Beyond Credit History: Investigating the Psychological Characteristics of Creditworthy Borrowers in a Micro-Loan Context

by

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Abstract

Assessing the risk of loan non-payment (i.e., borrower *creditworthiness*) is an important and current problem in the credit industry. The over-reliance on credit history that is missing or limited for much of the population spurred on the use of *alternative data* (e.g., public records, mobile phone usage, social media behaviour) for assessing creditworthiness. Without understanding what drives much of the alternative data, however, applied researchers and professionals cannot guarantee whether their creditworthiness assessments are adequately valid and fair. Psychology and psychometric measurement of relevant characteristics is well-suited to study this, and yet there has been little research in the area. This is especially relevant for assessing creditworthiness for *micro-loans* (small, unsecured loans repaid in instalments over several months or years), since they are deemed more risky than traditional, larger loans. Therefore, the present thesis addresses this applied problem by undertaking a five-study investigation of the psychological characteristics of creditworthiness in collaboration with a UK-based micro-lender. This research (a) identifies the relevant psychological characteristics and (b) develops and validates a psychometric measure for use in the applied setting. The studies include a systematic literature review, semi-structured interviews with underwriters and customers, qualitative and quantitative pilots of the new measure, and a longitudinal validation study as part of the borrowers' application process. Overall, preliminary support for the psychometric measure has been found. The image-based creditworthiness measure is a valuable contribution to the credit risk assessment literature that with further research might provide a more fair and accurate approach towards creditworthiness evaluation.

Preface

Declaration

I hereby declare that except where specific reference is made to the work of others, the contents of this thesis are original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other University. The thesis is the result of my own work, except where specifically indicated in the text. The thesis contains less than 100,000 words including tables, figures, references, and appendices.

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Chapter 1. General Introduction

"I had bad credit in the past. What happened is I travelled, I went away, and I couldn't pay some of the money. […] I've tried to explain to the bank that this is what happened, but they didn't want to know. Once you've missed your payment, it affects you. […] The bank wouldn't lend to me. Nobody would help me. Nobody wanted to support me. I came to [the micro-lender] and they believed me! I was so grateful to them to help me out when I needed the help. I'm still paying it for three years now and I've never missed a payment! I just think people need to give people a chance to be able to prove themselves. Nothing is certain in this world, anything can happen."

A micro-lending borrower (Customer #48) from Study 2b (Chapter 4) of this thesis

In the world of consumer loans, your financial past dictates your financial future and whether creditors trust you to repay. Because of this, it is estimated that one in eight UK adults (Davidge et al., 2018) cannot access mainstream credit (e.g., from banks or credit card companies) due to their limited or missing credit history. As illustrated by the quote above, a credit record is also far from the full story and may not always be predictive of future repayment behaviour. Meanwhile, loans are important economic tools, access to which give rise to widespread welfare implications. Studies show that individuals with access to affordable credit can accelerate future earnings by investing in education and starting businesses, as well as improve their welfare by absorbing financial shocks (e.g., Bruhn & Love, 2014; Cull et al., 2014).

This brings about the important applied problem of assessing *consumer creditworthiness*, defined as the risk associated with the borrower failing to honour their debt obligations. This practical problem of accurately predicting who will repay their loans is especially pertinent for micro-lenders, which provide small, unsecured loans (typically between £100 and £1,000) repaid in instalments over periods of several months or years. As non-mainstream credit providers, micro-lenders are often tasked with finding creditworthy borrowers among applicants that others have deemed to be too risky (i.e., subprime borrowers). This elevated risk profile could be due to bad, limited, or missing credit history, irregular or non-verifiable income, or simply because small, unsecured loans repaid over shorter periods are inherently more costly to manage and thus, possess higher risks (Collard & Kempson, 2005). All in all, this makes the applied problem of accurate measurement of creditworthiness especially important to micro-lenders wishing to provide credit at a sustainable level.

Traditionally, the research topic of consumer creditworthiness is the focus of the fields of Finance and Economics, often investigating socio-demographic predictors of credit risk (e.g., Puri et al., 2017; Vojtek & Kočenda, 2006), effects of credit legislation (e.g., Desai & Elliehausen, 2017; Honigsberg et al., 2017), or other relevant market processes (e.g., Hermes & Hudon, 2018; Murfin, 2012). However, with the growth of Behavioural Economics research and increased recognition of Psychology as a field important to consumer credit, more and more of the recent academic study has focused on understanding the cognitive processes and psychological factors that impact consumer credit behaviour (e.g., Lea et al., 1995; Norvilitis et al., 2006; Rustichini et al., 2016). Nevertheless, as other researchers have noted (e.g., Kamleitner & Kirchler, 2007) consideration of psychological variables as characteristics of creditworthiness is still in its infancy with most studies not being conducted until the 1990s (cf. Livingstone & Lunt, 1992; Zhu & Meeks, 1994). Although previous researchers have examined psychological aspects of individual credit behaviour, they have usually focused on debt accumulation (e.g., Joireman et al., 2005; McNair et al., 2016; Watson, 2003), impact of debt on wellbeing (e.g., S. Brown et al., 2005; Coste et al., 2020; Tay et al., 2017), as well as various cognitive processes in credit-related decision-making (e.g., Besharat et al., 2015; Raghubir & Srivastava, 2008), rather than on their overall disposition for debt repayment. Therefore, the present thesis fills this gap in the literature by incorporating psychological characteristics into the current understanding and measurement of creditworthiness.

The aim of this introductory chapter is to review and discuss the relevant applied and theoretical literature pertaining to creditworthiness research, setting the scene, and arguing for the impetus of the present research inquiry. In the first three sections, the applied relevance of the research is established. The UK lending market is described, and the specific problem of assessing creditworthiness in a micro-lending context is discussed. This is then followed by a more general exploration of the past and current industry trends that have created a need for alternative creditworthiness conceptualisations beyond credit history. Then, the next two sections focus on the key theoretical variables and conceptualisation issues relevant to creditworthiness research. A selective overview of the standard (nonpsychological) and psychological variables in the academic literature is presented, and related work from three differential psychology perspectives is reviewed and discussed. Lastly, the chapter closes with an outline of the limitations of the literature and how the present thesis aims to address them.

1.1. Brief Context Overview

The UK credit setting is a key component of the present thesis. To ensure the readers' familiarity and understanding of the lending market, the following sections provide a delineation of the different lender types and a brief historical and cultural overview of the micro-lending industry. Further details on the current research context are available in Chapter 2 (Section 2.1).

1.1.1. Lender Types in the UK

The UK credit market is quite diverse and includes a wide variety of product offerings for different loan amounts, durations, and other requirements, catering to different borrower needs and financial circumstances. Mainstream lenders include traditional banks and credit card companies, while non-mainstream or subprime lenders include credit unions, payday lenders, micro-lenders, and peer-to-peer lending platforms. What follows is a broad summary of each of these lender types (as informed by the relevant reports: CMA, 2015; Collard & Kempson, 2005; FCA, 2017, 2020, 2021; Personal Finance Research Centre, 2013). Note that this overview focuses on providers of unsecured loans (i.e., credit that does not require collateral), which excludes other non-mainstream lenders such as logbook lenders (e.g., Car Cash Point, Varooma) and pawnbrokers (e.g., The Money Shop, H&T Pawnbrokers). Providers of loans designed *only* for the acquisition of goods (i.e., retail finance; FCA, 2021), such as catalogue credit providers (e.g., Littlewoods, Grattan, Freemans), are also not covered.

Banks (e.g., Barclays, Lloyds Bank, HSBC, NatWest) are the most established and conventional lenders, offering various financial products such as mortgages, personal and business loans, credit cards, and overdrafts. Their personal, non-mortgage loans are typically longer (ranging from a few years and up to a decade) and larger (£1,000–£50,000) than from any other lender. These loans might be used for home improvement, weddings, or holidays. As mainstream credit providers, the annual percentage rate (APR) is generally lower compared to other types of lenders (approximately 5% representative in 2019), reflecting the lower risk profile of their borrower demographic, which usually consists of individuals with stable incomes and good credit histories.

Banks also provide authorised (arranged in advance) and unauthorised (unplanned or unarranged) overdrafts on their current account, where one is able to spend more than what is available in their account. Although not typically perceived as a loan, overdrafts are still debt and banks tend to charge fixed daily fees for unarranged overdrafts (£5–10/day in 2019) and interest rate for arranged overdrafts (20–40% in 2019). Most unauthorised borrowing is under £50 and does not last longer than a couple of days (but can also last up to several months), while authorised overdrafts are larger (limits up to £5,000) and can extend indefinitely. Notably, the daily fee model of unarranged overdrafts alongside their small amount means that they are effectively the most expensive form of borrowing in the present overview (> 3,500% APR representative in 2019). Overdrafts are typically used by younger individuals, lower-income borrowers, and those with volatile cash-flow.

Credit cards are also frequently provided by banks and by other providers (e.g., Capital One, Aqua, Fluid), and they allow consumers to purchase goods and services on credit while building an ongoing debt balance. Unlike loans from a bank, credit-union, or a micro-lender, credit cards are not paid in regular, fixed instalments but rather require minimum monthly repayments based on the current balance (which fluctuates based on the credit amount used). This means the debt is revolving and has no specified repayment term. The amount available to borrow on credit cards (i.e., the credit limit) tends to be moderate (£200–£4,000) but largely depends on the borrower’s credit rating, as does the APR charged (5–35% representative in 2019; some with 0% APR grace periods). Credit cards are more common among those in employment but are otherwise used by a large variety of consumers, both with good and bad credit histories. However, many subprime borrowers dislike using them for borrowing because they are afraid of overspending and have trouble managing the debt repayments (Kempson et al., 1994; Stango & Zinman, 2009).

Credit unions and community banks (e.g., LCCU, Crownsavers, London Mutual Credit Union) are member-owned financial cooperatives that provide traditional banking services, often including loans. These institutions serve individuals (who are also their shareholders) within a specific community, workplace, or who share other associations; as a result, there is no typical borrower demographic. Loan durations and amounts can vary but tend to be smaller and shorter than bank loans (e.g., £100–£15,000 repaid over 1–5 years).

While credit unions aim to offer competitive rates, their APRs are generally higher than for a bank loan (10–20% representative in 2019), especially for credit-building loans (up to 42.58% in 2019). This is because credit unions are often more willing to lend to subprime borrowers and offer more modest loans than most banks, as part of their commitment to serve their members and to promote financial inclusion. Compared to loans provided by payday lenders and micro-lenders, credit unions' loans tend to take longer to be approved and require the customer to be a member before being able to borrow.

Payday lenders (e.g., Wonga, QuickQuid, PiggyBank) offer loans intended to cover a borrower's expenses (e.g., personal emergencies) until their next payday. These loans are characterised by their short duration (usually not exceeding a month) and small amounts (£50–£500). However, the APR for these loans is very high (> 1,500% representative in 2019), due to their shorter term and reflecting the higher risk associated with the typically less financially stable borrower demographic. This includes individuals who might not have access to traditional banking services and/or have poor credit histories. The customer demographic is also predominantly male, young, and in paid work.

Micro-lenders (e.g., Oakam, Fair Finance, Moneyline, Street UK, Loans2Go) are subprime lenders that focus on providing small, instalment loans to individuals and small businesses. These loans are typically of smaller amounts (£100–£1,000) and shorter durations (between 3 months and 3 years) compared to traditional bank loans and are often used for entrepreneurial ventures or personal emergencies. Unlike most other instalment loans, micro-lenders allow weekly (instead of monthly) repayments. The APR tends to be higher than banks and credit unions (> 100% representative in 2019) but lower than payday lenders. The typical borrowers are low-income individuals, small business owners, and those with irregular or non-verifiable income or with bad, limited, or missing credit history. Most of the borrowers have earned income, are working class, and the split is even between genders. A specific subset of micro-lenders are doorstep/home-collected lenders (e.g., Provident, Morses Club), where an agent visits the borrower in their own home to process the loan application and collect weekly payments. The majority of doorstep lenders' customers are older women on benefits. Similar to credit unions, micro-lenders are often associated with social lending and promoting financial inclusion.

Other alternative finance providers include peer-to-peer lenders and crowdfunding platforms (e.g., Funding Circle, Lending Works, Lendy). These fully digital and increasingly niche lenders connect borrowers with individual investors willing to provide personal or business loans. As a result, the loan durations, amounts, and APRs can vary widely, depending on the platform, borrower's creditworthiness, and the specific financial product. These loans can be as small and short as a micro-loan or as big and long as a bank loan. The borrower demographic is also diverse, ranging from individuals seeking personal loans (e.g., on Lending Works) to entrepreneurs and small businesses looking for funding outside traditional banking channels (e.g., on Funding Circle). Similar to credit unions, peer-to-peer lenders tend to be selective about individuals they accept on their platform in order to provide competitive rates and more flexible loan terms than traditional banks.

Overall, the UK lending landscape encompasses a diverse array of providers. Specifically, micro-lenders serve a specific segment of the market where borrowers require financing that is smaller than a bank loan but is still repaid in regular instalments over a defined period (unlike a credit card). They are a cheaper alternative to payday lenders and bank overdrafts and are also spread out over a longer length of time into more affordable payments. Unlike loans from a credit union, micro-loans can be repaid over several months (rather than over several years), do not require prior membership, can be repaid weekly, and are overall faster and more accessible; all at the cost of being more expensive.

1.1.2. Broad Historical Background of the UK Credit Market

Subprime lenders have a long tradition in the UK credit market, with pawnbrokers existing since the medieval period and doorstep lenders since the Victorian era (e.g., Provident was founded in 1880, Morses Club in 1870; Tebbutt, 1983). The 19th century was characterised by technological innovation, urbanisation, and larger income insecurity, resulting in the growth of all forms of credit (e.g., from a bank), but particularly those in the subprime market (Finn, 2003; Tebbutt, 1983). Since then, consumer credit has kept on experiencing ever increasing demand and supply. The 1960s saw the emergence of the first credit card and credit union in the UK (O'Connell, 2009). Then, the 1980s marked a period of deregulation of financial institutions under Margaret Thatcher's government, leading to an explosion in the availability of credit cards, as well as the introduction of payday lending to the UK. This trend has since followed, with increasing financialisaton and diversification of the credit market (Appleyard et al., 2016; Rowlingson et al., 2016). In particular, the industry saw several more notable expansions—in the 2000s, driven by the ease of internet access and the subsequent growth of online lending (e.g., for micro-loans and payday lending); and following cuts in welfare provision in 2013 (e.g., the abolition of the Social Fund) which further increased the demand for small, manageable loans (Appleyard et al., 2016; Collard & Kempson, 2005; Rowlingson et al., 2016). Then, the introduction of stricter regulations and price caps in 2015 has crowded out some micro-lenders that were no longer financially viable (FCA, 2020), and between 2017 and 2020, unsecured debt levels were on a downward trend (FCA, 2021). Today, the size of the micro-loans market (short-term instalment and home-collected loans) is quite small, used by about 3% (or 1.6 million) of the UK adults in 2020 (FCA, 2021). By contrast, between 2019 and 2020, over a quarter (26% or 13.4 million) had used an overdraft at some point, and one in ten (10% or 5.1 million) were consistently overdrawn (FCA, 2021), which is unfavourable given how expensive overdrafts are relative to even the highest allowed APR micro-loan.

1.1.3. Cultural Comparison of Micro-Lending

In non-Western, lower-income countries (e.g., Bangladesh, Vietnam, Sri Lanka, Tunisia), micro-lending takes a slightly different form. The loans (microfinance or micro-credit as they are more commonly known) are primarily offered as a means of developing micro-enterprises; for instance, to allow the purchase of raw materials, such as bamboo, and use it to create a product, such as bamboo stools (Yunus, 2003). Due to the cultural and systemic gender inequality, women in rural areas tend to be more financially excluded and have fewer opportunities for economic participation than men in countries such as Bangladesh (Makino et al., 2019). As a result, these micro-loans are also largely aimed at women to have a larger impact on poverty alleviation. The loans are also not provided individually but rather at a group level (i.e., group or solidarity lending), whereby small groups borrow collectively, approve each member’s loan request in turn, and encourage one another to repay. Furthermore, many of these micro-lenders offer additional services outside of pure loan provision, which may include savings accounts (e.g., through a common group fund), business training/education or other hands-on support, and remittance services. Examples of non-UK micro-lenders include Grameen Bank, AFD (Agence Française de Développement), and FINCA.

All in all, while sharing a common goal of financial inclusion across different geographies, micro-lending varies notably in its implementation between higher-income countries like the UK and lower-income countries such as Bangladesh. Although the micro-loans are used for business development in the UK, it is not their most common purpose.

Similarly, there is no specific targeting of women for the loans, no group lending, and often no other additional services such as savings accounts. Nonetheless, some similarities remain—the core objective of financial inclusion and the general product format (i.e., small loans with terms of under a year that are repaid in weekly instalments).

1.2. The Importance of Fair & Accurate Micro-Lending

Provision of credit is inherently risky because it involves entrusting the borrower to honour the agreement to repay, but the expected payment might not occur. This makes the assessment of creditworthiness (i.e., the risk of debt non-payment) integral to loan provision. The need for fair and accurate assessments fundamentally stems from two things: the impact of giving loans to the wrong people (Type I error), and the impact of not giving loans to the right people (Type II error; see Table 1.1 for an overview).

Table 1.1. *Confusion Matrix Summarising the Potential Outcomes and Consequences of Creditworthiness Assessments*

Actual	**Assessed/Predicted**	
	Not Creditworthy	**Creditworthy**
Not Creditworthy	Accurately Declined	Inaccurately Approved (Type I error): ↓ *Borrower's Welfare* ↓ *Lender's Profit*
Creditworthy	Inaccurately Declined (Type II error): ↑ *Interest Rate* ↓ *Credit Access*	Accurately Approved

1.2.1. Type II Error

Starting with Type II error, inaccurately denying credit to a potential borrower result in unfairly higher interest rates and is also a major inclusion problem.

Access to affordable credit has been at the forefront of poverty and social exclusion issues for almost half a century (Erhardt, 2017; GPFI, 2016; Koku, 2015). Studies show that individuals with access to affordable credit can accelerate future earnings by investing in education and starting businesses, as well as improve their welfare by absorbing financial shocks (e.g., Bruhn & Love, 2014; Cull et al., 2014). Conversely, those who lack access to financial services are more likely to be excluded in other areas of society, such as education and the labour force (Fernández-Olit et al., 2018; Gloukoviezoff, 2007). In the UK, financial exclusion is an ongoing issue, with access to affordable credit recognised as an important component of financial wellbeing according to the latest UK strategy for Financial Wellbeing by the Money and Pensions Service (MaPS, 2020).

Unfortunately, financial exclusion is most prevalent among lower- and unstable-income individuals and these exact individuals tend to be the ones most frequently in need of credit for smoothing over cash-flow (Burton, 2008b; Collard & Kempson, 2005; Collins et al., 2009). This creates a deeply inequitable situation that micro-lenders aim to alleviate, since the smaller loan amounts of micro-loans (typically between £100 and £1,000) tend to be most relevant to those with lower incomes (though not always, see Appleyard et al., 2016; CMA, 2015). Furthermore, because micro-lenders often deal with applicants that were inaccurately declined from elsewhere, this makes them at the forefront of financial exclusion issues meaning it is especially important for them to not commit the same Type II error.

Of course, while financial access to non-mainstream lenders such as micro-lenders may constitute precarious inclusion that is less than the ideal goal of full mainstream inclusion (i.e., ‘super inclusion’ in Leyshon et al., 2004), research has found that UK micro-loan borrowing frequently results from positive (rather than little) choice (Appleyard et al., 2016). Indeed, the UK credit market is rather unique in that micro-loans can be quite competitive (i.e., end-up being cheaper and more convenient/flexible) compared to other credit products (for readers unfamiliar with the UK credit market, see the following reports for a comprehensive overview: CMA, 2015; FCA, 2020, 2021). For instance, bank overdraft facilities can be extremely expensive and unfavourable compared to even a micro-loan with the highest allowed APR, with the overdraft’s daily cost adding up to be over ten times higher (Appleyard et al., 2016; CMA, 2015; FCA, 2017, pp. 50–66, 2018b, p. 6); although, note that since the end of the research in this thesis, new overdraft rules have since been introduced in April 2020 which levelled the two product offerings more. All in all, the Financial Conduct Authority (FCA), the UK’s financial regulator, recognises that responsibly administered credit is useful to borrowers and should be provided “where it is affordable” (FCA, 2018a).

Denying credit to those likely to repay is not just inequitable, but it could perpetuate further harm beyond the direct effects of credit exclusion. Those individuals that struggle with accessing credit often have no choice but to borrow at higher interest rates or by using unsuitable products, making their credit unaffordable in the long-term and leading to financial difficulty (Appleyard et al., 2016; Collard & Kempson, 2005). This is caused by the widespread use of risk-based pricing across the credit market (Burton, 2008a), and so incorrectly perceived risk (i.e., Type II error) results in unfairly charged higher interest rates. In the worst-case scenarios, unfairly declined borrowers can even be pushed towards illegal lenders.

1.2.2. Type I Error

Concerning the Type I error, credit given to consumers unlikely to repay worsens their financial situation and has knock-on effects on the lender providing affordable loans to other, creditworthy borrowers.

In accordance with classic loan economics, if a borrower pays back a loan as planned, the lender earns money and has more capital to give new loans or to cover losses. Conversely, if a borrower does not repay the loan (i.e., the lender made a Type I error), the lender incurs a loss and has less capital to provide more loans or to cover other loan non-payments. However, because the lender ensures that there is enough capital to operate successfully by charging an appropriate interest rate that generates enough profit to cover business costs, it is especially important for micro-lenders to not commit Type I error. After all, the goal of micro-lenders is to empower and help the financially excluded (Ledgerwood & Gibson, 2013), even though the quality of loans is lower (both because of the credit product itself and because the applicants tend to be those others have deemed to be too risky, as explained earlier), striking a delicate balance between charging higher interest to prepare for the expected losses and providing affordable loans at competitive rates that benefit the borrower. Therefore, it is important for a micro-lender to be strong enough in financial performance/prediction (particularly regarding Type I error) to supply affordable credit at a sustainable level.

Furthermore, inaccurately approved credit also has a direct negative impact on the borrower themselves. For instance, a loan that is unaffordable or ends up becoming unaffordable will financially overextend the consumer, leading to their financial hardship and possibly even bankruptcy. If a loan should not have been given, then that is unnecessary debt for the consumer with little benefits, and as the research shows over-indebtedness can have a significant negative influence on an individual's wellbeing (S. Brown et al., 2005; Coste et al., 2020; Tay et al., 2017). Furthermore, as the borrower then fails to make payments (i.e., behaves as non-creditworthy) damaging their credit history and impairing their ability to obtain affordable credit in the future.

1.2.3. Critique of Micro-Lending

Whilst the focus thus far has been on the potential benefits of micro-loans (when fair and accurate), it should be noted that there are also potential problems with this kind of lending. One of the main drawbacks of micro-loans is their high APR relative to mainstream lending, due to the higher costs associated with providing smaller loans over a shorter period and with lending to subprime borrowers (Collard & Kempson, 2005). In part, the higher costs of micro-loans can be attributed to the *poverty premium*, which is when lower income households are charged more for essential services and goods than wealthier ones, a well-documented problem in the UK (Davies et al., 2016; Davies & Finney, 2020; Finney & Davies, 2020; F. Williams, 1977). It occurs through the interaction of current market practices with the circumstances, needs, choices, and constraints of lower-income households. This interaction can be compounded by factors such as digital or financial capability, as well as by geographical factors. As a result, potential borrowers that can access alternatives (such as a lower interest loan from a credit union or an interest-free loan from family or friends) are better off without a micro-loan, even if they are creditworthy and can afford it (Collard & Kempson, 2005; FCA, 2019a).

Another notable downside of micro-loans is that despite their potential for poverty alleviation and social and financial inclusion, micro-lenders are still businesses and micro-loans are still debt. As businesses, micro-lenders often feel the pressure to grow their portfolio to continue loan provision whole providing returns to investors/shareholders and thus, have little incentive to discourage creditworthy borrowers from taking out nonessential debt for consumption (e.g., to go on a holiday; A. Banerjee & Mullainathan, 2010; Collins et al., 2009; Guérin, 2006). This, in turn, increases the risk of over-indebtedness, if a creditworthy borrower makes a series of bad borrowing decisions but then encounters hardship that makes the loan unaffordable (Collins et al., 2009; Hulme, 2007). Therefore, it is important that credit is provided responsibly and borrowers have adequate legal protection. Furthermore, micro-loans are likely to have limited impact on poverty reduction if other important systemic issues are left unaddressed (e.g., education, employment, healthcare). Indeed, at some point, the debate crosses over into social/welfare policy, as some have shown that the problems that were previously shouldered by the government (and arguably should still be) got passed onto the private sector, leading to the increased need for micro-loans in the UK (Appleyard et al., 2016; Collard & Kempson, 2005; Rowlingson et al., 2016). However, discussion of the political aspect of micro-loans is beyond the scope of the present thesis.

1.2.4. Overview of the Importance of Good Micro-Lending

Overall, good creditworthiness assessment is at the heart of responsible lending. Access to affordable credit, social inclusion, decreased over-indebtedness, and lower cost of credit all in part rely on lender's ability to accurately differentiate between borrowers that will and those that will not repay their debt. The importance of and the far-reaching social implications of accurate micro-loan assessment are just some of the good practical reasons for research to be concerned with this issue. Although it is worth noting that micro-loans are not a panacea for subprime borrowers, even when provided responsibly. Other reasons for this research include issues with how the industry deals with creditworthiness assessments, which will now be discussed.

1.3. Current Industry Trends in Creditworthiness Assessments

1.3.1. Creditworthiness Assessments of the Past

For as long as credit has existed, it was up to human decision-makers to evaluate a loan applicant's creditworthiness. While the exact method of establishing a borrower's credit risk would vary depending on the location and time in history, it almost certainly involved a formal or an informal evaluation of one or several of the *Five Cs of Credit,* as they later became known (Abrahams & Zhang, 2008; Anderson, 2007; Strischek, 2009). The first *C* (Character) pertains to the borrower's *willingness to repay*, characterised by traits such as honesty, integrity, dignity, and reputation. The remaining *Cs* (Capacity, Collateral, Capital, and Conditions) consider the individual's *ability to repay,* determined by factors such as their income, expenditure, net worth, and the economic environment. For instance, in ancient Babylon, merchants would rely on future grain harvest as collateral (*Code of Hammurabi*); while Victorian England tradesmen and money lenders would use class and social status as proxies for the borrower's capital and character, respectively (Finn, 2003; Muldrew, 1998); and in early 20th century America, bankers would require signed statements that outline the borrower's assets and liabilities as a way to evaluate their repayment capacity (Peple, 1916; Post, 1906).

Fundamentally, the social and spatial proximities between creditors and borrowers of the past have meant that some of the information asymmetries and moral hazard were solved because of their (and their families') long-term relationships and borrowing history, especially in the absence of collateral (Diamond, 1989; MacLeod, 2007; T.-C. Wang, 2008). The lender's personal knowledge of the borrower's situation allowed for a better insight into their true creditworthiness than what an outsider might determine, while the promise of reinforced communal ties, long-term reciprocity, and mutual help acted as a deterrent against debt non-payment (Boot, 2000; Fafchamps, 1992). Therefore, for much of humanity's past, creditworthiness assessments were relatively subjective, unstructured, and focused on the human side of credit.

