'Neill, & Lytton, 2009).

Dimensions of financial risk tolerance. Tolerance for financial risks, as measured by the Grable & Lytton Financial Risk Tolerance Scale (Grable & Lytton, 1999), which has been found to be a useful and reliable indication of financial risk tolerance (see Gilliam, Chatterjee, & Grable, 2010; Grable & Lytton, 1999), consists out of three factors: investment risk, risk comfort and experience, and speculative risk.

Investment risk measures relative risk preferences for financial risk taking² (see Grable & Lytton, 1999), and is influenced by both the actual, objective financial risks (e.g., possible amount of loss, loss probability) and psychological constructs such as worry, voluntariness, catastrophic potential, and newness (Corter & Chen, 2005; Duxbury & Summers, 2004; Grable & Lytton, 1999; Koonce et al., 2005; Sachse, Jungermann, & Belting, 2012). While both objective and subjective risk characteristics explain the perceived financial risk, subjective attributes are more predictive than objective ones (see Koonce et al., 2005; Sachse et al., 2012).

Risk comfort and experience is the general attitude towards risk taking³ (Grable & Lytton, 1999), which is influenced by experience: the more experience individuals have with financial instruments, the less risks they perceive (Sachse et al., 2012; Wang, Keller, & Siegrist, 2011) and the more risk tolerant and riskier their financial behaviour becomes (Corter & Chen, 2005).

Speculative risk measures an individual's propensity to take a financial gamble⁴ (Grable &

² For example: If you unexpectedly received \$20,000 to invest, what would you do? (a) deposit it in a bank account, (b) invest it in high quality bonds, (c) invest it in stocks (see Grable & Lytton, 1999).

³ For example, "When you think of the word 'risk', which of the following words comes to mind first? (a) Loss, (b) Uncertainty, (c) Opportunity, (d) Thrill" (Grable & Lytton, 1999).

⁴ For example, "In addition to whatever you own, you have been given \$1,000. You are now asked to choose between: (a) a sure gain of \$500, or (b) a 50% chance to gain \$1000 and a 50% chance to gain nothing" (Grable & Lytton, 1999).

Lytton, 1999). While financial speculation is not uncommon (e.g., see Bauer, Cosemans, & Eichholtz, 2009; Odean, 1998), two critiques can be posted at this factor. First, methodologically it remains unclear whether this factor measures an aspect of risk attitude (which the other two factors assess) or a certain personality trait. In addition, speculative risk taking has already been related to the personality trait of sensation seeking (e.g., see Nicholson, Soane, Fenton-O’Creevy, & Willman, 2005; Wong & Carducci, 1991), but sensation seeking is not related to goal-oriented investment risk taking (Corter & Chen, 2005; Morse, 1998). This suggests that, at least in the context of saving behaviour and risk attitude, speculative risk might be misplaced. The other two factors (investment risk and risk comfort and experience) are, on the other hand, seen as promising components of financial risk attitude.

Empirical findings of financial risk tolerance. To the knowledge of the author, financial risk tolerance has not yet been related to saving intention, despite empirical results that hint at the importance of this construct. To begin with, financial risks are likely approached in another way than non-financial risks: willingness to take financial risks differs from other domains (see Corter & Chen, 2005; Nicholson et al., 2005; Markiewicz & Weber, 2013; Roszkowski & Davey, 2010; Soane & Chmiel, 2005; Weber, Blais, & Betz, 2002) and financial risk taking is considerably less passive than non-financial risks (Keinan & Bereby-Meyer, 2012). Like other risks (e.g., see Kievik & Gutteling, 2011), people act primarily on the basis of perceived, instead of actual, financial risk (Roszkowski & Davey, 2010). In addition, they are aware of their own financial risk tolerance (see Grable et al., 2009; Roszkowski & Grable, 2005), which is furthermore relatively stable⁵ (e.g., see Vlaev, Chater, & Stewart, 2009), although financial risk tolerance is subject to situational

⁵ This can be partly attributed to the influence of demographic variables on financial risk tolerance (e.g., see Finke & Huston, 2003; Grable, 2000; Grable, Britt, & Weber, 2008; Grable & Lytton, 1998; Grable, McGill, & Britt, 2011; Grable & Joo, 2004; Grable & Roszkowski, 2008; Hallahan, Faff, & McKenzie, 2003; Morse, 1998; Van de Venter, Michayluk, Davey, 2012; Sachse, Jungermann, & Belting, 2012; Sahm, 2012; Wang, 2009; Yao & Curl, 2010; Yao, Sharpe, & Wang, 2011). However, demographic variables explain only 11.7% (Grable & Lytton, 2004) to 22% (Grable, 2000) of the variance in financial risk tolerance, and demographic variables, due to their stable nature, explain just 0.4% of the variance in annual change in financial risk tolerance (Van de Venter et al., 2012).

influences (see Grable et al., 2004; Grable & Lytton, 2003; Roszkowski & Davey, 2010; Yao & Curl, 2010; Yao, Hanna, & Lindamood, 2004; Xie & Wang, 2003).

Financial risk tolerance has been found to be predictive of actual financial risk taking and risk avoiding behaviour (see Gilliam et al., 2010; Grable, Britt, & Webb, 2008; Grable et al., 2009), and, when it comes to saving, associated with short-term and regular saving (Fisher, 2010) and emergency savings (Babiarz & Robb, 2013). Despite the negative connotation, financial risk tolerance can have important positive consequences: high financial risk tolerance is predictive of higher household income (Grable & Lytton, 1998) and a higher net worth (Finke & Huston, 2003; Grable & Lytton, 2003; Grable & Joo, 2004), likely because higher risk tolerance is associated with a greater diversity of financial assets (Barasinska, Schäfer, & Stephan, 2012), which, in turn, generates better risk-adjusted returns (e.g., see Markowitz, 1952).

To summarise: individuals have a domain-specific attitude towards financial risk taking, and their tolerance for these type of risks (of which they are self-aware) is predictive of both their risk taking and risk avoidance behaviour. Based on these empirical findings, the model assumes that financial risk tolerance influences saving behaviour through saving intention. Since saving behaviour and intention are seen as precautionary measures to increase self-reliance in the current study, the assumption is that individuals who are more intolerant of financial risks exhibit a stronger saving intention while those who tolerant of financial risks display a lower intention to save money.

Financial knowledge

One of the constructs in the model (Figure A1) that is assumed to influence financial risk tolerance is subjective financial knowledge (i.e., the perceptions of one's knowledge), as opposed to objective knowledge. Individuals' objective (i.e., accurate) financial knowledge is, in general, low (see Babiarz & Robb, 2013; Jonubi & Abad, 2013; Lusardi, 2008; Lusardi, Mitchell, & Curto, 2010; Van Rooij, Lusardi, & Alessie, 2011). More objective financial knowledge is related to more

saving (Babiarz & Robb, 2013; Jonubi & Abad, 2013; Lusardi & Mitchell, 2005), but has a downside as well: more objective knowledge and experience increases the willingness to take financial risks (Corter & Chen, 2005; Grable & Joo, 2004; Morse, 1998; Sachse, Jungermann, & Belting, 2012; Sung & Hanna, 1996; Wang, 2009), presumably through the impact on confidence (Wang, 2009).

Despite the seemingly large impact of objective knowledge, it only explains modest amounts of variance in self-reported positive financial behaviours, ranging from 7% (Lusardi, 2008) to 14% (Lusardi & Mitchell, 2005). Potential explanations for this are: more objective knowledge does not necessarily lead to more prudent financial behaviour (e.g., Grable & Joo, 2004; Lusardi, 2008; Wang, 2009), individuals misestimate the accurateness of their objective knowledge (e.g., see Babiarz & Robb, 2013), objective knowledge has often little to do with actually performing the behaviour (Ajzen, Joyce, Sheikh, & Cote, 2011) while subjective financial knowledge might give people the confidence needed to act (Wang, 2009), and, finally, subjective knowledge has more impact on behaviour than objective knowledge has (e.g., Lusardi et al., 2009; Wang, 2009; Xiao et al., 2011).

Subjective financial knowledge has been found to predict attitude, such as financial budgeting attitude ($\beta = -.26$; Kidwell & Turrisi, 2004) and risk tolerance attitude ($\beta = .25$; Croy et al., 2010), and also self-reported behaviour like credit card debt ($\beta = .11$; Xiao et al., 2011) and saving contributions ($\beta = .28$; Hershey et al., 2008). In addition, individuals with emergency savings display a significant higher subjective financial knowledge than those without emergency savings (Babiarz & Robb, 2013).

Due to these empirical results, subjective financial knowledge seems better suited to predict risk taking attitude. The theoretical model therefore proposes that subjective financial knowledge positively influences financial risk tolerance, in the sense that more subjective financial knowledge leads to an attitude more favourable of financial risk taking.

Situational economic trust

Trust is often defined in relation to others, being this people (see relational trust; Earle, 2010), organisations (see institutional trust; Ter Huurne & Gutteling, 2009), or people using a communication channel in a trust environment (see the trust framework model; Schultz, 2006).

Situational trust, meaning trust in a specific situation or action (Viljanen, 2005), on the other hand, has received less research attention in the domain of risk psychology. This despite the importance of trust: there is hardly any economic transaction or decision that does not involve some degree of trust (Olsen, 2012). Since people can be very future oriented when making saving decisions (e.g., see Hershfield, Goldstein, Sharpe, Fox, Yeykelis, Carstensen, & Bailenson, 2011), any change that influences the amount of situational economic trust (i.e., trust in one's current economic situation) can have an impact on saving behaviour. Research has shown that individuals take both societal circumstances, such as recessions (Crossley, Low, & O'Dea, 2013) and financial crises (O'Neill & Xiao, 2012), and personal conditions, like a higher risk of divorce (González & Özcan, 2013; Pericoli & Ventura, 2011), possible health deterioration (Macé, 2012), and the recent unemployment of a close relative (Tokuoka, 2013), into account when saving money. Since saving is primarily motivated by precautionary motives (e.g., see Souleles, 2004), generally speaking any expected future change in (household) income affects saving behaviour (Alessie & Teppa, 2009; Fisher, 2010; Raaij & Gianotten, 1990).

Results from these studies show that a wide range of situational factors can influence saving behaviour. The model (Figure A1) assumes that such circumstances influence individuals' situational economic trust (e.g., see Souleles, 2004), which in turn affects financial risk tolerance: individuals with a higher situational economic trust are expected to have a higher tolerance for financial risks.

Regulatory focus

Regulatory focus theory distinguishes between two motivational states: promotion focus

and prevention focus (Halamish, Liberman, Higgins, & Idson, 2008). Individuals with a promotion focus see a goal as a standard one hopes to achieve (Idson, Liberman, & Higgins, 2000), which generates motivation to achieve a positive outcome (Leonardelli, Lakin, Arkin, 2007) by actively striving to reach the goal (Crowe & Higgins, 1997; Higgins, Friedman, Harlow, Isdon, Ayduk, & Taylor, 2001). Prevention focused individuals, on the other hand, are focused on avoiding failure (Crowe & Higgins, 1997; Higgins et al., 2001) and see their goal as a standard one must achieve (Idson et al., 2000), leading to motivation to avoid a negative outcome (Leonardelli et al., 2007). Furthermore, individuals with a promotion focus are concerned with advancement, growth, potential gains, and accomplishment, whereas a prevention focus is associated with concerns of security, safety, potential losses, impediments to goal achievement, and responsibility (Crowe & Higgins, 1997; Freitas, Liberman, Salovey, & Higgins, 2002; Halamish et al., 2008; Higgins et al., 2001; Leonardelli et al., 2007; Lockwood, Jordan, & Kunda, 2002; Summerville & Roese, 2008). The regulatory focus that people adopt depends, in part, on their personal preferences from earlier successes (see Higgins et al., 2001) and the situational framing (see Freitas et al., 2002; Halamish et al., 2008).

Regulatory focus has not yet been related to saving behaviour, although its relation with financial decisions have been researched. In general, people experience (financial) losses more strongly than gains of the same magnitude (i.e., prospect theory; see Halamish et al., 2008; Idson et al., 2000; Tversky & Kahneman, 1992). However, this asymmetry is moderated by regulatory focus: individuals with a prevention focus display stronger financial loss aversion than individuals with a promotion focus (Halamish et al., 2008).

The above mentioned studies led to the assumption that regulatory focus can have a stimulating and inhibiting influence on financial risk tolerance (see Figure A1): promotion focused individuals, with their interest in growth and gains, are expected to display a higher tolerance for financial risk taking. Prevention focused individuals, which have a stronger interest in losses and impediments, are expected to display an intolerance for financial risks.

Regulatory focus is also assumed to influence saving intention directly: prevention focused

individuals are expected to display a stronger saving intention due to their focus on safety and guarding against losses, while promotion focused individuals are anticipated to display less saving intention.

Subjective saving norm

Subjective norms refer to an individual's perceptions of general social pressure to perform, or not perform, a given behaviour (Ajzen, 1991; Armitage & Conner, 2001). The impact of subjective norms differs per individual: some are primarily driven by subjective norms, while others primarily by attitude (Armitage & Conner, 2001). Research has shown that social norms can have an important influence on financial behaviour. For instance, individuals who adhere to the norm of personal responsibility save more for retirement (Wiener & Doescher, 2008). In terms of social environment, parents are the most significant influence on money management behaviours for a large majority of students (Cude, Lawrence, Lyons, Metzger, LeJeune, Marks, & Machtmes, 2006). And, when faced with an important financial decision, up to 40% of people consider their social environment to be the most important source of financial advice (Van Rooij et al., 2011). Furthermore, individual's beliefs about the opinion and behaviour of, for them, important people is predictive of the intention to do likewise when it comes to retirement saving (Croy et al., 2010).

While those studies did not differentiate between a positive and negative influence stemming from subjective norms, other studies found that positive parental norms are predictive of a stronger students' intention to perform positive financial behaviours that included saving (Shim et al., 2012; Xiao et al., 2011). Sampling under adults, Davis and Hustvedt (2012) found that positive subjective norms were predictive of a stronger intention to save for retirement. In addition, encouragement to save and budget in childhood by (grand)parents is, when retrospectively reported, associated with various positive financial behaviours when being grown-up (Webley & Nyhus, 2013). But when one experiences a low amount of perceived control when it comes to financial matters, the impact of positive subjective norms on intention is negated (Kidwell &

Turrisi, 2004).

Given these studies, the proposed model assumes that positive perceived subjective norms towards saving are predictive of a stronger intention to save money, while individuals who do not perceive such norms exhibit an accompanying lower saving intention.

Perceived financial self-efficacy

The TPB's PBC is the individual's perception of the extent to which the performance of the behaviour is easy or difficult, and reflects both past experiences as well as anticipated impediments and obstacles (Ajzen, 1991). It refers to the amount of volitional control individuals perceive over the behaviour (Armitage & Conner, 2001) and can be seen as interchangeable with self-efficacy (see Ajzen, 1991; Conner & Armitage, 1998), although perceived controllability might constitute PBC together with perceived self-efficacy (see Ajzen, 2002; Conner & Armitage, 1998).

Self-efficacy is an individual's perception of his or her ability to perform a certain behaviour in dealing with a threat or challenge (Bandura, 1977), and, applied to the financial domain, the amount of control and ability one feels when dealing with money issues (Dietz, Carrozza, & Ritchey, 2003). Self-efficacy has already been shown to be related to risk perception and behaviour in a range of domains (e.g., see Gore & Bracken, 2005; Kievik & Gutteling, 2011; Ter Huurne & Gutteling, 2008, 2009). In TPB terms, perceived self-efficacy is moderately related to intention (meta analysis: $r = .43$, $N = 185$ studies), and, looking at correlation strength, similarly related to intention as PBC is ($r = .44$; Armitage & Conner, 2001), which is not surprising given that people engage in behaviours of which they feel capable (Conner & Armitage, 1998). An additional benefit of self-efficacy is that it is more clearly defined than PBC (see Ajzen, 2002; Armitage & Conner, 2001; Conner & Armitage, 1998), which makes it the preferred measure of PBC (Armitage & Conner, 2001). Taking these findings into account, the current study utilises perceived self-efficacy as a measure for the TPB's PBC.

Several studies have related self-efficacy to financial behaviours, such as a positive relation

to seeing more financial opportunities but without seeing more risks (Kreuger & Dickson, 1994), while low self-efficacy has been associated with a higher concern for losing money (Hopfensitz & Wranik, 2008). Looking at saving behaviour, people with higher levels of self-efficacy when it comes to saving for retirement are more likely to participate in pension plans (Wiener & Doescher, 2008) and having an easy-to-follow saving plan aimed at stimulating self-efficacy considerably increases saving behaviour (see Lusardi et al., 2009). In the context of the TPB, financial self-efficacy has been found to be a negative predictor of risky financial behaviour while being positively predictive of constructive financial behaviours like saving (Xiao et al., 2011).

Given this range of empirical findings, the model (see Figure A1) assumes that perceived financial self-efficacy influences both the intention to save money as well as the self-reported saving behaviour: individuals that score high on financial self-efficacy are expected to have a stronger saving intention and to report more saving behaviour, with the converse true for individuals who score low on perceived financial self-efficacy.

In addition, the model assumes that perceived financial self-efficacy is separate from perceived barriers to saving. While both can impede actual saving behaviour, perceived financial self-efficacy is operationalised as the beliefs and feelings towards money (e.g., feeling powerless when dealing with money issues), while barriers to saving deal with perceived practical obstacles (e.g., not sufficient discretionary income).

Summary of the theoretical model

As a synopsis, the following expectations are put forth in the theoretical model: situational economic trust, subjective financial knowledge, and regulatory focus are expected to influence financial risk tolerance. This latter construct, together with regulatory focus, subjective saving norms, and perceived financial self-efficacy, is expected to influence saving intention. Saving intention, in turn, is expected to predict the self-reported saving behaviour, though that relation is likely to be influenced by the perceived barriers to saving. Lastly, perceived financial self-efficacy is expected to influence self-reported saving behaviour directly.

Compared to the TPB (e.g., see Ajzen, 1991; Armitage & Conner, 2001), the model of this study differs in several important ways. First, attitude is replaced by a measure more specific to financial behaviour (i.e., financial risk tolerance). Second, attitude is expected to be influenced by three separate constructs that relate to knowledge (subjective financial knowledge), trust (situational economic trust), and approach to goal achievement (regulatory focus). Third, the inclusion of regulatory focus in a TPB framework is new. Fourth, instead of using PBC or general self-efficacy, the current study measures self-efficacy specifically relating to financial behaviours. Fifth and finally, the model assumes that the relation between intention and self-reported behaviour is influenced by the perceived barriers in performing the behaviour. The next part addresses the method, subsequently followed by the results and discussion.

Method

The proposed theoretical model was tested with a convenience sample that utilised an on-line questionnaire in a cross-sectional research design. The questionnaire was constructed in, and conducted with, SurveyMonkey⁶. Data were analysed with RStudio (version 0.98.493)⁷ in conjunction with R⁸ (version 3.0.2)⁹.

This section is structured as follows. Since the utilised recruitment procedures provide insight into the different participant subsamples, the procedure is discussed first, followed by

⁶ See <http://www.surveymonkey.com>

⁷ See <http://www.rstudio.com>

⁸ R was chosen over IBM's SPSS for several reasons. First, a practical consideration was that the author had more recent experience with R than with SPSS. Second, R has become more popular in recent years, while the use of SPSS, both in terms of job trends and scholarly articles, has dropped considerably (see Muenchen, 2014). Third, open source software has several benefits over proprietary software (see Yalta & Yalta, 2010). Fourth and finally, R shows accurate results when compared with other statistical software packages, including SPSS (see Almiron, Almeida, & Miranda, 2010; Keeling & Pavur, 2007; Odeh, Feathersone, & Bergtold, 2010).

⁹ See <http://www.r-project.org/>

addressing the participants' characteristics. The last part of this section will discuss the questionnaire items.

Procedure

Between November 7, 2013, and December 2, 2013, participants were recruited through e-mail, on-line message board posts, and a promotional message in the on-line Sona system¹⁰. This sampling method was aimed at increasing the heterogeneity amongst participants, while the representativeness (compared to the Dutch population) was not a primary concern given the aim to first validate the theoretical model.

The recruiting messages contained a brief research description (i.e., researching psychological determinants of saving behaviour), information about the gift certificates raffle (if applicable), privacy reassurances (no personally identifiable information was collected), and a hyperlink to the on-line questionnaire. Clicking on the hyperlink took participants to the cover letter (see Appendix E), which was followed by the questionnaire (see Appendix F).

The questionnaire consisted out of 87 statements, spread out over 9 pages with each page measuring one psychological construct (i.e., a page with saving intention statements, a page with regulatory focus statements, and so on). Statements were answered with an ordinal five-point Likert scale, ranging from *fully disagree* ("geheel oneens") to *fully agree* ("geheel eens"). Participants were told to choose the answer that best suited their views and that there were no right or wrong answers.

To prevent order-effect bias (see Perreault, 1975), both the page order (i.e., the order in which the constructs were measured) as well as the order of the statements on each page (i.e., statements presented in the order 1, 3, 2, 4 while another participant was presented with 4, 2, 1, 3) were randomised. After the pages with the psychological constructs were completed, participants

¹⁰ The Sona system is an on-line portal for recruiting research participants amongst Behavioural Science students at the University of Twente.

were presented with the last page (non-randomised) that asked for a few demographic variables.

Participants

In the first stage of sampling, participants were recruited amongst the student population through the University of Twente's Sona system. Since a sample solely consisting out of students was deemed unreflective of financial decision making (due to their assumed lower net worth and income than full-time employees), snowball convenience sampling was applied by which the author reached out to his contacts through e-mail with a brief description of the research (including estimated time requirement and privacy assurances) and asking them to participate. Since the response rate for on-line questionnaires can be quite low (20 to 30 percent; see Nulty, 2008), 5 gift certificates from the Dutch on-line retailer Bol.com (worth 20 euros each) were raffled amongst these participants¹¹. In addition, to stimulate the snowballing effect, 3 additional Bol.com gift certificates (worth 20 euros each) were raffled amongst those who forwarded the e-mail to other people.

However, despite the economic incentives, the snowballing sampling response was abysmal with only a few participants ($n = 8$). Since this unequivocally did not work, subsequently convenience sampling whereby participants were recruited through on-line message boards was deployed. The financial incentives were kept in place as a means to motivate participation, and so on-line message board participants were included in the already existing raffle of 5 Bol.com gift certificates. Since one of the targeted message boards explicitly forbade compensation for questionnaire participation, two Internet subsamples (with and without gift certificates¹² raffle) alongside the student-recruited sample were created (see Table 1 below¹³).

¹¹ The Sona system forbade financial compensation, and therefore Sona participants only received research credits, namely 0.25 of their 15 credits requirement for their three year long Bachelor programme (see Universiteit Twente, n.d.).

¹² Participants that were recruited through e-mail snowballing sampling were included in the 'with gift certificates'-subsample since these few participants did not justify being analysed in another, separate subsample.

¹³ See Appendix B for a comparison between the different subsamples.

A total of 340 participants, of which 272 (80%) completed the questionnaire, partook in this study. Just over the majority of participants were female (60%) and 69% of participants attended higher education (HBO or WO). Participants were young ($M = 26.81$, $SD = 9.51$, range = 15-73, $n = 272$), and a large group (50%) listed studying as their most important daily activity while 40% were employed. In terms of monthly net income, 22% reported no income, 33% earned less than 1,500 euros, 31% earned between 1,500 and 3,000 euros, and a small group (6%) earned more than 3,000 euros per month.

Table 1. *Descriptive statistics of the participants that completed the questionnaire.*

Item	Option	Internet, with gift certificate (IWG; <i>n</i> = 67)	Internet, no gift certificate (ING; <i>n</i> = 92)	Sona (<i>n</i> = 113)	All participants (<i>N</i> = 272)
Gender	Male	35 (52%)	56 (61%)	18 (16%)	109 (40%)
	Female	32 (48%)	36 (39%)	95 (84%)	163 (60%)
Education	VMBO	0	0	0	0
	HAVO/VWO	5 (7%)	7 (8%)	23 (20%)	35 (13%)
	MBO	12 (18%)	4 (4%)	2 (2%)	18 (7%)
	HBO	26 (39%)	32 (35%)	13 (12%)	71 (26%)
	WO	20 (30%)	48 (52%)	50 (44%)	118 (43%)
	No education (yet)	0	0	0	0
	Other	4 (6%)	1 (1%)	25 (22%)	30 (11%)
Domestic living situation	Living alone	14 (21%)	35 (38%)	10 (9%)	59 (22%)
	Living with a partner, without children	21 (31%)	30 (33%)	13 (12%)	64 (24%)
	Living with a partner and children	6 (9%)	12 (13%)	1 (1%)	19 (7%)
	Living with parents	19 (28%)	11 (12%)	33 (29%)	63 (23%)
	Living with one or more roommates	5 (7%)	3 (3%)	56 (50%)	64 (24%)
	Other	2 (3%)	1 (1%)	0	3 (1%)
Type of home	Rental	29 (43%)	37 (40%)	80 (71%)	146 (54%)
	Owner-occupied	38 (57%)	55 (60%)	33 (29%)	126 (46%)
Most important daily activity	Employed	37 (55%)	71 (77%)	2 (2%)	110 (40%)
	Self-employed (independent freelancer)	1 (1%)	5 (5%)	0	6 (2%)
	Looking for a job	2 (3%)	4 (4%)	0	6 (2%)
	Student	18 (27%)	9 (10%)	110 (97%)	137 (50%)
	Taking care of household	1 (1%)	1 (1%)	0	2 (1%)
	Retired	4 (6%)	1 (1%)	0	5 (2%)
	Declared (partly) work disabled	4 (6%)	1 (1%)	0	5 (2%)
	Other	0	0	1 (1%)	1 (0%)
Relation to the main breadwinner	I am the main breadwinner	32 (48%)	61 (66%)	11 (10%)	104 (38%)
	My partner is the main breadwinner	13 (19%)	17 (18%)	10 (9%)	40 (15%)
	My parent(s) are the main breadwinner	19 (28%)	9 (10%)	61 (54%)	89 (33%)
	Other	3 (4%)	5 (5%)	31 (27%)	39 (14%)
Monthly net income (in euros)	No income	3 (4%)	3 (3%)	55 (49%)	61 (22%)
	Less than 1,500	30 (45%)	16 (17%)	45 (40%)	91 (33%)
	1,500 - 3,000	26 (39%)	54 (59%)	5 (4%)	85 (31%)
	More than 3,000	1 (1%)	14 (15%)	0	15 (6%)
	Don't know	0	0	3 (3%)	3 (1%)
Don't want to say	7 (10%)	5 (5%)	5 (4%)	17 (6%)	

Note: Percentages may not add to 100 due to rounding differences. Incomplete questionnaires per subsample were: 17 (IWG), 47 (ING), and 4 (Sona).

Incomplete questionnaires. A total of 68 participants, or 20%, did not complete all questionnaire pages. Because the questionnaire was structured such that demographic variables were always on the last page (and therefore missing from all incomplete questionnaires), a statistical comparison between participants who dropped out and those who completed the questionnaire was not possible. In addition, the on-line questionnaire software lacked a feature to know which randomised page order was presented to which participant. This made it unattainable to know if a certain page order affected the dropout rate. That being said, the dropout per questionnaire page is displayed for completeness in Table 2 below.

Table 2. *Incompletion rates per questionnaire page.*

Questionnaire page	Number of participants that did not complete the page	Incompletion as a percentage of total participants ($N = 340$)
Financial risk tolerance	53	15.59%
Saving intention	53	15.59%
Financial self-efficacy	45	13.23%
Saving behaviour	37	10.88%
Subjective saving norms	51	15.00%
Financial knowledge	50	14.71%
Perceived saving obstacles	39	11.47%
Situational economic trust	44	12.94%
Regulatory focus	49	14.41%
Demographic variables	68	20.00%

None of the incomplete questionnaires were excluded from the data analysis. This led to a varying sample size for each construct, depending on the amount of participants that completed the statements for a certain construct (e.g., 303 participants completed the self-reported saving behaviour statements, while 291 finished the regulatory focus items). Several motivations led to the decision to include all participants, regardless of questionnaire completion. First, it would have been questionable to exclude participants solely based on their construct scores a posteriori. Second, the model did not assume a direct influence of demographic variables, and the absence of these therefore did not invalidate responses on psychological constructs from a participant. Third, exclusion based on psychological construct scores would have been hard (i.e., which range of scores are ground for exclusion?) and likely done in a non-random, biased manner, which would

jeopardise the assumed generality of the model. Fourth and finally, excluding participants based on certain criteria is better left for further research, where exclusion conditions can be formulated beforehand.

Comparison with the population. Table 3 below compares the sample with the general Dutch population. Several noteworthy differences were observed between the sample and population. First, the sample differed in terms of gender ($\chi^2(1) = 4.29, p < .05, n = 544$), though none of the individual standardised residuals reached significance. Second, participants were more likely to have attended WO and less likely to have attended VMBO or MBO ($\chi^2(5) = 177.46, p < .001, n = 543$). Third, participants were more likely to be living on their own and less likely to be living with a partner (Fisher's $\chi^2(3) = 52.53, p < .001, n = 533$). Fourth, both the sample and population showed differences in type of dwelling inhabited ($\chi^2(1) = 6.19, p < .05, n = 544$), though no individual standardised residuals reached significance. Fifth and finally, participants reported different daily activities ($\chi^2(3) = 164.84, p < .001, n = 539$): they were less likely to be self-employed, less likely to be retired, and more likely to be jobless.

While a truthful comparison between the sample and population is difficult (CBS data, for example, also includes children and elderly or is based on household data), the sample is certainly overrepresented: highly educated individuals, that live on their own and that do not have a job, were more likely to be included in the study. Results are therefore not necessarily generalisable to the population (but also see the Results section that verifies the predictive value of demographic variables).

Table 3. Comparison of the sample (n = 272) with the general Dutch population.

Demographic variable		Sample	Population
Gender	Male	40%	49%
	Female	60%	51%
Education	VMBO	0%	24%
	HAVO/VWO	13%	10%
	MBO	7%	31%
	HBO	26%	16%
	WO	43%	9%
	Other	11%	10%
Living situation	Alone or with roommates	46%	16%
	With a partner	31%	51%
	With parents	23%	27%
	Other	3%	2%
Type of home	Rental	54%	43%
	Owner-occupied	46%	57%
Most important daily activity	Employed	40%	55%
	Self-employed	2%	10%
	Unemployed, unable to work	53%	9%
	Retired	2%	25%

Note: Population percentages are based on the author's calculations using data from Statistics Netherlands [CBS] (see CBS Statline, February 2009, December 2009, July 2009, 2013, 2014). Percentages may not add to 100 due to rounding differences.

Questionnaire

The 87 statements of the questionnaire (see Appendix F) measured nine constructs. Each of these were analysed with factor and reliability analyses (details for each construct are in Appendix C), which are discussed below.

Financial risk tolerance. Statements intended to measure financial risk tolerance were derived from Grable & Lytton's (1999) Financial Risk Tolerance Scale, which consists out of three dimensions. Two of these, investment risk (5 items; reported Cronbach's $\alpha = .72$; see Grable & Lytton, 1999) and risk comfort and experience (5 items, reported Cronbach's $\alpha = .50$), were used in this questionnaire¹⁴. The 10 statements¹⁵ were adapted to rely less on investment knowledge and to

¹⁴ The third dimension (speculative risk), was, as discussed in the theory section, excluded for being judged ill-suited for measuring financial attitude in the context of saving behaviour.

¹⁵ For example, "when it comes to taking financial risks, I'm a real risk avoider" and "I don't mind taking large financial risks since

be answerable with a five-point Likert scale, that ranged from *fully disagree* to *fully agree*.

Answers were combined into an interval-based financial risk tolerance score, in such a way that high scores were indicative of financial risk intolerance and low scores signalled high tolerance for financial risks. The resulting scale succeeded in explaining 46% of the variance in financial risk tolerance with a Cronbach's alpha of .82. The one-factor structure¹⁶, provisionally termed general financial risk tolerance, was characterised by generic statements about (preferences for) financial risk taking.

Saving intention. Saving intention was measured with three subscales: general saving intention (4 statements; adapted from Davis & Hustvedt, 2012; Kidwell & Turrisi, 2004; and Xiao et al., 2011), and two more specific forms of (financial) intentions: stimulating (5 items; reported Cronbach's $\alpha = .76$) and instrumental risk taking (5 items with a reported Cronbach's $\alpha = .73$; both based on Zaleskiewicz, 2001). The 14 statements were scored with an ordinal five-point Likert scale ranging from *fully disagree* to *fully agree*, and calculated such that high scores would be indicative of a higher saving intention. The saving intention scale explained 57% of the variance in saving intention and consisted out of three factors. The first factor measured general saving intention with statements relating to the importance of saving¹⁷ and one's own intended saving behaviour¹⁸ (Cronbach's $\alpha = .80$). The second factor loaded on statements from both stimulating¹⁹

these give a chance at large profits".

¹⁶ This contradicts the findings from Grable & Lytton (1999), which showed that investment risk and risk comfort and experience were two separate factors. Several reasons can explain this difference. First, statements in this study were translated and adapted, plus scored with Likert scales instead of multiple choice answers. Second, participants in Grable & Lytton's (1999) American sample were older ($M = 43$ years), more in number ($N = 1,075$) and in large majority (72%) married. Third, their convenience sample was drawn amongst faculty and staff from an university: therefore, none of their participants were unemployed and a large majority had a high educational attainment.

¹⁷ For example, "I consider saving to be an unnecessary and boring activity" (reversed scored).

¹⁸ For example, "I plan to save money for unexpected expenditures".

¹⁹ For example, "I occasionally take financial risks for fun or to satisfy curiosity" (reverse coded).

and instrumental²⁰ risk taking (Cronbach's $\alpha = .78$), and the nature of the statements suggested that this factor could be termed as general financial risk taking. The third factor loaded only on long-term instrumental, goal-related statements²¹ (Cronbach's $\alpha = .57$). Zaleskiewicz's (2001) distinction between stimulating and instrumental risk taking was therefore not apparent in this study²².

Perceived financial self-efficacy. Participants' financial self-efficacy was measured with 8 items derived from Danes & Haberman (2007), Dietz et al. (2003), and Shim et al. (2012). These statements²³ were scored on ordinal five-point Likert scales ranging from *fully disagree* to *fully agree*, and calculated such that a high interval-based score was indicative of a high perceived financial self-efficacy. The perceived financial self-efficacy scale (Cronbach's $\alpha = .84$) explained 48% of the variance in perceived financial self-efficacy.