1.3.2. From Credit History to Credit Scoring: Automation of the Decision-Makers

By the late 18th and early 19th century, however, technological innovations, travel, social mobility, and urbanisation created a need for lenders to organise and share information about fraudsters and borrowers who failed to settle their debts, since borrowers were no longer bound to one community or one location (Finn, 2003). Formed by the British tailors, grocers, and other tradesmen these guardian societies and trade protection associations were the birthplace of credit reporting and the concept of credit history as we know it today (Finn, 2003). As these societies grew all over UK, the Five Cs of Credit still applied, but the personal relationship component of creditworthiness was replaced with a more general notion of reputation as a mechanism to enforce credit agreements (Diamond, 1989, 1991; MacLeod, 2007). Nowadays, most mainstream UK-based lenders primarily base their creditworthiness assessments on the modern version of these societies—*credit bureau data*. This includes public records and financial data that describe an individual's credit history, such as the recency, quantity, and severity of late payments for past debt, bankruptcies, and the total amount of current debt. Credit bureau data is frequently summarised into a single numerical value called a *credit score*. A credit score indicates whether an individual is likely to repay the debt, with larger values being associated with a lower risk of non-payment (i.e., better creditworthiness).

As data for assessing creditworthiness got more structured, it became easier to reduce decision-making to a formula that required little input from human experts aside from gathering relevant information. This was the start of the shift from relying on subjective expert evaluations made by humans to automated and objective decisions by computers

(Abdou & Pointon, 2011; Anderson, 2007; L. Thomas et al., 2017). *Automated credit scoring*, where decisions are dictated by statistical models, predicts the likelihood of loan non-payment based on the similarity between the applicant's information and information of past non-payers. This includes socio-demographic, economic, and loan data from application forms, credit bureaus, and existing internal files and is collectively referred to as *traditional data* (Vojtek & Kočenda, 2006). These automated assessments are more efficient, consider more data, are easier to audit, and easier to adjust according to the economic and regulatory environment compared to expert-based assessments (Anderson, 2007; G. G. Chandler & Coffman, 1979; Crook, 1996; though see Capon, 1982; Chen et al., 2015; Citron & Pasquale, 2014; J. Wang, 2014; Zarsky, 2016). The increased demand for credit, increase in computing power, and strict credit regulations have led to automated credit scoring becoming the preferred approach in consumer lending (Poon, 2007). However, while both willingness and ability are necessary for creditworthiness, preference for easily quantifiable variables for automated credit scoring and the decrease in face-to-face contact between lenders and borrowers where the borrower's character may be inferred (Moulton, 2007) has made willingness to repay harder to accurately assess (Strischek, 2009). See Table 1.2 below for an overview of the creditworthiness factors discussed thus far.

Table 1.2. *Creditworthiness Factors from its Two Main Conceptualisations in the Industry*

Conceptualisations	Creditworthiness Factors (Information Sources)
The Five Cs of Credit (Abrahams & Zhang, 2008)	• Character (e.g., integrity, dignity, reputation) • Capacity (e.g., income and expenditure, existing debt, experiences, and skills necessary for financial success) • Collateral (e.g., current, and future collateral valuation) • Capital (e.g., net worth and liquidity) • Conditions (e.g., economic, and regulatory environment)
Automated Credit Scoring (Traditional Data; Anderson, 2007)	• Socio-demographic profile (e.g., age, marital status, education, number of dependents, employment, income) • Credit score (i.e., length and quality of credit repayment history; credit utilisation and existing debt) • Existing lender-borrower relationship (i.e., past dealings, loyalty)

1.3.2.1. Problems with Credit History

Unfortunately, the credit bureau system is ineffective for individuals with no existing (no-file) or a limited (thin-file) credit history, collectively known as *credit invisibles*. These individuals might be entering the credit market for the first time due to recently turning 18, immigrating, or having never engaged with financial institutions that report to credit bureaus (e.g., they have only ever used informal lenders or have always relied on their spouse's finances). Other credit invisibles have long paid-off any prior loans and have not engaged with the credit bureau system since then. Without bureau data, low-interest, mainstream lenders such as banks cannot determine risk of non-payment and therefore, decline these consumers. As a result, credit invisibles are forced into more expensive credit to build up their credit history. So, while credit bureau data can be an effective way to characterise creditworthiness, it is limited for thin- and no-file individuals. For instance, the latest version of the *FICO* score has a discrimination ability (i.e., how accurately it classifies individuals into good and bad risks) of 0.901 which is considered excellent (Fair Isaac Corporation, 2018), yet for thin- and no-file borrowers, the score's discrimination ability is 0.639 which is regarded as poor (0.500 is no better than random; Fair Isaac Corporation, 2018). Research also shows that almost 40% of thin-file consumers eventually become good borrowers with *FICO* scores over 620 (the scores range from 300 to 850, with 620 being in the *fair* range), if they can gain access to the credit market in the first place (M. M. Smith & Henderson, 2018).

The credit bureau system also unfairly discriminates against individuals with a dented credit history due to factors outside of their control such as identity theft, abusive relationships, loss of employment, and errors on behalf of the bureau itself. Starting with the latter, US-centred research has shown that credit bureau information is highly prone to mistakes and inaccuracies such as incorrect balances, duplicate entries, wrong account inclusions, and account omissions (Avery, Calem, & Canner, 2004; Avery, Calem, Canner, et al., 2004; Avery et al., 2009; L. D. Smith et al., 2013). In one such study (L. D. Smith et al., 2013), over a quarter of the sample had at least one substantial error on their credit report, and even with the researchers' assistance, 12% of those were unable to correct their bureau information. Industry reports also suggest that credit bureau errors is a bigger problem in the UK specifically, due to the non-existence of personal identity numbers (such as Social Security Number in the US) that are allowed to be used by lenders to ensure individuals are correctly identified (Anderson, 2007; Wilkinson, 2003). Indeed, in an audit of UK's credit bureaus (i.e., credit reference agencies, CRAs), one of the most observed mishaps was data being mixed between consumers due to the difficulties associated with data matching between different sources of information (ICO, 2014).

Similarly, various forms of fraud and identity theft make credit history an unreliable measure of creditworthiness. With fraud being the most prevalent crime in England and Wales (over 4.6 million incidents were reported in 2020; ONS, 2021), it is extremely common across the financial industry due to the clear potential for pay-off. Indeed, industry reports suggest that fraud in the UK non-mortgage credit industry has been on the rise (Cifas, 2021). Furthermore, identity fraud tends to stay undiscovered for an average of 16 months before victims find themselves in legal trouble for credit they have no knowledge of, struggling to prove their innocence, according to Experian UK (Taylor, 2004).

Moreover, credit history often does not capture the full picture of the circumstances in question. As some credit risk practitioners have noted (e.g., see Abrahams & Zhang, 2009), historic repayment patterns may occasionally have more to do with convenience or unexpected events, as opposed to actual ability or willingness to honour debt obligations. Notwithstanding omissions and reporting lag to the credit bureaus, credit history is not independent of an individual's repayment capacity, among many other aspects. For instance, it does not capture whether the borrower's personal circumstances have changed since the time of the record—either for the better (e.g., new job, got out of an abusive relationship, overcame a money draining habit) or for the worse (e.g., loss of employment, addiction problems). The borrower could have changed in a psychological sense. The loan with the credit history in question could have also been poorly designed and/or unsuitable for the borrower (e.g., unaffordable or mis-sold).

However, it is worth mentioning that despite all these practical and conceptual problems with credit history as a determinant of future repayment behaviour, it still provides a useful signal. As already mentioned, the latest version of the *FICO* score has a discrimination ability of 0.901 which is considered excellent (Fair Isaac Corporation, 2018). The practical experience of loan repayment is also likely non-negligible (Turner & Agarwal, 2008). There is also research that demonstrates more general construct validity evidence of *FICO* scores as correlates of trustworthiness, patience, (low) impulsivity, and future-orientation (Arya et al., 2013). Nonetheless, there is also research demonstrating that minority status is negatively (and with large effect size) related to credit scores (Bernerth et al., 2012). In addition, the criterion outcome of creditworthiness and credit history are circular.

Therefore, by devaluing the importance of credit history (by focusing on other data), the unintended consequence can be increase in defaults, as demonstrated by Sharma (2017) in a series of simulated repeated games (i.e., mathematical models). Lastly, while using the past (i.e., credit history) to predict the future (i.e., future repayment behaviour) can seem incredibly deterministic/fatalistic, credit history does seep into the present and influences it—excess arrears accumulation in the past increases the debt burden in the present, decreasing the borrowers' capacity to repay.

Overall, credit history can often be an inaccurate and unfair measure of consumer creditworthiness. Reasons range from practical problems with credit bureau information due to missing or limited records, errors, or fraud to conceptual issues with what credit history captures. Indeed, one just has to look on some of the different scenarios reported by the various organisations in the industry to gain a sense of the number of things that could *go wrong* (e.g., see the FAQs on the ICO's website; ICO, 2022). Credit scores can be good indicators of creditworthiness, but only if consumers and organisations (creditors and credit bureaus) are vigilant about fraud, data accuracy, and only for some customer sub-segments (i.e., not for credit invisibles or those with varying circumstances). Therefore, understanding creditworthiness characteristics beyond credit bureau data may be the key to financial inclusion and more accurate and fair lending.

1.3.3. Looking Beyond Credit History with Alternative Data

The aforementioned issues with credit history have not gone without notice in the industry. Leveraging the rapid innovations in machine learning, the increase in the amount of data generated by individuals, and increased automation, the most recent development in creditworthiness assessments has been the rise of *alternative data*. Alternative data refers to non-credit bureau and other non-traditional data that may measure creditworthiness and is used to either complement or replace credit history altogether. The US Federal Trade Commission has been exploring alternative data since the early 2000s (Federal Trade Commission, 2004), and in the past decade, businesses have started doing the same (Akkizidis & Stagars, 2016). Examples of alternative data include mobile phone usage (used by *Cignifi* and *First Access*), psychometric test results (used by *EFL* and *Coremetrix*), and other public and personal data such as criminal records and address changes (used by *LexisNexis RiskView*; Aitken, 2017).

Due to this diversity in alternative data, creditworthiness has taken on numerous conceptualisations in the credit industry. For example, businesses relying on mobile phone usage for credit assessments argue that *connectedness* (i.e., returned phone calls, large and diverse social network, and sociability) is a characteristic of creditworthiness (Björkegren & Grissen, 2018; Hakim, 2016; McEvoy, 2014), because connections help with entrepreneurial opportunities or act as peer pressure for loan repayment (Björkegren & Grissen, 2018; Wei et al., 2016). Meanwhile, public records and personal data primarily characterise creditworthiness as a function of *stability and consistency*, where regular employment, stable residency, and voter registration are perceived to be signs of reliability, and hence good credit risk (Experian, 2018; LexisNexis, 2017). Similarly, criminal records and evictions (i.e., high-risk behaviours associated with financial stress) are used as proxies for character (LexisNexis, 2017).

1.3.3.1. Ethical Issues

However, the rise in alternative data for credit has not been without its issues. While some organisations provide adequate reasoning for collecting certain types of data, most alternative data firms rely on atheoretical and data-mined results for their credit scoring, justifying the relevance to creditworthiness post-hoc (e.g., *ZestFinance*, Lohr, 2015; *LexisNexis Risk Solutions*, Baumann, 2016; also see Reisinger, 2015). As a result, one concern is the fairness of which characteristics are used as alternative data. Many (e.g., Aitken, 2017; European Commission [EC], 2021; Wu, 2015) have argued against alternative data because it will lead to more of the same inequality as credit bureau data, since data tends to reflect and mimic human prejudices (e.g., racism, sexism, and xenophobia) unless approached consciously (Crawford, 2013; Garcia, 2016). After all, data exists within complex social systems; criminal records do not only represent high-risk behaviours, but rather reflect historical disenfranchisement and encounters with societal inequality and prejudice (Yu & McLaughlin, 2014). Therefore, lenders may rely on variables that are not discriminatory themselves but are correlated with protected characteristics under the UK legislation (Equality Act, 2010) leading to disparate impact (Brainard, 2016; Consumer Financial Protection Bureau, 2017; Hurley & Adebayo, 2017; Yu & McLaughlin, 2014). Alternative data confounded/biased by ethnicity in particular is an important consideration in improving fair access to credit. This is because empirical studies show ethnic minorities disproportionately impacted by the lack of access (Demirguc-Kunt & Klapper, 2013; Hogarth et al., 2005), and some recent research on US mortgages has found that the use of machine learning algorithms resulted in increased discrimination bias against Black/Hispanic borrowers (as compared to White/Asian borrowers; Fuster et al., 2021).

These issues arise because of the current atheoretical, naïve inductivist approach to credit scoring. Without a theoretical grounding there is a lack of unity among creditworthiness characteristics and lack of understanding overall what it means to be creditworthy, leading to unfair and unintended results. Theory is necessary to determine whether correlations between characteristics and creditworthy outputs are evidence of bias or validity. For example, if creditworthiness is best understood as *stability*, then lower creditworthiness would be found amongst the military where relocations are frequent. To address the fairness issues associated with alternative data, a more nuanced approach to credit scoring is required. It is important that sound theoretical reasons are provided regarding why a variable is a good measure of creditworthiness, and how these variables fit together.

Lastly, there are important ethical issues concerning how alternative data is acquired. In accordance with the fourth principle of the UK's Data Protection Act (DPA), it is required that personal data is accurate and where necessary, kept up to date (Data Protection Act, 2018). However, this is likely a significant challenge for alternative data, since over a quarter of consumers regularly experience accuracy issues with their credit bureau data (Federal Trade Commission, 2015), and many types of alternative data (e.g., social network patterns) are governed by much weaker standards (Consumer Financial Protection Bureau, 2017). Similarly, given that some types of alternative data rely on complex big data analytics and black-box machine learning, this calls into question its ability to meet the first DPA principle—the processing of personal data must be fair and lawful, including processing it in a transparent manner (Data Protection Act, 2018). If the data's sources are not transparent, the consequent decisions cannot be checked since consumers cannot identify, correct, and/or challenge the accuracy of the data used—a serious customer protection failure (Consumer Financial Protection Bureau, 2016, 2017; Hurley & Adebayo, 2017; Yu & McLaughlin, 2014; cf. Mazer et al., 2014). Taken together, these issues provide a compelling argument to move beyond inaccurate and non-transparent sources of alternative assessment.

Overall, credit scoring data needs to be fair, justifiable, accurate, transparent, compliant with the law, and generally, fit for purpose.

1.3.4. Overview of the Creditworthiness Assessments Industry Landscape

Prior to widespread institutionalisation of finance, credit was primarily a social contract between members of a community. Due to scalability and efficiency demands, the industry has attempted to structure and then automate creditworthiness assessments. This has given a rise in the use of credit history and then alternative data to improve credit scoring. Creditworthiness, previously seen as good character, capacity, collateral, availability of capital, and good conditions—evaluated by an expert—is now principally understood in terms of good credit history; with increasing alternative data reconceptualising creditworthiness once again. Therefore, understanding psychological characteristics of creditworthiness and considering their theoretical grounding could guide the industry towards devising creditworthiness assessments that are less arbitrary, more cautious, and thoughtful, and more likely to produce expected and desirable long-term impact.

1.4. Conceptualisations & the Study of Creditworthiness in the Literature

While the financial industry has been preoccupied with discovering new variables that predict creditworthiness (e.g., Aitken, 2017; Hakim, 2016), the academic literature has primarily focused on the methodological issues surrounding credit risk prediction, as is evident by the abundance of literature reviews on the subject (e.g., Abdou & Pointon, 2011; Hand & Henley, 1997; Hooman et al., 2016; Louzada et al., 2016; Marqués et al., 2013). Indeed, a recent review of the state of credit scoring research (Onay & Öztürk, 2018) found that "statistical techniques and classification accuracy" (p. 384) was the dominant theme in the literature, present in 41% of the articles. Furthermore, among the literature that does examine determinants of credit repayment behaviour, the vast majority is focused on socio-demographic, economic, and loan variables related to creditworthiness (e.g., Chuang & Lin, 2009; Gross & Souleles, 2002; Puri et al., 2017; Vojtek & Kočenda, 2006), rather than psychological factors. The following sections provide an overview of the academic literature on creditworthiness—relevant criterion outcomes, typical predictors of credit risk, and credit and other financial research in psychology more generally.

1.4.1. Criterion Outcomes of Creditworthiness

Creditworthiness is the risk associated with the borrower failing to honour their debt obligations. As a result, there are several ways to define the criterion outcomes of creditworthiness since borrowers can fail on their debt obligations with varying severity. The earliest indicator of credit risk would be the subjective assessment made by the loan officer of whether the individual is creditworthy. A borrower may fail on their debt obligation by missing payments (i.e., being delinquent) and having arrears (i.e., the monetary value of the missed payments). Although a borrower may recover from repayment problems and honour their overall debt obligation in a timely manner, these problems provide an early indication of default, as well as being undesirable for the lender. Default occurs when the final debt payment deadline has long passed, and the lender begins legal action against the borrower to recover some of the balance. Legal action outcomes are the most extreme and final stages of failing on a debt obligation and include bankruptcy and foreclosure. Therefore, the actual definition of creditworthiness' criterion outcome is imprecise and will vary from study to study. Nonetheless, these categorisations are necessary when researching creditworthiness.

By contrast, the accumulation of debt per se (e.g., making only minimum credit card payments and multiple borrowing) is not failing on debt obligations and so would not be a suitable criterion outcome of creditworthiness. Similarly, the *amount* of debt is distinct from creditworthiness. While high debt-to-income ratios may indicate future repayment difficulties (Trades Union Congress, 2016), no *objective threshold* can accurately account for borrowers' circumstances because the same ratio can be both excessive and manageable for different people (Betti et al., 2007; Keese, 2012; Lea et al., 1993; Schicks, 2013).

It is common for credit research (especially in psychology) to rely on self-reports instead of actual payment records. However, self-reported credit behaviour is more susceptible to under-reporting, recall-, and perception-bias compared to observed measures (Karlan & Zinman, 2008; Zinman, 2009). This is despite some research demonstrating that using self-reported criterion outcomes of creditworthiness is a valid approach (e.g., Gathergood, 2012a). As a result, creditworthiness research that relies on self-reported criterion outcomes may be inadequate.

1.4.2. Typical Predictors of Credit Risk

Biographical records of credit behaviour, lender-borrower relationship factors, credit product characteristics, borrower socio-demographic characteristics, and other financial information are some of the most common creditworthiness variables included in research on the topic. Most often their inclusion is justified based on their typicality and availability in the retail credit sector, rather than a clear theoretical reason (Abdou & Pointon, 2011). The characteristics are implicitly considered relevant because they are collected by the financial institutions. Nonetheless, because creditworthiness research focuses on such a complex and dynamic set of behaviours, it is particularly important for studies to protect against omitted variable bias and include all the potentially relevant covariates and factors. The rest of this section details each type of creditworthiness characteristic common in creditworthiness literature.

Socio-demographic characteristics such as age, gender, ethnicity, marital status, number of dependants, educational level, occupation, employment length, and housing type are all frequently used in creditworthiness studies, either as control or as predictor variables (e.g., Bellotti & Crook, 2009; Gerardi et al., 2018; Gerardi, Herkenhoff, et al., 2013; T.-S. Lee et al., 2002). Most often, research finds that there is a significant difference in debt repayment behaviour between single and married borrowers, with married borrowers having a lower risk of default. Similarly, credit risk tends to decrease with age, and older women tend to be less risky than young men. Self-employed borrowers and borrowers with short employment length are perceived as bigger credit risks, than full-time employees with long-term employment, due to employment stability potentially being linked to debt repayment stability (Vojtek & Kočenda, 2006). However, it is worth noting that many of the socio-demographic characteristics used in academic research could not be used in the retail sector because they are protected by discrimination laws. For instance, in the UK, age, gender, marital status, sexual orientation, and religion are all protected characteristics (Equality Act, 2010). As a result, their use in industry credit scoring would lead to unlawful discrimination/disparate treatment.

However, it is worth noting that many of the socio-demographic variables serve as proxies for other financial characteristics. For instance, income tends to increase with age and education level, and married individuals have more financial security from pooling of resources. Indeed, the borrower’s financial position, including their income and expenditure, disposable income, income type, current indebtedness, wealth, and collateral value, is an important predictor included creditworthiness research (T.-S. Lee et al., 2002; Puri et al., 2017). The inclusion of financial information is largely *common sense* and self-evident; borrowers' relative resource availability has a significant impact on their repayment capabilities (Vojtek & Kočenda, 2006). For example, a higher ratio of the loan amount to the value of the collateral (i.e., the loan-to-value ratio) indicates higher credit risk, as there is less collateral to cover the loan in the event of default. With real estate, for instance, typically considered as a more secure type of collateral than personal property such as a vehicle since it depreciates less over time.

Similarly, biographical records of credit behaviour provide tangible evidence of the borrower's financial position (such as indebtedness), as well as other valuable credit risk predictors that have been previously investigated (e.g., Bellotti & Crook, 2009; Chuang & Lin, 2009; Serrano-Cinca et al., 2015). This includes credit amount, types of credit borrowed, credit limit, credit utilisation, worst account status, time since most delinquent account, CCJs, and search inquiries.

Credit product characteristics such as type, term, amount, interest rate, and purpose have also been taken into consideration in the creditworthiness literature (e.g., Bellotti & Crook, 2009; Serrano-Cinca et al., 2015).

Lastly, lender-borrower relationship factors, which include prior applications and other dealings, time with the lender, physical proximity, and frequency of face-to-face interactions, have also been used in creditworthiness research (e.g., Behr et al., 2011; Bellotti & Crook, 2009; Kysucky & Norden, 2016; Puri et al., 2017). In a meta-analysis of the impact of lender-borrower relationship variables on various outcomes, Kysucky and Norden (2016) found that factors such as total time with the lender and exclusivity were significantly associated with lower interest rates and larger credit volume (i.e., better creditworthiness/credit risk as perceived by the lender). Some of the lender-borrower relationship variables can be simply thought of as localised biographical records of credit behaviour.

Overall, there are several important types of variables that have been found to be associated with default or similar criterion outcome conceptualisations of creditworthiness and are thus relevant to the study of creditworthiness. Thus, creditworthiness can be thought to have all these characteristics.

1.4.3. Credit & Other Financial Research in Psychology

While socio-demographic, biographic, and economic characteristics are relatively well-studied and typical in credit risk research, psychological characteristics are not. As the systematic review in Chapter 3 will show, the literature on psychological characteristics of creditworthiness is rather scarce, as it is a relatively new and unexplored area of research. This is despite substantial evidence highlighting the psychological underpinnings of a variety of financial behaviours and outcomes (e.g., Kamleitner et al., 2012; Lea et al., 1995; Norvilitis et al., 2006; Rustichini et al., 2016). Indeed, previous studies of credit psychology have tended to fall into several broad categories that do not address creditworthiness directly. Instead, most of the research has focused on causes and effects of consumer debt and factors most relevant to avoiding and eliminating debt accumulation; for instance:

- understanding how people get into debt (Bernthal et al., 2005; Feinberg, 1986; Hirschman, 1979; Raghubir & Srivastava, 2008; Soman, 2001; Soman & Cheema, 2002),
- effects of consumer debt on psychological wellbeing (S. Brown et al., 2005; Coste et al., 2020; Norvilitis et al., 2006; Tay et al., 2017), and
- strategies to encourage economically optimal debt repayment behaviour (Amar et al., 2011; Besharat et al., 2014, 2015; A. L. Brown & Lahey, 2015; Gal & McShane, 2012; Kettle et al., 2016).

More generally, psychology research has also tended to concentrate on materialism (e.g., Richins, 2017; Watson, 2003), compulsive or impulsive buying (e.g., Lo & Harvey, 2011; Norum, 2008), and financial capability/literacy and education (e.g., Serido et al., 2013; Xiao, Chen, et al., 2014). However, because there is a large amount of interdependency between different financial behaviours (e.g., compulsive buying can lead to higher credit use, causing payment difficulties and indebtedness), this more general literature still provides useful insights. Therefore, a concise overview of the broader differential psychology research of financial behaviour now follows.

The influential theories of planned behaviour and reasoned action suggest that behaviour stems from certain attitudes and beliefs (Fishbein & Ajzen, 2010; also see Section 1.5.3 later in the chapter), and much of the credit literature has examined the impact of these types of variables on financial behaviour. For example, a favourable attitude towards credit or debt has consistently been linked to higher credit use (Cosma & Pattarin, 2011; L. Wang, Lu, et al., 2011; L. Wang, Lv, et al., 2011) and higher levels of indebtedness (Almenberg et al., 2021; Lea et al., 1993; Schooley & Worden, 2010; Webley & Nyhus, 2001). Although there are some studies that have failed to replicate these associations (e.g., Lea et al., 1995; Norvilitis et al., 2003), they are uncommon, and other evidence suggests that product-specific attitudes (e.g., towards credit cards) are more predictive than a general debt attitude (L. McCloud & Dwyer, 2011; Norvilitis et al., 2006).

Meanwhile, research on the impact of locus of control (i.e., internal vs. external perceived control over outcomes; Skinner, 1996) on financial behaviour has been more mixed. While some studies have found internal locus of control to be associated with higher revolving credit use (L. Wang, Lv, et al., 2011) and larger mortgage loan amounts (M. Wang et al., 2008), others have failed to find any correlations of locus of control with credit use (Cosma & Pattarin, 2011) or indebtedness (Lea et al., 1995; Pinto et al., 2004). Conversely, consumers with internal locus of control have been shown to have higher credit scores (Perry, 2008), and individuals with external locus of control have more favourable attitudes towards credit use (M. W. Allen et al., 2007).

Other research has identified stable individual differences in money attitudes and beliefs, with some of the most common dimensions being money worry and anxiety, money as a source of power and prestige, money as security, and money as a sign of achievement and success (Furnham et al., 2012; Lay & Furnham, 2019; Rose & Orr, 2007; Tang, 1992; Yamauchi & Templer, 1982). These dimensions are associated with a wide range of consumer behaviour. For instance, perception of money as a sign of status and prestige has been linked to higher materialism (Durvasula & Lysonski, 2010; Rose & Orr, 2007), compulsive/impulsive buying (K. M. Palan et al., 2011; Rose & Orr, 2007), frequency of revolving credit use (L. Wang, Lv, et al., 2011), and financial problems with credit cards (Tokunaga, 1993), suggesting that these consumers fund their pursuit of perceived status with credit. Similarly, money as a source of worry was correlated with gambling behaviour (Lostutter et al., 2019), compulsive/impulsive buying (Abrantes-Braga & Veludo-de-Oliveira, 2020; Rose & Orr, 2007), and indebtedness (Abrantes-Braga & Veludo-de-Oliveira, 2020) in some studies, but not others (Duh et al., 2021; Norvilitis et al., 2003). Indeed, research is not yet clear on the exact causality and mechanisms between these attitudes and consumer behaviour. Money worry has also been shown to be consistent with a tendency to conserve money—positive association with price consciousness (i.e., the tendency to strive to get the best price) and with an interest in frugal living (Rose & Orr, 2007).

Impact of more distal and general individual differences, such as the Big Five personality traits, on financial outcomes has also been examined by prior research. For example, conscientiousness has been found to predict lower susceptibility to pathological gambling (Mann et al., 2017; Myrseth et al., 2009), fewer payment delinquencies (Letkiewicz & Heckman, 2019), and less credit card debt (S. Brown & Taylor, 2014). High neuroticism has been shown to positively relate with increased credit repayment delinquency (Letkiewicz & Heckman, 2019) and financial distress (Xu et al., 2015). Among those with lower income, higher agreeableness has been associated with financial hardship (Matz & Gladstone, 2020).

Overall, while this research has been instrumental in demonstrating the relevance of psychology and psychological characteristics within the applied domain of credit, the research focus has at the same time muddled the line between debt accumulation and debt repayment behaviour. Although inevitably linked, with larger debts decreasing an individual's ability to repay as well as being potentially symptomatic of debt non-payment, the behaviour and mechanisms in question are fundamentally distinct. Indeed, by failing to differentiate between the two, the dominant research agenda in consumer psychology glosses over the inevitability and utility of credit for many consumers.

1.5. Differential Psychology Perspectives on Creditworthiness

Despite the potential of psychological characteristics in consumer creditworthiness, finding a psychological theoretical framework to encompass the topic is difficult. Nonetheless, the main theoretical influences within this research enquiry can be grouped into the following three, diverse perspectives:

a) Trait theory (rooted within the psychometric paradigm),
b) Behavioural economics (rooted within the cognitive psychology paradigm),
c) The reasoned action approach (rooted within the social psychology paradigm).

In the next sections, these theoretical perspectives are briefly outlined and examined.

1.5.1. Trait Theory

While often not explicitly acknowledged or referenced, trait theory (Allport, 1937; Cattell, 1943; Eysenck, 1998) is one of the most common implicitly relied upon psychological frameworks for understanding loan repayment (e.g., Klinger et al., 2013; Stockham & Hesseldenz, 1979) and other financial behaviour (e.g., Pirog & Roberts, 2007). Trait theory is a psychological theory that proposes individuals have certain inherent personality traits that can be used to predict their behaviour. Personality is a set of psychological characteristics used to describe an individual's habitual way of thinking, feeling, and behaving in a range of situations. Since it is habitual, it is relatively stable and consistent over time. Thus, in the context of creditworthiness research, trait theory can be stated as follows: creditworthy behaviour varies as a function of internal behavioural dispositions (i.e., traits) that render it coherent, stable, consistent, and predictable.

However, trait theory by itself does not make any specific predictions regarding which individual psychological differences would be predictive of (non-)creditworthy behaviour, apart from them being stable personality dispositions (as opposed to beliefs or attitudes, for instance). As a result, this makes it weak as a theoretical framework to rely upon. In its most traditional interpretation, trait theory is also rather deterministic and assumes little-to-no interaction between the underlying traits and environmental influences, making it a rather simplistic perspective.

1.5.2. Behavioural Economics: Creditworthiness as Rationality

One of the most acknowledged psychological approaches to understanding undesirable credit behaviour (e.g., not repaying debt) is *behavioural economics* (Block-Lieb & Janger, 2006; Capuano & Ramsay, 2011; Majid, 2010; van Raaij, 2016). Using principles from cognitive psychology, the behavioural economics perspective explains that consumers deviate from optimal financial behaviour because of individual tendencies for poor judgements and decision-making (Kahneman & Tversky, 1979, 2000; Mullainathan & Thaler, 2015). In the present thesis, the behavioural economics approach is discussed exclusively in the context of differential psychology (rather than the field of behavioural economics as a whole) and thus, the relevant individual characteristics under this perspective can be equated with *(ir)rationality* (de Sousa, 2007; Etzioni, 2014; Stanovich et al., 2016). Specifically, individuals behave irrationally because of certain individual preferences, beliefs, and thinking processes (e.g., nonstandard decision-making, overconfidence, time and risk preferences; see DellaVigna, 2009). Irrationality is thought to cause bad purchasing and borrowing decisions (Block-Lieb & Janger, 2006; Capuano & Ramsay, 2011; Majid, 2010) and irresponsible financial behaviour and money management (van Raaij, 2016), decreasing the consumer's ability to honour their debt obligations. For instance, consumers with a present-oriented time preference (also called myopia and impatience) overvalue costs and benefits of something available now and fail to adequately consider the future, leading to financial behaviour that produces non-optimal outcomes (Frederick et al., 2002). Similarly, a consumer with lower capacity to perform mental tasks may be constrained in their decision-making quality because they do not fully process relevant information required to make optimal decisions (Dohmen et al., 2018; Frederick, 2005; Stanovich, 1999; Stanovich & West, 2000; though see Lopes & Oden, 1991; Stanovich, 2010, 2012; Torrens, 1999).

Nonetheless, an important point of contention in characterising creditworthiness as *rationality* is that perfectly rational consumers will repay their debt depending on the relative benefits and costs of such behaviour (Meckling, 1977). For instance, when the property's value falls below the balance of its mortgage, optimal financial behaviour is to strategically default on this debt (assuming default costs are minimal; Elmer & Seelig, 1999; LaCour-Little, 2008; Vandell, 1995), and empirical evidence suggests that some individuals behave in this way (e.g., Gerardi et al., 2018). Hence, the *behavioural economics* perspective on creditworthiness predicts that a rational consumer's willingness to repay is dictated by the specific features of the debt contract and legal system in question (B. Adler et al., 2000; Korobkin & Ulen, 2000; White, 1998) and so could lead to lower creditworthiness under certain conditions. This would occur despite perfectly rational consumers' superior ability to repay, and therefore, the extent to which the behavioural economics perspective is suitable for understanding creditworthiness is unclear.

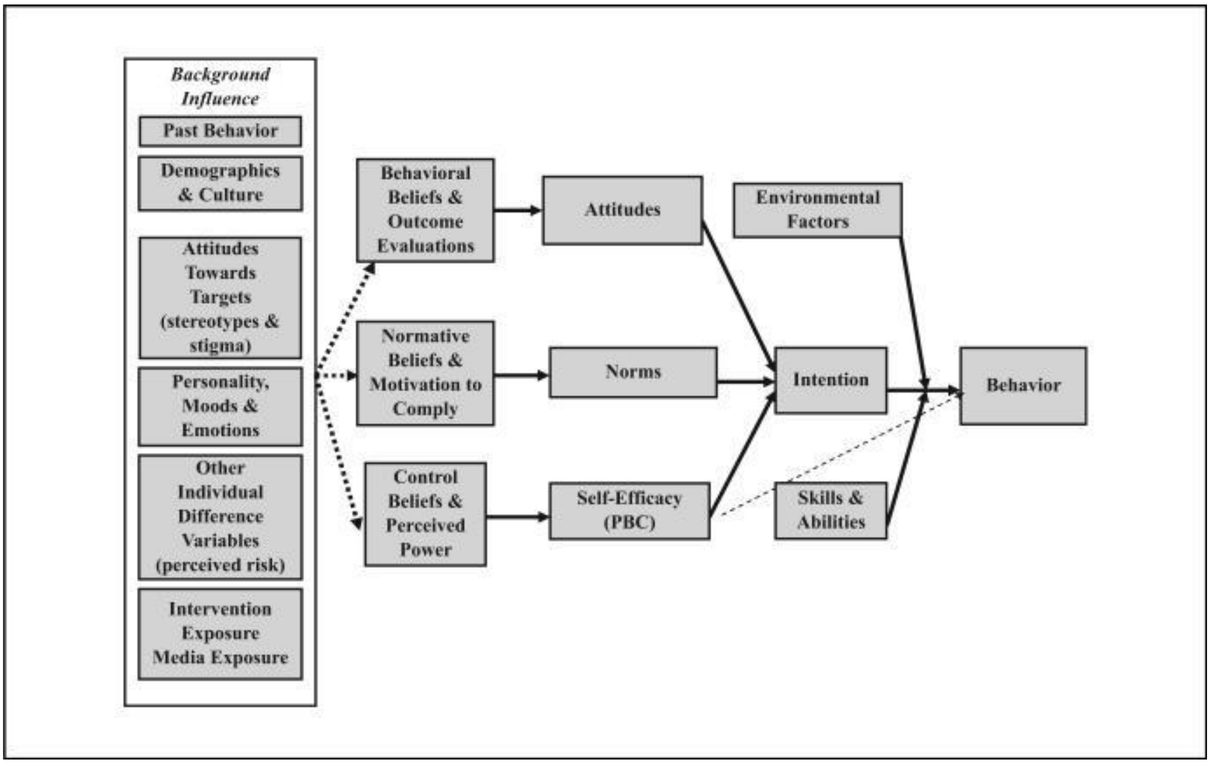
1.5.3. Reasoned Action Approach: Credit Attitudes & Beliefs

Another common psychological framework towards interpreting financial behaviour is the *reasoned action approach* which includes theoretical frameworks such as theory of planned behaviour (Ajzen, 1985, 1991) and theory of reasoned action (Fishbein & Ajzen, 1975). These established and widely applied theories (McEachan et al., 2016; though cf. Schwarzer, 2014; Sniehotta et al., 2014) argue that behaviour stems from a range of various beliefs:

1. Behavioural beliefs are concerned with the positive or negative consequences that might be experienced if the behaviour is performed.
2. Injunctive and descriptive normative beliefs are concerned whether important individuals or reference groups approve and perform the behaviour in question, and
3. Control beliefs are concerned with whether personal or environmental factors can impact the attempts to carry out the behaviour (Fishbein & Ajzen, 2010).

In its most current formation (see Figure 1.1 below), the reasoned action approach posits that an individual's intention and subsequent likelihood of performing a behaviour depends upon the person's attitudes, perceived norms, perceived behavioural control (i.e., self-efficacy), behavioural beliefs, normative beliefs, and control beliefs (Fishbein & Ajzen, 2010). In addition, the relationship between intentions and actual behaviours is moderated by actual control made up of skills, abilities and environmental factors, and background variables such as personality (e.g., conscientiousness), exposure to information, intelligence, demographics, past experiences, and other individual differences influence the behavioural, normative and control beliefs.

Figure 1.1. *The Theories of Reasoned Action and Planned Behaviour with Background Factors*



Source: (Fishbein & Ajzen, 2010)

1.5.4. Overview of Psychological Perspectives

All in all, there are three main theoretical influences on differential psychology research into consumer creditworthiness—trait theory, behavioural economics, and the reasoned action approach. Whilst it has its drawbacks, the approach taken in this thesis is based in part on trait theory. This is due to no one psychological theoretical framework encompassing the topic and trait theory being flexible enough to accommodate a variety of psychological characteristics. Specifically, a more expanded conceptualisation of personality is considered that is still situated within the psychometric paradigm, but also includes less stable characteristics such as attitudes and beliefs (e.g., McCrae & Costa, 2008).

1.6. Summary & Impetus for the Research Inquiry

Fair and accurate creditworthiness assessments are at the heart of responsible micro-lending. There are important and far-reaching social implications of good credit risk assessments, not to mention that there are currently many issues with how the industry has approached the problem of consumer creditworthiness. From problems with credit history to ethical and validity concerns over alternative data, there is a clear need for more theoretical grounding to guide the industry towards creditworthiness assessments that are less arbitrary, more cautious, and thoughtful, and more likely to produce expected and desirable long-term impact. However, much of existing academic literature has either focused on methodological issues surrounding credit risk prediction or on traditional socio-demographic, economic, and/or loan predictors of creditworthiness. Furthermore, among the psychological credit research, studies of debt accumulation, psychological effects of debt, and financial decision-making dominate instead. Moreover, there is no one dominant theoretical approach to understanding psychological characteristics of consumer creditworthiness.

The measurement of consumer creditworthiness is an interdisciplinary research area with numerous schools of thought, which creates inherent difficulties in integrating various findings and perspectives. Furthermore, due to the highly practical and applied nature of the research problem, the distinct contextual factors are likely to be important. Indeed, compared to some of the other applied fields with an information asymmetry problem, the UK micro-lending industry is a highly regulated domain, creating a unique context for research. By approaching this problem from a psychological paradigm, as opposed to a machine learning one, the regulators' expectations (i.e., expectations from the FCA, ICO, EHRC, CMA and the likes) can be met by providing better explainability and interpretability than what black-box machine learning can do.

1.6.1. Description of the General Conceptual Framework

All in all, there are many variables that can be at play in creditworthiness research—from individual (internal) factors to proximal external ones as well as the environment context. An overview of these relevant factors can be seen in Figure 1.2. As previously discussed, socio-demographic, psychological, and loan characteristics have all been found to be associated with default or similar criterion outcome conceptualisations of creditworthiness in past research. On a macro level, the distal context (e.g., the financial market, media, culture etc.) also plays an important role in providing the circumstances under which certain individual characteristics might be more relevant than others. Prior research has found that financial behaviour varies by culture and is influenced by moral hazard, social mood, and unconscious herding (Hira, 1997; Hira et al., 2013; Sabri et al., 2012). In the figure, in accordance with previous research, persons (i.e., individual factors) also share a bi-directional relationship with the situation (i.e., external factors; Briley & Tucker-Drob, 2017; Rauthmann et al., 2016; Roberts et al., 2013).

Overall, this general conceptual framework of various relevant factors provides an overview of what has been discussed thus far. Most of these factors are relatively well-studied apart from psychological characteristics (highlighted in the figure). Therefore, the focus of this thesis is on this exact gap in the literature.

Figure 1.2. *Conceptual Framework of Relevant Factors in Creditworthiness Research*

Environmental Context

- Socio-cultural factors (e.g., credit culture, societal norms, religion, literacy rates, urbanisation)
- Local economy (e.g., unemployment rates, inflation, gross national income, economic development)
- Legal factors (e.g., consumer protection, lending regulations, debt non-payment consequences)
- Credit market (e.g., financial inclusion, presence of credit bureaus, debt advice accessibility)
- Political factors (e.g., political stability, tax policies, prevalence of lobbying)

Individual Factors

- Socio-demographic characteristics (e.g., age, gender, ethnicity, nationality, marital status, SES)
- Economic characteristics (e.g., net disposable income, income type, current indebtedness, employment length)
- Biographical records of credit behaviour (e.g., credit history, search inquiries, types of credit borrowed, credit utilisation, CCJs)
- Acquired personal attributes (e.g., financial experiences, education, skills, capabilities)
- Psychological characteristics (e.g., personality traits, abilities, attitudes, beliefs, values)

External Factors

- Loan characteristics (e.g., term, interest rate, relative total cost, purpose, amount)
- Lender characteristics (e.g., lending policy, quality of affordability assessments, internal risk measures, reputation, customer support)
- Relationship factors (e.g., time with the lender, physical proximity, frequency of face-to-face interactions)
- Proximal social factors (e.g., childhood financial socialisation, household credit behaviour, social support)

Criterion Outcomes

- Repayment problems (e.g., missed payments, arrears, delinquency)
- Recovery actions (e.g., promise to pay, adjusted repayment plan, debt manage plan)
- Loan state (e.g., repaid, current, 0-1 months in arrears, 2-3 months in arrears, default, write-off)
- Individual insolvency and other legal actions (e.g., IVA, CCJ, Administration Order, Debt Relief Order, Bankruptcy Order)
- Confirmed fraud (e.g., chargebacks, false misselling claims, never paid and no contact, credit runaway, SAR/ CIFAs, other post application misrepresentation)

Note. The highlighted factor emphasises the area of research paucity and thus, the focus of the present thesis. SES = Socioeconomic Status.

1.6.2. Thesis Goals & Overview

There is a practical need to expand the types of constructs that constitute the conceptualisation of creditworthiness to improve credit risk prediction and consumer access to affordable loans. This is especially the case for micro-loans, access to which plays a major role in economic development, poverty alleviation, and other social issues. However, while psychology has much to offer in terms of understanding financial behaviour, few studies have investigated the individual differences of those that do and do not honour credit obligations. Therefore, the present thesis aims to address this knowledge gap. Based on two-and-a-half years of research (2017-2020) in collaboration with a UK-based micro-lender, this five-study inquiry explores the role of psychological characteristics of creditworthiness in the context of UK micro-loans. Therefore, the central research questions that guide this thesis are as follows:

1. *What psychological characteristics predict micro-loan repayment behaviour?*
2. *Can these psychological characteristics be used in an applied setting?*

Throughout this thesis, the term psychological characteristics refers to the behavioural, emotional, and/or cognitive individual differences and encompasses attributes such as personality, abilities, states, attitudes, values, interests, and beliefs (Revelle et al., 2013). Thus, the focus is on the individual and not the social, economic, or otherwise exogenous factors relating to the individual.

It is expected that individual psychological differences do have an impact on micro-loan repayment behaviour. Furthermore, it is expected that valid and reliable measures of psychological characteristics of consumer creditworthiness will explain unique variance in debt repayment behaviour associated with being a creditworthy borrower. To fully investigate both questions, the present research had two key stages:

1. A qualitative component (reported in Chapters 3 and 4) eliciting behavioural, affective, and cognitive indicators for good and poor debt repayment behaviour, used to develop a novel psychometric measure of creditworthiness, and
2. A (primarily) quantitative stage (reported in Chapters 5 and 6) investigating the structure of the latent psychological constructs and testing hypothesised relationships between these characteristics and actual loan repayment behaviour in the long-term.

Thus, the empirical studies unfold as follows. A systematic synthesis of existing literature (Study 1a, Chapter 3) is the first step in understanding the potential part that individual psychological differences might play in determining borrowers' creditworthiness in a micro-lending context. By systematically examining published empirical research, psychological characteristics were identified that distinguish between creditworthy and non-creditworthy borrowers most consistently, as well as the types of research most frequently conducted in this theoretical space. The next stage focuses on the unique context by conducting primary, qualitative research in the field (Study 1b, Chapter 4). Using semi-structured interviews with underwriters and customers, a framework of psychological characteristics of creditworthiness specific to UK micro-loans is developed. This framework is then built upon by developing (Study 2a, Chapter 5) and piloting (Study 2b, Chapter 5) a novel psychometric measure of creditworthiness. Focus groups with stakeholders and online questionnaire with subject-matter experts are used for developing, and a cross-sectional, low-stakes questionnaire is used for piloting the measure. This is an important step in being able to quantify the impact of these psychological characteristics on borrower creditworthiness. Hence, the final study (Study 3, Chapter 6) necessitates testing the findings up to this point in an applied context to address the second main research question, the feasibility of using psychological characteristics to assess creditworthiness. This is achieved by introducing the novel psychometric measure as part of the UK micro-lender's loan application process and assessing the predictive validity of these psychological characteristics several months after the borrowers begin to repay (or not) their loans.

The present work provides multiple contributions to the literature. Firstly, unlike most prior psychology research (e.g., Bernthal et al., 2005; Raghubir & Srivastava, 2008), the present thesis focuses squarely on the key criterion outcomes of creditworthiness to differentiate between debt non-payment and other extraneous behaviour (e.g., borrowing, overspending). Secondly, it is one of the few empirical works in consumer creditworthiness that focuses specifically on a UK-based micro-lender. Earlier research instead has concentrated on non-Western micro-lenders since they are comparatively more prevalent (e.g., Carpenter & Williams, 2014; Klinger et al., 2013). Thirdly, our method utilises a mixed methods approach (Creswell & Creswell, 2018; Onwuegbuzie et al., 2010; Tashakkori et al., 2021) where the sequential studies inform the latter by findings from the former, allowing for deeper exploration and more comprehensive understanding of the relationship between psychological characteristics and creditworthiness—a research area still in its infancy.

It should be noted, however, that a complete discussion of why individuals do not honour their debt obligations or get into excessive debt lies beyond the scope of this thesis. This research inquiry is focused on the individual psychological aspects of credit risk, and while the borrower is only one component of a complex socio-economic and political credit environment (as illustrated in Figure 1.2), effects of the individual are just as necessary to understand as the structural and regulation issues surrounding creditworthiness (cf. Block-Lieb & Janger, 2006; Fritzdixon et al., 2014; Honigsberg et al., 2017).

The next chapter (Chapter 2) outlines the methodological considerations of the research inquiry, elaborating further on the applied and unique context in which the investigation takes place.

Chapter 2. Research Context, Design, & Methodology

The present chapter examines the methodological considerations of this thesis. First, details of the sociocultural context and the host organisation are outlined. Second, the challenges of conducting applied research are considered. The chapter then introduces the psychometric paradigm as the approach to guide the present investigation. Lastly, an overview of the research design and methods employed in this thesis is provided.

2.1. Research Context

2.1.1. The UK Lender Regulation

There are important structural and legal differences between countries in respect to credit and debt. This credit context can be very influential, dictating the boundaries and providing opportunities that give rise to unique market features and behaviours. Indeed, previous research has shown that economic factors, such as market competition, inflation, and corruption (Kysucky & Norden, 2016), and market regulations, such as maximum interest rate charged, maximum amount that can be borrowed (Li et al., 2012), have substantive effects on loan repayment behaviours and outcomes. Therefore, to help the reader contextualise the research presented in this thesis, the relevant credit regulations and other market background will now be outlined.

In the UK, lenders fall under the strict legal governance of the Financial Conduct Authority (FCA), which regulates financial companies and provides protection to consumers. The FCA supervises and monitors lenders, creates guidance, and enforcing a set of rules as outlined in their handbook (FCA Handbook, 2021), as well as the relevant national laws (e.g., Consumer Credit Act, 1974; Financial Services and Markets Act, 2000). Failure to comply risks fines, restitutions, disciplinary prohibition, criminal proceedings, or suspension from conducting the regulated activities. The FCA’s code of conduct includes rules regarding customer affordability assessments, pricing and contract terms, fair treatment of customers, complaints handling, financial crime prevention, and many other areas. For instance, lenders must reject applications where it is known or reasonably suspected that the customer has not been truthful (CONC 5.2A.36R FCA Handbook, 2021), and ensure credit is provided only to those that can repay comfortably and sustainably (CONC 5.2A.22G FCA Handbook, 2021). Customers that feel that the lender has conducted themselves irresponsibly or unfairly (e.g., irresponsible or unaffordable lending) are able to file a complaint to the lender, either by themselves, through the free, independent Financial Ombudsman Service (FOS) or via a fee-based claims management company. If the complaint is upheld, the lender waivers or refunds the interest and/or balance due, removes records of loan from the credit file and/or takes other remedial actions depending on the specific case. The FCA then publishes these statistics for organisations that had 500 or more complaints within a six-month reporting period or 1,000+ for an annual reporting period.

Overall, FCA's approach to governance has been quite influential on the credit market, in that they have been able to match the speed of this rapidly developing industry and frequently issue the necessary rule changes, market standards, and financial penalties. In practice, this has meant that the UK's non-mainstream credit environment experiences constant regulatory changes that make applied research in this context rather unique. One of the most relevant regulations implemented by the FCA is the High-Cost Short-Term Credit (HCSTC) price cap that came in effect in 2015 and limits the total cost over the whole life of the loan (including all interest, fees, and charges) at no more than the amount of capital borrowed (FCA, 2014). The daily cost of the loan (interest + fees charged) was also limited to a maximum of 0.80% per day of the amount borrowed. The FCA defines HCSTC as any loan with a term of up to 12 months and APR equal to or larger than 100%, meaning it applies to many micro-lending products on the market.

2.1.2. The Host Organisation

The applied research in this thesis was conducted in collaboration with a UK-based, FCA-authorised micro-lender that aims to break down barriers to affordable credit for the financially excluded. Unlike many banks and other lenders, this organisation lends to individuals even if they are self-employed, recent migrants, receiving benefits, had previously been turned down for credit, or had CCJs in the past. However, the lenders' main requirements are that the applicant is over 18 years old, a UK resident for the last 6 months, meets the minimum income threshold of £400 a month (salary and/or benefits), and has a valid bank card and UK bank account. In addition, they do not accept individuals currently in debt management, bankrupt, with an IVA or current unspent CCJs.

2.1.2.1. Products

The micro-lender offers two possible credit products depending on the customer's needs: the smaller, shorter-term loan (£100-£1,750 repaid over 3-12 months) and the larger, longer-term loan (£1,000-£5,000 over 18-36 months). The smaller one is designed for emergencies, unexpected bills, special events, shopping, or travel and the bigger one is for larger purchases, renting deposits, business opportunities, or home improvements. However, due to the higher risks associated with lending the larger amounts, loans over £1,000 are only available to existing customers, with the host organisation relying on a relationship lending strategy to mitigate this risk. New customers who are judged to have an elevated credit risk are also limited further in the maximum loan amount available to them (e.g., £300 instead of £1,000). Thus, customers can obtain loan increases (called a *Top-Up*) no earlier than 45 days after taking out their first loan, subject to good repayment behaviour over the course of those days. Because different FCA regulations, limitations, and interest rates apply depending on how much of the previous loan has already been repaid (i.e., whether a *Top-Up* counts as refinancing), some borrowers wait longer before increasing their loan limit and some repay their loans fully before immediately applying for a larger amount.

The cost of credit is below the FCA HCSTC price cap (0.50%-0.76% daily rate versus the 0.80% cap; see the prior section on FCA's regulations for further details), and the lender does not charge any other common fees (e.g., missed/late payment, processing, faster payments, rollover fees). The actual APR charged depends on: (a) loan amount, (b) loan length, (c) frequency of loan repayments, and (d) the credit risk (e.g., new vs. existing customers). Among the new customers that refinance after 2-3 months of good repayment behaviour, almost 90% experience a notable drop in the overall interest charged. For example, a new customer borrowing £300 for 6 months would pay £21.50 weekly (projected to repay £559.10 in total with a representative APR of 1,375%), but after refinancing (same term and amount) would pay £18.00 weekly (£467.90 to repay in total, 539% representative APR). However, in both scenarios the customer is repaying more than 50% of the original amount borrowed which is not suitable for everyone. Individuals that can borrow interest-free from friends or family or use low-interest, low-fee credit cards, for example, are better off not borrowing from the host organisation; although, as noted in the previous chapter (Section 1.1), the total cost of credit is more favourable than a typical unarranged overdraft or other HCSTC providers.

2.1.2.2. Shift to Digital Lending

The micro-lender has been providing loans for over a decade. They started out in 2006 as a primarily physical business where underwriters would process loan applications in a half-an-hour interview, conducted either face-to-face or over the phone. By the end of 2017, the micro-lender had 18 physical stores across London and the Midlands and served the rest of the UK over the phone in a Virtual Store (located in London). In 2015 (about two years prior to the first primary research study in this thesis—Study 1b, Chapter 4), the micro-lender began going digital and accepting loan applications through its mobile app and an online web-form, where a small percentage of all approved applications were processed without any human input. This application channel rapidly increased over the duration of the research inquiry, and by 2019, the business was fully digital, having closed the last of its stores. The lender had realised that despite the success of the underwriter business model, this approach to micro-loans was hurting their mission of improving access to credit. Firstly, the high operational costs of having a high-street presence were very large compared to the cost of default risk, which increased the cost of credit for the borrower and reduced access to credit for those for whom the cost made the loan unaffordable. Secondly, the limited ability of underwriters to process a certain number of applicants a day made the business non-scalable; thus, also limiting the applicants' access to credit.

2.1.2.3. Customer Population

Overall, as a result of the product design and the basic eligibility criteria, the micro-lender's customer base is a unique blend of credit needs, backgrounds, nationalities, incomes, and social class. Some of the lender's borrowers can be described as *credit invisibles* (e.g., migrants, young adults, older individuals); whilst others have dented credit history due to past credit mistakes, fraud, or inaccuracies within the credit bureau data; some are on a limited income (e.g., single parents); and yet another group have variable income that might not be commonly recognised by mainstream lenders (e.g., small-business owners, individuals working in the grey or gig economy). Thus, the credit needs and experiences of these borrowers vary accordingly. For example, economic migrants were more likely to request funds to purchase specialist trade tools or hire a van for a job and borrow for a shorter period. To help serve this migrant population, the lenders' underwriters speak over a dozen different languages, including English, French, Italian, Polish, Romanian, Russian, Hindi, Farsi, Filipino, and Twi. Meanwhile, single mums were more likely to borrow over much longer periods of time and with intent to purchase things for their growing children, such as school uniform or furniture. In sum, Table 2.1 below highlights the demographic profile of the host organisations' population in question, and how the composition of the population has shifted over the years of the research inquiry, in part due to events like Brexit and the micro-lender's pivot to online-only lending.

Table 2.1. *The Population Composition of the Host Organisation's Borrowers during the Years of this Thesis*

Characteristic	**Year**			
	2017 [a]	**2018 [b]**	**2019**	**2020 [c]**
Socio-Demographic				
% of non-UK nationals	52.19	29.61	18.00	10.32
% of female borrowers	82.0	73.5	67.4	56.6
Median age	35	35	35	35
Mean age (*SD*)	36.7 (10.7)	36.6 (10.6)	37.1 (10.3)	34.6 (10.3)
Economic				
Median monthly income (£)	1,387	1,425	1,500	1,614
% salary only	73.1	54.8	44.8	45.2
% benefits only	25.1	31.5	32.0	17.6
% salary & benefits mix	1.78	13.8	23.2	37.2
Overall				
Number of new borrowers	19,849	32,176	9,771	15,672

Note. The characteristics are only included in the year that the loan was taken out. To prevent double counting of customers who took out several loans within a given year, only the first instance of data per customer per year is included.