Self-reported saving behaviour. Saving behaviour was measured with 5 statements²⁴ derived from Davis & Hustvedt (2012) and Shim et al. (2012). The items were scored with an ordinal five-point Likert scale ranging from *fully disagree* to *fully agree*, and combined to an interval-based score such that high scores were indicative of a higher amount of self-reported saving behaviour. The self-reported saving behaviour scale (Cronbach's $\alpha = .84$) succeeded in explaining 61% of the variance in self-reported saving behaviour.

Subjective saving norm. Participants' perceived saving norms were measured with statements from Croy et al. (2010), Kidwell & Turrisi (2004), and Xiao et al. (2011). The 7

²⁰ For example, "To achieve something in life you need to be willing to take risks" (reverse coded).

²¹ For example, "I see money as a means to achieve important goals in the long run".

²² Possible explanations for this discrepancy are that Zaleskiewicz's (2001) sample consisted out of 159 undergraduates in business administration ($M = 21.26$ years, $SD = 0.82$) that took a class in behavioural decision making. These individuals likely approached financial risk taking in a manner different from a more diverse sample. Furthermore, Zaleskiewicz (2001) intended his statements as a personality trait as opposed to measuring an aspect of intention in the context of a specific behaviour.

²³ For example, "I often feel powerless in dealing with money issues" (reverse coded).

²⁴ For example, "In the past six months I have frequently saved money".

statements²⁵ were scored with ordinal five-point Likert scales, ranging from *fully disagree* to *fully agree*, and combined such that a high interval-based score would be indicative of a stronger perceived norm towards saving. The subjective saving norm scale (Cronbach's $\alpha = .81$) explained 52% of the variance in subjective saving norms.

Financial knowledge. Financial knowledge was assessed with 15 statements, divided amongst two assumed dimensions: perceived subjective financial knowledge²⁶ (8 statements) and practical saving knowledge and experience²⁷ (7 statements). These statements, derived from Flynn and Goldsmith (1999) and Xiao et al. (2011), were scored on ordinal five-point Likert scale ranging from *fully disagree* to *fully agree*. Derived, interval-based scores were constructed such that high scores were indicative of more financial knowledge. Analysis revealed two factors: subjective financial knowledge (Cronbach's $\alpha = .93$) and practical saving knowledge (Cronbach's $\alpha = .70$), which explained 46% and 15% of the variance in financial knowledge, respectively.

Perceived barriers to saving. Barriers to saving were measured with statements derived from Lunt and Livingstone (1991), Lusardi et al. (2009), and Madern and Van Gaalen (2011). Two dimensions, information obstacles and income plus expenses obstacles, were assumed to underlay the 9 items. The statements, measured with five-point ordinal Likert-scales ranging from *fully disagree* to *fully agree*, were combined into interval scores such that high values would be indicative of a higher amount of perceived obstacles. Analysis of the items uncovered two factors: informational²⁸ (Cronbach's $\alpha = .81$) and income and expenses²⁹ obstacles (Cronbach's $\alpha = .57$), that together explained 62% of the variance in perceived barriers to saving.

Situational economic trust. Participants' situational economic trust was measured with 10 statements, with two assumed underlying dimensions: trust in the current economic situation and

²⁵ For example, "I think that people who I consider important or who's opinion I respect think it's important that I save regularly".

²⁶ For example, "My general knowledge of money matters is high".

²⁷ For example, "I've already once switched banks with my savings".

²⁸ For example, "With all the information about saving I don't know where to start".

²⁹ For example, "I think that I don't have enough income to save money".

trust in the future economic situation. These items were based on statements from Statistics Netherlands (see CBS, n.d.), and scored with ordinal five-point Likert scales ranging from *fully disagree* to *fully agree*. The resulting interval scores were calculated such that high scores indicated a higher amount of situational economic trust. Instead of two underlying dimensions³⁰, however, the analysis uncovered three factors³¹: personal financial situation³² (Cronbach's $\alpha = .79$), major purchases³³ (Cronbach's $\alpha = .58$), and trust in economic conditions³⁴ (Cronbach's $\alpha = .30$), which together explained 59% of the variance in situational economic trust.

Regulatory focus. Regulatory focus was measured with 9 statements based on the General Regulatory Focus Measure (see Lockwood et al, 2002), and scored with five-point Likert scales ranging from *fully disagree* to *fully agree*. Statement scores were calculated such that high positive scores were indicative of a strong promotion focus, while low negative scores were denotative of a strong prevention focus. Statistical analysis unveiled, as expected, two factors: prevention focus³⁵ (Cronbach's $\alpha = .66$) and promotion focus³⁶ (Cronbach's $\alpha = .65$) that, together, explained 48% of the variance in regulatory focus³⁷.

³⁰ Results could not be compared with the original CBS items on which the scale was based, since measures of the reliability of these were not publicly available (J.M.M.J. Nieuweboer, personal communication, September 4, 2013).

³¹ Potential explanations for this are that, while the CBS items are based on a broader sample, participants in this sample were young ($M = 26.81$ years, $SD = 9.51$, $n = 272$) and likely in a life situation that required spending on durable goods, regardless of their financial situation (e.g., when leaving the parental home, moving in together). Furthermore, few participants were unemployed and looking for a job ($n = 6$), which can explain why participants' personal financial situation was separate from their trust in economic conditions (e.g., the labour market).

³² For example, "At the moment I can easily make ends meet" and "My financial situation has improved in the last 12 months".

³³ For example, "I currently consider it a good time for major purchases such as furniture, a television or other durable goods".

³⁴ For example, "Given the current economic situation, it is certainly worthwhile to save money" (reverse coded).

³⁵ For example, "I often think about how I can prevent failures in my life".

³⁶ For example, "When I think about the future, I often envision how I achieve my goals".

³⁷ Internal consistencies were slightly lower than those reported in the literature (.75 and .81 for prevention focus and promotion focus, respectively; see Lockwood et al., 2012). The factor structure was arranged well, however: all statements intended to measure prevention focus loaded on this factor (likewise for the promotion focus statements).

Descriptive statistics of constructs. Table 4 below provides descriptive statistics for the constructs while Figure C1 (see Appendix C) displays these in a boxplot.

Table 4: *Descriptive statistics of the measured constructs*

Construct	Mean	Median	SD	Min	Max	Skew	Kurtosis	<i>n</i>
Financial risk tolerance	3.62	3.75	0.739	1.00	5.00	-0.89	0.81	287
Saving intention	3.79	3.83	0.554	1.67	5.00	-0.51	0.51	287
Financial self-efficacy	3.80	3.88	0.752	1.50	5.00	-0.91	-0.57	295
Saving behaviour	3.88	4.20	1.022	1.00	5.00	-0.94	0.17	303
Subjective saving norms	3.53	3.50	0.691	1.00	5.00	-0.44	0.80	289
Financial knowledge	3.07	3.00	0.889	1.00	5.00	0.16	-0.76	290
Saving obstacles	3.31	3.29	0.447	1.14	4.43	-0.46	1.60	301
Situational economic trust	3.10	3.11	0.658	1.11	4.67	-0.38	0.07	296
Regulatory focus	-0.05	-0.11	0.496	-1.56	1.56	0.22	0.47	291

In terms of distribution of the construct scores, saving behaviour, financial self-efficacy, and financial risk tolerance were moderately skewed³⁸. In addition, saving obstacles, financial risk tolerance, subjective saving norms, and financial knowledge displayed (compared to the other constructs) high absolute kurtosis values.

Further examination with normal quantile-quantile (Q-Q) plots³⁹ showed that self-reported saving behaviour had a distribution that was not completely normal, which is also evident by its median score of 4.2 (towards the high end of the range 1-5). This relatively high score can be explained by the fact that a large group of Dutch households already save (see NIBUD, 2012), and that the used sampling method likely overrepresented individuals with an interest in saving money.

Several options for how to proceed with this variable were explored. Recoding saving behaviour into categories (e.g., saver and not-saver) was discarded since this would lead to an

³⁸ As a general rule of thumb (Bulmer, 1979, in Brown, 2012): $|skew| > 1$ signals a highly skewed distribution, $0.50 \leq |skew| \leq 1$ is indicative of a moderately skewed distribution, while $|skew| < 0.50$ is a distribution that is approximately symmetric.

³⁹ Normality tests were not performed since these can give significant results with sample sizes above 200, even when there is no deviation from normality (Field, Miles, & Field, 2012).

inordinate loss of data. Using Tobit regression analyses, suitable for dealing with floor and ceiling effects (see McBee, 2010), was judged undesirable since one of the Tobit regression model assumptions (truncation) was missing. Since ceiling effects can give a higher chance of a Type I error in regression analysis (Austin & Brunner, 2003; Brunner & Austin, 2009), a stricter significance level than the default .05 was used in interpreting the results.

Results

General findings

The correlations between the constructs are displayed in Table 5 below. Several moderate to strong relationships with medium to large effect sizes were found⁴⁰:

Financial risk tolerance displayed a positive relationship with saving intention ($r = .46, p < .001$), highlighting that a higher financial risk intolerance was accompanied with a greater intention to save money. Furthermore, financial knowledge was negatively related to financial risk tolerance ($r = -.46, p < .001$): more financial knowledge is associated with more tolerance for financial risks.

Saving intention displayed a positive relation with financial self-efficacy ($r = .34, p < .001$): a higher amount of financial self-efficacy is associated with a stronger intention to save money. Saving intention was also related to self-reported saving behaviour ($r = .56, p < .001$), showing that stronger saving intentions concord with more self-reported saving behaviour.

Self-reported saving behaviour was positively related with financial knowledge ($r = .45, p < .001$) and economic trust ($r = .45, p < .001$): more financial knowledge is related to more saving behaviour and more economic trust is related to more saving behaviour.

Financial knowledge was positively associated with economic trust ($r = .36, p < .001$),

⁴⁰ According to Cohen (1988, 1992; in Field et al., 2012): $|r| \pm .10$ is a small effect, $|r| \pm .30$ corresponds to a medium effect, and $|r| \pm .50$ equals a large effect size. Furthermore, in terms of relationship strength, according to an overview by Taylor (1990): $|r| < .35$ exhibits a low to weak relation, $.35 < |r| < .67$ signals a moderate relation, $.67 < |r| < .90$ equals a strong relationship, and $.90 < |r| < 1.00$ is the equivalent of a very strong relationship.

highlighting that participants with a higher amount of financial knowledge displayed more economic trust.

Financial self-efficacy was positively associated with several other constructs. First, financial self-efficacy was associated with self-reported saving behaviour ($r = .64, p < .001$): individuals who had a higher amount of financial self-efficacy also reported more saving behaviour, and vice versa. Second, financial self-efficacy was also associated with financial knowledge ($r = .62, p < .001$), suggesting that more financial knowledge coincides with a higher amount of financial self-efficacy. Third, financial self-efficacy was correlated with economic trust ($r = .51, p < .001$), depicting that a high amount of financial self-efficacy corresponds to more trust in one's economic situation.

Table 5. *Correlation matrix of the relationships between the different constructs.*

	Financial risk tolerance	Saving intention	Financial self-efficacy	Saving behaviour	Saving norm	Financial knowledge	Saving obstacles	Economic trust	Regulatory focus
Financial risk tolerance	-								
Saving intention	.46***	-							
Financial self-efficacy	-.26***	.34***	-						
Saving behaviour	-.04	.56***	.64***	-					
Saving norm	.09	.24***	.23***	.25***	-				
Financial knowledge	-.46***	.08	.62***	.45***	.23***	-			
Saving obstacles	-.05	.19**	.18**	.13*	.00	.26***	-		
Economic trust	-.30***	.12	.51***	.45***	.19**	.36***	-.11	-	
Regulatory focus	-.24***	-.13*	.21**	.00	.02	.12*	-.04	.18**	-
<i>n</i>	287	287	295	303	289	290	301	296	291

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Significant relations are highlighted with bold typeface.

Validation of the theoretical model

The theoretical model (see Figure A1) was tested with several hierarchical linear regression analyses⁴¹, which are discussed below.

Predicting financial risk tolerance. The dependent variable (DV) financial risk tolerance was, as hypothesised in the theoretical model, assumed to be predicted by the independent variables (IVs) situational economic trust, subjective financial knowledge, and regulatory focus. Based on theoretical assumptions and observed correlations, financial knowledge was first regressed on financial risk tolerance followed by situational economic trust (model 2) and regulatory focus (model 3). These regression results are displayed in Table 6 below.

Each subsequent model explained significantly more variance, with the final model explaining 25% of the variance in financial risk tolerance. The strongest predictor was financial knowledge ($\beta = -.40, p < .001$), followed by regulatory focus ($\beta = -.17, p < .01$), and situational economic trust ($\beta = -.12, p < .05$). Each IV therefore had, while controlling for the influence of the other variables, a significant impact on financial risk tolerance: more subjective financial knowledge leads to a higher tolerance of financial risks⁴², a stronger promotion focus (compared to a prevention focus) is predictive of more financial risk tolerance, and more situational economic trust also leads to more financial risk tolerance. Further analysis of this regression model showed that the assumptions of linear regression analysis had been met (see Appendix D for details).

To further examine financial risk tolerance, an additional regression analysis was performed that included demographic variables⁴³ (see Table D1 in Appendix D). This model explained slightly more variance ($R^2 = .32$), nullified the impact of economic trust ($\beta = -.09, n.s.$), and found two demographic variables to be significant predictors of financial risk tolerance. First, women showed, compared to men, a higher intolerance for financial risks ($\beta = .19, p < .01$).

⁴¹ This type of regression analysis circumvents disadvantages of stepwise regression analysis while having the benefit of comparing different models to see if added independent variables lead to a higher explained variance (Field et al., 2012).

⁴² As discussed in the Method section, financial risk tolerance was scored such that high scores were indicative of financial risk intolerance. Low(er) financial risk tolerance scores are therefore indicative of (more) tolerance for financial risks.

⁴³ Demographic variables were dummy coded into groups, with the largest group serving as the baseline.

Second, individuals who earned more than 3,000 euros per month (compared to those who earned less than 1,500 euros per month) were significantly more tolerant of financial risks ($\beta = -6.59^{44}$, $p < .05$).

Table 6. *Results of the hierarchical regression analysis with financial risk tolerance as the dependent variable and subjective financial knowledge, situational economic trust, and regulatory focus as independent variables (n = 276).*

Variable	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Constant	4.79***	0.14		5.18***	0.20		5.03***	0.21	
Financial knowledge	-0.38	0.04	-.46***	-0.34	0.05	-.41***	-0.33	0.05	-.40***
Economic trust				-0.17	0.07	-.15**	-0.14	0.07	-.12*
Regulatory focus							-0.26	0.08	-.17**
R^2	.21			.23			.25		
F for change in R^2	74.19***			6.83**			10.139**		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Predicting saving intention. As depicted in the theoretical model, saving intention (DV) was assumed to be predicted by financial risk tolerance, regulatory focus, subjective saving norms, and perceived financial self-efficacy (IVs). A hierarchical regression analysis was performed to see if these assumptions were validated by the data. Based on the a priori formulated theoretical expectations and the found correlations, the first model included financial risk tolerance, followed by adding financial self-efficacy, subjective saving norms, and regulatory focus in the second till fourth model, respectively (see Table 7).

⁴⁴ While not common, standardised beta values can be in excess of the range (-1,1) when two or more predictors are correlated with each other (see IBM, 2012; Jöreskog, 1999). To place this finding into context, individuals with the high income scored on average 2.72 points ($n = 15$) on the financial risk tolerance scale (range 1-5), while those with incomes less than 1,500 per month scored 3.84 points on average ($n = 91$).

The final model succeeded in explaining 44% of the variance in saving intention. The strongest predictors were financial risk tolerance ($\beta = .55, p < .001$) and financial self-efficacy ($\beta = .49, p < .001$), while regulatory focus had a minor influence ($\beta = -.11, p < .05$) and the impact of subjective saving norms was absent ($\beta = .08, n.s.$). These results showed the following: an intolerance of financial risks leads to a stronger intention to save money, a stronger financial self-efficacy leads to a greater intention to save money, and a prevention focus predicts more saving intention. Given that the impact of subjective saving norms was insignificant, individuals formulated their saving intentions independent from others' perceived opinions. Furthermore, the model met the assumptions of linear regression analysis (see Appendix D for details).

To further examine saving intention, additional regression analyses were performed (see Table D2 in Appendix D). In the fifth regression model the predictors of financial risk tolerance were added to verify if these did not influence saving intention. Results confirmed that situational economic trust ($\beta = .05, n.s.$) and subjective financial knowledge ($\beta = .06, n.s.$) did not predict saving intention. The sixth model subsequently added demographic variables as potential predictors of saving intention. This model failed to explain a significant higher amount of variance ($F(14, 261) = 1.491, n.s.$), although two demographic variables were found significant: females reported a higher saving intention than males did ($\beta = .11, p < .05$). And individuals who lived with a partner ($\beta = .22, p < .05$) and also those who lived with their parents ($\beta = .18, p < .05$) both reported higher saving intentions than those who lived on their own.

Table 7. Results of the hierarchical regression analysis with saving intention as the dependent variable and financial risk tolerance, financial self-efficacy, subjective saving norms, and regulatory focus as independent variables ($n = 274$).

Variable	Model 1			Model 2			Model 3			Model 4		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Constant	2.57***	0.15		0.85***	0.21		0.72**	0.22		0.72**	0.22	
Financial risk tolerance	0.34	0.04	.46***	0.43	0.04	.58***	0.43	0.04	.57***	0.41	0.04	.55***
Financial self-efficacy				0.36	0.03	.49***	0.35	0.04	.47***	0.36	0.04	.49***
Subjective saving norms							0.06	0.04	.08	0.06	0.04	.08
Regulatory focus										-0.12	0.05	-.11*
R^2	.21			.43			.43			.44		
F for change in R^2	71.65***			108.38***			2.58			5.02*		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Predicting self-reported saving behaviour. The third part of the theoretical model assumed that self-reported saving behaviour (DV) was predicted by saving intention and perceived self-efficacy (IVs). A hierarchical regression analysis was performed to see if the data confirmed this (see Table 8). The theoretical expectations and the uncovered correlations led to the inclusion of saving intention first, followed by perceived financial self-efficacy in the second model.

Both saving intention ($\beta = .37$, $p < .001$) and financial self-efficacy ($\beta = .50$, $p < .001$) were found to be significant predictors of self-reported saving behaviour, and together explained 52% of the variance. This shows that a stronger intention to save money is predictive of more self-reported saving behaviour and that a higher financial self-efficacy leads to more reported saving behaviour. This model also met the assumptions for linear regression analysis (see Appendix D for details).

To further explore participants' self-reported saving behaviour, two additional regression analyses were performed (both are reported in Table D3 in Appendix D). In the third model,

predictors of financial risk tolerance and saving intention were added. While not expected in the model, two were found to have a significant influence: more financial knowledge ($\beta = .16, p < .01$) and more economic trust ($\beta = .20, p < .001$) both predicted higher amounts of self-reported saving behaviour. In the fourth model, demographic variables were added as potential predictors of self-reported saving behaviour. Doing so provided the opportunity to verify if the demographic variables on which the sample differed from the population (see the Method section) influenced the reported saving behaviour. As expected by the theoretical model, none of the demographic variables were found to be significant. In addition, including them only raised the explained variance by 1 percent point, an insignificant increase over the model with the psychological variables⁴⁵ ($F(14, 251) = 1.495, n.s.$).

Table 8. *Results of the hierarchical regression analysis with self-reported saving behaviour as the dependent variable and saving intention and perceived financial self-efficacy as independent variables (n = 280).*

Variable	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Constant	0.00	0.36		-1.38***	0.32	
Saving intention	1.02	0.09	.55***	0.69	0.08	.37***
Financial self-efficacy				0.69	0.06	.50***
R^2	.30			.52		
F for change in R^2	119.5***			129.29***		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Figure A2, in Appendix A, contains the theoretical model with the standardised beta values from all three hierarchical regression analyses.

⁴⁵ A regression analysis with only demographic variables as predictors of self-reported saving behaviour explained 23% of the variance (not reported in a table), still considerably less than the model with only psychological variables explained (52%; Table 8).

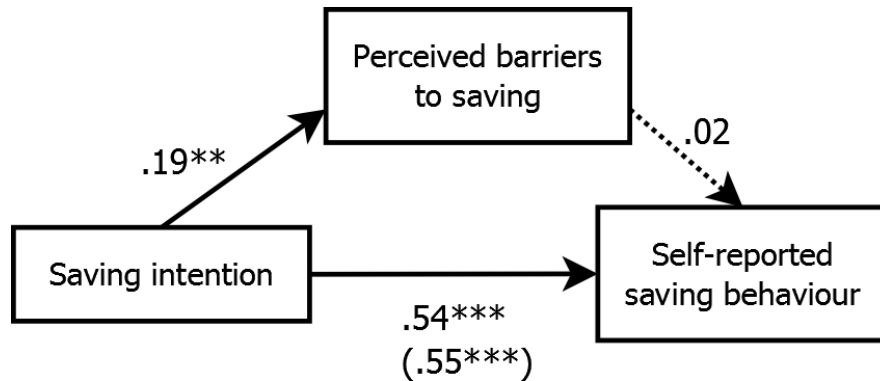
[insert Figure A2 here]

Testing the influence of saving barriers. The model assumed that perceived barriers to saving influenced the relationship between saving intention and self-reported saving behaviour: individuals who perceived stronger barriers to saving were assumed to be less able to translate saving intentions into saving behaviour, while those who perceived relatively small saving barriers were anticipated to do so much easier. To test this hypothesis, a factorial ANOVA was performed which showed a significant main effect of saving intention on saving behaviour ($F(1, 276) = 117.69, p < .001$), but no main effect of perceived barriers on saving behaviour ($F(1, 276) = 0.19, n.s.$) nor an interaction effect of saving intention and saving barriers on self-reported saving behaviour ($F(1, 276) = 0.37, n.s.$) was observed. These results showed that perceived saving barriers did not influence the strength of the relationship between saving intention and self-reported saving behaviour.

To examine if the relationship between saving intention and self-reported saving behaviour could be explained by including perceived barriers to saving, a mediation analysis was performed⁴⁶. As Figure 1 below shows, no mediation effect of perceived barriers to saving on the relation between saving intention and self-reported saving behaviour was found (Sobel's $z = 0.44, n.s.$). This showed that saving barriers did not account for a significant part of the relationship between saving intention and saving behaviour: saving barriers do not explain the relationship between saving intention and self-reported saving behaviour.

⁴⁶ This was tested with the method proposed by Baron & Kenny (1986): first the mediator was regressed on the IV, followed by regressing the DV on the IV, and in the third and final step the DV was regressed on both the IV and mediator.

Figure 1. *Mediation model with perceived barriers to saving as mediating the relation between saving intention and self-reported saving behaviour (n = 280). The total effect of the DV on the IV is noted between parentheses.*



Note: Depicted values are standardised betas. *** $p < .001$, ** $p < .01$, * $p < .05$.

Discussion

This study examined the impact of psychological determinants on saving behaviour, explained by a model based on the TPB. This model hypothesised predictive relations, which were subsequently tested with questionnaire data collected amongst a diverse sample of participants. The results showed interesting, and in some cases new, findings. In this section these results are discussed and put into a broader context, after which the limitations will be addressed followed by highlighting the practical and theoretical significance of the findings.

Conclusions

The model (see Appendix A) was tested with three regression analyses aimed at explaining three variables: financial risk tolerance, saving intention, and self-reported saving behaviour.

Explaining financial risk tolerance. The TPB's attitude was replaced by financial risk tolerance, a construct that measured an individual's beliefs and stance towards financial risk taking behaviour. The first part of the model assumed that this construct was predicted by situational

economic trust, subjective financial knowledge, and participants' regulatory focus — an assumption that was confirmed by the results.

Situational economic trust was, relative to the other IVs, a small, albeit significant, predictor of financial risk tolerance: a high situational economic trust leads to more financial risk tolerance. Situational factors, such as the current economic situation, the labour market, and an individual's personal financial situation can therefore be expected to mildly influence financial risk tolerance. This is a new finding: no other study related situational economic trust to financial risk tolerance, while other studies did show that both personal economic situational factors (e.g., González & Özcan, 2013; Macé, 2011; Pericoli & Ventura, 2011; Tokuoka, 2013) and macro-level factors (e.g., Crossley et al., 2013; Cox, 2007; Hansen, 2012; O'Neill & Xiao, 2012) are related with financial behaviour. Situational economic trust, however, had its predictive impact on financial risk tolerance invalidated when demographic variables were added to the regression model, of which gender and a high income proved to be weak and strong predictors of financial risk tolerance, respectively. Further research will therefore be needed to examine if situational economic trust is a (psychological) variable that can explain unique variance in financial risk tolerance.

Subjective financial knowledge proved to be the strongest predictor of financial risk tolerance: a high subjective financial knowledge leads to more tolerance for financial risk taking. Individuals who estimate their financial knowledge to be greater than that of other people, who are familiar with different saving options, and who exhibit practical knowledge about saving, have a considerable higher tolerance for financial risks. This is a new finding: no other study related subjective financial knowledge to financial risk tolerance.

Regulatory focus was a modest, significant predictor of financial risk tolerance: individuals who exhibited a promotion focus displayed a higher tolerance for financial risk taking (presumably to achieve their goals), while those who were concerned with a prevention focus had a greater intolerance of financial risk taking. This finding was in accordance with the literature on regulatory focus (e.g., see Crowe & Higgins, 1997; Freitas et al., 2002; Lockwood et al., 2002, and, in the

context of financial behaviour, Halamish et al., 2008), but it was also a new finding: no other study connected financial risk tolerance with regulatory focus theory.

Explaining saving intention. The next part of the model assumed that saving intention was predicted by financial risk tolerance, regulatory focus, subjective saving norms, and perceived financial self-efficacy. Results showed that the majority of these assumptions were proven to be correct.

Tolerance towards financial risks proved to be the strongest predictor of saving intention: an intolerance for financial risks is predictive of a stronger saving intention, while a strong financial risk tolerance forecasts less saving intention. This was not yet researched in the literature: other studies instead used a more general measure of attitude towards financial behaviour(s) (e.g., see Davis & Hustvedt, 2012; Croy et al., 2010; Shim et al., 2012; Kidwell & Turrisi, 2004). Interestingly, the standardised beta value of financial risk tolerance predicting saving intention was much higher than those studies. While further research is needed, perhaps financial risk tolerance might be a better operationalisation of attitude when it comes to financial behaviours.

Regulatory focus had a small impact on saving intention: a prevention focus is predictive of a stronger saving intention, while a promotion focus predicts less saving intention. Individuals who are concerned about security and potential losses can therefore be expected to have a stronger intention to save money, while those that consider advancement and potential gains more important will have less saving intention. While other studies showed corresponding results (e.g., see Crowe & Higgins, 1997; Higgins et al., 2001), this study seems to be the first that related regulatory focus with saving intention.

Surprisingly and against the assumption, subjective saving norms were a weak and insignificant predictor of saving intention, in contradiction with other studies into financial behaviour (e.g., see Croy et al., 2010; Davis & Hustvedt, 2012; Shim et al., 2012; Xiao et al., 2011). Two potential reasons might explain this. First, high educational attainment is associated with more financial knowledge and, more importantly, individuals with high financial knowledge are half as likely to consult their social environment than those with low financial knowledge (Van

Rooij et al., 2011). The participants in this sample were high educated and might not have taken their social environment's opinion into consideration when formulating their saving intentions: perhaps they considered themselves knowledgeable about saving already or felt that they, given the straightforwardness of saving, could do this easily themselves (i.e., high self-efficacy). Further research will be needed to determine if the relationship between perceived subjective norms and saving intention is moderated by either educational attainment or self-efficacy. The second potential explanation is that the influence of saving norms might have been nullified because more than half of participants were unemployed, which could have reduced the experienced control over saving money. Research from Kidwell and Turrisi (2004) showed that, if people experience a high level of control over a given behaviour, they experienced a stronger effect of subjective norm on intention, with the reverse true for people with low perceived control. This explanation also warrants further research.

Perceived financial self-efficacy turned out to be one of the strongest predictors of saving intention: the higher an individual's financial self-efficacy, the stronger their intention to save money. Individuals who feel themselves capable to deal with financial matters can therefore be expected to have stronger saving intentions than individuals who feel powerless when faced with financial decisions. This finding is in accordance with other studies that showed that financial self-efficacy influences saving intention and financial behaviour (see Davis & Hustvedt, 2012; Lusardi et al., 2009; Weiner & Doescher, 2008; Xiao et al., 2011).

Explaining self-reported saving behaviour. The last part of the model assumed that self-reported saving behaviour was predicted by saving intention and perceived financial self-efficacy. Results confirmed this: both variables predicted self-reported saving behaviour.

Saving intention predicted self-reported saving behaviour in the sense that the stronger the saving intention, the more saving behaviour was reported. It therefore seems reasonable to assume that individuals are fairly capable of translating their saving intentions into behaviour. Incidentally, the standardised beta value in this study was larger than those reported in the literature (see Davis & Hustvedt, 2012; Shim et al., 2012; Xiao et al., 2011), but results nonetheless collaborated

existing empirical findings: saving intention is predictive of self-reported saving behaviour (Loibl et al., 2011).

Perceived financial self-efficacy predicted self-reported saving behaviour as follows: higher financial self-efficacy leads to more saving behaviour. This suggests that individuals who feel capable in dealing with money issues also succeed into translating this into financial behaviour, a finding that is in line with other studies (see Weiner & Doescher, 2008; Davis & Hustvedt, 2012; Xiao et al., 2011).

Interestingly enough, and opposed to prior expectations, both subjective financial knowledge and situational economic trust also predicted self-reported saving behaviour, albeit mildly. Further research will be needed into both constructs. For instance, in the case of subjective financial knowledge it is not clear under which conditions this leads to risk taking or risk prevention: it can likely make people more confident, leading to more risk taking (see Wang, 2009), but individuals with emergency savings exhibit higher subjective knowledge than those who have no emergency savings (see Babiarz & Robb, 2013). Perhaps subjective knowledge consists out of both an estimate about one's own knowledge coupled with a confidence related factor, with each factor acting out its influence on saving differently.

The impact of perceived saving barriers. The assumption was put forth that perceived barriers to saving influenced the relationship between saving intention and self-reported saving behaviour: individuals who perceived stronger saving barriers were expected to have more difficulty translating their saving intentions into behaviour. This hypothesis was based on the assertion of the TPB that the amount of volitional control a person has determines to what degree intentions are translated into behaviour (Ajzen, 1991). Research indeed showed that both actual (such as income and spending behaviour; see Lunt & Livingstone, 1991) and perceived barriers (see Lusardi et al., 2009) are related to saving behaviour. But in this study no impact of perceived saving barriers on the relation between saving intention and self-reported saving behaviour was found.

Several reasons, each warranting further research, might explain this finding. First,

perceived barriers to saving, though operationalised based on the literature, might have fallen short of measuring actual, meaningful barriers participants experienced. For instance, discretionary barriers were not taken into account: participants who earmarked their excess discretionary income as needed for other purposes (like accelerated paying off the mortgage) would in practice experience barriers to saving, even though they experienced no income-related saving barriers (i.e., if they prioritise differently, they could save). Second, perceived saving barriers included statements about a lack of information. These might have carried little weight, however: the sample was high educated and young, and therefore presumably Internet-savvy enough to find saving information on-line. Perhaps informational barriers were, in this context, more reflective of a certain saving disinterest. Third, both saving intention and self-reported saving behaviour were operationalised without referencing a specific amount of euros to prevent biasing answers due to income inequalities. Should participants had been asked about perceived barriers when presented with a considerable and specific saving goal, they likely would have reported stronger barriers to saving. Fourth and finally, perhaps perceived barriers were already taken into account before saving intentions were formulated: individuals with high perceived barriers could have placed a lower value on saving (i.e., cognitive dissonance: Festinger, 1957, in Goetzmann & Peles, 1997), resulting in a smaller saving intention (i.e., perceived barriers might predict saving intention).

Limitations

While the study had several strong points, the following limitations are addressed with recommendations for further research:

Better sampling. In contrast to similar studies (e.g., see Shim et al., 2012; Xiao et al., 2011) the sample was not limited to the student population, which allowed to achieve the goal of model verification based on a heterogeneous sample. However, the sample was not representative of the Dutch population (e.g., only 2 percent of participants were retired) and included a self-selection bias due to self-recruiting participants. Further validation of the model is therefore

well advised to use a large, more diverse sample.

Dropout examination. The current study asked demographic variables at the end of the questionnaire given their privacy-sensitive nature and to prevent biasing answers (see Perrault, 1975). A drawback of this was, however, that it was impossible to examine if, and how, participants that dropped out differed from those that did complete the questionnaire. Further research might therefore consider using a different sequence of questions.

Concrete operationalisations. Several constructs (like saving intention and perceived saving barriers) were operationalised in general terms to prevent biasing due to income differences. But this also impeded answering several important questions. For instance, are saving intentions stronger the more an individual wants to save, or would lofty saving goals have a negative impact on perceived financial self-efficacy and lead to a lower saving intention? One resolution to this would be to use questionnaire software that allows different statements dependent on earlier answers. That way explicit saving targets can be formulated that are relative to each individual's reported income range. Similarly, a range of hypothetical situations with concrete saving goals could randomly be presented to participants to examine how this impacts their saving intention. An additional benefit of this latter approach is that it gives insight into which information-based interventions can be useful (see Kievik & Gutteling, 2011, for an example).

Examine subjective norms broader. The study did not find evidence to support the claim that perceived subjective norms influence saving intentions, even though it operationalised subjective norms in accordance with the literature and in line with the TPB. Perhaps not all behavioural intentions for all age groups can be explained with subjective norms that solely relate to the immediate social environment and a broader definition will be needed. An example of this latter is Hershey's model of investor behaviour (see Hershey, 2004; Hershey et al., 2008) that sees cultural ethos (the sociocultural influences that stem from family, societal, and peer norms) as one of the factors that influences financial behaviour.

Define saving behaviour more extensive. The current study looked specifically at saving behaviour, thereby excluding other financial products (e.g., insurance) that can also serve as

risk-mitigating strategies. But individuals with a high intolerance for financial risk might not prefer to reduce their potential financial risks by saving but, for instance, by purchasing insurance that covers a wide range of situations. Further research might therefore look into expanding the definition of saving behaviour.

Theoretical implications

The results of this study have both theoretical as well as practical implications, which are discussed below. To start with the first:

Adapt the TPB to specific domains. The TPB has already been proven to be a model that can predict a wide range of behaviours (see, for an overview, Ajzen, 1991; Armitage & Conner, 2001; Conner & Armitage, 1998), and results from this study further added credence to the TPB by successfully applying it to the domain of financial behaviour: the model explained 52% of the variance in self-reported saving behaviour as opposed to 31% in self-reported behaviour for the TPB in general (see Armitage & Conner's, 2001, meta-analytic review). This showed that adapting the TPB to specific domains can be a valuable line of inquiry.