[a] The start of the research inquiry

[b] Interviews with micro-lender's customers and underwriters as part of Study 1b (Chapter 4), with recruitment based upon data from the previous year

[c] Validation study (Study 3, Chapter 6) as part of a live application process for new borrowers at the host organisation

2.1.2.4. Assessments

In line with the aforementioned FCA regulations, the host organisation conducts a range of affordability and vulnerability assessments, as well as identity and fraud checks. For instance, they ensure that the borrower can afford their loan by verifying that the monthly loan repayments are no more than the minimum of the following:

- monthly affordability stated by the customer during their application;

- 80% of the borrower's monthly Net Disposable Income (NDI), after considering all the discretionary and non-discretionary spending, payments to other lenders, and 5% of balances on credit that do not have regular repayments (e.g., credit cards, overdrafts); and
- 30% of the customer's monthly income minus the loan repayments to other lenders (includes the 5% of balances calculations mentioned above).

These affordability figures are validated using external information, such as CATO, credit bureau information, ONS databases, and bank statements. It would be against FCA regulations for the micro-lender to give a loan if the borrower does not have the ability to repay. The host organisation also has a policy against giving out loans that would put the borrower's debt-to-income ratio over 30%.

2.1.2.5. Customer Impact

To help meet the needs of their customers as outlined earlier, the micro-lender provides same day approval whenever they can. They do not charge any fees and conduct themselves in a simple, transparent, and straightforward manner. As part of this approach, the lender provides borrowers with flexible repayment options. For instance, the customers are heavily encouraged to contact the lender, if they know they are not going to their next payment or missed one recently to make a *Promise to Pay*, set up a decreased *Payment Plan*, or adjust the term or repayment frequency of the loan. In addition, the micro-lender allows borrowers to temporarily put their account on hold (i.e., a payment holiday or defer payment) without affecting their credit file, incurring any additional charges or interest. Indeed, increased flexibility in repayment is important for consumers' mental health as previous research has shown (Alvarez et al., 2018; Field et al., 2012; Richardson et al., 2013). The host organisation's good reputation among their customers is evident by their "Excellent" *TrustPilot* score (90% of the customers have rated the lender as 4 or 5 out of 5; overall *TrustScore* of 4.7; 18,387 total reviews), as well as a relatively high referral rate (45% of new customers were referred by an existing one). However, it is worth noting that over the past three years (2016–19), 290 mis-selling claims against the micro-lender were upheld, and redress was paid. An undetected debt spiral (e.g., the credit file showing poor account management) was the most common reason for the upheld complaints. Although that is a relatively small number of claims compared to the market average (FCA, 2019b), this demonstrates potential drawbacks of this kind of lending for some borrowers.

2.1.2.6. Risk Outcomes

However, in trying to improve financial inclusion, the organisation naturally attracts bad actors interested in gaming the system. For instance, this micro-lender regularly encounters fraudsters applying under some else’s name (first-degree identity fraud), falsifying their documents, or omitting important details, such as address history, from their application (application fraud). This is extremely common across the industry due to the clear potential for financial pay-off, especially since instances of application fraud in the non-mortgage credit industry have been on the rise (Cifas, 2021), and overall fraud is now the most common crime in England and Wales, with over 4.6 million incidents reported in 2020 (ONS, 2021). Between fraud, credit, and vulnerability risk, as well as the increase in information asymmetry due to the move online, the host organisation faces a lot of challenges in accurately assessing new customers that have never borrowed from this lender before. With an average of 11% of all loans with new customers never being paid (i.e., £0 repaid), 2% being confirmed fraudulent, and 40% being written off (loans are financially written-off after being in arrears for 4 months or more), this lender is in clear need of increasing the accuracy of its selection decisions for new customers.

2.1.2.7. Summary

It is against the backdrop of this complex context that the current research was conducted, with the overall aim of understanding of what is beyond the borrowers’ credit history, when it comes to predicting loan repayment behaviour. Overall, the host organisation in this thesis faces a complex balancing act between providing access to credit and not falling prey to fraudsters or making the situation worse for those that take out loans without willingness to repay; being fair enough to benefit the financially excluded, but without creating a further unfairness sub-populations; and doing thorough assessments while maintaining a user-friendly and frictionless customer experience. These considerations are presented throughout this thesis and inform a range of research decisions.

2.2. Conducting Applied Research

Understanding psychological characteristics of micro-loan borrowers is an important practical and social issue impacting those overlooked by mainstream credit and their lenders. This makes it an applied area of inquiry. As a result, the field benefits most from applied, field research, where contextually rich data is gathered from real consumers engaging in real situations, rather than from student populations responding to lab-based stimuli. This helps ensure the relevance, practicability, and ecological validity of the findings. Nonetheless, there are several practical challenges associated with conducting applied creditworthiness research. Thus, what follows is an overview of these difficulties, with a special focus on those that were encountered as part of the research in this thesis.

As has been previously acknowledged by other academics (e.g., Dorfleitner & Jahnes, 2014; Lea et al., 2012), there are practical difficulties that researchers face because information regarding creditworthiness and credit payment behaviour can be difficult to access. For instance, credit bureau data is not publicly available and can be difficult to obtain for research purposes. Borrowers can be difficult to identify and recruit due to unwillingness to declare/acknowledge their indebtedness status. Sensitivity of information and the heavily regulated status of the industry also present barriers to data access for research. Furthermore, organisations can be reluctant to allow academic publishing of results, to prevent losing a competitive advantage among other lenders, but also in fear that non-creditworthy applicants could use these results to adapt their behaviour and game the system. Therefore, industry collaborations and applied inquiries, such as the one presented in this thesis, are important to the creditworthiness research area. Following the completion of the necessary training on fraud, money laundering, bribery, IT security, and FCA conduct rules and reporting, the researcher gained access to a large participant pool of micro-loan borrowers. Moreover, by engaging with an industry partner, the present inquiry benefited from the support of the micro-lender's employees and their excellent domain knowledge and field-based understanding of some aspects of creditworthiness within the micro-lending context.

However, even with the support of an industry partners and access to participants and data, there can still be other constraints on *how* the data is collected. As mentioned earlier, one of the notable features of the UK micro-lending market is the importance of the customer experience, especially during the loan application process (CMA, 2015; Experian, 2018)**.** Consequently, this created a practical limitation on the type and length of psychometric measures that could be used during the high-stakes validation study (Study 3, Chapter 6), as part of the loan application process. With the aims to maximise the trade-off between the research data quality/validity and the ease of user experience during the loan application, the format chosen for the psychometric measure was pictorials or image-based items, where the item stem is a question/statement, and the response options are images. Moreover, the number of items in the measure were also restricted to limit the completion time to no longer than five minutes.

Another obstacle encountered during this research process was obtaining cooperation from potential customer interviewees as part of an interview study about loan repayment behaviour (Study 1b, Chapter 4), despite offering financial incentives. This was especially the case for those who were in the “bad” and “written-off” stratified repayment behaviour groups. As will be seen in Chapter 4, the borrowers’ response was rather low—only 3% of those contacted agreed to take part, and of those who agreed, only 46% showed up to the interviews, even after re-scheduling several times. This translated to an overall response rate of about 1%, which is slightly lower than previous research on similar debtor samples in the UK, with typical response rates of about 5% (Lea et al., 1993, 1995, 2012; Mewse et al., 2010); though notably, majority of these studies were postal questionnaires or interviews conducted over the phone. Thus, in a practical sense, the UK micro-borrowers turned out to be a somewhat hard to reach/challenging population to study. Of course, this is expected for an interview study with individuals who might be particularly avoidant, if they are already trying to avoid debt collectors; in precarious life situations, with little available time; unwilling to discuss their financial situations with a stranger; or simply sceptical of being interviewed for a research study. As a result, recruitment was more gradual, and it was made as easy as possible for potential interviewees to participate (e.g., conducting one over the phone and conducting another in a non-local lender store), so long as it did not harm the data quality. The dynamic nature of the key construct of interest (i.e., creditworthiness) was also utilised whenever possible, by asking participants to reflect on times when they had not acted in a creditworthy manner, to obtain more data on low creditworthiness.

Lastly, applied creditworthiness research often takes place in highly complex and volatile contexts where conclusions are necessarily tentative. The research in this thesis was conducted between 2017 and 2020 and during that time certain economical, legislative, and credit market changes have taken place that are contextually relevant/important. For instance, there were some notable legislative changes to affordability assessments from the FCA in 2018/2019 (FCA, 2018a) that likely created a population shift in the micro-lender’s customer population. The biggest macro influence on this research, however, is most certainly the COVID-19 pandemic and subsequent lockdowns that coincided with the final two studies in this thesis (Q1-Q3 of 2020). During this time, the UK economy took a sizeable hit, with GDP fall of 21% in Q2 (ONS, 2022a). Although the economy then went on to recover somewhat in

Q3, most likely due to the UK's government various schemes and other responses (e.g., the furlough scheme, "Eat Out to Help Out" scheme, business grants and loans etc.), there was still a notable impact on the tourism, hospitality, and construction industries, with many businesses shutting down, leading to a sharp rise in unemployment. As a result, some of the borrowers' repayment abilities might have been undermined by the external forces of the health and economic crisis.

Overall, although sometimes there may be a trade-off between internal (rigour) and external validity in applied research, both were aimed for. However, it was also recognised that different research prioritises different goals and one of them does not necessarily represent a different level of quality than the other. Afterall, research inquiries with strong practitioner/societal implications need not necessarily revise our understanding of theoretical construct, but they should still be practicable, robust, and important.

2.3. Research Paradigm

The present research takes the psychometric paradigm (Allport, 1937; Cattell, 1943; Eysenck, 1998) as the approach to guide the present investigation. Thus, as part of this analytical research approach, it is assumed that creditworthiness is (in part) a dispositional tendency that generates individual differences in loan repayment behaviour. These individual differences are assumed to be relatively consistent over time, but dependent upon the specific circumstances. With the assessment of creditworthiness conceived as an exercise in prediction (see Section 1.2 in the previous chapter), it is assumed that a borrower requires certain personal attributes to repay the loan successfully. The goal is, thus, to identify the psychological characteristics that can adequately predict future loan repayment behaviour within the practical limitations of a given context. Then, to develop and apply an assessment instrument which will (partially) predict the repayment behaviour according to the levels of the necessary characteristics that the borrower possess. Therefore, the first step is to identify the psychological characteristics with the greatest impact on consumer debt repayment behaviour, since it would not be feasible for a measure administered as part of a loan application process to reliably measure all facets of personality, cognitive ability, attitudes, beliefs etc. Indeed, consumer credit behaviour is a complex net of predictors, outcomes, and perspectives, with many potential psychological components. Therefore, some form of systematic choice procedure is necessary to identify which aspects of borrowers' personality, beliefs, and attitudes make them honour their debt obligations. It is believed that such a ground-up research inquiry will be the most beneficial to future academic research and applied practitioners across economic and psychological disciplines.

2.4. Research Design & Methods

Therefore, the research in this thesis adopts a sequential exploratory design utilising a mixed methods strategy to broadly investigate the psychological characteristics of micro-loan borrowers that contribute to successful loan repayment behaviour. This research approach is found across numerous mixed method typologies proposed by different authors (e.g., Creswell & Creswell, 2018; Onwuegbuzie et al., 2010; Tashakkori et al., 2021) and involves collection of qualitative data, results of which are then used to drive the development of a quantitative measure to further explore the research problem. This sequential exploratory approach especially benefits research areas that are in their infancy, such as the study of micro-loan borrowers' creditworthiness from a psychological perspective. The qualitative start to this inquiry is necessary to ensure a good understanding of the complexities being researched. In the multi-step process used in this research, the thesis aimed to: (a) carefully unpack context-relevant indicators of creditworthiness using qualitative methods and outline the relevant instruments measuring the construct; (b) apply qualitative findings to the development and piloting of a context-informed measure; and (c) validate this measure in a high-stakes, high-fidelity context. The theoretical underpinning in this research area was insufficient to justify starting out with a quantitative approach, as evidenced by discrepant findings and absence of an overarching theoretical model in the literature (see previous chapter for details). Therefore, beginning with a qualitative approach was more appropriate as it is suitable to gather rich information on topics where little is known, and to comprehend the nature of the problem in cases where very few studies might have been conducted in that area.

Since one of the key values of mixed methods research is that the whole is more than the sum of its parts (Barbour, 1999), it was important to ensure that the complex qualitative data collected in the first stages can easily feed into the quantitative part of the research design, and for the quantitative stage to take advantage of the richness of the qualitative findings. Therefore, after conducting a systematic review of psychological characteristics in the creditworthiness literature (Study 1a, Chapter 3), semi-structured interviews with micro-loan borrowers and underwriters (Study 1b, Chapter 4) were conducted using the Critical Incident Technique (CIT; Flanagan, 1954), which allowed to collect concrete, context-rich observations of behaviours, thoughts, and emotions concerning the effective and ineffective outcome of interest—debt repayment. Then, in Study 2a (Chapter 5), the behavioural, affective, and cognitive indicators obtained from the interviews were used to generate items for a novel creditworthiness measure in a micro-lending context, supported by the psychological characteristics groupings identified in the two qualitative studies prior. To ensure appropriate steps were being followed to develop a good psychometric instrument, mixed methods evaluations of those items (Study 2a, Chapter 5) were then followed by a quantitative pilot study (Study 2b, Chapter 5) and lastly, a quantitative validation study (Study 3, Chapter 6). Throughout the five empirical studies, care was taken to ensure validity of the data before moving onto the next research stage (as per Creswell & Creswell, 2018). A summary of the studies conducted in this thesis and how each one contributed to the psychometric properties of the final instrument is depicted in Table 2.2.

2.5. Summary of Chapter 2

This chapter provided an overview of the empirical and organisational context where the present inquiry in this thesis took place. Some of the unique aspects and challenges of conducting applied creditworthiness research were discussed. Furthermore, this chapter provided justifications for the research paradigm, design, and methodology employed over the course of entire thesis. The next chapter, therefore, moves on to present the first empirical study of the creditworthiness inquiry—a systematic literature review of the published empirical research on the psychological characteristics of consumer creditworthiness (i.e., Study 1a). This systematic synthesis of existing literature is the first step in understanding the potential part that individual psychological differences might play in determining borrowers' creditworthiness in a micro-lending context.

Table 2.2. *Overview of the Research Studies Presented in this Thesis*

Thesis Chapter (Study #)	Research Phase	Key Research Aim	Study Design & Method	Sample	Psychometric Properties Evaluated
Chapter 3 (Study 1a)	Qualitative exploration	Identify the relevant psychological characteristics of consumer creditworthiness according to existing empirical literature	Systematic literature review and thematic synthesis of prior empirical research	34 academic studies across 33 journal articles	Content validity
Chapter 4 (Study 1b)	Qualitative exploration (in context)	Develop a systematic definition of the most relevant psychological characteristics of consumer creditworthiness for a UK micro-loan setting	Semi-structured interviews using Critical Incident Technique (CIT) and subsequent content analysis of the transcripts	50 micro-loan borrowers 35 micro-loan underwriters	Content validity Contextual relevance
Chapter 5 (Study 2a)	Mixed methods	Operationalise this systematic definition of psychological characteristics of consumer creditworthiness, appraising and refining the resultant psychometric items in the process	Focus groups with stakeholders and online questionnaire with subject-matter experts	10 host organisation stakeholders 9 subject-matter experts	Content validity Face validity
Chapter 5 (Study 2b)	Quantitative	Pilot and refine the novel psychometric measure of consumer creditworthiness	Cross-sectional questionnaire-based study in a low-stakes, low-fidelity context	459 *Prolific* participants with recent experience of high-cost lenders in the UK	Internal consistency (reliability) Structural (internal) validity External validity

Thesis Chapter (Study #)	**Research Phase**	**Key Research Aim**	**Study Design & Method**	**Sample**	**Psychometric Properties Evaluated**
Chapter 6 (Study 3)	Quantitative	Establish the validity (especially predictive validity) of the novel psychometric measure of consumer creditworthiness in an applied setting	Longitudinal, questionnaire-based field study in a high-stakes, high-fidelity context T1: loan application T2: 2-4 months after borrowing	560 micro-loan borrowers	Internal consistency (reliability) Test-retest reliability Face validity Structural (internal) validity External validity Criterion-related predictive validity

Note. T1 = Time 1. T2 = Time 2.

Chapter 3. Psychological Characteristics of Creditworthiness: A Systematic Literature Review

3.1. Introduction

Lending based on credit history can be problematic, especially in a micro-lending context. The reasons outlined in Chapter 1 range from thin or missing credit files to inaccurate information, among many others. This has created a need to understand other facets of creditworthiness that go beyond credit history and other traditional socio-demographic, economic, and loan variables, and psychology has much to offer in terms of informing decisions with regards to consumer behaviour, such as credit lending decisions. This is because of the substantial evidence highlighting the psychological underpinnings of a variety of financial behaviours and outcomes (e.g., Kamleitner et al., 2012; Lea et al., 1995; Norvilitis et al., 2006; Rustichini et al., 2016). Therefore, as the first step in understanding the role that individual psychological differences play in micro-loan creditworthiness, the current academic literature on the subject matter needs to be reviewed.

Few reviews of new creditworthiness variables exist (though see Kysucky & Norden, 2016, for a meta-analysis of the impact of bank-borrower relationship variables on lending outcomes) and to the best of the author's knowledge, no previous systematic review examined psychological factors as characteristics of creditworthiness. The main exception to that is a non-systematic review by Kamleitner et al. (2012). Their extensive review described four psychological perspectives on consumer borrowing, each describing the processes before, during, and after credit acquisition. These perspectives were "(1) a reflection of the situation, (2) a reflection of the person, (3) a cognitive process, and (4) a social process" (Kamleitner et al., 2012, p. 1). Kamleitner et al. (2012) found that research focused on the person perspective tends to be static and does not distinguish between before, during, and after phases of credit acquisition, arguing that the same individual differences influence choosing, borrowing, and repayment behaviours. They grouped these differences into (1) *desire for the good* (i.e., social comparison and materialism), (2) *desire for now* (i.e., delay of gratification/myopia and self-control), and (3) *desire to use credit* (i.e., debt/money attitude, optimism, sensation-seeking, and risk seeking). However, Kamleitner et al. (2012) advised cautious interpretation because they identified a significant gap in the literature regarding the influence of these personal characteristics on credit repayment behaviour. Therefore, this chapter is a timely update to Kamleitner et al.’s (2012) non-systematic review because this study’s focus is on this exact gap—individual psychological characteristics of creditworthiness.

The need for this review goes beyond simply identifying the relevant psychological constructs. Much of empirical research exploring the psychological factors relating to non-payment of loans (e.g., Guiso et al., 2013; Mewse et al., 2010) is not based on a unified theoretical framework. This has resulted in studies focused on descriptions of selective factors and findings that are often fragmented, with little consideration for causal explanations and interactions between variables. Therefore, the present review addresses these issues by unifying, synthesising, and evaluating what is currently known about the psychological characteristics of creditworthiness. The specific questions that drive this chapter’s research are:

What psychological characteristics distinguish creditworthy and non-creditworthy borrowers, and consequently, how can creditworthiness be best conceptualised?

The personal financial obligations in this literature review include both secured (e.g., mortgages and automobile loans) and unsecured debt (e.g., consumer and entrepreneurial loans and credit cards). The criterion outcomes of creditworthiness being considered in the present review are the same as previously outlined in Chapter 1—bankruptcy, foreclosure, default, missed payments, repayment problems, delinquency, arrears, and credit risk assessment by loan officer. Furthermore, as mentioned in Chapter 1 (Section 1.6.2), the term *psychological characteristics* refers to individual differences such as personality, abilities, and attitudes. For this study, it is necessary to clarify the term a little further. The researcher understands psychological characteristics to be non-observable or latent constructs (distinguished from something like demographics) which means the way these characteristics are assessed is important. For example, measuring neuroticism based the individual’s usage of first-person singular and negative words in a loan request (S. Wang et al., 2016) would not be adequate. This type of measure is not explanatory or theoretically relevant and so would lack construct and content validity. Therefore, the present review does not consider proxy measures of psychological characteristics if they lack construct and content validity. Similarly, variables such as ‘financial literacy’ and ‘financial capability’ were not considered to be psychological characteristics since they are mainly based on learnt skills and knowledge, rather than innate abilities (Hoelzl & Kapteyn, 2011).

3.2. Method

3.2.1. Literature Search

In April 2018, electronic searches were conducted using the *Web of Science Core Collection* database and ten *EbscoHOST* databases, chosen to reflect the range of fields in which consumer creditworthiness research has appeared, such as business, economics, and psychology. These were: *Academic Search Complete*, *Business Source Complete*, *eBook Collection*, *EconLit*, *Health and Psychosocial Instruments*, *PsycARTICLES*, *PsycBOOKS*, *PsycINFO*, *PsycTESTS*, and *SocINDEX*. The search strategy included a comprehensive list of search terms (see Table 3.1) and specific, pre-defined inclusion and exclusion criteria (see Table 3.2).

Table 3.1. *The Search Strings Used to Identify Potentially Relevant Records*

Search Strings	
1.	(loan OR credit OR mortgage)
2.	AND ((borrower OR applicant OR application OR individual OR customer OR consumer OR people OR human OR participant OR user OR entrepreneur OR “business owner*” OR underwriting) N5 (characteristics OR personality OR demographics OR factors OR ability OR behaviour* OR behavior* OR propensity OR differen* OR criteria OR classification OR data OR information OR creditworth* OR “credit worth*” OR “trust worth*” OR trustworth*))
3.	AND (pay* OR repay* OR default OR delinquen* OR bankrupt* OR foreclos* OR fraud OR risk)
4.	NOT (insurance OR bond OR currency OR dividend OR sovereign OR securitization OR governance)

Note. For the search in the Web of Science database, “N5” in search string 2 was replaced with “NEAR/5”.

Table 3.2. *Inclusion and Exclusion Criteria Used to Screen the Articles*

Inclusion Criteria	Exclusion Criteria
1. Original articles which either: a) Aim to understand creditworthiness through a suitable criterion outcome (e.g., expert judgement, loan arrears, missed payments, bankruptcy, and foreclosure), and/or b) Describe the development of a creditworthiness assessment.	**1.** Articles which exclusively focus on any of the following: a) Statistical methodologies and modelling, b) Legislative and policy issues, c) Macro-economic constructs, d) Financial attitudes, or e) Other irrelevant topics.
2. The constructs under study are of psychological nature (i.e., consider the behavioural, emotional, or cognitive individual differences).	**2.** The constructs under study are not psychological (e.g., they are demographic, environmental, or economic in nature).
3. The article context is that of the consumer credit market, which includes credit cards, instalment loans, mortgages, peer-to-peer loans and individual entrepreneurial, SME, or agricultural loans.	**3.** The article context is that of corporate, bank, or sovereign credit market, including pricing of equity-based options.
4. Empirical (i.e., quantitative, qualitative, or mixed methods) studies.	**4.** Summary or review articles which do not contain original data.
5. Peer reviewed and scholarly articles, working and conference papers.	**5.** News articles, trade publications, magazines, market research reports, white papers, books, and dissertations.
6. Study population of adults aged 18 and over.	**6.** Study population of under 18s.
7. Articles in English.	**7.** Articles in languages other than English.
8. Date of publication and context or country are unrestricted.	**8.** N/A

For the search terms, different synonyms and spellings of the search words were considered and combined. These terms appeared in the title, abstract, or keywords of the text. The four search strings utilised can be seen in Table 3.1. The first string relates to the context – consumer credit market (inclusion criteria 3, see Table 3.2). The second search string covers a range of psychological constructs to meet inclusion criteria 2. The third string detects the studies likely to consider the relevant criterion outcomes (e.g., loan repayment and default; inclusion criteria 1). Last, the fourth string ensured a more efficient search by excluding articles most likely to match exclusion criteria 1 and 3 (i.e., irrelevant focus and irrelevant context).

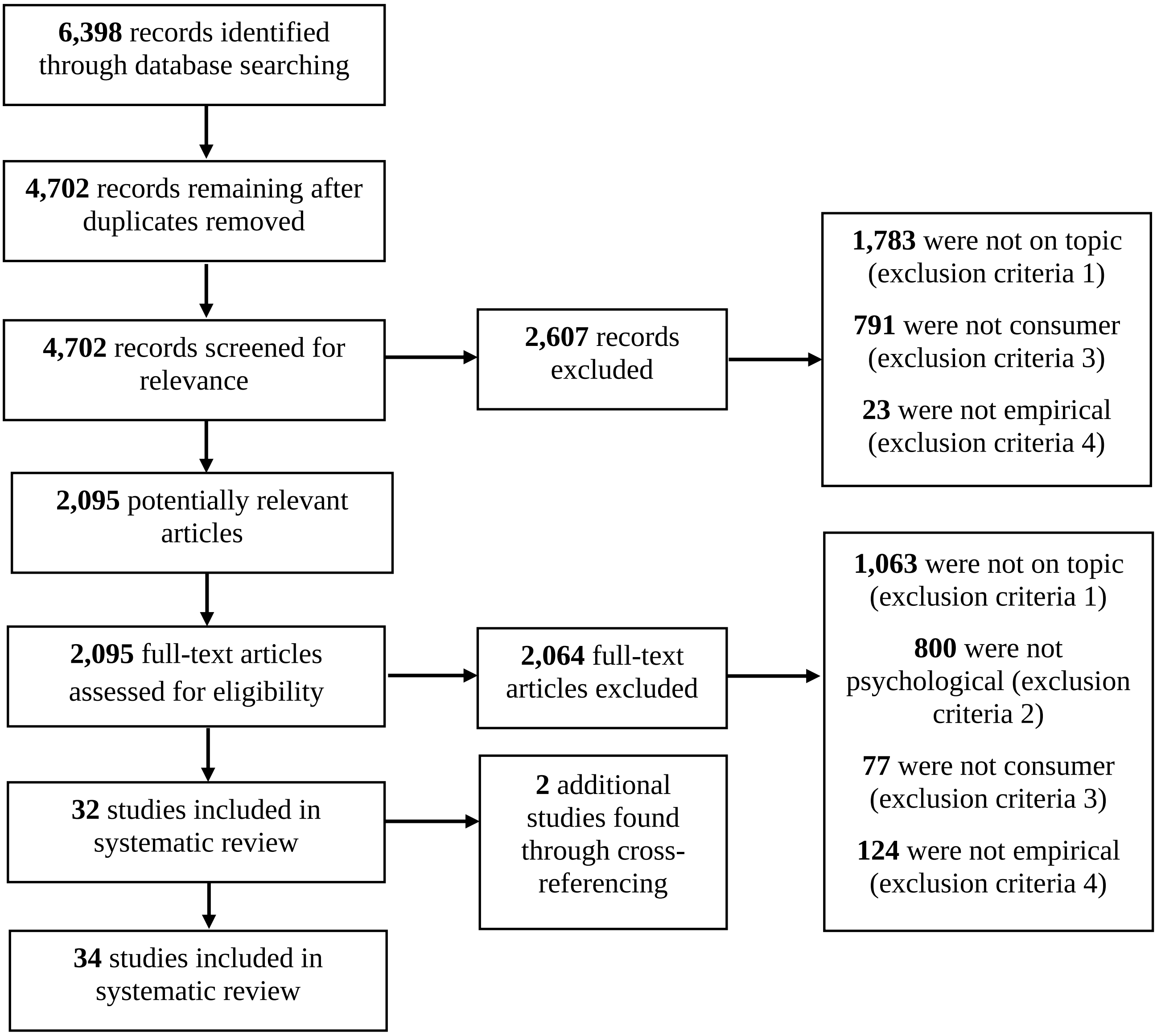
The search parameters were limited to the English language (inclusion criteria 7), and by the publication type: news articles, trade publications, magazines, and market research reports were excluded (exclusion criteria 5). All other search parameters were unrestricted (inclusion criteria 8).