Add a specific measure of attitude. The TPB's general attitude was replaced in this study with an operationalisation considered to be more reflective of the subject matter at hand. Results confirmed this assumption: financial risk tolerance was a much stronger predictor of saving intention than less elaborative measures of attitude in TPB-based studies. This suggests that, at least for certain behaviours, other operationalisations than general attitude can be beneficial.

Include subjective knowledge in the TPB. Results showed that subjective financial knowledge was an important predictor of financial risk tolerance, in addition to being a significant predictor of self-reported saving behaviour directly. This latter finding collaborated other studies that already showed that subjective knowledge has an important impact on (financial) behaviour. Perhaps the predictive capabilities of the TPB can be further expanded by including subjective knowledge.

Behaviour is not only predicted by intention and PBC. The TPB assumes that solely

intention and PBC (i.e., self-efficacy) predict behaviour. But in the case of saving behaviour, results showed that this was not the case: both situational economic trust and subjective financial knowledge predicted self-reported saving behaviour directly, while each did not predict intention. This suggests that not all psychological constructs exert their influence on behaviour through intention or PBC.

Psychological variables are better predictors of saving behaviour than demographic variables. Several studies have related demographic variables to (self-reported) saving behaviour (e.g., see Alessie & Teppa, 2009; Babiarz & Robb, 2013; Barasinska et al., 2012; Danes & Haberman, 2007; Dietz et al., 2003; Finke & Huston, 2003; Fisher, 2010; O'Neill & Xiao, 2012; Pericoli & Ventura, 2011) but in this study, interestingly enough, no demographic variable was a significant predictor when added to the psychological model (i.e., perceived financial self-efficacy and saving intention) that predicted self-reported saving behaviour. In addition, a regression model consisting solely out of demographic variables explained considerable less variance in self-reported saving behaviour than the psychological model did. While this finding will need to be replicated, it does show that even seemingly important demographic variables like work or income are much less important than psychological determinants.

Practical implications

Besides these theoretical implications, the study also generated several worthwhile practical implications:

Target financial self-efficacy in interventions. When it comes to stimulating saving behaviour, perceived financial self-efficacy seems to be one of the most promising determinants: it proved to be a strong predictor of both saving intention and self-reported saving behaviour directly. In addition, self-efficacy in the context of saving can be relatively easily (and cost-effectively) manipulated with informational materials (see Lusardi et al., 2009).

Address motivational states. Results showed that regulatory focus influenced both an individual's financial risk tolerance as well as their saving intention. Even though its impact was

less than financial self-efficacy, regulatory focus can be addressed in interventions because it can be manipulated conveniently by framing financial information (see Halamish et al., 2008) and is situation-dependent (see Freitas et al., 2002). Perhaps interventions can combine both financial self-efficacy and regulatory focus for a combined, stronger effect. For example, saving could be framed in a prevention focus (to stimulate saving intentions) coupled with addressing how one can easily save regularly (to stimulate saving intentions and self-reported saving behaviour directly).

Saving barriers might not always be relevant. Counterintuitively, findings showed that perceived saving barriers (such as income or information) might not be relevant for saving behaviour. While still a tentative insight and replication of this finding is needed, it does suggest that saving barriers are not always that important. This would imply that interventions aimed at helping individuals to achieve more discretionary income (e.g., through budgeting) might not lead to (more) saving behaviour, unless such interventions also address financial self-efficacy and/or regulatory focus.

Saving norms might be better left untouched. Results showed that subjective saving norms showed no impact on saving intention. In addition, results from Kidwell and Turrise (2004) showed that subjective norms in certain circumstances can evoke negative emotions. It therefore seems prudent that practitioners refrain from using subjective norms in an attempt to stimulate saving behaviour, since they might not contribute to the formulation of saving intentions and can even backfire.

Communicating specific saving targets needs a stronger theoretical foundation. This study showed that financial self-efficacy (in general, the perception of being able to perform a certain action; Bandura, 1977) is the most important factor in predicting saving intention and self-reported saving behaviour. While research is needed into the impact of communicating saving targets on financial self-efficacy, it seems reasonable to assume that high saving targets lower an individual's perception of successfully meeting that goal.

Ironically, NIBUD's (2008, 2012, 2013) approach to stimulating saving behaviour has been exactly that: communicating the exact amount of savings households should, according to

NIBUD's (2008) calculations, need to have. For example, a 50-year old individual with a net income of 35,000 euros living in an owner-occupied house is advised to have a minimum buffer of 16,200 euros, which excludes unexpected expenditures and the costs of a period with lower income due to unemployment or retirement (see NIBUD, 2008).

In the light of the empirically-validated model put forth in this study it is hard to envision how such an approach does not reduce perceived financial self-efficacy, leading to a weaker saving intention and eventually less saving behaviour. If anything, this study has shown that psychological determinants play an important role in saving behaviour and that stimulating saving behaviour is much more than merely providing matter-of-fact information. Even in the seemingly objective, quantitative world of financial behaviours, psychology has its place.

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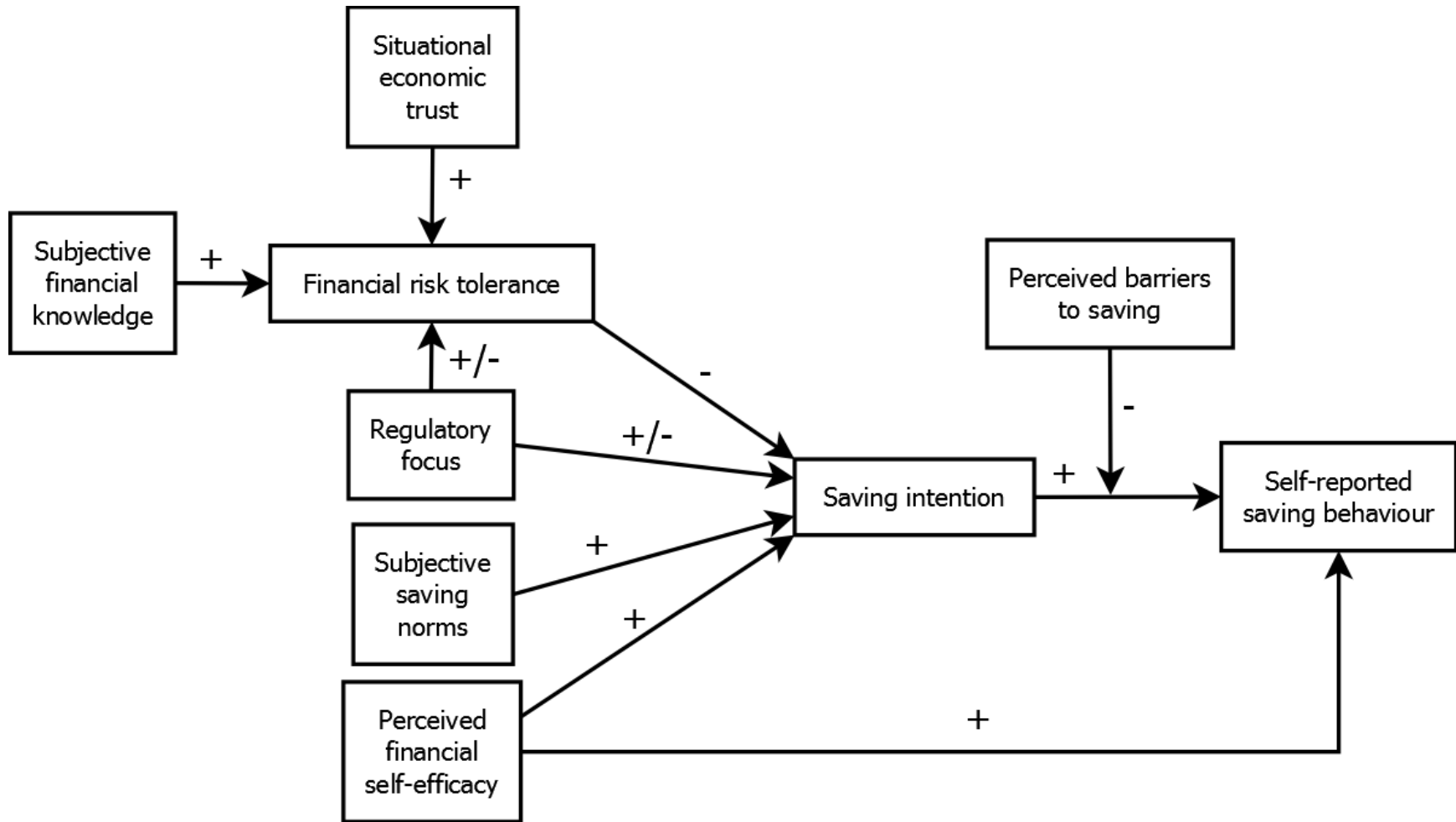
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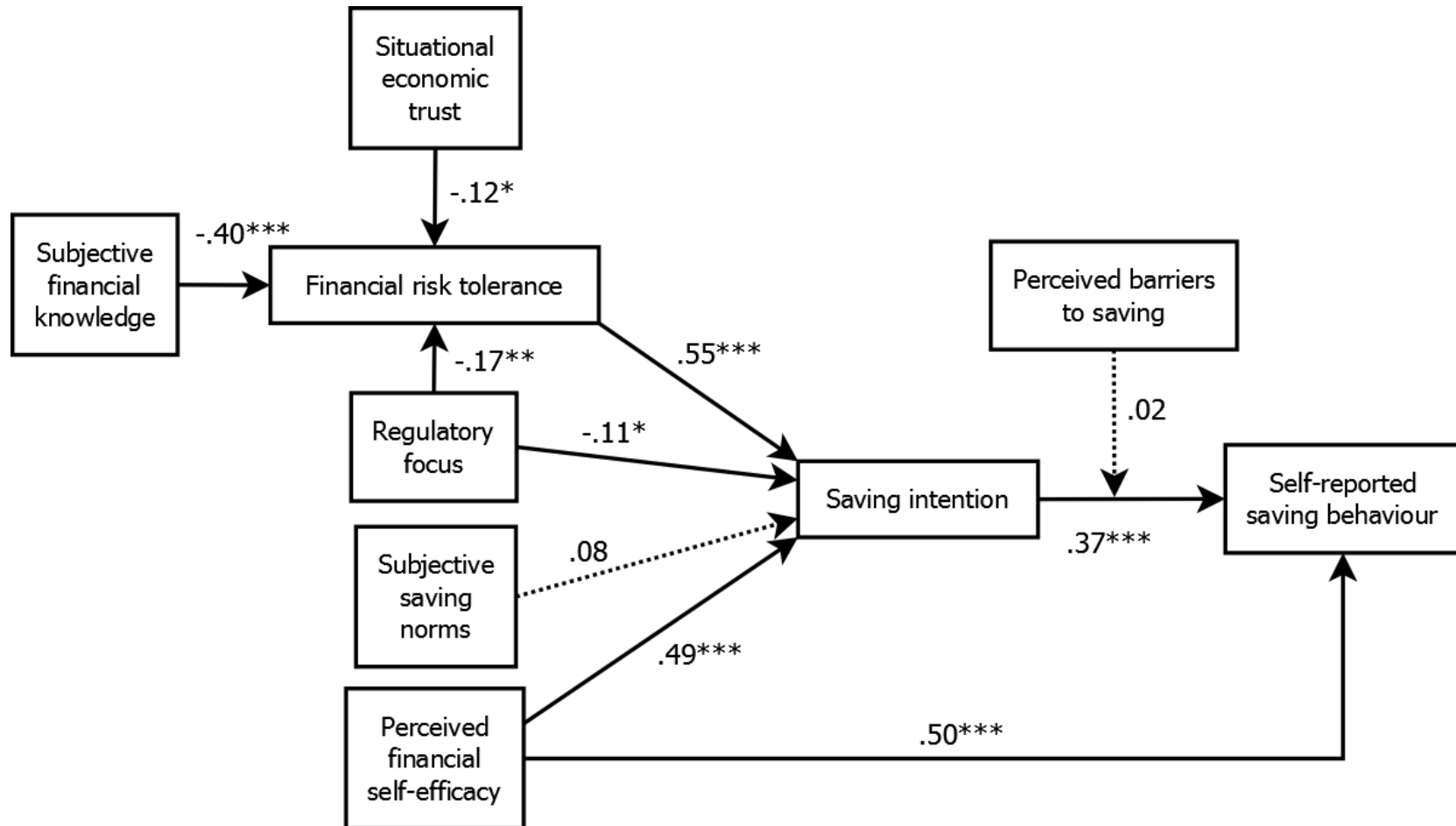
Appendix A: Theoretical model

Figure A1. *Proposed theoretical model.*



Note: The +/- sign for the regulatory focus relations is meant to convey that both a positive and negative relation are expected, depending on the motivational states (i.e., prevention and promotion focus).

Figure A2. Empirically tested model.



Notes:

(a) Financial risk tolerance is scored such that high scores are indicative of an intolerance for financial risks. Other variables were scored such as one would expect, with high scores representing more of the variable in question.

(b) Saving intention is a weaker predictor here ($\beta = .37$) than was observed in the mediation model. This is caused by the inclusion of financial self-efficacy, which reduces the impact saving intention has on self-reported saving behaviour.

* $p < .05$, ** $p < .01$, *** $p < .001$. Insignificant relations are highlighted with a dotted line.

Appendix B: Comparisons between subsamples

One of the motivations behind the convenience sampling method was to achieve a greater amount of diversity than if participants were only recruited amongst the student population.

Statistical comparisons of the subsamples showed that this goal was achieved.

First, participants in the Sona group were more likely to be female while participants in both Internet samples were more likely to be male ($\chi^2(2) = 48.13, p < .01, n = 272$). Second, ING participants were less likely to be low educated (MBO, HAVO/VWO, MBO, Other) and more likely to have attended higher education (HBO and WO). Sona participants were more likely to be less well educated⁴⁷ ($\chi^2(2) = 23.32, p < .01, n = 272$). Third, ING participants were less likely to be living with their parents and more likely to be living with a partner, while IWG participants were less likely to be living alone or with roommates. Sona participants were more likely to be living alone or with roommates and less likely to be living with a partner ($\chi^2(4) = 37.49, p < .01, n = 272$). Fourth, Sona participants were more likely to be living in a rental property and less likely to be living in an owner-occupied home ($\chi^2(2) = 22.93, p < .01, n = 272$). Fifth, Sona participants were more likely to be studying and less likely to be unemployed (looking for a job, retired, unable to work, taking care of the household) or working (including self-employed). IWG participants were more likely to be unemployed while ING participants were more likely to be employed. Moreover, both ING and IWG participants were less likely to be studying ($\chi^2(2) = 22.93, p < .01, n = 271$). Sixth, Sona participants were less likely to be the main breadwinner themselves and more likely to identify one of their parents as such, while ING participants were more likely to be the main breadwinner themselves ($\chi^2(6) = 103.02, p < .01, n = 272$). Seventh, Sona participants were more inclined to report no income, ING participants were more likely to state an income in excess of 1,500 euros per month, and IWG participants were less likely to report no income ($\chi^2(8) = 146.55,$

⁴⁷ This suggests that several participants read this question as ‘what is your highest level of education that you graduated from’ while the question asked ‘what is your highest level of education?’ (‘wat is uw hoogst genoten opleiding?’), regardless of whether they finished this education or not.

$p < .01$, $n = 269$). Eight and finally, the three subsamples differed from each other in average age (Welch's⁴⁸ $F(2, 110.92) = 104.51$, $p < .001$): Sona participants were significantly⁴⁹ younger than both IWG participants ($M_{\text{Sona-IWG}} = -10.497$, 99% CI [-15.413, -5.581]) and ING participants ($M_{\text{Sona-ING}} = -10.601$, 99% CI [-13.018, -8.186]), while there was no significant age difference between the Internet participants ($M_{\text{ING-IWG}} = 0.105$, 99% CI [-5.286, 5.495]).

As these subsample differences show, the utilised sampling method led to a more diverse sample than if sampling would have been limited to the student population.

⁴⁸ Because Levene's test for the homogeneity of variances ($F(2, 269) = 50.09$, $p < .001$) showed a violation of one of ANOVA's assumptions (see Field et al., 2012), a Welch's ANOVA test was performed.

⁴⁹ A post hoc test that corrects for the unequal sample sizes and variances, the Dunnett's modified Tukey-Kramer pairwise comparison test, also known as Dunnett's C procedure, was performed to uncover the individual group differences (see e.g., Huizingh, 2004; Lau, 2013).

Appendix C: Statistical analysis of constructs

Financial risk tolerance

Prior to analysing the financial risk tolerance items with a principal components factor analysis (PCA), preliminary analyses were done to explore the relationships amongst the statements. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy⁵⁰ showed a good value of .85. And, while inspection of the correlation matrix showed several weak relationships, the Bartlett's test of sphericity gave strong evidence that the correlations between items were significantly different from zero ($\chi^2(45) = 904, p < .001$). Finally, the determinant of the *R*-matrix showed no evidence⁵¹ of (extreme) multicollinearity and singularity ($|R| = 0.06717$).