The initial search returned 6,398 articles across all the databases and search strings, with 4,702 remaining after the removal of duplicates. The titles and abstracts of all returned articled were read and assessed for eligibility. As a result, 1,783 articles were removed based on exclusion criteria 1; 791 articles were removed based on exclusion criteria 3; and 23 articles were removed based on exclusion criteria 4. After evaluating the full text of the remaining 2,095; over half of the articles were removed for not focusing on characteristics of creditworthiness (exclusion criteria 1); 800 articles did not measure any psychological variables (exclusion criteria 2); 77 were not set in the consumer credit context (exclusion criteria 3); and 124 articles were removed because they did not contain an empirical study (exclusion criteria 4). This meant 31 papers describing 32 studies were retained for review (see Figure 3.1). The reference lists of these papers and relevant previous reviews (Kamleitner et al., 2012; Onay & Öztürk, 2018) were then examined for any additional studies that could meet the inclusion criteria. These studies were obtained and evaluated based on the same criteria (Table 3.2). This search yielded two eligible studies.

3.2.2. Coding of Studies

In total, 34 studies in 33 journal articles were included in the final review. These were coded for the following key features: study design, ecological validity of the design, type of credit, study context, population, sample size, psychological constructs assessed, criterion outcomes and their types, and brief findings (see Appendix A1). The methodological quality of each study was assessed using the Mixed Methods Appraisal Tool (MMAT; Q. N. Hong et al., 2018), a validated quality assessment tool. Depending on the study design (qualitative, quantitative non-randomised, or quantitative descriptive) the MMAT addressed quality criteria such as adequate data collection, population representativeness, appropriate measure, consideration of confounders, and appropriate statistical analysis (see Appendix A1, Table A1.1 for more information). Based on how many of these criteria were met, each study received an MMAT quality score ranging from 0 to 5, a higher score indicating better methodological quality or lower risk of bias.

Figure 3.1. *Flowchart of the Study Selection Process*



Moreover, consideration of causality, outcome measurement accuracy, and ecological validity were addressed in an additional quality assessment, resulting in an additional quality score ranging from 0 to 3 (see Appendix A1, Table A1.1). It was important to include these three extra quality criteria because of their relevance in the current context. First, since several studies (e.g., Autio et al., 2009; Lea et al., 2001; Tay et al., 2017) have demonstrated that debt and credit use has an influence on the individual's psychological characteristics, it is important to differentiate between creditworthiness as a cause and creditworthiness as a consequence (e.g., Kamleitner et al., 2012). Second, despite some research demonstrating that using self-reported criterion outcomes of creditworthiness is a valid approach (e.g., Gathergood, 2012a), they are more susceptible to under-reporting, recall-, and perception-bias compared to observed measures (Karlan & Zinman, 2008; Zinman, 2009). Third, ecological validity is an important consideration for the study of creditworthiness since it is a complex and dynamic process and not easily examined in an artificial setting (e.g., in a lab).

The details of the included studies can be found in Table A1.2 (Appendix A1). The majority of the quantitative studies reported a range of results. These varied within the study depending on whether correlations or regression models are examined and depending on the exact specifications of the models. Therefore, if regressions are available, these are considered instead of correlations and the more robust regression analyses are prioritised. This is because creditworthiness is a complex construct that is influenced by numerous factors and accounting for these factors would allow for the strongest, most consistent psychological characteristics to stand out.

3.3. Results

The review's findings are presented as follows. First, findings describing characteristics of the studies are presented. Second, results of the studies are thematically grouped and classified according to the strength of the evidence. Last, psychological characteristics with the strongest evidence are described.

3.3.1. Studies Overview

Six qualitative studies (three used interviews, two used Delphi technique, and one used a mix of methods) and 28 quantitative studies (eight were cross-sectional and 20 were longitudinal) met the inclusion criteria (see Table 3.3). All qualitative studies and 22 of the 28 quantitative studies were of high ecological validity. The studies were published between 1979 and 2018, with a spike in publications between 2011 and 2017. All studies came from peer-reviewed journals, except for Klinger et al. (2013) which was from a peer-reviewed book series. The majority were conducted in North America (18 studies) and in Europe (five studies), two studies were cross-continental, and the rest included participants from Africa, Asia, and South America, with three studies from each continent. The sample sizes were varied. The quantitative studies ranged from 102 to 44,547 participants (*M* = 3,121) and the qualitative studies ranged from 9 to 38 participants (*M* = 17).

Table 3.3. *Characteristics of the Studies Included in the Systematic Review*

Characteristic	*N*	Characteristic	*N*
Publication Year		**Study Design & Ecological Validity**	
Pre 2000	4	Quantitative (Longitudinal)	20
2000-2004	0	High ecological validity	19
2005-2009	6	Low ecological validity	1
2010-2014	14	Quantitative (Cross-sectional)	8
2015+	10	High ecological validity	3
		Low ecological validity	5
Continent		Qualitative. High ecological validity	6
North America	18	Interviews	3
Europe	5	Delphi technique	2
Africa	3	Interviews, observations, focus groups	1
Asia	3		
South America	3	**Type of Credit**	
Cross-Continental	2	Mortgage	8
		Not specified	7
Criterion Outcome Type		Microfinance and SME loans	5
Self-Reported	19	Credit card	4
Observed	14	Agricultural loans	3
Self-Reported or Observed	1	A mixture of consumer loans	3
		Consumer and commercial loans	1
Study Quality & MMAT + Additional Score Distribution		Peer-to-peer loans	1
High	18	Doorstep loans	1
4/5 + 2/3	7	Student loans	1
5/5 + 2/3	6		
5/5 + 3/3	3	**Criterion Outcomes**	
4/5 + 3/3	2	A mixture of outcomes of varying severity	6
Moderate	12	Between more than 1 month and more than 3 months delinquency	6
3/5 + 3/3	6	Legal actions and follow-up (e.g., default, bankruptcy, and foreclosure)	5
3/5 + 2/3	2	Any arrears or delinquency	4
2/5 + 2/3	2	Willingness and intention to not honour debt obligations	3
5/5 + 1/3	1	Perceived risk by lenders	3
4/5 + 1/3	1	Timely repayment	3
Low	4	Repayment	2
4/5 + 0/3	3	Repaying the collections agency	2
3/5 + 0/3	1		

There was a range of credit products examined in these studies. The most common type of credit was a mortgage (eight studies), followed by microfinance and SME loans (five studies) and credit cards (four studies). However, seven of the studies did not specify the type of credit studied and three examined several credit types at once. Similarly, six studies examined several criterion outcomes at once. Two other frequently assessed criterion outcomes were delinquency that lasted longer than one, two, or three months (six studies), and legal actions and follow-up such as default, bankruptcy, and foreclosure (five studies). The majority of criterion outcomes were self-reported (19 studies), one study used a mixture of self-reported and observed criterion outcomes, with the rest (14 studies) were observed.

The study quality was assessed by the Mixed Methods Appraisal Tool (MMAT; Q. N. Hong et al., 2018) and the additional, custom quality score (outlined in Section 3.2.2). As demonstrated in Table 3.4, the quality of the study was deemed to be *high*, if it comprehensively addressed multiple principles of research rigor (i.e., MMAT quality score = 4-5 and additional quality score = 2-3). The quality was judged to be *low*, if the study showed significant deficiencies in its research rigor (i.e., MMAT quality score = 0, or additional quality scores = 0, or MMAT quality score = 1-2 and additional quality scores = 1). The rest of the studies were deemed *moderate* in quality. Overall, more than half of the studies (18) were of high-quality, approximately a third were of moderate-quality, and four studies were considered low-quality. All studies in the present review were considered while taking their quality into consideration, as advocated by Pawson (2006).

Table 3.4. *Matrix for Determining the Study's Quality Based on its MMAT and Additional Quality Scores*

MMAT Score (out of 5)	**Additional Score (out of 3)**		
	0	1	2-3
0	Low	Low	Low
1-2	Low	Low	Moderate
3	Low	Moderate	Moderate
4-5	Low	Moderate	High

Note. MMAT = Mixed Methods Appraisal Tool (Q. N. Hong et al., 2018).

3.3.2. Findings Overview

The studies in this review presented a wide range of psychological characteristics, which were thematically grouped into 51 constructs that are summarised in Table 3.5. Evidence for each construct being associated with creditworthiness was summarised in terms of the following five characteristics:

1. *Amount of evidence* (i.e., the number of studies relevant to the construct), with four possible categories—large (six studies or more), medium (between four and six studies), small (three or two studies), and very small (one study).
2. *Quality of evidence* (i.e., the risk of bias across studies constituting the evidence). This was determined by assessments of individual study quality based on the MMAT and the additional quality score (see Table 3.4). Evidence was considered high-quality if the majority of the studies forming the evidence were rated as high; low-quality if majority were low; and moderate if the number of high-, moderate-, and low-quality studies constituting the evidence was roughly equal.
3. *Context of evidence* (i.e., the variety regarding the geographical region and the credit type researched). This differentiates between evidence limited to a specific geographical region or credit type and evidence that is global and context non-specific.
4. *Consistency of findings* (i.e., the degree to which conclusions of different studies agree whether the construct is characteristic of creditworthiness and the direction of the relationship). Evidence was deemed to be consistent when studies arrived at identical (i.e., highly consistent) or virtually identical (i.e., moderately consistent) conclusions. Inconsistent evidence was characterised by one or more study directly opposing the findings of another in the same context. However, if the context was different, then that evidence was deemed to be mixed.
5. *Overall association with creditworthiness* (i.e., a summary of the direction of the construct's effect on creditworthiness). If the majority (over 60%) of the relevant studies found support in a positive, negative, or no direction, then the corresponding association is reported. If there is no majority, then the association is labelled *unclear*.

Based on these characteristics, the overall *strength* of evidence for each construct was evaluated as follows:

1. Evidence that is large in size, high-to-moderate quality, global and context non-specific, and consistent was deemed to be *strong*.
2. Evidence that is medium in size, moderate-quality, global and context non-specific, and consistent was judged to be *moderate*.
3. Evidence that is mixed or inconsistent, limited in its context or small and of moderate-to-low quality was labelled as *limited*.
4. Any evidence that is based on a single study, regardless of the other evidence characteristics, was deemed to be *very limited*.

Of the 51 constructs, 11 showed predominantly no relationship with creditworthiness, 30 indicated either a negative or a positive relationship and for 10 characteristics the relationship was unclear. Since for the majority, the evidence was limited or very limited (see Table 3.5), the rest of the review concentrates on characteristics with strong or moderate evidence. These characteristics are *integrity*, *conscientiousness*, *perceived control,* and *prosocial orientation*. In addition, findings concerning rationality factors (i.e., cognitive ability, patience, and risk-aversion) are briefly described since these psychological characteristics have been researched extensively (see Table 3.5) and are related to the behavioural economics perspective of creditworthiness described in the introduction (see Chapter 1).

Table 3.5. *Overview of the Results of the Systematic Review*

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
Strong Evidence							
Integrity	Adherence to lender-accepted moral and ethical principles; characterised by principles of honesty, promise fulfilment, and morality	(Atlas et al., 2017; Ding et al., 2009; Featherstone et al., 2007; Guiso et al., 2013; Herzenstein et al., 2011; Karlan, 2005; Klinger et al., 2013; Leyshon et al., 2006)	Large (seven quantitative and one qualitative study)	Moderate (three high, two moderate, and three low quality studies)	Global and context non-specific	Moderately consistent (six studies provided full support, one provided partial, and one provided no support)	Predominantly positive
Conscientiousness	A multi-faceted personality trait that is part of the Big Five personality model; characterised by orderliness, industriousness, self-discipline, and responsibility	(Ganzach & Amar, 2017; Gathergood, 2012b; Henning & Jordaan, 2016; Herzenstein et al., 2011; Juan, 2011; Klinger et al., 2013; Moulton, 2007)	Large (four quantitative and three qualitative studies)	High (five high and two moderate quality studies)	Global and context non-specific	Moderately consistent (six studies provided support and one study did not)	Predominantly positive
Perceived control	A group of "control-related beliefs and processes that influence how an individual relates to [their] environment" (Infurna & Reich, 2016, p. 2); includes self-efficacy, internal locus of control, mastery, and sense of control	(Ding et al., 2009; Henning & Jordaan, 2016; Herzenstein et al., 2011; Kuhnen & Melzer, 2018; Lindblad & Riley, 2015; Mewse et al., 2010; Tokunaga, 1993)	Large (six quantitative and one qualitative study)	Moderate (three high, three moderate, and one low quality studies)	Global and context non-specific	Highly consistent (all seven studies provided support)	Positive

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
Moderate Evidence							
Prosocial orientation	The general attitude of positively evaluating, being concerned with, and empathising with others; includes characteristics such as tendency to trust others, altruism, and empathy	(Baklouti, 2014; Carpenter & Williams, 2014; Guiso et al., 2013; Karlan, 2005; Stockham & Hesseldenz, 1979)	Medium (five quantitative studies)	Moderate (one high, three moderate, and one low quality studies)	Global and context non-specific	Moderately consistent (four studies provided full support and one study provided partial support)	Predominantly positive
Limited Evidence							
Cognitive ability	The skills involved in performing core mental tasks, such as processing information, learning, understanding, reasoning, and judgment; characterised by numerical and verbal abilities, abstract reasoning, cognitive reflection, and working memory	(Adams et al., 2014; Atlas et al., 2017; Carpenter & Williams, 2014; Ganzach & Amar, 2017; Gerardi, Goette, et al., 2013; Klinger et al., 2013; Kuhnen & Melzer, 2018)	Large (seven quantitative studies)	High (six high and one low quality studies)	Predominantly US mortgage context	Mixed (two studies found full, two studies partial, and three studies found no support)	Unclear
Patience	A preference for large delayed rewards over small immediate ones; characterised by a small long-run discount factor or a small present-bias	(Adams et al., 2014; Atlas et al., 2017; Bieker & Yuh, 2015; Carpenter & Williams, 2014; Gathergood, 2012b; Gerardi, Goette, et al., 2013; Kuhnen & Melzer, 2018)	Large (seven quantitative studies)	High (five high and two moderate quality studies)	Global and context non-specific	Inconsistent (four studies found no support, one study found partial, and two studies found full support)	Unclear
Risk-aversion (propensity measures)	The propensity to avoid or be reluctant to tolerate risk, risky behaviour, and uncertainty	(Chalise & Anong, 2017; Ding et al., 2009; Guiso et al., 2013; Kuhnen &	Medium (five	Moderate (two high, one moderate,	Global and context non-specific	Mixed (two studies found full, one study partial, and one study no	Unclear

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
		Melzer, 2018; Samanta & Ray, 1980)	quantitative studies)	and two low quality studies)		support, while another study found support in the opposite direction)	
Optimism	The attitude that future outcomes will be positive, favourable, and desirable; includes related factors of hope, positivity, positive attitude, future income expectations, house price expectations, and subjective probability of unemployment.	(Barros & Botelho, 2012; Chalise & Anong, 2017; Guiso et al., 2013; Henning & Jordaan, 2016; Mewse et al., 2010)	Medium (four quantitative and one qualitative studies)	Moderate (two high, one moderate, and two low quality studies)	Global and non-context specific	Mixed (two studies found support, one study found partial support, and two studies did not find any support)	Unclear
Risk-aversion (behavioural measures)	The tendency to avoid options that entail a risk of loss when choosing between alternatives (VandenBos, 2015)	(Adams et al., 2014; Carpenter & Williams, 2014; Gerardi, Goette, et al., 2013; Tokunaga, 1993)	Medium (four quantitative studies)	High (four high quality studies)	Global and context non-specific	Mixed (two studies found no support, one study provided support in one direction, and another study provided in the another)	Unclear
Agreeableness	A multi-faceted personality trait that is part of the Big Five personality model; characterised by trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness	(Ganzach & Amar, 2017; Hill, 1994; Klinger et al., 2013)	Small (two quantitative and one qualitative studies)	High (three high quality studies)	Global and non-context specific	Mixed (two studies provided no support and one study did)	Predominantly no association
Openness to experience	A multi-faceted personality trait that is part of Big Five personality model;	(Ganzach & Amar, 2017; Klinger et al.,	Small (three quantitative studies)	High (two high and one	Global and non-context specific	Mixed (two studies provided	Predominantly negative

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
	characterised by ideas, fantasy, aesthetics, actions, feelings, and values.	2013; Stockham & Hesseldenz, 1979)		moderate quality studies)		support and one study did not)	
Extraversion	A multi-faceted personality trait that is part of the Big Five personality model; characterised by gregariousness, assertiveness, activity, excitement-seeking, positive emotions, and warmth	(Ganzach & Amar, 2017; Klinger et al., 2013; Stockham & Hesseldenz, 1979)	Small (three quantitative studies)	High (two high and one moderate quality studies)	Global and non-context specific	Mixed (two studies provided no support and one study did)	Predominantly no association
Emotional instability/ Neuroticism	A multi-faceted personality trait that is part of Big Five personality model; characterised by anxiety, angry hostility, depression, self-consciousness, emotional impulsiveness, and vulnerability to stress.	(Ganzach & Amar, 2017; Klinger et al., 2013; Stockham & Hesseldenz, 1979)	Small (three quantitative studies)	High (two high and one moderate quality studies)	Global and non-context specific	Mixed (one study provided support in one direction, another provided in another, and one study provided no support)	Unclear
Negative attitudes towards credit	The negative evaluation of credit	(Chalise & Anong, 2017; L. McCloud & Dwyer, 2011)	Small (two quantitative studies)	High (two high quality studies)	US context only	Mixed (one study provided partial and one study found no support)	Unclear
Impression management	Tendency to respond in such a way to make a good impression	(Herzenstein et al., 2011; Stockham & Hesseldenz, 1979)	Small (two quantitative studies)	Moderate (one high and one moderate quality studies)	US context only	Highly consistent (one study found full and one study found partial support)	Predominantly positive
Cooperation	The tendency to work together towards common or complementary goals that	(Hill, 1994; Karlan, 2005)	Small (one quantitative and one	Moderate (one high and one moderate	Global and non-context specific	Mixed (one study provided support	Unclear

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
	benefit both yourself and the other individual(s).		qualitative studies)	quality studies)		and the other study did not)	
Religiosity	The tendency to adhere to religious beliefs and to engage in religious practices	(Herzenstein et al., 2011; Stockham & Hesseldenz, 1979)	Small (two quantitative studies)	Moderate (one high and one moderate quality studies)	US context only	Highly consistent (both studies provided no support)	No association
Mental health	“A state of mind characterized by emotional well-being, good behavioral adjustment, relative freedom from anxiety and disabling symptoms, and a capacity to establish constructive relationships and cope with the ordinary demands and stresses of life” (VandenBos, 2015, p. 639)	(Gathergood, 2012a; Lindblad & Riley, 2015)	Small (two quantitative studies)	Moderate (two moderate quality studies)	Western context only	Moderately consistent (one study found full and another partial support)	Predominantly positive
Perceived financial competency	The beliefs an individual hold regarding their own financial understanding, knowledge, and ability	(Gathergood, 2012b; Xiao, Ahn, et al., 2014)	Small (two quantitative studies)	Moderate (two moderate quality studies)	Western context only	Mixed (one study provided support and one did not)	Unclear
Perceived financial situation	The beliefs an individual hold regarding their current financial situation	(Kropp et al., 2009; Ssebagala, 2016)	Small (two quantitative studies)	Moderate (two moderate studies)	Global and non-context specific	Mixed (one study provided support in one direction and another study in another)	Unclear
Cognitive biases	A pattern of deviation from rationality in judgements and decision-making; including loss	(Atlas et al., 2017; Baklouti, 2014)	Small (two quantitative studies)	Moderate (one moderate	Global and non-context specific	Highly consistent (both studies	No association

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
	aversion, probability distortion, diminishing sensitivity, miscalibration, better-than-average effect, and illusion of control			and one low quality studies)		provided no support)	
Very Limited Evidence							
Sensation-seeking	The personality trait characterised by "the need for varied, novel, and complex sensations and experiences, and the willingness to take physical and social risks" (Zuckerman, 1979, p. 10)	(Tokunaga, 1993)	Very small (one quantitative study)	High	Credit cards in US	N/A	Positive
Power-prestige money attitude	The perception of money "as a symbol of success and status and as an instrument to influence others" (Yamauchi & Templer, 1982, p. 523)	(Tokunaga, 1993)	Very small (one quantitative study)	High	Credit cards in US	N/A	Positive
Retention money attitude	The predisposition to plan and prepare for the future by abstaining from spending (Yamauchi & Templer, 1982)	(Tokunaga, 1993)	Very small (one quantitative study)	High	Credit cards in US	N/A	Positive
Anxiety money attitude	The perception of money as "a source of anxiety as well as a source of protection from anxiety" (Yamauchi & Templer, 1982, pp. 524–525)	(Tokunaga, 1993)	Very small (one quantitative study)	High	Credit cards in US	N/A	Negative
Self-esteem	An individual's global perception regarding their own sense of worth	(Tokunaga, 1993)	Very small (one	High	Credit cards in US	N/A	No association

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
			quantitative study)				
Creativity and innovation	“Applying new ideas, for example adjusting or refining an existing product; identifying new opportunities with a solution” (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Commitment and confidence	“Willingness to commit personal resources to the business” (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Leadership and human relations	“Ability to build a team and to give responsibility and credit when due […]; good personal interactions, trusting in people, and giving recognition when deserved” (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Opportunity seeking	“Ability to adjust to an ever-changing environment and to use change to one’s advantage” (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Conflict management	“Ability to handle conflict between various stakeholders of the business” (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
Self-confidence	"Belief in own abilities" (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Passion	"Enjoying what one is doing in all activities" (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Risk management	"Ability to take on calculated risk opportunities" (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Tenacity	"Overcoming hurdles and obstacles" (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Persistence	"Belief in the business despite setbacks" (Henning & Jordaan, 2016, p. 7)	(Henning & Jordaan, 2016)	Very small (one qualitative study)	High	Agricultural loans in South Africa	N/A	Positive
Irrational consumer behaviour	A set of consumption-related behaviours characterised by "[compromising of] economic logic [that] leads to irrational consumption and full or partial ignorance of budget constraints" (Taujanskaite et al., 2016, p. 410)	(Taujanskaite et al., 2016)	Very small (one qualitative study)	High	Consumer loans in Lithuania	N/A	Negative

Psychological characteristic	**Definition**	**Relevant studies**	**Amount of evidence**	**Quality of evidence**	**Context of evidence**	**Consistency of findings**	**Overall association with creditworthiness**
Certainty about one's future finances	The perceived security of one's future finances	(Chalise & Anong, 2017)	Very small (one quantitative study)	High	Consumer loans and mortgages in US	N/A	No association
Personal integration	"High scorers admit to few attitudes and behaviors that characterize socially alienated or emotionally disturbed persons" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	Positive
Political conservativism	High scorers are more conservative (Elton & Rose, 1974)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	Positive
Impulse expression	"High scorers have an active imagination, value sensual reactions and feelings, and are aggressive" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	Negative
Complexity	"[Tolerance] of ambiguities and uncertainties […] [and fondness] of novel situations and ideas" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	Negative
Theoretical orientation	"Preference for dealing with theoretical concerns and problems and for using the scientific method in thinking" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	Negative

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
Autonomy	"Tendency to be independent of authority as traditionally imposed through social institutions" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	No association
Masculinity	"High scorers deny interests in esthetic matters and they admit to few adjustment problems" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	No association
Thinking introversion	"[High scorers] are characterized by a liking for reflective thought and academic activities" (Elton & Rose, 1974, p. 425)	(Stockham & Hesseldenz, 1979)	Very small (one quantitative study)	Moderate	Student loans in US	N/A	No association
Utilisation of emotions	The ability to access and evoke emotions to facilitate cognition	(Baklouti, 2014)	Very small (one quantitative study)	Moderate	Microfinance loans in Tunisia	N/A	Positive
Perception and managing of own emotions	The ability to be aware of and regulate one's own emotions to promote emotional and intellectual growth	(Baklouti, 2014)	Very small (one quantitative study)	Moderate	Microfinance loans in Tunisia	N/A	No association
Debtor social identity	An individual's sense of who they are based on their debtor group membership	(Mewse et al., 2010)	Very small (one quantitative study)	Moderate	Any type of credit in UK	N/A	No association
Positive attitudes towards increased government regulation	The positive evaluation of more government regulation	(Guiso et al., 2013)	Very small (one quantitative study)	Low	Mortgages in US	N/A	Negative

Psychological characteristic	Definition	Relevant studies	Amount of evidence	Quality of evidence	Context of evidence	Consistency of findings	Overall association with creditworthiness
Anger about the current economic situation	The negative evaluation of the current economic climate	(Guiso et al., 2013)	Very small (one quantitative study)	Low	Mortgages in US	N/A	Negative

3.3.3. Integrity

Integrity is defined as adherence to a set of moral and ethical principles that the lender finds acceptable. As illustrated by McFall (1987), acting in accordance with one's values defines personal integrity (i.e., congruence and consistency), while adherence to acceptable values defines moral integrity (i.e., normative integrity for the purpose in question). Since the lender expects debt repayment, principles of promise fulfilment and honesty are most relevant in the creditworthiness context. Morality in general (i.e., adherence to socially accepted morals that are not lender-specific) is also relevant to the present definition of integrity (Halfon, 1989).

Seven quantitative studies and one qualitative study of predominantly moderate quality were moderately consistent in demonstrating support for integrity as a psychological characteristic of creditworthiness. There is strong evidence that higher integrity (characterised by honesty, promise fulfilment, and morality) is associated with higher creditworthiness across several national and credit contexts.

In a qualitative study, Leyshon et al. (2006) described how openly declaring financial difficulties and honesty were associated with a higher likelihood to repay on time. Klinger et al. (2013) demonstrated a strong association between lower performance on a traditional integrity test (i.e., measuring attitudes towards honesty and theft) and default among microfinance and SME loans. Featherstone et al. (2007) found that when agricultural loan application scenarios contained a statement indicating the applicant's honesty or dishonesty, there was a significant impact on whether a loan was offered by lenders. Claiming a moral identity (i.e., "an honest or moral person", Herzenstein et al., 2011) predicted repaying the loan on time instead of repaying late or defaulting. Meanwhile, borrowers claiming a trustworthy identity, defined as "lenders can trust the borrower to pay back the money on time" (Herzenstein et al., 2011), and related to promise fulfilment principles, were more likely to repay ahead of time than on time. Similarly, lower trustworthiness as measured by fewer coins returned to an "investor" in the Trust Game predicted default and being dropped from a microfinance programme in a different longitudinal study (Karlan, 2005). Furthermore, individuals who felt it was not morally wrong to default on a mortgage (i.e., positively evaluated promise infidelity) had higher willingness to default if the value of their home decreased in one study (Guiso et al., 2013), but not in another (Atlas et al., 2017) where they found no effect. Last, endorsing ethically questionable behaviours (EQBs, a measure of morality; Brinkmann & Lentz, 2006; Mentovich & Zeev-Wolf, 2018) predicted an individuals' intention to not repay credit card expenses (Ding et al., 2009).

3.3.4. Conscientiousness

Conscientiousness is a multi-faceted personality trait part of the Big Five personality model alongside openness to experience, extraversion, agreeableness, and emotional stability (Goldberg, 1993). It encompasses characteristics such as orderliness (e.g., being neat and organised), industriousness (e.g., being hardworking and striving for success), self-discipline (e.g., ability to inhibit impulses and put off immediate gratification for a larger goal), and responsibility (e.g., tendency to uphold obligations and follow rules; J. J. Jackson et al., 2010; Peabody & De Raad, 2002; Roberts et al., 2004).

Three qualitative and four quantitative studies of predominantly high quality were moderately consistent in showing conscientiousness as a psychological characteristic of creditworthiness. There is strong evidence that higher conscientiousness (characterised by orderliness, industriousness, self-discipline, and responsibility) is associated with higher creditworthiness across several national and credit contexts.

In a qualitative study, Juan (2011) identified self-control (characterised by being prudent in the spending and methodically keeping track of expenses) as a factor that differentiates timely credit card holders from those who are delinquent. Moulton's (2007) qualitative research found that lenders identify good borrowers by examining their behavioural cues and that "people with good character are respectful, obedient, clean, competent, stable, and reliable" (p. 314). Similarly, Henning and Jordaan (2016) have identified "need for achievement" and "planning" as creditworthiness characteristics in agricultural lending. In Ganzach & Amar's (2017) study, lower conscientiousness predicted mortgage repayment difficulties and in Klinger et al. (2013) lower conscientiousness predicted SME and microfinance loan defaults. In Gathergood's (2012b) study, a higher tendency to impulsively purchase items predicted being one month and being three months behind on their debt repayments. In Herzenstein et al.'s (2011) research, claiming to be hardworking in the borrower's request for the loan did not predict default, late payments, or paying ahead of time.

3.3.5. Perceived Control

Perceived control can broadly be defined as a group of "control-related beliefs and processes that influence how an individual relates to [their] environment" (Infurna & Reich, 2016, p. 2). In the present review, four control-related constructs have been identified—self-efficacy, internal locus of control, mastery, and sense of control. Mastery and sense of control both refer to the prototypical definition of control—the extent to which individuals believe they are in control of their own lives (Skinner, 1996). This type of belief is between the individual and the outcome. Self-efficacy on the other hand focuses on the belief whether a response (not an outcome) is available to an individual (Skinner, 1996). It is the extent to which the individual trusts their abilities to undertake the actions and plans needed to be successful. Lastly, locus of control complements self-efficacy by focusing on the beliefs of whether certain actions (either own behaviour or external forces) lead to certain outcomes. It is the degree to which people believe that they, as opposed to forces beyond one's control, have command over the outcomes of events in their lives (Skinner, 1996).

There were one qualitative and six quantitative studies of predominantly moderate quality that demonstrated support for perceived control as a psychological characteristic of creditworthiness. There is strong evidence that higher perceived control (primarily self-efficacy and internal locus of control) is associated with higher creditworthiness across several national and credit contexts.

Henning and Jordaan's (2016) qualitative research identified internal locus of control and self-efficacy as creditworthiness characteristics in agricultural lending. One quantitative longitudinal study (Kuhnen & Melzer, 2018) found that lower mastery predicted (a) being more than 60 days behind on debt payments; (b) having accounts in collection; and (c) experiencing foreclosure, repossession, or bankruptcy. Another study (Lindblad & Riley, 2015) observed lower sense of control in home-owners who experienced a foreclosure sale or had to receive a loan modification compared to those who experienced neither. Furthermore, one measure of self-efficacy (the Self-Efficacy Scale; Sherer et al., 1982) differentiated between those with serious financial problems and those in a control group (Tokunaga, 1993); while another measure (the General Self-Efficacy Scale; Schwarzer & Jerusalem, 1995) predicted whether participants resumed repaying their debts after receiving a warning of court judgement for non-payment (Mewse et al., 2010). In both cross-sectional studies, lower self-efficacy associated with higher credit risk (i.e., lower creditworthiness). Both studies also considered internal locus of control but have varied somewhat in their findings. Mewse et al. (2010) reports that self-efficacy is a stronger predictor of debt repayment than internal locus of control, with locus of control being no longer significant once self-efficacy is included in the regression. Meanwhile, the study by Tokunaga (1993) found lower internal locus of control to be a stronger predictor of serious financial problems than self-efficacy, but both factors remained significant when included in a model together. Ding et al. (2009) have also demonstrated that lower internal locus of control has a significant association with a higher intention to not repay credit card expenses. Last, Herzenstein et al. (2011) found that those claiming the "economic hardship identity", defined as "the borrower is someone in need because of hardship, as a result of difficult circumstances, bad luck, or other misfortunes that were, or were not, under borrower's control" (Herzenstein et al., 2011, p. S140), were less likely to pay their loan ahead of time, but it did not predict default or late payment.

3.3.6. Prosocial Orientation

A large variety of definitions of the terms "prosocial orientation", "prosociality", and "prosocial personality" have been suggested (see Amici, 2015; Graziano & Habashi, 2015; Zaki & Mitchell, 2013 for reviews). In broad terms, prosocial orientation is the opposite of self-interest and could encompass constructs such altruism, cooperation, helpfulness, sharing, kindness, fairness, trust, empathy, and social concern. This review uses the more restricted definition as originally suggested by Staub (1978, 1990, 2005) who defined prosocial orientation as a dispositional tendency to positively evaluate others (e.g., the tendency to trust people), empathise, be concerned with, and feel personal responsibility for their welfare (e.g., altruism that can arise from empathy and/or moral beliefs; Batson et al., 2015). In this sense, prosocial orientation is inherently moral, distinct from sociality, and encompasses affect, cognition, and behaviour (Duffy & Chartrand, 2017; Mikulincer & Shaver, 2010). The reason behind choosing this definition is that it fits the pattern of results found in the present review best. A common method of assessing different aspects of prosociality (e.g., altruism and willingness to trust) is observing the decisions individuals make in economic cooperation games that capture the tension between self-, other-, and the collective interests (Camerer, 2003; Van Lange et al., 2013).

Five quantitative studies of predominantly moderate quality demonstrated moderately consistent support for prosocial orientation (characterised by altruism, tendency to trust others, and empathy) as a psychological characteristic of creditworthiness. There is moderate evidence that higher prosocial orientation is associated with higher creditworthiness across several national and credit contexts.

Karlan (2005) found that higher proportion given to an “investor” in the Trust Game (i.e., a measure of trust) but lower self-reported trust towards people in the society predicted being dropped out of the microfinance group for default or discipline, while self-reported trust towards people in the microfinance group was unrelated to being dropped out. Another cross-sectional study (Guiso et al., 2013) found lower trust towards banks to predict higher willingness to strategically default on a mortgage if the value of their home decreased. In one longitudinal study (Carpenter & Williams, 2014), higher altruism (measured as the amount of money anonymously given to a stranger in a Dictator Game; Forsythe et al., 1994) predicted lower microfinance repayment problems. In another longitudinal study (Stockham & Hesseldenz, 1979), self-report altruism (defined as being trusting and ethical in their relations with others) correlated with a lower probability of default on student loans. Last, entrepreneurs with higher empathy were less likely to default on their microfinance loans (Baklouti, 2014).

3.3.7. Rationality Factors

There is a large body (seven quantitative studies) of high quality evidence relating to the effects of cognitive ability on creditworthiness and it is predominately mortgage-related and US-based. However, the findings of the evidence are mixed, making the overall association with creditworthiness unclear (e.g., Ganzach & Amar, 2017, found a positive relationship and Klinger et al., 2013, found no relationship). Similarly, support for patience as a psychological characteristic of creditworthiness was unclear. The evidence was large (seven quantitative studies), of high quality, global, and context non-specific, but the findings were inconsistent (e.g., Atlas et al., 2017, found a positive relationship and Carpenter & Williams, 2014, found no relationship with creditworthiness). It is also not clear what is the association of risk-aversion with creditworthiness. Five quantitative studies of predominantly moderate quality demonstrated mixed support for risk-aversion (assessed using propensity measures) as a psychological characteristic of creditworthiness across several national and credit contexts. Four quantitative studies of predominantly high quality demonstrated mixed support for risk-aversion (assessed using behavioural measures) as a psychological characteristic of creditworthiness across several national and credit contexts. Overall, evidence for rationality factors (i.e., cognitive ability, patience, and risk-aversion) as characteristics of creditworthiness is limited; thus, the behavioural economics perspective of creditworthiness as rationality is not supported.

3.3.8. Other Factors

Many of the other factors (e.g., agreeableness, neuroticism, negative attitudes towards credit, and perceived financial competency) had small bodies of inconsistent evidence regarding their association with creditworthiness (see Table 3.5 for details). This makes it hard to draw any valid conclusions regarding the evidence for these factors as characteristics of creditworthiness. Furthermore, most of the remaining factors (e.g., sensation-seeking, self-esteem, and debtor social identity) were only ever researched by one of the studies, making it impossible to synthesise support for them as creditworthiness characteristics.

3.4. Discussion

This systematic review identified the psychological characteristics that distinguish between creditworthy and non-creditworthy consumers and then synthesised these empirical findings according to evidence strength. Of the 51 constructs found, there were four (integrity, conscientiousness, perceived control, and prosocial orientation) that had strong-to-moderate evidence of association with creditworthiness. The other constructs either had opposing findings or the amount of evidence was too small (i.e., three studies or fewer) to make firm conclusions. Regardless, this research suggests that individual psychological differences are relevant for evaluating creditworthiness and supports previous findings of psychological underpinnings of different financial behaviours and outcomes (e.g., Kamleitner et al., 2012; Lea et al., 1995; Norvilitis et al., 2006; Rustichini et al., 2016). The rest of this discussion provides a summary and reconciliation of the main findings, examining the possible mechanisms and theoretical contextualisation of the four psychological characteristics with the strongest association with creditworthiness, as well as other relevant characteristics (i.e., rationality factors and factors suggested by the Kamleitner et al.'s (2012) review). This is then followed by a discussion of the theoretical and practical implications, limitations of the present research, and its future directions.

3.4.1. Characteristics of Creditworthiness

3.4.1.1. Integrity

The present review substantiates that integrity predicts creditworthiness, with all but one of the eight studies finding some level of support. The study that found no effect (Atlas et al., 2017) had the smallest sample size among the other quantitative studies (*N* = 215, compared to *N* = 448–4,059), meaning the effect of integrity on creditworthiness might not have been detected due to the reduced statistical power and a less representative sample. Furthermore, the outcome measured by Atlas et al. (2017) was continuous (i.e., how much home value loss is necessary for strategic default) rather than binary, as is normally the case in most of the other studies (e.g., Guiso et al., 2013; Herzenstein et al., 2011; Klinger et al., 2013). This likely also made the effect harder to detect due to the larger variation of the outcome and higher chance of measurement error. Replication with a larger sample size would be needed to ascertain the impact of integrity on mortgage strategic default.

Integrity is part of the character component of the Five Cs of Credit framework used by the industry (Abrahams & Zhang, 2008; Anderson, 2007; Strischek, 2009). It is important for debt repayment because it intrinsically motivates the borrower to behave in accordance with their moral principles, and as long as these principles are also lender-accepted, the borrower will be willing to fulfil their financial agreement. For instance, if the consumer is committed to the virtue of honesty, they will feel obligated to avoid false promises of repayment since they believe it is unfair to deceive others (Miller, 2017; Wilson, 2018).

3.4.1.2. Conscientiousness

Conscientiousness had all but one of the seven studies finding support for it being a characteristic of creditworthiness. Similar to integrity, the study that did not find an effect (Herzenstein et al., 2011) also had the smallest sample size among the other quantitative studies (*N* = 728 compared to *N* = 1,234–2,927), meaning the effect of conscientiousness on creditworthiness might not have been detected due to the reduced statistical power and a less representative sample. However, it seems more likely that the inconsistency is due to Herzenstein et al. (2011) looking at hardworking identity claims in the borrower’s loan request, rather than measuring conscientiousness (Ganzach & Amar, 2017; Klinger et al., 2013) or impulsive spending (Gathergood, 2012b) using likert-type scales. Firstly, it could be that the industriousness aspect of conscientiousness is not relevant to creditworthiness, since only one qualitative study (Henning & Jordaan, 2016) identified the “need for achievement” as a creditworthiness characteristic. Secondly, Herzenstein et al.’s (2011) manual qualitative coding might have introduced more sources of measurement error, making the effect harder to detect. Lastly, the difference in the results could also be attributed to the high-stakes measurement context in Herzenstein et al.’s (2011) study, rather than the low-stakes context in the other quantitative studies where measurement of conscientiousness was separate from the credit context. Further quantitative research assessing conscientiousness as part of the loan application process is needed to establish whether that is the case.

Even though conscientiousness is not necessary for financial success, as a creditworthiness characteristic, it is in accord with the capacity component of Five Cs of Credit. It has been consistently shown that higher conscientiousness is significantly associated with higher salary (Ng et al., 2005; Spurk & Abele, 2011), higher savings and net worth (Kausel et al., 2016; Letkiewicz & Fox, 2014; Prevoo & ter Weel, 2015), and lower susceptibility to pathological gambling (Mann et al., 2017; Myrseth et al., 2009)—all of which imply financial success and impact the borrower’s ability to repay their debt. Furthermore, the present finding broadly supports prior indebtedness research linking conscientiousness with credit card debt (S. Brown & Taylor, 2014).

3.4.1.3. Perceived Control

Overall, empirical research on perceived control as a characteristic of creditworthiness has been remarkably consistent despite the heterogeneity in the study designs (e.g., Henning & Jordaan, 2016, qualitative research; Kuhnen & Melzer, 2018, longitudinal study; and Tokunaga, 1993, cross-sectional control group study) and contexts (e.g., peer-to-peer loans in the U.S., Herzenstein et al., 2011; and agricultural loans in South Africa, Henning & Jordaan, 2016). Similar to conscientiousness, perceived control is not necessary for financial success, but higher perceived control (operationalised as either self-efficacy or internal locus of control) has been found to be associated with higher salary (Abele & Spurk, 2009; Ng et al., 2005; Prevoo & ter Weel, 2015), and is generally associated with life success due to importance of the construct in coping with challenges and recovering from setbacks (Bandura, 1997; Judge et al., 1998). Moreover, perceived control has been shown to function as an important mechanism for translating higher conscientiousness into financial outcomes (Spurk & Abele, 2011). Lastly, this finding is consistent with that of Perry (2008) who demonstrated an association between internal locus of control and higher credit scores. Therefore, perceived control provides general support for the capacity component of Five Cs of Credit.

3.4.1.4. Prosocial Orientation

All five studies examining aspects of prosocial orientation found evidence for it being a creditworthiness characteristic; however, Karlan’s (2005) study provided only partial support. In that study, the proportion given to an “investor” in the Trust Game (i.e., a measure of trust) predicted being dropped out of the microfinance group for default or discipline, which is contrary to what was expected and to the other studies measuring trust (e.g., Guiso et al., 2013). Karlan (2005) argued that the unexpected result was due to the Trust Game not being a valid method to measure trust, but rather a measure of risk propensity. The experimental literature somewhat supports this interpretation, with at least some of the variance in trustor behaviour corresponding to risk acceptance (Chaudhuri & Gangadharan, 2007; Fairley et al., 2016; Schechter, 2007); although, prosocial orientation is also a notable influence (Chaudhuri & Gangadharan, 2007; Cox, 2004). Overall, because no other study in the present review looked at behaviour in the Trust Game, further research is necessary to replicate this result and shed light on the mechanisms in question. Furthermore, Karlan (2005) found that self-reported trust towards people in the microfinance group was unrelated to default, while overall society-level trust was. This inconsistency may be due to group-level trust being based more on functional necessity (with interactions being more structured and transactional) rather than capturing a general personal tendency.

Prosocial orientation is likely another element of the Five Cs’ character component, alongside integrity, that has not been explicitly outlined. A prosocial individual tends to care for, feel connected to, and identify with others and so is intrinsically motivated to show kindness and goodwill to the lender. As a result, the borrower will be willing to repay their debt because they feel non-payment would cause damage to the lender’s welfare and hence, unfair. Therefore, prosocial orientation is consistent with the character component of Five Cs of Credit.

3.4.1.5. Rationality Factors

Contrary to the theoretical arguments presented by the behavioural economics perspective (Block-Lieb & Janger, 2006; Capuano & Ramsay, 2011; Majid, 2010; van Raaij, 2016), this review did not find rationality (i.e., individual differences responsible for good judgements and decision-making) associated with creditworthiness. The findings on psychological characteristics such as risk-aversion, cognitive ability, and patience were either mixed or inconsistent in the present review. Thus, the evidence for their association with creditworthiness is limited, despite being the most studied characteristics. Generally, studies of mortgage repayment reported that these characteristics predict creditworthiness (Atlas et al., 2017; Ganzach & Amar, 2017; Gerardi, Goette, et al., 2013), with research in other contexts failing to replicate these findings (Gathergood, 2012b; Klinger et al., 2013), but this was also not always the case (Bieker & Yuh, 2015; Carpenter & Williams, 2014). Perhaps rationality is only characteristic of creditworthiness when the debt is large and long-term (such as with a mortgage) because greater decision-making quality is necessary; although the evidence is presently not strong enough to make this assertion. Another possible explanation for these inconsistent findings is that while rationality improves a consumer's ability to repay, it also impedes their willingness to repay when the relative costs of repaying outweigh the benefits. This is in line with the research on strategic debt defaulting (B. Adler et al., 2000; Elmer & Seelig, 1999; Gerardi et al., 2018; Korobkin & Ulen, 2000; LaCour-Little, 2008; Meckling, 1977; Vandell, 1995; White, 1998), but it undermines the behavioural economics argument that creditworthiness can be conceptualised as rationality (Block-Lieb & Janger, 2006; Capuano & Ramsay, 2011; Majid, 2010; van Raaij, 2016).

3.4.1.6. Previous Review

As outlined in the introduction of this chapter, Kamleitner et al.'s (2012) non-systematic review found three groups of psychological characteristics that influence credit behaviour. There was little overlap between their findings and the results of the present systematic review. Psychological characteristics from the Kamleitner et al.'s (2012) *desire to use credit* and *desire for now* groups had mixed, inconsistent, and/or very small amounts (1-2 studies) of evidence, and no studies in the present review examined psychological characteristics from *desire for the good* group. This discrepancy in findings could be attributed to Kamleitner et al. (2012) not distinguishing between the three different criterion behaviours—credit choosing, credit borrowing, and credit repayment, since they did not differentiate between individual differences influences before, during, and after phases of credit acquisition. This suggests that honouring debt obligations relies on fundamentally different psychological characteristics compared to debt accumulation.

3.4.1.7. Creditworthiness as Trustworthiness?

Instead, the results of the present review suggest that creditworthiness (characterised by integrity, conscientiousness, perceived control, and prosocial orientation) has notable overlaps with the construct of trustworthiness. Trustworthiness can be defined as individual characteristics that inspire positive expectations in another person (Colquitt et al., 2007). The most pertinent trustworthiness conceptualisations in the context of personal characteristics (Butler, 1991; Gabarro, 1978; Mayer et al., 1995) tend to include variations of the following three dimensions: (1) *competence* (i.e., understanding and capability to do what one is trusted to do; Baier, 1986; Jones, 1996), (2) *goodwill* (i.e., motivation to do good by the trustor, also referred to as benevolence; Baier, 1986; Hardin, 1996; Jones, 1996; Pettit, 1995), and (3) *virtuous character* (i.e., enduring disposition towards moral goodness and being someone who can be counted on; Potter, 2002). In this sense, integrity and to a certain extent conscientiousness as characteristics of creditworthiness bear similarity to the virtuous character dimension of trustworthiness. Likewise, prosocial orientation is likely related to the commitment dimension and perceived control impacts the competence dimension (as discussed earlier). Indeed, in the same way creditworthiness is considered in terms of risk, uncertainty, probability, and confidence are also key elements of trust and trustworthiness (Jones, 1999; McLeod, 2015). Furthermore, as seen in Table 3.6, the three domains of trustworthiness provide a useful organising framework for the psychological characteristics in the present review, the Five Cs of Credit, and the information typically used in automated credit scoring. As a result, the present review raises the possibility of conceptualising creditworthiness as a variation of trustworthiness.

Table 3.6. *Creditworthiness Factors from Three Competing Conceptualisations Categorised by the Trustworthiness Domains*

Creditworthiness Conceptualisations	**Ability**	**Willingness**	
	Competence	**Goodwill**	**Virtuous Character**
This Systematic Review	Conscientiousness (i.e., orderliness, industriousness, self-discipline, responsibility) Perceived control (i.e., self-efficacy, internal locus of control, mastery, sense of control)	Prosocial orientation (i.e., tendency to trust others, altruism, empathy)	Integrity (i.e., honesty, promise fulfilment, morality)
The Five Cs of Credit (Abrahams & Zhang, 2008)	Capacity (e.g., income and expenditure, existing debt, experiences and skills necessary for financial success) Collateral (e.g., current and future collateral valuation)	—	Character (e.g., integrity, dignity, reputation)

Creditworthiness Conceptualisations	**Ability**	**Willingness**	
	Competence	**Goodwill**	**Virtuous Character**
	Capital (e.g., net worth and liquidity) Conditions (e.g., economic and regulatory environment)		
Automated Credit Scoring (Traditional Data; Anderson, 2007)	Socio-demographic profile (e.g., age, marital status, education, number of dependents, employment, income) Credit score (i.e., credit utilisation and existing debt)	Existing lender-borrower relationship (i.e., past dealings, loyalty)	Credit score (i.e., length and quality of credit repayment history)

3.4.2. Theoretical & Practical Implications

The present systematic review provides five main theoretical implications. First, this review broadly supports the industry convention of conceptualising creditworthiness as Five Cs of Credit (Abrahams & Zhang, 2008; Anderson, 2007; Strischek, 2009). Creditworthiness characteristics of integrity and prosocial orientation reflect the character component (i.e., willingness to repay) and conscientiousness and perceived control provide general support for the capacity component (i.e., ability to repay) of the Five Cs. This is despite integrity being the only Five Cs characteristic that is explicitly outlined in the industry literature. Furthermore, no factors relating to the dignity and reputation aspects of character in the Five Cs were identified as creditworthiness characteristics in the present review. Second, the present findings challenge the notion that behavioural economics is a suitable approach for examining psychological characteristics of creditworthiness, despite it being one of the most frequently acknowledged perspectives (Block-Lieb & Janger, 2006; Capuano & Ramsay, 2011; Majid, 2010; van Raaij, 2016). Propensity and behavioural risk-aversion, cognitive ability, and patience were found to not be valid as creditworthiness characteristics. Third, the results contend the three groups of psychological characteristics identified as relevant by Kamleitner et al.'s (2012) non-systematic review. This implies that characteristics related to the *desire for the good*, *desire for now*, and *desire to use credit* may not be valid for distinguishing between creditworthy and non-creditworthy borrowers. It also highlights the importance of distinguishing between debt repayment behaviour and debt choosing and accumulation behaviours. Fourth, the theoretical similarities between the four psychological characteristics of creditworthiness and the construct of trustworthiness provide support to examining creditworthiness as a variation of trustworthiness. Last, the lack of evidence supporting alternative data characterisations of creditworthiness as *connectedness* (Björkegren & Grissen, 2018; Hakim, 2016; McEvoy, 2014) and *stability and consistency* (Experian, 2018; LexisNexis, 2017) suggests that these characterisations are likely to be theoretically inadequate and lack validity.

3.4.3. Limitations & Future Research Recommendations

However, the present findings should be interpreted with two main limitations of this review in mind. First, the psychological characteristics identified in the present review are broad, general, and combine different operationalisations of the same constructs. While some argue that examining broad characteristics improves reliability and narrow facets add little value to understanding which psychological characteristics are the most valid and predictive (Ones & Viswesvaran, 1996), research suggests that the specificity of narrow facets helps maximize predictive validity (Judge et al., 2013; Paunonen & Ashton, 2001). For example, Big Five personality traits such as extraversion and neuroticism had mixed findings regarding their association with creditworthiness (see Table 3.5). It is plausible that the broad nature of these traits meant that other, more precise psychological characteristics associated with creditworthiness were not identified because they exist in a narrower personality facet. Hence, future work should incorporate qualitative and exploratory research to further investigate this.

Second, while care was taken to identify psychological characteristics that predict creditworthiness across several contexts, the meaning of creditworthiness likely varies depending on the credit type, population, and geographical region in question. For instance, because the borrower’s ability to repay a large SME loan directly relates to their effectiveness as an entrepreneur (Klinger et al., 2013), creditworthiness in this context might demand a different combination of abilities, personality traits, and attitudes compared to another borrower repaying credit card debt. Therefore, further qualitative research that acknowledges context specificity is needed to explore which psychological characteristics are most beneficial to honouring debt obligations in different contexts. This is important since it impacts the validity of any subsequent creditworthiness assessments based on these characteristics.

3.4.4. Summary

The purpose of the present systematic literature review was to identify and synthesise published empirical research on the psychological characteristics of consumer creditworthiness and to provide a comprehensive overview of the topic. Integrity, conscientiousness, perceived control, and prosocial orientation emerged as the four psychological characteristics of creditworthiness with the strongest evidence, where the consistency of findings, and the amount, quality, and context of evidence were all taken into consideration. To the best of the authors' knowledge, this is the first study that has systematically reviewed existing research to determine psychological characteristics of consumer creditworthiness. In general, the findings suggest that creditworthiness theoretically resembles the concept of trustworthiness, and that conceptualising creditworthiness as rationality (as argued by behavioural economics) and as *connectedness* or *stability and consistency* (as done by some alternative data) is likely to be theoretically inadequate and lack validity. However, these results may not be applicable to all types of credit contexts. Therefore, in the next chapter, further qualitative research is conducted to explore which psychological characteristics are most beneficial to honouring debt obligations in the relevant contexts (i.e., micro-loans) to improve the validity of creditworthiness assessments that incorporate psychological characteristics.

Chapter 4. Conceptualising Creditworthiness in a UK Micro-Loan Context

4.1. Introduction

The systematic review in the previous chapter identified integrity, conscientiousness, perceived control, and prosocial orientation as psychological characteristics most strongly and consistently related to creditworthiness. There is still uncertainty, however, whether these characteristics would adequately translate to the unique context of this thesis—micro-loans in the UK. As outlined in Chapter 2, borrowers of the host micro-lender in the UK represent a particularly multifaceted population of consumers which increases the likelihood that a psychological characteristics conceptualisation of creditworthiness in this context would be distinct. Indeed, tentative insights from the systematic literature review suggest that certain psychological characteristics are likely to be context-dependent; for example, cognitive ability, risk-aversion, and patience tend to be predictive of good debt repayment behaviour in mortgage contexts (Atlas et al., 2017; Ganzach & Amar, 2017; Gerardi, Goette, et al., 2013), but not other contexts (Gathergood, 2012b; Klinger et al., 2013). In addition, for majority of the psychological variables investigated by prior research (see Chapter 3 for details), evidence is unclear, and the jury is still out regarding their relevance to creditworthiness. Therefore, the purpose of the study in this chapter was to address the gaps identified in the academic literature and gain insight regarding the relevant psychological characteristics in the micro-lending context. In particular, the research question was:

What psychological characteristics distinguish creditworthy and non-creditworthy borrowers in the context of UK micro-loans?

Since the review of prior literature has not been able to establish a comprehensive framework of psychological characteristics of creditworthiness that can be investigated in this specific setting, a fully exploratory, qualitative study is needed to identify the relevant dimensions of the creditworthiness construct. This is important as it provides the theoretical foundation needed for this novel research avenue, since there is a clear paucity of psychological studies on creditworthiness characteristics, especially in micro-loan settings. Indeed, among the six qualitative studies of creditworthiness identified by the systematic review (see Chapter 3), none were in Psychology, but rather in disciplines such as Sociology, Marketing, and Engineering (e.g., Hill, 1994; Moulton, 2007; Taujanskaite et al., 2016). Furthermore, only one of those qualitative studies was conducted in the UK (Leyshon et al., 2006).

Overall, the purpose of this chapter's study is to (a) inductively develop the construct of consumer creditworthiness by identifying the psychological characteristics of creditworthy micro-loan borrowers in the UK; thus, (b) gauge how applicable the psychological characteristics identified in the systematic literature review (Chapter 3) are to the UK micro-lending context; and (c) provide the basis for item generation to help identify creditworthy individuals in a micro-lending context (to use in subsequent studies).

4.2. Method

The present investigation adopted a qualitative, exploratory research design (Tashakkori et al., 2021) to determine what psychological characteristics (i.e., traits, tendencies, attitudes, and beliefs) of creditworthy individuals are most influential when it comes to loan repayment behaviour in the oft-overlooked context of UK micro-loans. Individual, semi-structured interviews were chosen as the most appropriate means of data collection due to their superior ability to build rapport (especially when discussing a sensitive topic such as finance), as well as gather in-depth recollections (Talmage, 2012). The interview schedule was based on the Critical Incident Technique (CIT; Flanagan, 1954), because the technique allows to collect concrete, context-rich observations of behaviours, thoughts, and emotions concerning the effective and ineffective outcome of interest—debt repayment. Hence, a purposive sample of top-performing underwriters at the host micro-lender organisation (n = 35) and a stratified sample of their customers (n = 50) were interviewed. The transcribed interviews were then analysed using qualitative content analysis (Neuendorf, 2017; Schreier, 2014), as it allowed to systematically reduce qualitative data in a way that is aligned with the current research goals. All materials and procedures for this study were approved by the Psychology Department Research Ethics Committee at City, University of London (*PSYETH (R/L) 17/18 07*; see Appendix A2.1 for the materials).