Next an exploratory unrotated PCA with 10 factors was performed to see if the items clustered in a meaningful way. This tentatively uncovered two factors with eigenvalues above Kaiser's criterion of 1 (see Field et al., 2012). The eigenvalues were subsequently plotted in a scree plot and the point of inflexion (see Field et al., 2012) also suggested that there were likely 2 factors underlying the data.

Since this was in accordance with the a priori formulated theoretical assumptions, a PCA with oblique rotation that forced the items into 2 factors was performed. This did not, however, identify a clear factor structure: while the first factor had high factor loadings ($> .30$) with 9 statements, the second factor loaded on statement 5⁵², cross-loaded on statement 1⁵³, and loaded

⁵⁰ The Kaiser-Meyer-Olkin (KMO), the ratio of the squared correlation between variables to the squared partial correlation between variables, varies between 0 and 1: a value of 0 indicates diffusion in the patterns of correlations, which makes factor analysis likely inappropriate. A value close to 1 indicates that the patterns of correlations are relatively compact and factor analysis should, therefore, yield distinct and reliable factors (Field et al., 2012).

Hutcheson and Sofroniou (1999, in Field et al., 2012) suggest that values between .5 and .7 are mediocre, between .7 and .8 are good, between .8 and .9 great, and values above .9 are superb.

⁵¹ Field et al. (2012) suggest that the determinant should be greater than 0.00001 to give evidence for the absence of multicollinearity.

⁵² This item read, reversely coded: "If a family member leaves me an inheritance of 100,000 euros, I would invest everything in stocks" (in Dutch: "Als een familielid me een erfenis nalaat van € 100.000 zou ik alles in aandelen investeren").

negatively on statement 7⁵⁴. Given that both factors were assumed to measure the same psychological construct (i.e., financial risk tolerance), there was an unexpected weak relationship between both ($r = .10$). Moreover, the second factor had a very poor internal consistency (Cronbach's $\alpha = .19$).

Statements 5 and 7 from the second factor differentiated themselves from other statements by asking participants what they would do in a very unlikely situation (e.g., inheriting 100,000 euros). Given the statistical results in addition to the wording of these statements, it was decided to exclude both statements and to perform the PCA with oblique rotation again, this time forcing the items into 1 factor. This resulted in a factor (see Table C1 below) that explained 45.79% of the variance and had a good internal consistency (Cronbach's $\alpha = .82$).

⁵³ This item read: "Should I unexpectedly receive a sum of money that equals my yearly net income, I would put it in my savings account and not invest it" (in Dutch: "Als ik onverwachts een bedrag ter grootte van mijn jaarlijkse netto inkomen kreeg, dan zou ik het op een spaarrekening zetten en niet beleggen").

⁵⁴ This item read: "If I lose my job a few weeks before I will go on a luxury holiday, I would immediately cancel all bookings" (in Dutch: "Als ik mijn baan zou verliezen een paar weken voordat ik op een luxe vakantie ga, dan zou ik de boekingen direct annuleren.").

Table C1. Results of the principal components analysis with oblique rotation of the financial risk tolerance items ($n = 287$).

Items	Factor 1
8: I feel comfortable taking financial risks*	.77
4: I don't mind taking large financial risks since these give a chance at large profits*	.75
6: When it comes to taking financial risks, I'm a real risk avoider	.74
9: When hearing the word 'risk', I think more about losses and uncertainty than about possibilities and profits	.68
2: Should I invest in something, then I certainly don't want to lose money in the worst-case scenario, even if that means I will barely make a profit	.67
1: Should I unexpectedly receive a sum of money that equals my yearly net income, I would put it in my savings account and not invest it	.64
3: When it comes to taking financial risks, I'm only willing to take small risks at most	.61
10: I have enough knowledge and experience to be comfortable with taking financial risks*	.52
Eigenvalue	3.66
Explained variance	45.79%
Cronbach's α	.82

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F.

Saving intention. Preliminary analyses were performed to see if factor analysis on the saving intention statements would have been justified. First, the KMO measure of sampling adequacy showed a good value of .76. Furthermore, while visually inspecting the correlation matrix showed several weak correlations ($-.20 < r < .20$), the Bartlett's test of sphericity gave very strong evidence that the correlations between the items were significantly different from zero ($\chi^2(91) = 1424.17, p < .001$). Finally, concerns about multicollinearity or singularity were considered unfounded ($|R| = 0.01396$).

An exploratory unrotated PCA with 14 factors was performed to see if any items could be grouped together. This provisionally uncovered 4 factors with eigenvalues larger than Kaiser's criterion (3.73, 2.38, 1.18, and 1.07). The fourth factor was just above the criterion, and the scree plot of eigenvalues in addition to inspecting the factor loadings suggested that 3 factors were likely

to be underlying the data. Since this was in accordance with the assumed number of underlying dimensions, a PCA with oblique rotation that forced the items into 3 factors was performed. The resulting three-factor solution had eigenvalues clearly above Kaiser's criterion (3.16, 2.57, and 1.56) and explained just over more than half of the variance.

However, two statements had weak factor loadings and lowered the internal consistency. Removal of statement 9 ("I usually make financial decisions without spending too much time on it"⁵⁵, reversely coded) from the second factor would raise the reliability from .75 to .78. While this is a minor increase, the item also exhibited a low item-rest correlation ($r = .30$), which is on the borderline of being acceptable (Field et al., 2012). Since the wording of this statement could also be seen as reflective of financial decision making (instead of an aspect of saving intentions) it was decided to drop this item. Statement 8 from the third factor also lowered the reliability: removing it would raise the internal consistency considerably from .42 to .57. This item was also removed since the face validity was considered quite low in relation to saving intention ("I'm only willing to take financial risks if these can be controlled"⁵⁶).

After the removal of these two items a PCA with oblique rotation that forced the items into 3 factors was performed, which gave a three-factor solution that succeeded in explaining 57.24% of the variance (see Table C2). There were no strong correlations amongst the sub-scales: the general saving intention statements (factor 1) had a weak correlation with the general financial risk taking (factor 2; $r = .21$) and long-term instrumental financial intentions (factor 3; $r = .21$) statements. And these last two factors were negatively correlated ($r = -.09$). Since these correlations suggest that each sub-scale measured a distinct part of saving intention (otherwise stronger correlations would have been found; see Field et al., 2012), they were combined into one saving intention scale.

⁵⁵ The Dutch item read: "Financiële beslissingen neem ik doorgaans zonder daar veel tijd aan te verspillen".

⁵⁶ The Dutch item read: "Ik ben alleen bereid om financiële risico's te nemen als deze kunnen worden gecontroleerd".

Table C2. Results of the principal components analysis with oblique rotation of the saving intention items ($n = 287$).

Items	Factors		
	1	2	3
7: I consider saving to be an unnecessary and boring activity*	.78		
1: I want to save money so that I'm prepared for unexpected expenditures	.73		
3: I don't consider it necessary to save money in the near future*	.73		
6: I only consider saving important if this is absolutely necessary*	.72		
4: I intent to save money for unexpected expenditures	.70		
2: I expect to save money in the coming months	.43		.36
12: If I want to achieve a lot of profit, then I intend to take large risks*		.90	
11: If there is a large chance on profit, I'm willing to take even large risks*		.87	
5: I occasionally take financial risks for fun or to satisfy curiosity*		.65	
10: To achieve something in life you need to be willing to take risks*		.62	
14: I primarily save to achieve my future goals			.80
13: I see money as a means to achieve important goals in the long run			.77
Eigenvalue	2.98	2.47	1.60
Explained variance	24.16%	20.25%	12.84%
Cumulative variance explained	24.16%	44.41%	57.24%
Cronbach's α	.80	.78	.57

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F. Factor loadings $< .30$ are suppressed.

Perceived financial self-efficacy. Preliminary statistical analyses were performed to delve into the relationships amongst the perceived financial self-efficacy statements. The KMO measure of sampling adequacy showed with .83 a good value. Furthermore, visual inspection of the correlation matrix showed only a few weak correlations, and this was confirmed by a highly significant Bartlett's test of sphericity ($\chi^2(28) = 1016.08, p < .001$). Also, no multicollinearity or singularity was judged to be present ($|R| = 0.04835$).

An exploratory unrotated PCA with 8 factors was performed to see if items could be grouped together; this tentatively suggested two factors that had eigenvalues of 3.83 and 1.07. The second factor, however, cross-loaded on all eight items, and the subsequently created scree plot

also suggested that there was likely one factor underlying the data. Since that was consonant with the theoretical assumptions, a PCA with oblique rotation that forced the items into 1 factor was performed (see Table C3) that led to a financial self-efficacy scale (Cronbach's $\alpha = .84$).

Table C3. *Results of the principal components analysis with oblique rotation of the financial self-efficacy items (n = 295).*

Items	Factor
	1
7: I find regularly saving money difficult*	.82
8: With money matters, I find it difficult to execute my plan or keep my good intentions*	.77
2: I often feel powerless in dealing with money issues*	.76
6: I am convinced I can save regularly	.73
5: I often feel confident when making financial decisions	.69
1: I only have little influence on the financial things that happen to me*	.66
3: There are only a few things I can do to change my financial affairs	.58
4: I am convinced that how I deal with money influences my future	.43
Eigenvalue	3.83
Explained variance	47.91%
Cronbach's α	.84

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F.

Self-reported saving behaviour. Preliminary analyses of the self-reported saving behaviour statements showed a good measure of sampling adequacy ($KMO = .83$), no evidence for the absence of correlations according to Bartlett's test of sphericity ($\chi^2(10) = 680.52, p < .001$), and no evidence for multicollinearity ($|R| = 0.13238$). An exploratory unrotated PCA with 5 factors revealed, analogous to the assumptions, one factor with a large eigenvalue (3.07) above Kaiser's criterion, and this one-factor solution was subsequently confirmed by taking the point of inflexion of the scree plot into consideration.

Next a PCA with oblique rotation that forced the statements into 1 factor was performed

(see Table C4). The self-reported saving behaviour factor had high loadings on every item and explained 61.35% of the variance (Cronbach's $\alpha = .84$).

Table C4. *Results of the principal components analysis with oblique rotation of the self-reported saving behaviour items (n = 303).*

Items	Factor
	1
4: Besides the money I have already saved, I still save regularly	.88
1: In the past six months I have frequently saved money	.82
2: I have saved money for unexpected expenditures	.79
3: I also save money when I don't have a real saving goal	.74
5: I did not save money in any of the past 12 months*	.66
Eigenvalue	3.07
Explained variance	61.35%
Cronbach's α	.84

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F.

Subjective saving norm. Relations amongst the subjective saving norm items were explored with several preliminary statistical tests. The KMO measure of sampling adequacy achieved a good value of .83. Furthermore, Bartlett's test of sphericity showed that there were at least some correlations ($\chi^2(21) = 668.64, p < .001$), but these relationships were not approaching multicollinearity or singularity ($|R| = 0.13636$). Subsequently, an unrotated exploratory PCA with 7 factors was performed to see whether or not the items could be grouped together in a meaningful way. This uncovered one factor with an eigenvalue above Kaiser's criterion, and the point of inflexion of the plotted eigenvalues suggested also as much. Since this confirmed the assumptions, a PCA with oblique rotation that forced the items into one factor was performed.

The resulting one-factor solution had relatively high factor loadings on all items but one. This item, statement 6, also led to a minimal reduction in the internal consistency and, more importantly in this case, displayed a poor item-rest correlation ($r = .30$). Further inspection showed

that the item ("I think that people who I consider important or who's opinion I value don't save regularly themselves"⁵⁷) was the only negatively worded item, and on a page where the statements were relatively long-winded ($M_{\text{words per sentence}} = 17.14$, $SD = 1.8645$). In addition, several of these statements were formulated in a similar manner. It was therefore deemed likely, as an explanation for the low item-rest correlation, that participants might have misread this statement.

Consequently, this item was removed and the PCA with oblique rotation was performed again (see Table C5 below), resulting in a solution that explained 52% of the variance (Cronbach's $\alpha = .81$).

Table C5. *Results of the principal components analysis with oblique rotation of the subjective saving norm items (n = 289).*

Items	Factor
	1
7: I think that people who I consider important or who's opinion I respect save regularly themselves	.79
3: I think that people who I consider important or who's opinion I respect think it's important that I save regularly	.77
4: I think that people who I consider important or who's opinion I respect expect that I save regularly	.75
5: I think that people who I consider important or who's opinion I respect view regularly saving positively	.72
2: My friends consider it important to save money every month for unexpected expenditures	.68
1: My parents consider it important to save money every month for unexpected expenditures	.62
Eigenvalue	3.12
Explained variance	52.08%
Cronbach's α	.81

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F.

Financial knowledge. To verify if forcing the financial knowledge items into a factor structure would have been justified, several preliminary statistical tests were performed. No red

⁵⁷ In Dutch, the item read: "Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer zelf niet regelmatig zouden sparen".

flags were raised with an impressive KMO measure of sample adequacy of .93, very strong evidence of correlations amongst items (Bartlett's test of sphericity: $\chi^2(105) = 2892.13, p < .001$), and no strong evidence for multicollinearity or singularity ($|R| = 0.00017$). To initially explore the factor structure, an unrotated PCA with 15 factors was performed. The eigenvalues of 7.03 and 1.81 in conjunction with the scree plot suggested that a two-factor solution would be most appropriate. Since this tentatively confirmed the theoretical assumptions, a PCA with oblique rotation that forced the items into two factors was executed.

This led to a two-factor structure in which the first factor had both a high eigenvalue (6.55) and internal consistency (Cronbach's $\alpha = .93$). This latter could have been raised with .01, but the item-rest correlation for statement 14 ($r = .41$) did not warrant such a decision. The second factor, however, was less impressive when it came to reliability (Cronbach's $\alpha = .69$). Removal of the 10th item ("I save with a monthly, automatic plan"⁵⁸) would raise the reliability due to its low item-rest correlation ($r = .30$). Since this statement was deemed more reflective of saving behaviour than of saving knowledge, the statement was removed and the PCA was performed again. This led to the two-factor solution depicted in Table C6 below. Furthermore, both factors showed a weak correlation ($r = .28$), raising the possibility that each measured a different aspect of financial knowledge. Both sub-scales were therefore combined into one financial knowledge scale.

⁵⁸ The Dutch item read: "Ik spaar via een maandelijks automatisch plan".

Table C6. Results of the principal components analysis with oblique rotation of the financial knowledge items ($n = 290$).

Items	Factors	
	1	2
4: I know enough about money matters to feel quite confident when making a financial decision	.86	
7: Compared to other people I don't know much about money matters*	.86	
8: I find managing money matters always complicated*	.85	
5: I feel that I'm not very aware about of money matters*	.85	
2: My general knowledge of money matters is high	.84	
1: I know a lot about financial matters compared with friends	.79	
6: In my circle of friends, I'm one of the "expert" when it comes to money matters	.79	
3: I know a lot about the different options for saving money	.74	
13: I'm familiar with the Dutch saving deposit insurance	.71	
14: I don't know what bank saving exactly is*	.51	
12: I would switch to another bank if I would get a higher saving interest rate		.80
15: I've already once switched banks with my savings		.70
11: I've put my savings into a long-term deposit		.68
9: I often check what the current saving interest rates are	.49	.51
Eigenvalue	6.56	2.14
Explained variance	46.17%	14.64%
Cumulative variance explained	46.17%	60.82%
Cronbach's α	.93	.70

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F. Factor loadings $< .30$ are suppressed.

Perceived barriers to saving. A few preliminary statistical tests were performed to see if forcing the perceived barriers to saving items into factors would have been justified. The KMO measure of sampling adequacy showed a good value of .85. Furthermore, no potential issues in terms of correlations were uncovered with a highly significant Bartlett's test of sphericity ($\chi^2(36) = 837.92, p < .001$) and large R -matrix determinant ($|R| = 0.08211$). An exploratory unrotated PCA with 9 factors was performed to explore the potential factor structure, which provisionally suggested 2 factors with eigenvalues of 3.58 and 1.16. Since this was in accordance with the

assumed underlying dimensions, a PCA with oblique rotation that forced the items into 2 factors was performed.

Reliability analysis of the resulting factor structure showed that the first factor had an acceptable internal consistency (Cronbach's $\alpha = .78$), which, in addition, could also be raised to .81 should statement 7 been removed. This item ("Compared to my friends I spend a lot of money each month on things such as clothing, mobile phone, music and movies"⁵⁹) also exhibited a low item-rest correlation ($r = .27$). The poor performance of this item was attributed, in part, to the fact that it asked participants, as opposed to the other items, to make an estimate about spending patterns of friends. Since answers on this item might also reflect how openly one speaks with friends about spending money, it was decided to exclude this item.

The internal consistency of the second factor was, compared to the first factor, much poorer (Cronbach's $\alpha = .56$). Item 6 of this factor ("I find it hard to plan far into the future"⁶⁰), however, would raise the reliability slightly to .57 if removed. This item, which had a low item-rest correlation ($r = .29$), was considered to measure saving obstacles too indirectly by asking about general planning instead of financial planning, and was thus removed from the factor. After exclusion of these two items, the PCA with oblique rotation that forced the items into two factors was performed again, and gave a much clearer two-factor solution that explained 61.74% of the variance (see Table C7). With both factors correlating weakly ($r = .32$), each might explain some unique variance in perceived saving obstacles. Both sub-scales were therefore combined into one perceived saving obstacles scale.

⁵⁹ The Dutch item read: "Vergeleken met mijn vriendenkring spendeer ik maandelijks veel geld aan dingen als kleding, telefoonabonnementen, muziek en films".

⁶⁰ The Dutch item read: "Ik vind het lastig om ver in de toekomst te plannen".

Table C7. Results of the principal components analysis with oblique rotation of the perceived saving obstacles items ($n = 301$).

Items	Factors	
	1	2
1: It is not clear to me how I can set up an automatic saving plan	.83	
4: I don't know where to start for creating a financial buffer against unexpected circumstances	.78	
2: With all the information about saving I don't know where to start	.78	
3: I don't have enough knowledge to save regularly in practice	.71	
5: Should I have the money, then I would know exactly how to set up a saving plan*	.66	
9: I can properly make ends meet each month		.87
8: I think that I don't have enough remaining income to save money		.72
Eigenvalue	2.95	1.46
Explained variance	41.53%	20.20%
Cumulative variance explained	41.53%	61.74%
Cronbach's α	.81	.57

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F. Factor loadings $< .30$ are suppressed.

Situational economic trust. To verify whether factor analysis would be appropriate given the relationships amongst the situational economic trust statements, several preliminary statistical tests were performed. First, the KMO measure of sampling adequacy showed a good score of .78. Second, while visually inspecting the correlation matrix showed several weak relations ($-.10 < r < .10$), Bartlett's test of sphericity ($\chi^2(45) = 726.38, p < .001$) unequivocally showed that the general pattern of correlations was significantly different from zero. Third, no multicollinearity or singularity was judged to be present ($|R| = 0.11431$). Next an unrotated PCA with 10 factors was performed to explore the possible factor solution. This uncovered three factors with eigenvalues above Kaiser's criterion (3.24, 1.35, and 1.03), and inspecting the scree plot suggested that two or three factors could be underlying the data. Even though the assumptions formulated beforehand presumed two dimensions, the third factor did explain an additional 10.33% of the variance and had an eigenvalue above 1. Therefore, a PCA with oblique rotation that forced the items into three

factors was performed.

The resulting factor-solution was structured as follows. Factor 1 had a high eigenvalue (2.78) with a decent reliability (Cronbach's $\alpha = .79$), which could be raised with .01, though the item-rest correlation of statement 6 was not that bad ($r = .40$). The second factor, with an eigenvalue of 1.60, showed a poor reliability (Cronbach's $\alpha = .52$), which could be raised to .58 with the removal of statement 9 ("In the next two years I will buy or build a house"⁶¹). Besides lowering the reliability, an additional reason for the removal of this statement was that a large group of participants ($n = 113$) were students that had at least 1.5 years left before graduation: regardless of their economic trust, they would probably not buy a house while still studying. The third factor (eigenvalue = 1.24) had an awful internal consistency (Cronbach's $\alpha = .30$), which in addition could not have been raised further by removing an item. Because these items were not intended as a standalone scale, this low reliability was not considered a huge problem.

After exclusion of statement 9, the PCA with oblique rotation was performed again, resulting in the three-factor solution displayed in Table C8. The three situational economic trust factors displayed weak relationships: the first factor, personal financial situation, related weakly with the second factor (major purchases; $r = .26$) and was unrelated to the third factor (trust in economic conditions; $r = .04$). The relation between the second and third factor was also weak ($r = .10$). Due to these low correlations, and the fact that each factor raised the explained variance in situational economic trust considerably, it was decided to combine the sub-scales to fully reflect the underlying nature of situational economic trust.

⁶¹ The Dutch item read: "Ik ga binnen de komende twee jaren een huis kopen of laat er één bouwen".

Table C8. Results of the principal components analysis with oblique rotation of the situational economic trust items ($n = 296$).

Items	Factors		
	1	2	3
5: At the moment I can easily make ends meet	.86		
4: At the moment my financial situation is such that I use savings to make ends meet*	.77		
10: I think that I will be able to save money in the coming 12 months	.76		
2: My financial situation has improved in the last 12 months	.71		
6: I expect that my financial situation will strongly improve in the coming 12 months	.43		
8: I expect to spend more money in the coming 12 months on major purchases such as furniture, a television or other durable goods		.90	
1: I currently consider it a good time for major purchases such as furniture, a television or other durable goods		.68	
3: Given the current economic situation, it is certainly worthwhile to save money*			.79
7: I think that the Dutch labour market will worsen in the coming 12 months*			.72
Eigenvalue	2.77	1.48	1.23
Explained variance	30.15%	15.67%	13.52%
Cumulative variance explained	30.15%	45.82%	59.35%
Cronbach's α	.79	.58	.30

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F. Factor loadings $< .30$ are suppressed.

Regulatory focus. Preliminary analyses were performed to see if the relations amongst the regulatory focus items were suitable for factor analysis. The KMO measure of sampling adequacy showed a good value of .73. Inspection of the correlation matrix raised no red flags, which was subsequently confirmed by Bartlett's test of sphericity ($\chi^2(36) = 491.30, p < .001$) and the determinant of the R -matrix ($|R| = 0.23094$). To explore if the statements would fit into a factor structure, an unrotated PCA with 9 factors was performed. This showed a clear two-factor solution with eigenvalues of 2.38 and 1.98, and the corresponding scree plot confirmed that two factors were likely underlying the data. Since this was similar to the theoretical assumptions, a PCA with

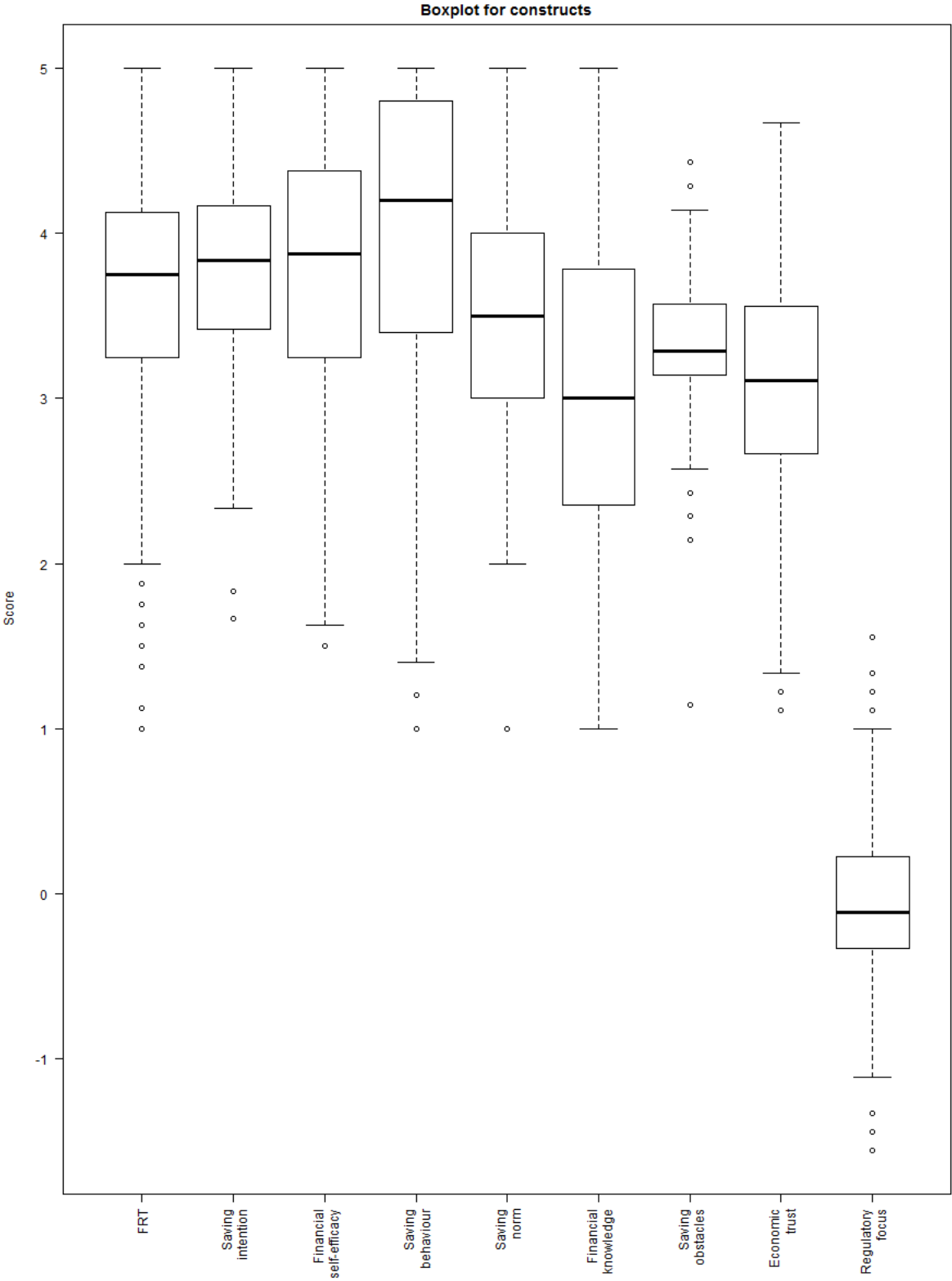
oblique rotation, forcing the items into 2 factors, was performed. This led to a factor solution that explained 48.36% of the variance (see Table C9).

Table C9. *Results of the principal components analysis with oblique rotation of the regulatory focus items (n = 291).*

Items	Factors	
	1	2
7: I often think about how I can prevent failures in my life	.70	
9: I often see myself as someone who strives to what he or she ‘needs to be’ with fulfilling my obligations and responsibilities	.65	
8: I consider preventing failure a lot more important than achieve successes	.63	.31
6: I’m often concerned that I properly fulfil my responsibilities and obligations	.62	
5: Failing to reach a goal affects me much more than achieving a goal	.61	
2: I often see myself as someone who strives to reach his ‘ideal self’ and, by doing so, fulfil my dreams and desires		.74
1: I am primarily focused on achieving positive outcomes and not so much on preventing negative outcomes	.35	.69
4: When I think about the future, I often envision how I achieve my goals		.68
3: I often envision myself experiencing good and positive things in the future		.65
Eigenvalue	2.29	2.07
Explained variance	25.38%	22.98%
Cumulative variance explained	25.38%	48.36%
Cronbach’s α	.66	.65

Note: reversed scored items are indicated with an asterisk. The item numbers correspond to the Dutch items in the questionnaire, included in Appendix F. Factor loadings < .30 are suppressed.

Figure C1. *Boxplot of measured constructs.*



Note: The financial risk tolerance construct is abbreviated to 'FRT' here.

Appendix D: Regression analyses

Financial risk tolerance

Table D1. *Results of the hierarchical regression analysis with financial risk tolerance as the dependent variable and subjective financial knowledge, situational economic trust, regulatory focus, and demographic variables as independent variables (n = 272).*

Variable	Model 3			Model 4		
	B	SE B	β	B	SE B	β
Constant	5.08***	0.21		4.44***	0.33	
Financial knowledge	-0.33	0.05	-.40***	-0.29	0.05	-.35***
Economic trust	-0.15	0.06	-.13*	-0.11	0.07	-.09
Regulatory focus	-0.25	0.08	-.17**	-0.20	0.08	-.14*
Demographic variables						
Age				0.00	0.01	.12
Gender: female versus male				0.29	0.09	.19**
Education: low versus high				-0.04	0.09	-.03
Living situation: living with a partner versus on their own				-0.01	0.11	-.01
Living situation: living with parents versus on their own				0.19	0.13	.13
Type of home: owner occupied versus rental				-0.10	0.10	-.08
Type of work: Employed versus student				0.23	0.13	.21
Type of work: Unemployed versus student				0.25	0.21	.44
Relation to the breadwinner: Breadwinner self vs. other				-0.14	0.12	-.17
Relation to the breadwinner: not specified vs. other				-0.01	0.13	-.01
Net income: between 1,500 and 3,000 euros vs. Less than 1,500				-0.05	0.12	-.03
Net income: more than 3,000 vs. Less than 1,500				-0.51	0.21	-6.59*
Net income: no income vs. Less than 1,500				-0.14	0.12	-.09

Net income: other vs. Less than 1,500		-0.11	0.16	-0.07
R^2	.26		.32	
F for change in R^2	32.75***		2.536**	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Validating the financial risk tolerance regression analysis. Before the hierarchical regression analyses were performed, each IV was plotted against financial risk tolerance for a first examination of the relationship: no large clustering of outliers was observed for any of the IVs. After the regression analyses had been performed, the third model (which explained 25% of the variance in financial risk tolerance) was subjected to further statistical tests to explore the accuracy of this model.

First, outliers were analysed with standardised residuals: 18 cases (6.52%) displayed a standardised residual with an absolute value greater than 1.96. While slightly above advised guidelines⁶², this still appears to conform to what we would expect from a fairly accurate model (see Field et al., 2012). Furthermore, statistics to measure the impact of influential cases on the model (Cook’s distance, leverage/hat values, and covariance ratios) were inspected for these 18 outliers and none displayed a strong influence on the whole model. Judging from these statistics, the tested model appears to be fairly reliable and not unduly influenced by any subset of cases.

Next, the assumption of independence was tested with the Durbin-Watson test. This statistic was insignificant with a value close to 2 ($d = 1.9121$, $p = .43$), signalling that adjacent residuals were uncorrelated. Collinearity was assessed with the Variance Inflation Factor (VIF) and its reciprocal, the tolerance statistic. VIF values were all well below 10, the average VIF was with 1.1235 very close to 1, and the individual tolerance statistics were all clearly below the guideline of .2 (see Field et al., 2012). These results show that predictors did not have a strong linear relation with other predictors, and that therefore concerns about collinearity are unfounded.

⁶² Field et al. (2012) maintain the general rule that, in order to prevent the regression model to be excessively influenced by outliers, less than 5% of the cases should have a standardised residual with an absolute value greater than 1.96.

Finally, the studentised residuals were visually inspected with a histogram and Q/Q-plot, and neither of these showed a strong deviation from normality. In conclusion, since the assumptions of linear regression analysis have been met, the IVs used in this model are judged to be accurate predictors of financial risk tolerance for the sample and are, at least based on statistical grounds, suitable candidates for generalising the model to other populations.

Saving intention

Table D2. *Results of the hierarchical regression analysis with saving intention as the dependent variable and financial risk tolerance, financial self-efficacy, subjective saving norms, regulatory focus, financial knowledge, economic trust, and demographic variables as independent variables (n = 272).*

Variable	Model 4			Model 5			Model 6		
	B	SE B	β	B	SE B	β	B	SE B	β
Constant	0.70**	0.22		0.55*	0.25		0.49	0.30	
Financial risk tolerance	0.41	0.04	.55***	0.43	0.04	.58***	0.40	0.04	.53***
Financial self-efficacy	0.36	0.04	.49***	0.32	0.05	.44***	0.31	0.05	.43***
Subjective saving norm	0.07	0.04	.08	0.06	0.04	.07	0.05	0.04	.06
Regulatory focus	-0.12	0.05	-.11*	-0.12	0.05	-.10*	-0.11	0.05	-.10*

Predictors of financial risk tolerance

Financial knowledge	0.03	0.04	.06	0.02	0.04	.03
Economic trust	0.05	0.05	.05	0.05	0.05	.06

Demographic variables

Age	0.00	0.00	.02
Gender: female versus male	0.13	0.06	.11*
Education: low versus high	0.01	0.06	.00
Living situation: living with a partner versus on their own	0.15	0.07	.22*
Living situation: living with parents versus on their own	0.20	0.09	.18*
Type of home: owner occupied	-0.13	0.07	-.14

versus rental			
Type of work: Employed versus student		0.18	0.09 .22
Type of work: Unemployed versus student		0.27	0.14 .63
Relation to the breadwinner: Breadwinner self vs. other		0.04	0.08 .05
Relation to the breadwinner: not specified vs. other		0.03	0.08 .04
Net income: between 1,500 and 3,000 euros vs. Less than 1,500		0.01	0.08 .02
Net income: more than 3,000 vs. Less than 1,500		-0.02	0.14 -.02
Net income: no income vs. Less than 1,500		0.09	0.08 .14
Net income: other vs. Less than 1,500		-0.02	0.11 -.02
R^2	.44	.44	.46
F for change in R^2	54.76***	0.829	1.491

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Validating the saving intention regression analysis. Before the hierarchical regression analyses were undertaken, each IV was plotted against saving intention for a first examination of the relationship: no large clustering of outliers was observed for any of the IVs, although the relationship between saving intention and regulatory focus showed a low dispersion of values. After the regression analyses had been performed, the fourth model (which explained 44% of variance in saving intention) was analysed further to examine the accuracy of this model.

First, standardised residuals showed that 17 cases (6.20%) had an absolute value greater than 1.96. A relatively large leverage (more than three times the average leverage) and a covariance above the calculated upper limit (see Field et al., 2012) were observed for 3 of these cases. However, since the Cook's distance statistic signalled that none of these outliers had an inordinately influence on the model as a whole, no case was excluded. Next, the assumption of

independence was tested with the Durbin-Watson statistic, which showed an insignificant value close to 2 ($d = 2.07, p = .67$), signalling that the assumption of uncorrelated error residuals was not violated. Furthermore, the assumption of no multicollinearity between the IVs also held, with all VIF statistic values well below 10, an average VIF of 1.1190 close to 1, and individual tolerance statistics all well above .2. Finally, the studentised residuals were visually inspected with a histogram and Q/Q-plot, and neither of these showed a strong deviation from normality.

In conclusion, the assumptions of linear regression analysis have been met for this model, and the IVs are seen as accurate predictors of saving intention for the sample and, solely statistically speaking, the model could be generalised to other populations.