4.2.1. Participant Selection & Recruitment

Participant selection was conducted using the host organisation’s database that contained the necessary repayment and lending information. Subject-matter experts (SMEs) and key organisational stakeholders were also consulted to define the selection criteria for both populations.

For underwriters, criterion purposeful sampling (Schreier, 2018) was used by identifying underwriters who were making objectively good lending decisions. This performance criterion was a composite, relative ranking according to the following three metrics:

- percentage of loans granted that had to be written off due to default (smaller is better),
- the total volume of loans that are from repeat customers (bigger is better), and
- the total volume of individuals that were referred by the underwriters’ customers (bigger is better).

Because CIT interviews are susceptible to recall bias (Urquhart et al., 2003), underwriters were eligible to participate if they had rejected and granted loans in the year prior (i.e., in 2017), so that the critical incidents elicited in the interviews are recent, as per Flanagan’s (1954) guidelines on the CIT. Furthermore, the aim was to recruit at least one underwriter from every store location so that the critical incidents would represent a range of experiences. The underwriters were recruited gradually by reaching out to the selected underwriters over email in English (see Appendix A2.1 for the invitation email and other materials). In total, 42 top-performing underwriters (out of 82 eligible) were invited to participate in an interview, of whom seven (17%) declined. Reasons for refusal included being too busy, understaffed, desire to meet store targets, or not wanting to have time away from work.

For customers, stratified purposeful sampling (Schreier, 2018) was used by ensuring variation in the customers’ repayment behaviour with the micro-lender according to the following four groups:

- perfect payers (i.e., those with no recorded late payments, given that at least one of their loans has already matured);
- good, but not perfect payers (i.e., those who have missed payments before, but no more than 30%; they have not been written-off; and have never been in arrears for 1 month or more, given that at least one of their loans has already matured);

- bad payers (i.e., those who have been in arrears for at least 1 month and have missed more than 30% of their total payments, but have not been written-off); and
- written-off payers (i.e., those who have been written-off due to default in the past but are current customers and so can be accessed for interviewing).

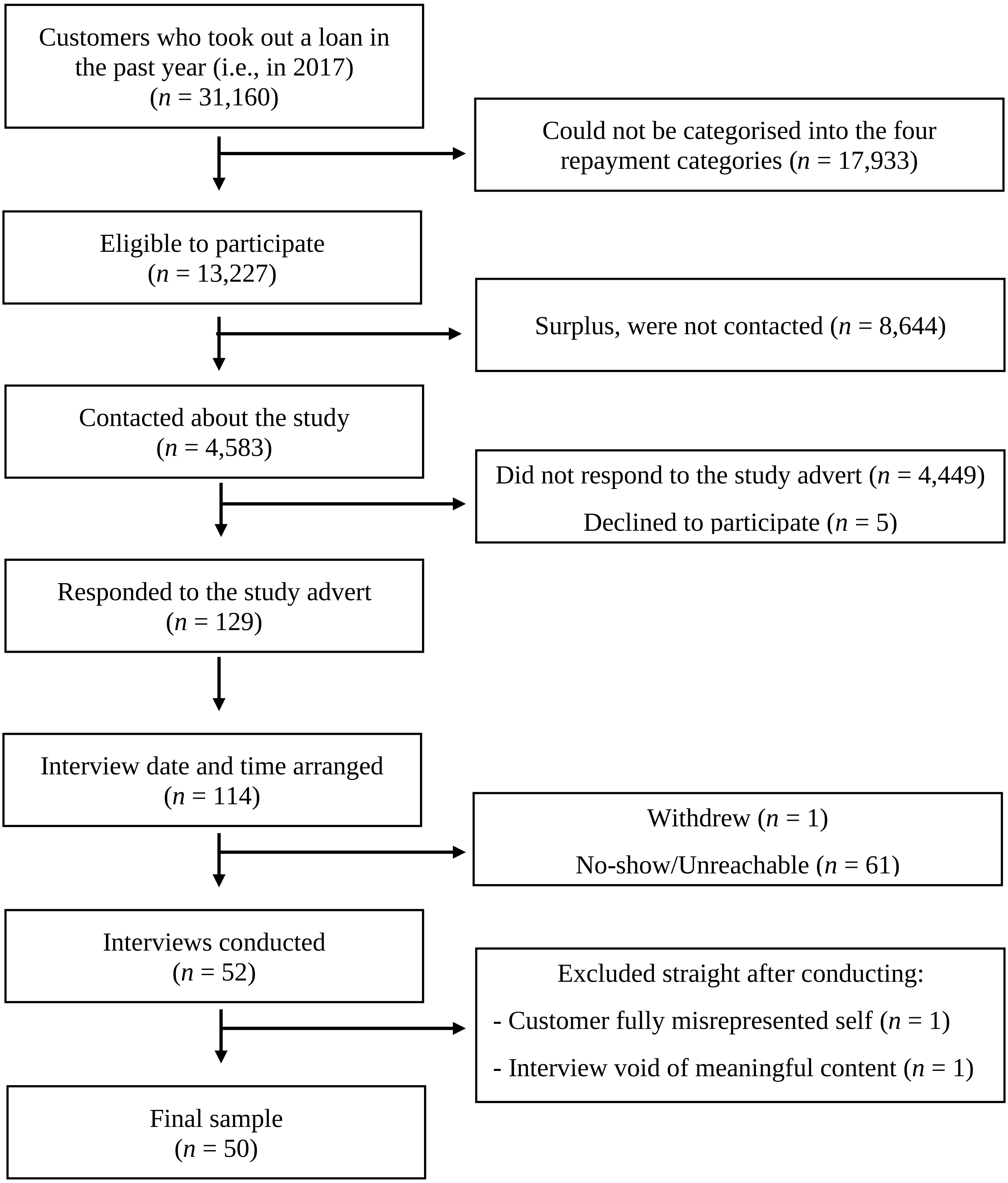
Due to the blend of nationalities among the host organisations' customers and the impact this has on their credit needs and experiences (see Chapter 2), nationality was another dimension used for participant selection. Thus, a sampling grid of nationality (UK vs. Non-UK) against the four customer groups (perfect, good, bad, and written-off) guided the recruitment process, whereby the aim was to have at least two participants in each of the eight cells (see Table 4.1 for the sampling grid at the end of data collection). Furthermore, while age, gender, marital status, income type, customer length, and origination store were not included as formal stratifying criteria, an attempt was made to reach-out to customers that also varied according to these factors to ensure a range of experiences.

Table 4.1. *Customer Participants' Recruitment Sampling Grid*

Repayment Category	**Nationality**		
	UK	Non-UK	Total
Perfect	5	6	11
Good	10	12	22
Bad	9	2	11
Write off	4	2	6
Total	28	22	50

Customers were recruited from a population of those who have taken out a loan within the past year (i.e., in 2017), so that the critical incidents elicited in the interviews are recent and the risk of recall bias is lower. To minimise selection bias among economic migrants with poor English skills (see Chapter 2 for the context), customers that can converse in either English or Russian were eligible to participate; thus, the study was advertised in both languages. This was possible because the researcher is bilingual (see Section 4.2.2.1 for details). Customers were targeted in several controlled recruitment waves using email, SMS, and occasionally through underwriter communication (see Appendix A2.1 for the invitations and other materials). Anyone interested was invited to fill-out an online survey indicating their availability and preferred location or contact the researcher directly to arrange an interview. See Figure 4.1 for the participants flow in the study.

Figure 4.1. *Flow of Customer Participants in the Study*



4.2.2. Participants

The participants sample (*N* = 85) comprised of 35 underwriters and 50 customers.

The underwriters were 80% female (the population is 84% female), aged 23-55 (*M* = 31.46, *SD* = 7.80) and represented 11 nationalities. Six (17%) did underwriting on the phone only, with the rest doing a mixture of face- and phone-based underwriting. At the time of the study, the underwriters had been with the organisation between 0.59 and 6.50 years (*M* = 3.10, *SD* = 1.74). All but two (6%) underwriters worked full-time and seven (20%) had managerial responsibilities. The micro-lender uses a performance rating system where consistently good performance and additional training moves the underwriter to higher *star* levels and grants them the authority to approve larger loans or loans for riskier customers. Levels can be lost by failing to comply with lending policies and procedures or due to poor performance. There are six star levels, and it takes a minimum of four months to earn each level. Majority of the participants (*n* = 18; 51%) had the highest level (4-star), five (14%) had the 3-star level, and 12 (34%) had the 2-star level. Underwriters from a large variety of stores were included, with 17 out of the maximum possible 19 represented. See Appendix A2.3 for further sample information.

The customers in the sample were 62% female (the population is 55% female), aged 23–67 (*M* = 40.36, *SD* = 10.75) and 56% UK nationals (of which a third, 32%, were dual nationals). The non-UK nationals had been in the UK for 2.83–42.75 years (*M* = 14.08, *SD* = 11.40, median = 10.75), and comprised of 13 different nationalities; the most common were Polish (*n* = 5, 23%) and Portuguese, French, Romanian, Irish, and Jamaican (*n* = 2, 9% each). About a third of the customers sample had no dependents (36%), another third (32%) had one, 16% had two, 12% had three, and 4% had four. About half of the customers (52%) were single, a quarter (26%) were married, 12% were *other*, and 10% were divorced. Majority of the customers' income type was salary (62%), a third (34%) was benefits, and the rest (4%) received a mix of income types. Most customers described themselves as competent when it came to loans (68%), 18% said they are experts, and 14% said they are novices. At the time of the interview, the customers had been with the host micro-lender for 0.50–9.83 years (*M* = 3.47, *SD* = 2.45), and excluding the most recent loans (loans taken out in 2017/18), about a quarter of the customers (28%) have not had a loan with this micro-lender before (*M* = 3.50, *SD* = 3.94, range = 0–16). Customers from a large variety of origination stores were included, with 17 out of the maximum possible 23 represented. See Appendix A2.3 for further sample information.

4.2.2.1. Researcher Positionality

At the time of study, the researcher had lived in London for four-and-a-half years and in West Midlands for seven years, making them familiar with the participants' geographical contexts. As a Russian-born migrant who is fluent in English and Russian, the researcher was able to connect with the prevalent Eastern European customer and underwriter demographic more easily. Additionally, some participants who share their identity as a woman may have felt more comfortable communicating their experiences. Throughout the research process, the researcher was mindful of how their social position as a middle-class graduate might influence data collection and analysis. Care was taken to minimise any potential status differences and communicate their role as an open-minded listener. At the time of the data collection, the researcher had over 3 months of engagement and collaboration with the host organisation on a part-time basis. They also spent a lot of time at the stores with the underwriters in preparation for and in-between interviews. This helped them gain an understanding of the customer lifecycle, become immersed in the context, refine the approach for the study, and build a consultative partnership.

4.2.3. Data Collection

Data collection occurred between January and April 2018. As telephone or *Skype* interviews can be detrimental to the quality of the research, for example, by masking body language cues and by creating a barrier to building a rapport (Irvine, 2011; Seitz, 2016), these were kept to a minimum. Thus, all but two interviews (one with an underwriter and one with a customer) were conducted face-to-face. For underwriters, data collection took place in the stores in which they work, which were located across 14 different locations in London (including Virtual Store) and five different locations in Midlands (see Chapter 2 for further details of the context). For customers, data collection took place in their most local store or in the organisation's headquarters, depending on what was most comfortable for the customer.

Interview guides were used to standardise the interviews across participants, minimise bias, and ensure relevant data is collected. The guides were based Critical Incident Technique (CIT; Flanagan, 1954) and were evaluated by another academic (a chartered occupational psychologist) for content validity, appropriateness, and clarity. They were also piloted (one underwriter and one customer) and adjusted accordingly. The interviews began with general questions about the underwriting process for the underwriters, and the relationship with the micro-lender for the customers. Next, positive and negative incidents were sought; for example, interviews with underwriters focused on specific instances of when a customer was deemed creditworthy (i.e., was granted a loan), was deemed not creditworthy (i.e., was not granted a loan), and was deemed creditworthy but ended up demonstrating non-creditworthy behaviour (i.e., was granted a loan, but ended up defaulting or frequently missed their payments). Meanwhile, interviews with customers focused on specific instances of when they demonstrated creditworthiness (i.e., paid on time) and when they did not demonstrate creditworthiness (i.e., did not pay on time). Probes were used to ensure the full depth of the incidents was covered and to clarify any descriptions of the behaviours, thoughts, and/or emotions. Lastly, an overview question pertaining to the research aim was asked to summarise and clarify the participants' thoughts (see Appendix A2.1 for the full interview schedule).

All participants were provided with an information sheet and a consent form prior to their interview. Interviewees were assured that their participation was voluntary and confidential. They then gave their consent and completed a brief demographic questionnaire. Underwriters were not compensated for their time (salary notwithstanding), and customers received £20 for their 1-hour interview (based on the standard practice at the host organisation of rewarding customers with £10 for a half an hour interviews). After each interview, the participants were debriefed (see Appendix A2.1), and field notes were made to summarise the main points from the interviews, as well as general reflections and impressions as they pertain to the research question. Furthermore, by comparing the broad ideas reflected in the field notes and transcribing throughout the data collection process, it was possible to understand when saturation had been achieved and data collection could be halted (Small, 2009). Moreover, for the customer population, the recruitment process was deemed to be completed after there were at least two participants occupying all the cells in the recruitment sampling grid (Table 4.1). Underwriter interviews lasted 20–67 min, averaging 45 min, and customer interviews lasted 20–77 min, also averaging 45 min.

4.2.4. Analysis

4.2.4.1. Data-Analytic Strategies

The interviews were transcribed verbatim and any identifying information was removed (see Appendix A2.2 for an example interview transcript). The two Russian interviews were translated into English during the transcription process. Then, the transcripts were imported into *NVivo*, the qualitative analysis software (QSR International, 2015), for coding and qualitative content analysis. The content analysis was primarily based on the procedures recommended by Schreier (2014).

To promote valid inductive analysis, the ten richest and most diverse interview transcripts (based on the field notes and participant characteristics) were open coded, line-by-line, before doing more directed coding on the rest of the transcripts (Schreier, 2014). Using in vivo coding, descriptive statements that illustrate the behaviours, thoughts, and emotions present in the critical incidents were extracted, while retaining the participants' perspective and language, and without pre-judging the data or labelling beliefs as incorrect. To start with, this was done indiscriminately, coding even (potentially) irrelevant statements to avoid introducing personal bias or preconceptions into the analysis (Schreier, 2014). An example of a first cycle, in vivo code is as follows:

> *"I check my bank account every day, a couple of times a day to make sure the right money came out and to see if it has been taken straight away or if it will come out two days later"*

The codes were formatted as "I" statements , lightly paraphrasing and/or adding contextual details or clarifications where necessary.

These initial codes did not overlap (Schreier, 2014) and were also sub-coded for whether the incident in question was positive or negative. As established in Chapter 1, there are different stages of criterion outcomes of creditworthiness based on severity. For the purposes of this study, the researcher did not differentiate between severity of the outcomes, but only whether the behaviour was assisting (positive incident) or impeding (negative incident) loan repayment. Importantly, the renegotiation of a repayment plan was considered a positive incident and an approved loan, but no repayment was considered a negative incident. During second cycle coding, the detail-rich in vivo codes were collapsed into more succinct codes that best captured the essence of meaning (Roulston, 2014; Saldaña, 2021). For example, the in vivo code mentioned earlier became "check bank transactions for accuracy".

Next, the aim was to inductively reduce the number of codes, based on semantic similarity and patterns of code co-occurrences, with as few theoretical assumptions as possible (Saldaña, 2021; Schreier, 2014). Groups of codes that shared the same fundamental meaning were assembled into preliminary categories, while considering the nuances and distinctions identified by the participants. For instance, consider the distinction between someone being "nice" and "too nice", and between "forthright" and "privateness/reserve" and "mistrust". The focus was on combining codes that share an underlying meaning, the same essence, implicit (as opposed to explicit) terms. At this stage, some of these preliminary categories could overlap to help prevent selective interpretation. Then, using a matrix coding query (Bazeley & Jackson, 2013, p. 251), co-occurrence of the categories with the incident type (positive or negative) were inspected. This ensured that constructs most strongly and consistently differentiated between creditworthy and non-creditworthy outcomes (Miles et al., 2020; Schreier, 2014). Themes of positive incidents were compared to themes of negative incidents and the respective antonyms were combined (e.g., “Truthful” and “Dishonest”). To achieve mutually exclusive constructs, the themes were refined further by either combining or dropping overlapping codes to create non-overlapping constructs (Schreier, 2014).

Lastly, the themes were collapsed and reorganised into an overarching coding frame (Schreier, 2014). To ensure the comprehensiveness and inclusiveness of this coding frame, the transcripts were briefly revisited to check that each participant had contributed to the coding frame and all the key codes were covered (Miles et al., 2020). Data triangulation was used to enhance the validity of the research findings, by dropping constructs present in fewer than a third of the interviews for each of the two participant populations (customers and underwriters; Miles et al., 2020). During the formulation of the final constructs, a chartered occupational psychologist provided feedback on sample codes for each one and reviewed the overall coding frame, revising, as necessary. The definition of each psychological characteristic identified can be seen in Table 4.3 in the results section.

4.2.4.2. Methodological Integrity Check

To ascertain the analytic rigor of the construct framework, the inter-rater agreement of each construct was tested with input from an independent researcher (Neuendorf, 2017). This reliability check was conducted on 100 randomly selected codes (approximately 5% of all codes) from each of the nine constructs (11 each and 12 for Conscientiousness). The independent coder classified each code into one of the nine mutually exclusive constructs. The inter-rater reliability of the coding scheme was good ($\kappa = .75 \pm .09$; J. Cohen, 1968), with all constructs meeting the criterion minimum of .40 (see Table 4.2 below) recommended by Banerjee et al. (1999). Lastly, the researcher assessed their own coding consistency by classifying a different set of 100 codes on two separate occasions, six weeks apart (Neuendorf, 2017). This intra-coder reliability was almost perfect (κ = .97 ± .04; J. Cohen, 1968).

Table 4.2. *The Inter-Rater Reliability of the Construct Framework*

Construct	Kappa (κ)
Coping Tendency	.88
Pro-Lender Orientation	.86
‘Can Do’ Beliefs	.84
Reputation & Credit Access Concern	.83
Responsibility & Integrity	.79
Humility & Compliance	.73
Anti-Debt Attitude	.59
Vigilance & Financial Consciousness	.57
Conscientiousness	.56
Overall	.75

Note. Neuendorf (2017) advised to report reliability variable by variable

4.3. Results

Nine psychological characteristics of creditworthiness emerged in the analysis of the interviews: (a) Responsibility & Integrity, (b) Conscientiousness, (c) Humility & Compliance, (d) Vigilance & Financial Awareness, (e) Coping Tendency, (f) Pro-Lender Orientation, (g) Anti-Debt Attitude, (h) ‘Can Do’ Beliefs, (i) Reputation & Credit Access Concern. Table 4.3 shows the definitions of these along with the number of interviews where each characteristic was mentioned. All four of the psychological characteristics identified in the systematic review were reflected in the interviews (denoted by asterisk(s) in Table 4.3), and the interviews established five additional constructs resulting in a total of nine characteristics of creditworthiness. For the rest of the results section, the psychological characteristics will be described and illustrated in more detail.

Table 4.3. *Psychological Characteristics Identified in the Semi-Structure Interviews and Their Definitions*

Psychological Characteristic	Definition	Sample Quote	Frequency, n (%)
Personality & Other Dispositional Traits			
Responsibility & Integrity**	Tendency to be governed by an abstract moral obligation to other people and to society at large	"The customer must be honest about their application. I think that this is the most important thing ever. Because when the customer is lying to you, how can you trust this customer to give him money? […] 'I don't have any credit at all,' but you can see credit cards in arrears." (Underwriter #26)	Underwriters: 35 (100%) Customers: 43 (86%)
Conscientiousness*	Tendency to (a) exert control over one's impulses, to deliberate carefully, and consider consequences; (b) work hard, be strongly motivated to achieve, and persist in the face of challenges; and (c) seek order, plan, and approach finances in a structured way	"I'm going to go home, relax, maybe get some sleep. Then, when I wake up, see how I feel. Then, think about it all again. Then, make a decision. I don't rush into anything and make the wrong decision. I'll just try to sit back. If I do everything, I see what makes more sense and what doesn't make sense. Then, act accordingly." (Customer #44)	Underwriters: 31 (89%) Customers: 46 (92%)
Humility & Compliance	Tendency to view self as ordinary, to expect little from one's social world, to react in a self-effacing manner to conflict and unmet expectations, and to be uninterested in possessing and displaying signs of lavish wealth	"It's the mentality because they think that they can get whatever they want. […] I say, 'I'm sorry, you have to wait a little bit longer. We can't offer you anything right now,' and then they just go, 'Okay, fine. I'm going to stop paying to you.'" (Underwriter #12)	Underwriters: 29 (83%) Customers: 30 (60%)
Vigilance & Financial Consciousness	Tendency to be alert to potential threats and to be highly aware of, to be involved in, to monitor, and to think about one's finances	"I use an online app. I know what's in my account all the time, every time. I check it every single day, several times a day." (Customer #17)	Underwriters: 19 (54%) Customers: 37 (74%)
Coping Tendency	The habitual behavioural, emotional, and cognitive responses to finance-specific stress that vary in terms of how adaptive or maladaptive these patterns of coping are	"Now, if I find I have a problem, I'll talk to whoever I owe money to try and resolve it. Rather than before, I just couldn't talk to anybody about it […] and just bury my head in the sand. Whereas now, I'll just approach if I'm in a bind and try and	Underwriters: 14 (40%) Customers: 41 (82%)

Psychological Characteristic	Definition	Sample Quote	Frequency, n (%)
		resolve it in any way I can which makes me feel a lot better." (Customer #4)	
	Attitudes & Beliefs		
Pro-Lender Orientation**	Tendency to favourably evaluate, have positive feelings towards, trust, empathise with, and worry about the lender	"The bank wouldn't lend to me. Nobody would help me. Nobody wanted to support me. […] I came to *[Lender's Name]* and they believed me. I was so grateful to them to help me out when I needed the help. I'm still paying it for three years now and I've never missed a payment." (Customer #48)	Underwriters: 29 (83%) Customers: 41 (82%)
Anti-Debt Attitude	The extent to which borrowers believe appropriate uses of debt are limited, experience the desire to avoid debt and to become debt-free, and associate debt with negative cognitions, affect, and outcomes	"You are new immigrants. You need to move out and need to go to a new place. You need the money for the deposit. The customer thinks, 'Okay I'm going to pay double [for this loan], but at least I can move to a new place.' Okay, makes sense, but for Christmas present, I don't think so. What I think is that they won't pay it." (Underwriter #8)	Underwriters: 24 (69%) Customers: 43 (86%)
'Can Do' Beliefs**	A group of self-, future-, and finance-related beliefs and attitudes that together give rise to a high motivational level and ability to act on personal motivators; includes (a) perceived financial control and self-efficacy, (b) optimism, and (c) perceived "costs"	"Because of my experience knowing that nothing's going to happen, nothing's going to change and help me, if I don't help myself." (Customer #28)	Underwriters: 24 (69%) Customers: 35 (70%)
Reputation & Credit Access Concern	The desire to achieve, protect, and maintain a good reputation among lenders and to have access and command over financial products and resources by utilising this reputation.	"If you've got a person that's saving money for a mortgage and they need a short loan for something, they're more likely to have that intention to pay. Because in the back of their head they'd be like, 'Hold up. I need to get a mortgage. I need to have a good credit for that.'" (Underwriter #18)	Underwriters: 26 (74%) Customers: 30 (60%)

Note. Grouped by characteristic type and ordered by frequency. Underwriter *n* = 35 and customer *n* = 50.

** Identical to systematic review results. ** Very similar to systematic review results*

4.3.1. Responsibility & Integrity

The Responsibility & Integrity characteristic consisted of several key facets such as sincerity, honesty, forthrightness, fidelity to promises, sense of duty, morality, accountability, stability, and incorruptibility. For instance, during the loan application process, underwriters would often detect dishonesty by comparing reported and actual credit history, reported and actual income and expenditure (i.e., from income verification from a credit reporting company or from bank statements), spotting inconsistent responses to follow-up questions or illogical/implausible purposes of a loan (e.g., asking for a loan for a car insurance or a car, but having no driving license, not even a provisional one). As one underwriter put it: *"most important is that the customer is telling the truth and is not lying, because it's nothing to lie about anyway. I'm seeing everything on a screen, so if you are going to lie, that's even worse"* (Underwriter #35). Although some borrower dishonesty may stem from a lack of awareness regarding credit and their finances (see 4.3.4. Vigilance & Financial Awareness), intentional deception was also common. Interestingly, several of the underwriters also gave specific examples of behavioural cues (e.g., gaze aversion, fidgeting, slow responding) that they interpret as dishonesty, with honesty characterised by the borrower being more relaxed and giving more detailed, complex, compelling, and immediate responses.

Many of the perfect payer customers expressed strong moral beliefs that likely led to their good repayment behaviour. They described how they believe *"in making a promise and making do with that promise, […] that people should live by honesty [and] transparency"* (Customer #50); that non-repayment of debt *"is not fair, because at the end of the day, it's somebody else's money"* (Customer #14); and that *"a debt must be repaid—there's no two ways about it"* (Customer #31). For some these beliefs stemmed from religion but not for everyone.

4.3.2. Conscientiousness

The self-controlled aspect of conscientiousness played an important role in debt repayment for many borrowers in this study. Customers gave examples of how they were willing to sacrifice immediate enjoyment (e.g., refrain from buying something on a whim) to limit potential negative outcomes in the future (e.g., not having enough money to pay back the loan). Specifically, positive incidents were associated with careful decision-making and controlled money handling, while negative incidents were associated with impulsive and careless money management. This included borrowing behaviour itself, as exemplified by how the following Write-Off customer decided to take-out a loan:

> *"I was just walking past, is what I remember, and I think what attracted me was obviously the green [logo]. I remember that there was just balloons and stuff outside and I just thought, 'Okay, you know what? Let me just try and apply for it.' […] I didn't read the paperwork or realise how much you would have to pay back. If I did, I probably wouldn't have taken it out […] I just thought, 'You know what? I might as well just take it out.' I mean I could have found a different alternative. I could have asked friends. I could have done some extra work. […] I didn't really think. I just kind of put it in the back of my head. I didn't really think about it."* (Customer #21)

Orderliness and planfulness were also important facets of conscientiousness. Customers gave examples of how they were willing to spend time and effort organising their finances (e.g., tracking their budget) to obtain various advantages in the future, such as easily being able to know their affordability. For example, one single father explained this strategy:

> *"At the beginning of the week I look at how much money I've got. I realistically think about what I need to do, how much I need to spend, what bills are coming out, what activities my children might have that week. Then, I sit down from the Sunday night or the Monday morning and work out what I can and can't do."* (Customer #44)

Lastly, industriousness also played a role in good repayment behaviour. Customers gave examples of how they were willing to put in immediate effort (e.g., by working more job hours) to achieve a positive outcome in the future (e.g., repaying their debt early).