Self-reported saving behaviour

Table D3. *Results of the hierarchical regression analysis with self-reported saving behaviour as dependent variable (n = 272).*

Variable	Model 2			Model 3			Model 4		
	B	SE B	β	B	SE B	β	B	SE B	β
Constant	-1.42***	0.32		-2.07***	0.35		-1.95***	0.45	
Saving intention	0.70	0.08	.38***	0.75	0.08	.40***	0.71	0.09	.38***
Financial self-efficacy	0.69	0.06	.51***	0.43	0.08	.32***	0.40	0.08	.30***
Predictors of financial risk tolerance									
Financial knowledge				0.18	0.06	.16**	0.16	0.06	.14*
Economic trust				0.31	0.07	.20***	0.29	0.08	.19***
Regulatory focus				-0.13	0.09	-.06	-0.10	0.09	-.05
Predictors of saving intention									
Subjective saving norms				-0.01	0.06	-.01	-0.05	0.06	-.03
Demographic variables									
Age							0.00	0.01	.05
Gender: female versus male							0.19	0.10	.09
Education: low versus high							0.07	0.09	.03

Living situation: living with a partner versus on their own			-0.05	0.12	-.04
Living situation: living with parents versus on their own			0.01	0.14	.01
Type of home: owner occupied versus rental			0.15	0.11	.09
Type of work: Employed versus student			0.16	0.14	.11
Type of work: Unemployed versus student			0.16	0.14	-.33
Relation to the breadwinner: Breadwinner self vs. other			-0.10	0.12	-.06
Relation to the breadwinner: not specified vs. other			-0.05	0.14	-.04
Net income: between 1,500 and 3,000 euros vs. Less than 1,500			0.12	0.13	.11
Net income: more than 3,000 vs. Less than 1,500			0.23	0.23	.14
Net income: no income vs. Less than 1,500			-0.08	0.13	-.04
Net income: other vs. Less than 1,500			0.04	0.17	.03
R^2	.54	.58	.59		
F for change in R^2	157.7***	7.647***	1.496		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Validating the self-reported saving behaviour regression analysis. Before the hierarchical regression analyses were performed, each IV was plotted against self-reported saving behaviour to explore the relations amongst the constructs. Both IVs showed a clear, positive relation with no clustering of outliers. After performing the regression analyses, the second model (which explained 52% of the variance in self-reported saving behaviour) was analysed further to examine its accuracy.

Outliers were identified with the help of standardised residuals and this showed that 20

cases (7.14%) had an absolute value that was greater than 1.96. Furthermore, several cases displayed leverage values and covariance ratios beyond the suggested limits (see Field et al., 2012). However, the Cook's distance statistic for each of these outliers not even came close to the criterion of 1 (see Field et al., 2012), suggesting that none of these cases had a strong influence on the model as a whole. Since there were also no theoretical grounds to exclude these cases, no participants were excluded from the regression model. Next, the assumption of independence was tested with the Durbin-Watson statistic, which displayed an insignificant value close to 2 ($d = 2.16, p = .19$), signalling that error residuals were uncorrelated and that this assumption was not violated in the data.

Furthermore, the assumption of no multicollinearity between the IVs also held, with all VIF statistic values well below 10, an average VIF of 1.1395 close to 1, and individual tolerance statistics all well above .2. Finally, the studentised residuals were visually inspected with a histogram and Q/Q-plot. These exhibited a slight negative skew, but not in such a manner that this was considered a problem.

In conclusion, the presumptions underlying linear regression analysis were confirmed for this model, and the IVs are judged to be accurate predictors of self-reported saving behaviour for the sample, and, merely speaking from a statistical standpoint, good potential candidates for generalising the model to other populations.

Appendix E: Cover letter

Prior to starting the on-line questionnaire, participants were presented with the following cover letter as the first page of the questionnaire. The paragraph between parentheses was shown only to Internet participants who were included in the gift certificate raffle.

Geachte heer/mevrouw,

Bedankt voor uw interesse in dit onderzoek. Met dit onderzoek proberen we een beter beeld te krijgen van welke psychologische factoren een rol spelen bij het spaargedrag van mensen. Wat maakt bijvoorbeeld dat sommige mensen regelmatig sparen en anderen hier meer moeite mee hebben, zelfs als beide groepen mensen wel maandelijks geld overhouden? En welke rol zouden risicotolerantie, zelfeffectiviteit en normen over spaargedrag hierbij spelen?

Dit onderzoek wordt uitgevoerd door Jos Magendans, student Psychologie aan de Universiteit Twente, onder begeleiding van Dr. J.M. Gutteling en Dr. S. Zebel van de vakgroep Psychologie van Conflict, Risico & Veiligheid (PCRv) [<http://www.utwente.nl/gw/pcrv/>] aan de Universiteit Twente. Dit onderzoek is voorgelegd aan de Commissie Ethiek van de Faculteit Gedragwetenschappen en goedgekeurd bevonden. De door u verstrekte gegevens worden met de grootste vertrouwelijkheid behandeld en zullen anoniem worden verwerkt: er zal geen informatie worden verzameld die direct tot u te herleiden is. Naast de onderzoeker zelf zullen geen andere personen of partijen inzage in de gegevens hebben.

(Bol.com waardebonnen

Onder de deelnemers van dit onderzoek worden 5 Bol.com waardebonnen à € 20,- verloot. Wilt u meedoen aan deze loting? Geef dan uw e-mail adres op aan het einde van de vragenlijst. Uw e-mail adres zal enkel worden meegenomen in de loting en niet worden gebruikt voor andere doeleinden. Dit onderzoek loopt tot 2 december, waarna de loting zal plaatsvinden.)

De vragenlijst bestaat uit een elftal pagina's, en wordt doorgaans binnen 8 à 10 minuten voltooid.

Uw deelname aan dit onderzoek wordt zeer op prijs gesteld. Mocht u nog vragen hebben, dan kunt u contact opnemen via de onderstaande contactgegevens.

Met vriendelijke groeten,

Jos Magendans

[e-mail address]

Appendix F: Questionnaire

Note: reversely scored items are indicated with an asterisk ().*

Financial risk tolerance

Op deze pagina leggen we u enkele stellingen voor over uw financiële risicotolerantie. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Als ik onverwachts een bedrag ter grootte van mijn jaarlijkse netto inkomen kreeg, dan zou ik het op een spaarrekening zetten en niet beleggen.
2. Als ik ergens in zou investeren, dan zou ik in het meest ongunstige geval zeker geen geld willen verliezen, zelfs als dat betekent dat ik dan maar nauwelijks winst maak.
3. Als het op financiële risico's aankomt, ben ik bereid om hoogstens kleine risico's te lopen.
4. Ik heb geen moeite met het nemen van grote financiële risico's want deze geven ook de kans op grote opbrengsten*.
5. Als een familielid me een erfenis nalaat van € 100.000 zou ik alles in aandelen investeren*.
6. Als het aankomt op het nemen van financiële risico's ben ik een echte risicomijder.
7. Als ik mijn baan zou verliezen een paar weken voordat ik op een luxe vakantie ga, dan zou ik de boekingen direct annuleren.
8. Ik voel me comfortabel met het nemen van financiële risico's*.
9. Bij het woord 'risico' denk ik meer aan verliezen en onzekerheid dan aan kansen en winsten.
10. Ik heb voldoende kennis en ervaring om comfortabel te zijn met het nemen van financiële risico's*.

Saving intention

Op deze pagina leggen we u enkele stellingen voor over uw spaarintentie. Geef hierbij aan welke

antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Ik wil geld gaan sparen zodat ik ben voorbereid op onvoorziene uitgaven.
2. Ik verwacht de komende maanden geld te gaan sparen.
3. Ik vind het niet nodig om de komende tijd geld te sparen*.
4. Ik ben van plan om geld opzij te leggen voor onvoorziene uitgaven.
5. Ik neem wel eens financiële risico's voor de lol of uit nieuwsgierigheid*.
6. Ik vind sparen alleen belangrijk als dit absoluut noodzakelijk is*.
7. Ik vind sparen maar een onnodige en saaie activiteit*.
8. Ik ben alleen bereid om financiële risico's te nemen als deze kunnen worden gecontroleerd.
9. Financiële beslissingen neem ik doorgaans zonder daar veel tijd aan te verspillen*.
10. Om iets in het leven te bereiken moet je bereid zijn om risico's te willen nemen*.
11. Als er een grote kans op winst is ben ik bereid om zelfs grote risico's te nemen*.
12. Als ik veel winst wil behalen, ben ik ook van plan daar grote risico's voor te nemen*.
13. Ik zie geld vooral als een middel om belangrijke doelen op de lange termijn te bereiken.
14. Ik spaar hoofdzakelijk om mijn toekomstige doelen te verwezenlijken.

Financial self-efficacy

Op deze pagina leggen we u enkele stellingen voor over hoe u tegen geldzaken aankijkt. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Ik heb maar weinig invloed op de financiële dingen die me overkomen*.
2. Ik voel me vaak machteloos in het omgaan met geldproblemen*.

3. Er is maar weinig wat ik kan doen om de geldzaken in mijn leven te veranderen*.
4. Ik ben ervan overtuigd dat hoe ik omga met mijn geld van invloed is op mijn toekomst.
5. Ik voel me vaak zelfverzekerd als het aankomt op het maken van financiële beslissingen.
6. Ik ben ervan overtuigd dat ik regelmatig kan sparen
7. Ik vind regelmatig sparen moeilijk*.
8. Als het op geld aankomt, vind ik het moeilijk om vast te houden aan m'n plan of goede voornemen*.

Saving behaviour

Op deze pagina leggen we u enkele stellingen voor over uw spaargedrag. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Ik heb de afgelopen zes maanden vaak geld opzij kunnen leggen.
2. Ik heb geld gespaard voor onvoorziene uitgaven.
3. Ik spaar ook geld zonder hier een echt doel voor te hebben.
4. Naast het geld dat ik al heb gespaard, spaar ik nog steeds regelmatig.
5. In geen van de afgelopen 12 maanden heb ik geld gespaard*.

Subjective saving norms

Op deze pagina leggen we u enkele stellingen voor over waargenomen spaarnormen. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Mijn ouders vinden het belangrijk om elke maand geld opzij te leggen voor onvoorziene

- uitgaven.
2. Mijn vrienden vinden het belangrijk om elke maand geld opzij te leggen voor onvoorziene uitgaven.
 3. Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer het belangrijk vinden dat ik regelmatig spaar.
 4. Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer verwachten dat ik regelmatig spaar.
 5. Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer positief oordelen over regelmatig sparen.
 6. Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer zelf niet regelmatig zouden sparen*.
 7. Ik denk dat mensen die ik belangrijk vind of wiens mening ik respecteer zelf regelmatig sparen.

Subjective financial knowledge

Op deze pagina leggen we u enkele stellingen voor over uw financiële kennis. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Vergeleken met vrienden weet veel over financiële onderwerpen.
2. Mijn algemene kennis van geldzaken is hoog.
3. Ik weet veel over de verschillende mogelijkheden die er zijn om te sparen.
4. Ik weet genoeg van geldzaken om me vrij zeker te voelen wanneer ik een financiële beslissing neem.
5. Ik heb het gevoel niet goed op de hoogte te zijn van geldzaken*.
6. In mijn vriendenkring ben ik één van de "experts" als het op geldzaken en sparen aankomt.

7. Vergeleken met de meeste andere mensen weet ik weinig van geldzaken af*.
8. Geldzaken regelen vind ik altijd ingewikkeld*.
9. Regelmatig ga ik na wat de actuele spaarrentes zijn.
10. Ik spaar via een maandelijks automatisch plan.
11. Ik heb spaargeld voor langere tijd vastgezet op een deposito.
12. Ik zou overstappen naar een andere bank als ik daar een hogere spaarrente krijg.
13. Ik ben bekend met het Nederlandse depositogarantiestelsel voor spaarders.
14. Ik weet niet wat banksparen precies inhoudt*.
15. Ik ben wel eens overgestapt naar een andere bank met mijn spaargeld.

Perceived saving obstacles

Op deze pagina leggen we u enkele stellingen voor over uw obstakels tot sparen. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Het is me niet duidelijk hoe ik een automatisch spaarplan kan opzetten.
2. Door alle informatie over sparen weet ik eigenlijk niet waar te beginnen.
3. Ik heb niet genoeg kennis om regelmatig te sparen in de praktijk.
4. Ik weet niet waar ik moet beginnen met het aanleggen van een financiële buffer voor onvoorziene omstandigheden.
5. Mocht ik het geld hebben, dan zou ik exact weten hoe ik een spaarplan zou opzetten*.
6. Ik vind het lastig om ver in de toekomst te plannen.
7. Vergeleken met mijn vriendenkring spendeer ik maandelijks veel geld aan dingen als kleding, telefoonabonnementen, muziek en films.
8. Ik vind dat ik niet genoeg inkomen over heb om te kunnen sparen.
9. Ik kan maandelijks goed rondkomen*.

Situational economic trust

Op deze pagina leggen we u enkele stellingen voor over uw vertrouwen in de economische situatie. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Ik vind het nu een gunstig moment voor het doen van grote aankopen als meubelen, een televisie of ander duurzame artikelen.
2. Mijn financiële situatie is in de afgelopen twaalf maanden beter geworden.
3. Gezien de economische situatie heeft het zeker zin om te sparen*.
4. Momenteel is mijn financiële situatie zodanig dat ik spaargeld aanspreek om rond te komen*.
5. Ik kan momenteel gemakkelijk rondkomen.
6. Ik verwacht dat mijn financiële situatie de komende twaalf maanden sterk zal verbeteren.
7. Ik denk dat de Nederlandse arbeidsmarkt de komende twaalf maanden zal verslechteren*.
8. Ik verwacht de komende twaalf maanden meer geld uit te geven aan grote aankopen zoals meubelen, een televisie of andere duurzame artikelen.
9. Ik ga binnen de komende twee jaren een huis kopen of laat er één bouwen.
10. Ik denk dat ik de komende twaalf maanden geld opzij kan leggen.

Regulatory focus

Op deze pagina leggen we u enkele stellingen voor over hoe u tegen doelen aankijkt. Geef hierbij aan welke antwoordmogelijkheid het meeste op u van toepassing is. Er zijn hierbij geen 'goede' of 'foute' antwoorden.

Antwoordmogelijkheden: geheel eens, enigszins oneens, noch eens noch oneens, enigszins eens, geheel eens.

1. Ik ben vooral gericht op het behalen van positieve uitkomsten en niet zozeer op het vermijden van negatieve uitkomsten.
2. Ik zie mezelf vooral als iemand die erna streeft om zijn 'ideale zelf' te bereiken en daarmee mijn wensen en dromen te realiseren.
3. Ik stel me vaak voor dat ik goede en leuke dingen meemaak in de toekomst.
4. Bij het denken over de toekomst stel ik me vooral voor hoe ik mijn doelen behaal.
5. Het falen om een doel te behalen doet me veel meer dan het behalen van een doel.
6. Ik ben vaak bezorgd dat ik niet goed aan mijn verantwoordelijkheden en verplichtingen voldoe.
7. Ik denk vaak over hoe ik mislukkingen kan voorkomen in mijn leven.
8. Ik vind het voorkomen van mislukkingen een stuk belangrijker dan het behalen van successen.
9. Ik zie mezelf als iemand die vooral streeft naar wat hij of zij 'behoort te zijn' met het voldoen aan mijn verplichtingen en verantwoordelijkheden.

Demographic variables

Tot slot willen we u op deze pagina naar enkele demografische kenmerken vragen.

1. Wat is uw leeftijd? (in jaren)
2. Wat is uw geslacht?
 - a. Man
 - b. Vrouw
3. Wat is uw hoogst genoten opleiding?
 - a. Voorbereidend middelbaar beroepsonderwijs (VMBO)
 - b. HAVO/VWO
 - c. MBO
 - d. HBO
 - e. Wetenschappelijk onderwijs (WO)

- f. (Nog) geen onderwijs (gevolgd)
 - g. Anders
4. Wat is uw thuissituatie?
- a. Op zichzelf wonend
 - b. Samenwonend, zonder kinderen
 - c. Samenwonend, met kinderen
 - d. Inwonend bij ouders
 - e. Wonend met een huisgenoot of huisgenoten
 - f. Anders
5. Woont u in een huur- of koopwoning?
- a. Huurhuis
 - b. Koopwoning
6. Wat is uw belangrijkste bezigheid?
- a. Ik verricht betaald werk in loondienst
 - b. Ik ben freelancer of zelfstandige
 - c. Ik zoek werk
 - d. Ik studeer of ga naar school
 - e. Ik verzorg het huishouden
 - f. Ik ben met pensioen
 - g. Ik ben (gedeeltelijk) arbeidsongeschikt
 - h. Anders
7. Wat is uw relatie tot de hoofdkostwinner in uw huishouden? (De hoofdkostwinner is degene met het hoogste inkomen)
- a. Ik ben zelf de hoofdkostwinner
 - b. Mijn partner is de hoofdkostwinner
 - c. Mijn ouder(s) zijn (is) de hoofdkostwinner
 - d. Anders

8. Wat is uw netto inkomen per maand?
- a. Geen eigen inkomen
 - b. Minder dan € 1500
 - c. € 1500 - € 3000
 - d. Meer dan € 3000
 - e. Weet ik niet
 - f. Wil ik niet zeggen
9. (Indien van toepassing) Wilt u meedoen aan de loting van de Bol.com waardebonnen à € 20,-? Geef dan hieronder uw e-mail adres op: _____