4.3.3. Humility & Compliance

An important aspect of the Humility & Compliance construct was a modest lifestyle. There was a sense that being happy with simple things and *"[not wanting] the best, [having] to have everything"* (Customer #28) is important for healthy borrowing and repayment habits. A big driver of this lifestyle seemed to be not feeling the need to impress others or *"[spending] money to feel better"* (Customer #37), and instead finding importance in more humble things, as one customer with bad repayment history illustrated:

> "*Someone bought a car in my family. I felt, 'How come? I should buy too. I earn money. Why shouldn't I buy it?' I did, and then I had to pay back because I didn't*

have enough money, which made me broke because I didn't ***have*** *to have a car."* (Customer #37)

This desire to match what others have or to have more than others was closely linked to the view individuals have of themselves, especially when compared to others. As one underwriter noted, *"[they think] that if they have good income and they finished a good school, they're better"* (Underwriter #3). This attitude would then manifest in behaviours such as *"trying to do [the application] fast and […] not answering [any] of [the underwriter's] questions [… saying] 'If I'm born in the UK, why are you asking me this? […] I just need the money. Can you hurry up? I don't have time'"* (Underwriter #2).

At the more extreme end, this lack of humility would manifest itself through antisocial and hostile behaviours (as opposed to compliant/cooperative ones) when the customers' application gets rejected or a minor inconvenience takes place. The loan applicants would shout, swear, throw insults, get confrontational, and seek conflict. In some cases, customers would act in a vindictive manner because of a perceived injustice and thus stop upholding their debt repayment obligation to "punish" the lender (see the quote in Table 4.3). Thus, humility raises the threshold for what is perceived to be an injustice and a cooperative tendency helps customers to deal with their social obligations more maturely, improving creditworthiness. Meanwhile, lack of humility means a customer would rather not cooperate, but instead impose themselves on others, likely leading to lower creditworthiness.

4.3.4. Vigilance & Financial Consciousness

The Vigilance & Financial Consciousness characteristic consisted of several key facets such as being alert, aware, involved, and on guard with their finances. *"Customer that knows exactly how much they're spending on their expenditure and knows exactly how much they can afford"* (Underwriter #9). This means that if *"something happens [and they get overcharged], they're aware of that and they will try to settle everything"* (Underwriter #9). Moreover, *"[these customers] are aware of their credit history and are aware of their defaults"* (Underwriter #26).

In practice, this level of awareness and involvement was often achieved through high worry and anxiety that directed the borrowers' attention towards their finance. Although these vigilant behaviours tended to co-occur with many of the conscientiousness behaviours when leading up to positive incidents, the affective valence and sense of threat distinguished this characteristic from simple conscientiousness. The borrowers that espouse this trait are always considering possible dangers or financial difficulties; *"they can always see disaster"* (Underwriter #3). The reason for this is a fundamental desire to minimise stressful events in their lives, as one customer explained:

> *"I don't miss no payments. I can't mess with all of that, I can't do it. [laughs] It would stress me out. […] Every time I think I might miss a payment, just for one day, I literally start to stress out […] I can't have someone knocking on my door, debt collectors, no. […] When I feel like I'm getting stressed, it's not that I'm just thinking about the situation now, I think about how it's going to escalate."* (Customer #3)

Overall, while this vigilance tendency may seem maladaptive, it was found to be closely associated with a lot of the positive incidents and common among good and perfect payers.

4.3.5. Coping Tendency

Throughout the interviews, it was apparent that micro-loan borrowers frequently experience acute stressors and problems (*"something happens in their lives"*; Underwriter #14) that have the potential to impact their loan repayments. It ranged from relatively minor matters such as technical and/or bank issues, overspending or other types of temporary money shortfalls to major problems such as serious illnesses, accidents, job loss, and divorce (i.e., change of circumstances). In all cases, the borrowers' reaction (i.e., their thoughts and emotions) and subsequent action (or inaction) to cope with the problems were linked to creditworthy or uncreditworthy behaviour. For instance, many borrowers have had situations where they would suddenly begin to struggle with loan/bill payments and "deal" with the situation by avoiding confronting the problem altogether. The borrowers would *"just bury [their] head in the sand"* (Customer #4). On a practical level, this involved avoiding any opportunity for communication from the creditors, such as phone calls or letters, as exemplified by the following borrower:

> *"I just thought, 'You know what? Leave me alone.' […] I was getting letters and not opening them. I wasn't opening them for a long period of time. […] I just kept on getting letters and I was just sticking them all in the drawer, and then in the end the drawer broke. […] Then, I started opening them, and then I see like, 'You got a CCJ.' It was like, 'Oh my gosh.'"* (Customer #1)

Many of these avoidant behaviours were preceded by intense feelings of fear and shame, making the individual feel discouraged from action and motivating them to avoid contact. In some cases, borrowers simply *"[get] scared, […] don't feel confident to approach [the lender]"* (Underwriter #18). Notably, these types of reactions were quite distinct from other negative emotions such as anxiety, as those did not discourage action.

Conversely, many other borrowers would describe how they would deal with their financial problems head-on by re-negotiating their loan repayments with the micro-lender. One borrower recounts when she went into the hospital for just a week and her ESA (Employment Support Allowance) benefits stopped, meaning she could no longer afford the loan repayments:

> *"What I had to do was remain calm about it, because it's very easy to become emotional and very panicky. […] I sat down and thought about things, reflected on what's happened, thought about a plan of action. […] I called [the micro-lender] and I was able to say in a non-threatening way, 'I can't pay this at the moment because of this reason, not because I don't want to.' […] Contacting the ESA people, talking to social workers, and community workers, just talking to a range of people really, helped me to cope with that."* (Customer #28)

4.3.6. Pro-Lender Orientation

A borrower that trusts the lender and in general, views them favourably would be more inclined to honour their debt obligation to that lender. Underwriters sense this trust based on how open, friendly, and outgoing the customer acts towards them: *"open to building a relationship with [the lender …], being open to all [their] questions"* (Underwriter #5), as opposed to being distrustful and closed-off. The underwriters often believe that they can manipulate this attitude to improve the likelihood of a borrower repaying, as one explained:

> *"Working with people, it's hard, so you just got to have that connection with them. Sometimes, even if [the customer doesn't] have intention to pay, but if you turn out to be a good advisor to them and explain them everything and make them aware of everything, actually [they] change their mind and they come back to repay."* (Underwriter #5)

Indeed, the positive feelings towards the lender may come from borrower's appreciation, as they are finally able to get a loan from somewhere, as exemplified by the quote in Table 4.3. In this situation, the customer's gratitude towards the micro-lender motivated his perfect repayment behaviour.

Similarly, customers that perceive the lender in humanising terms or feel empathy towards them were more likely to be good payers, as illustrated by the following:

> *"Put yourself in their shoe. Imagine you had money and you borrowed someone and then nobody pays you back. How would you feel? Because obviously, someone might actually ask you, 'I need so and so money from you so I can buy something.' Then you went with their words, you have that confidence, believed that they will pay you back. Then all of a sudden, they run off or they don't do anything, but they don't pay you back. How do you feel? You feel upset. You feel angry because it's your money."* (Customer #14)

Furthermore, for some customers, it was easy to see the bigger picture of the business and think of the lender as financially responsible:

> *"[The micro-lender] is there not only just to borrow you money. You borrow money, pay with interest, and then the money goes back to the lender. Helps the loan company generate more capital and more investment for the benefit of workers and their children too. Not only [to benefit] me—taking, taking, and disappearing. […] People think a company is just the building but there's people running it for it to function. […] It's just some people, they do not care, whatever, I don't know, but you're killing someone's economy, you're killing the future of other people too in that perspective."* (Customer #22)

4.3.7. Anti-Debt Attitude

An anti-debt attitude encompassed a range of attitudes and beliefs that described how serious or careless an individual is about debt. This was most evident in what one considers to be a "good" reason for a loan, both in a subjective and a more objective sense. In general, many of the underwriters and customers regarded Christmas presents, clothes shopping, hair, to go out for food/drinks, to help out a friend, or to go on holiday as frivolous loan purposes. While other customers, many of whom were in the 'bad' repayment category disagreed and explained how, for example: *"every year around Christmas time, [my family] took out a Provident loan and it became part of our culture"* (Customer #28). From a more subjective standpoint, anti-debt attitude means taking out a loan only for something valuable, important and/or urgent. Otherwise, the customer *"will be paying for six months loan towards the loan for [their] hair [which] is not sensible"* (Underwriter #9) and hard to sustain motivation for.

On the other end of the scale, a careless attitude to debt was characterised by *"[just apply] for the sake of applying"* (Underwriter #30), *"[not knowing] why they need the loan"* (Underwriter #26), or *"just [taking] the loan because there is money available"* (Customer #31). Indeed, the reason is that such an attitude can lead to overburdening oneself in the long run, as illustrated by the following borrower's negative critical incident:

> *"In my house, I always get, 'Get this credit card, lower interest, get this,' and then, [I got] fascinated. 'Let's get it!' And that's my mistake. I took credit cards, I took loans, and after, I found out they were too much for me. […] I couldn't cope with them. Then it's, 'If I pay to this one, I cannot pay to that one.' […] Then, another £12 charge or whatever fees because you didn't pay the money on time. […] I say, 'If I get another loan, I pay the one I owe and there is one new. Next month is going to be easy for me. I'm going to pay this one.' That's not true."* (Customer #36)

This interviewee highlights the impact that having too many credit products at the same time could have, even if they were affordable at the time and taken out for good reasons (in this case, a growing family—wife, children), and the subsequent danger of believing that you can cover one loan with another.

4.3.8. 'Can Do' Beliefs

The core of the 'Can Do' Beliefs included facets such as financial self-efficacy, optimism, hope, effort expectancy, and internal locus of control. Customer interviewees would frequently refer to how they are *"quite good with money"* (Customer #50), *"feel a lot more in control [of their finances with the loan]"* (Customer #4), *"have never found any problem repaying"* (Customer #29) and *"don't wait for nothing from no one"* (Customer #49) when describing their thoughts and behaviour leading up to a positive incident. As one single mum explained:

> *"I have lived with £15 per day, and I know that I'll be okay with the money […] because that's nothing. I've survived* ***weeks*** *with no money! […] I didn't have money to buy bus pass. I said, 'Okay, fine,' then we walked to school."* (Customer #16)

The self-efficacy and trust she has in her abilities to manage budgets and meet any challenges was self-evident.

This optimistic view of the future was especially common among economic migrants, *"[expecting their] financial situation to become better, day-by-day"* (Customer #49). As one customer explained:

> *"Yes, circumstances might happen and things like that, God forbid. [But] I'm more of a positive person because even sometimes[the underwriters] ask, 'Do you think something can happen in the future that will not allow you to pay this amount, this money, and things like that.' I'm like, 'No.' Me saying no is me being positive that nothing would happen that would not allow me to."* (Customer #50)

Thus, an individual that has faith in the future and their own abilities has a higher motivational level and better ability to act on personal motivators to achieve personal goals such as loan repayment. Although, notably, this seemed to be partially reflective of actual, material circumstances, as well as psychological beliefs.

On the other end of the scale, many of the negative incidents were shrouded in participants expressing a sense of resignation with regards to their finances. They would say things like *"with money, you can't feature in everything; it's too unpredictable,"* and *"it was inevitable that would happen"* (Customer #13).

4.3.9. Reputation & Credit Access Concern

As a primarily, extrinsic/instrumental concern, the importance of loan repayment to the micro-lender was linked to the desire to achieve, protect, and maintain a good credit history or credit score (i.e., the reputation metric specific to the lending context) to gain access and command over financial products and resources. The facets of this characteristic ranged from a more general *"it's important [to me] to keep a very good track record everywhere I go"* (Customer #14) and *"I [always] try to leave a good reputation"* (Customer #41), to a loan-specific context of *"I don't want my credit to spoil"* (Customer #48) and *"[I'm] improving [my] overall credit score and how companies will look at [me] as a risk factor"* (Customer #44). Many of the critical incidents featured mentions of financial products and resources, such as mortgages, car loans, larger store card limits, phone contracts, or further loans provided by the micro-lender. Some felt that this good reputation among lenders and the subsequent credit access is an important necessity of adult life, as illustrated below:

"It's simple stuff like Argos card. At my age, you work, you should be able to get things. For my age, to not get things, it's kind of like, 'You're not really much of an adult, are you?' [...] I know you don't have to get a contract phone, but how can you not be able to get a contract phone being an adult? That's one thing that a child can't do. A simple thing as that. [...] If you can't get it, how are you sourcing yourself? [...] You don't actually realise how important it is until it hits you. You're like, 'Wow, I can't even get a car out or a mortgage. I've been working all my life to save up for a house, and I can't even do that because of my credit.'" (Customer #3)

While it might seem that there would not be much of a variation in this characteristic, to differentiate between creditworthy and non-creditworthy borrowers, some of the Write-Off customers expressed beliefs that seem to in part explain their non-paying behaviour. As one such customer explained:

"Then, I took out another [micro-loan] again because I thought it would help with my credit history, but it doesn't actually help your credit history at all. [...] I just thought that sometimes when you take out money it just shows like a pattern on your credit history, but with this one it doesn't. Mortgage brokers don't like to see that on your file. [...] Obviously, I don't want to pay it off now. [...] I know they'd been sending letters and debt collectors and bailiffs and stuff like that, but I'd not really been at that address, so they had not really been coming to me." (Customer #21)

In this case, the customer lost all the instrumental motivation that was influencing him before because he was told by brokers that High-Cost Short-Term Credit (HCSTC) negatively impacts his mortgage application. He then took that as justification for not repaying the loan all together.

4.4. Discussion

The present study aimed to establish major psychological characteristics of consumer creditworthiness in a UK micro-lending context. Overall, content analysis of 85 semi-structured interviews with borrowers and underwriters identified nine psychological traits most pertinent to debt repayment outcomes. These traits were (a) Responsibility & Integrity, (b) Conscientiousness, (c) Humility & Compliance, (d) Vigilance & Financial Awareness, (e) Coping Tendency, (f) Pro-Lender Orientation, (g) Anti-Debt Attitude, (h) 'Can Do' Beliefs, (i) Reputation & Credit Access Concern. Of these, characteristics such as Pro-Lender

Orientation, Coping Tendency, and Reputation & Credit Access Concern are relatively novel, while characteristics such as Responsibility & Integrity and Conscientiousness have been explored in prior creditworthiness research (e.g., Atlas et al., 2017; Herzenstein et al., 2011; Klinger et al., 2013).

There was overlap between the present results and the key psychological characteristics identified in the systematic literature review in Chapter 3, which were Integrity, Conscientiousness, Perceived Control, and Prosocial Orientation. Thus, the psychological characteristics identified in the systematic review are applicable to the UK micro-lending context. However, there were also some notable re-conceptualisations that make more sense in the current context. For instance, compared to the Perceived Control construct in the systematic review, 'Can Do' Beliefs encompass a slightly wider range of beliefs that include the likes of optimism, hope, and perceived *costs*. Meanwhile, the Pro-Lender Orientation characteristic identified in the present study appears to be a more context-specific version of Prosocial Orientation construct outlined in the systematic review. While Prosocial Orientation describes the degree tend to trust, empathise with, and act altruistically towards all other people, those high on Pro-Lender Orientation only concerns itself with attitudes towards the lender rather than other people.

Compared with the systematic review, the present study established five additional characteristics of creditworthiness which serve as important contributions to the gaps in the systematic literature review results. This makes for a more inclusive and comprehensive conceptualisation of creditworthiness as relevant to the UK micro-lending context. For example, the Reputation & Credit Access Concern characteristic is an important addition to the conceptualisation due to its overlap with *dignity* and *reputation* aspects of *character* in the Five Cs of Credit framework, that were not covered by the results of the systematic literature review (see Table 4.4).

Moreover, some of these additional characteristics are broadly consistent with the existing literature on psychological determinants of financial behaviour. For instance, aspects of the Vigilance & Financial Awareness characteristic bared some resemblance to the anxious money attitudes identified in prior studies (e.g., Rose & Orr, 2007; Yamauchi & Templer, 1982), with creditworthy borrowers in the present study acting vigilantly towards their finances due to their tendency to worry about money. Although this finding contradicts the research that found money worry to be associated with unfavourable financial outcomes

(Abrantes-Braga & Veludo-de-Oliveira, 2020; Lostutter et al., 2019; Rose & Orr, 2007), it is supportive of other research where money worry was positively correlated with good financial habits, such as price consciousness and frugality (Rose & Orr, 2007). The Anti-Debt Attitude factor is also generally aligned with previous research where a more negative attitude towards debt/credit has been linked with favourable financial outcomes, such as lower levels of indebtedness (Almenberg et al., 2021; Lea et al., 1993; Schooley & Worden, 2010; Webley & Nyhus, 2001) and lower delinquency on credit payments (L. McCloud & Dwyer, 2011).

Table 4.4. *Creditworthiness Factors from Four Competing Conceptualisations Categorised by the Trustworthiness Domains*

Creditworthiness Conceptualisations	Ability	Willingness		
	Competence	**Goodwill**	**Virtuous Character**	**Other**
This Study (Interviews)	• Conscientiousness • 'Can Do' Beliefs • Coping Tendency • Vigilance & Financial Awareness	• Pro-Lender Orientation • Humility & Compliance	• Responsibility & Integrity • Reputation & Credit Access Concern	• Anti-Debt Attitude
Systematic Review	• Conscientiousness (i.e., orderliness, industriousness, self-discipline, responsibility) • Perceived control (i.e., self-efficacy, internal locus of control, mastery, sense of control)	• Prosocial orientation (i.e., tendency to trust others, altruism, empathy)	• Integrity (i.e., honesty, promise fulfilment, morality)	—
The Five Cs of Credit (Abrahams & Zhang, 2008)	• Capacity (e.g., income and expenditure, existing debt, experiences and skills necessary for financial success) • Collateral (e.g., current and future collateral valuation) • Capital (e.g., net worth and liquidity) • Conditions (e.g., economic and regulatory environment)	—	• Character (e.g., integrity, dignity, reputation)	—

Creditworthiness Conceptualisations	Ability	Willingness		
	Competence	**Goodwill**	**Virtuous Character**	**Other**
Automated Credit Scoring (Traditional Data; Anderson, 2007)	• Socio-demographic profile (e.g., age, marital status, education, number of dependents, employment, income) • Credit score (i.e., credit utilisation and existing debt)	• Existing lender-borrower relationship (i.e., past dealings, loyalty)	• Credit score (i.e., length and quality of credit repayment history)	—

Furthermore, the results from the underwriter interviews were in line with Moulton's (2007) qualitative research that demonstrated that lenders use face-to-face contact with the borrowers to infer the borrower's character through behavioural cues, especially when the lending decision is not very clear-cut. The specific "honesty cues" were also an interesting finding. The reliance on whether the customers' responses make sense, are immediate, full of specific details or whether they are inconsistent, tense, hesitant, too good to be true, behaving strangely, averting their gaze are all possible deception cues that have been identified before (DePaulo et al., 2003). However, as DePaulo et al.'s (2003) systematic review and meta-analysis highlight, not all of these are good cues (e.g., the "gaze aversion/eye contact" cue) because majority of them have no discernible or weak links to deceit. This demonstrates that, despite all their expertise, underwriters at the host micro-lender are prone to biases and reliance on unfair signals, just as would be suspected (e.g., see Abdou & Pointon, 2011).

Overall, the present qualitative research represents an important step towards addressing the problems of credit history-based creditworthiness assessments. The framework outlined in Table 4.3 is an important knowledge base for professional practice, especially for a unique context such as UK micro-loans since it provides a systematic and explicit definition of the concept of creditworthiness in the form of psychological characteristics. Building on these results, one can develop a psychometric measure of creditworthiness that operationalise this conceptualisation.

4.4.1. Limitations & Future Research

However, while the richness of interview data enables deep understanding and engagement with the research question, due to the exploratory and qualitative nature of this study, there are several important issues that should be noted. Firstly, while the nine psychological characteristics have been identified as having an impact on debt repayment behaviour in a UK micro-loan context, the extent to which they do this is not yet known. It is not clear how reliable this impact is and whether the effects of these characteristics are confounded in any way by other key variables such as indebtedness, income, or age (see Chapter 1 for the conceptual framework). Afterall, quantifying their influence is important to the applied nature of this research inquiry. Therefore, the next chapter in this thesis builds on these results by quantifying the nine psychological characteristics identified and measure the extent of their impact on consumer creditworthiness.

Secondly, interviews with underwriters (in particular) were likely to have been influenced by the subjective nature of questions and recall. For instance, descriptions of positive and negative critical incidents could have been influenced by the underwriters' implicit models of personality (e.g., see Consistency Theory), where an irrelevant characteristic (e.g., sloppy dress) might have "cross-contaminated" the underwriter's concrete recollection of the facts (e.g., how organised were the customer's finances). While CIT was used to minimise eliciting *perceived* creditworthiness characteristics and improve objectivity of findings, the risk is still present. Therefore, further confirmatory research to replicate the results of this qualitative study can help establish the validity of the psychological characteristics outlined.

4.4.2. Summary

Based on 85 semi-structured interviews, the present study established a data-grounded framework of nine psychological traits characterising creditworthy, micro-loan borrowers. Those that honour their debt obligations tended to be governed by a moral obligation to others; experience empathy and positive affectivity towards the lender; be involved in and alert to their financial affairs; and be cautious, hard-working, humble, and self-assured among several other characteristics. Meanwhile, those borrowers that do not act in a creditworthy manner displayed tendencies such as avoidant coping when faced with stressful situations; lacking concern for their reputation or having access to credit; and being antagonistic and/or opportunistic in their dealings with others.

In the next chapter, these results are built upon by quantifying the nine psychological characteristics identified by developing a novel psychometric measure of creditworthiness. The purpose of the upcoming studies is to establish the novel measures' dimensionality, reliability, and face, content, convergent, and discriminant validities.

Chapter 5. Developing a Psychometric Measure of Creditworthiness in a Microlending Context

5.1. Introduction

Underwriter and borrower interviews identified five dispositional traits and four attitudes/beliefs differentiating creditworthy and non-creditworthy applicants in a UK micro-lending context (Study 1b, Chapter 4). This was a novel finding due to the paucity of psychological studies on creditworthiness characteristics in this setting, since most micro-lending studies are conducted in non-Western countries (e.g., Carpenter & Williams, 2014; Klinger et al., 2013). Therefore, quantifying the impact of these characteristics is an important step to further investigate and measure the influence and relevance of the psychological characteristics in micro-loan repayment behaviour, advancing the applied aspect of this thesis. To do so, a psychometric measure of these characteristics that can be used as part of an online application process for individuals seeking to borrow from a UK micro-lender is needed. However, given the lack of available psychometric instruments for assessing consumer creditworthiness, the aim of the studies in the present chapter was to develop a novel psychometric measure to assess psychological characteristics of consumer creditworthiness.

5.1.1. Design Considerations

Measuring loan applicants' psychological characteristics as part of their application process poses certain psychometric challenges due to the need to have a short but accurate inventory. As mentioned previously (see Chapters 1 and 2), the brevity and simplicity of a micro-loan application is an important quality in the UK's competitive High-Cost Short-Term Credit (HCSTC) market (CMA, 2015; Experian, 2018). As a result, the measure format cannot be too cognitively demanding, or time consuming. At the same time, however, accuracy cannot be sacrificed given the existing issues with flawed credit history and inaccurate alternative assessments in the industry (see Chapter 1 for more details). This is likely to be an issue for traditional Likert-type personality and attitude inventories, since these type of psychometrics have attracted much criticism over the decades for their vulnerability to socially desirable responding (Bernreuter, 1933; Graziano & Tobin, 2002; Morgeson et al., 2007), response acquiescence bias (Krosnick & Presser, 2010; Paulhus, 1991), and inability to engage the participant, thus leading to inattentive responding (Krosnick, 1991; Steedle et al., 2019).

While some of these issues can be addressed by using multiple-choice items instead of Likert-type ones, another novel measurement format that has the potential to combat some of these challenges is a pictorial- or image-based measure. These have been used to assess vocational interests (Becker, 1975; Brady, 2020; Elksnin & Elksnin, 1993; Geist, 1959) and personality (Halim & Zouq, 2021; Hilliard et al., 2022a; Krainikovsky et al., 2019; Leutner et al., 2017; Murray, 1943; Paunonen, 2003; Paunonen et al., 1990). Still, image-based measures are relatively rare and their use is mostly limited to special populations, such as children and individuals with disabilities and/or limited reading skills. Furthermore, rather than having images as response options, many of these inventories use the images simply as prompts with response options in the form a Likert-like scale (e.g., measuring likelihood; Paunonen et al., 1990) or as part of a projective method that requires a verbal response (e.g., Murray, 1943). The measures that do have images as response options tend to be scale-like, or use images as nonverbal illustrative labels, rather than multiple-choice. Lastly, some of the more recent pictorial assessments have relied on simple image preferences (i.e., without personality specific prompts) to measure personality (Halim & Zouq, 2021; Krainikovsky et al., 2019).

5.1.1.1. Advantages of Image-Based Formats

Image-based inventories have the advantage of being more enjoyable and engaging than their text-based counterparts, thus, attracting the attention of the respondents and addressing the inattentiveness and respondent fatigue issue (Emde & Fuchs, 2012). Similarly, because images are more diverse, this could help address the response acquiescence. These measure formats also have the potential to capture faster and more accurate data. Image stimuli are more intuitive and evoke stronger preferences in respondents than verbal stimuli (Meissner & Rothermund, 2015). This has been shown to result in faster response times per question compared to equivalent text-based (P. Chandler & Sweller, 1991), thus, resulting in reduced length of image-based measures. Moreover, feeling faces (i.e., smileys or emojis) which depict different emotions using facial expressions (such as happy, sad, frightened etc.)

have the advantage of being easier to identify by respondents than verbal labels because they eliminate the barrier of mapping feelings into words (Kunin, 1998). By relying on images instead of words, pictorial measures can also reduce linguistic barriers and remove misunderstanding of text items (Paunonen et al., 1990). This was particularly relevant to the present context due to the specific credit needs of recent migrants (see Chapter 2 for more details). However, it is worth mentioning that images still rely on respondent's interpretation, leaving room for potential misunderstanding of what the response options are depicting. Items are also somewhat limited to only concern themselves with those things that can be visually represented. Despite this, image-based measures have generally been shown to produce good data quality (in terms of response distribution, for instance), as well as overall good validity and reliability (e.g., Andrews & Crandall, 1976; Emde & Fuchs, 2012; R. Y. Hong et al., 2008; Moore et al., 2010; Paunonen, 2003).

5.1.1.2. Keying of Image-Based Items

Traditional personality inventories that use Likert(-type) scales to measure individual differences typically key a person's response by translating their level of (dis)agreement with the target statement into their corresponding consecutive numerical integers from 1 to *n*, where *n* is the number of response categories. This ordinal data is then treated to be approximately continuous/numeric (i.e., interval or ratio) for the purposes of further statistical analysis. Although this approach in of itself has been seen as problematic by some in the literature (Bernstein & Teng, 1989; Harpe, 2015; Russell & Bobko, 1992), the statistical issues are further accentuated when gradations between the options are unevenly spaced (thus making the data simply ordered categorical) or the number of response categories decrease (Fabrigar & Wegener, 2012; Flora et al., 2012; Holgado–Tello et al., 2010; Wirth & Edwards, 2007). In addition, multiple-choice items cannot inherently be mapped onto a definitive continuous scale.

All of this introduces the critical issue of how to key response options in an image-based measure such as the one being developed here. This was addressed by looking towards Situational Judgement Tests (SJTs) and Biodata literature, where there are primarily four types of keying methods: (a) empirical, (b) theoretical, (c) expert-based, and (d) hybrid (Bergman et al., 2006; Cucina et al., 2012). Empirical keying involves assigning values to response options according to an objectively measured association between endorsing the option and a criterion associated with the aim of the item. Theoretical keying involves subjective assignment of values based on the presumed relationship; expert-based relies on values assigned across several experts; and hybrid scoring is when a combination of approaches is used. The present study used a hybrid key, with empirical as the primary and theoretical as the secondary key. The empirical criteria used relied on standard measures of a similar construct, which is analogous to how predictive personality measures are created and validated (e.g., Bachrach et al., 2012; Lambiotte & Kosinski, 2014). The theoretical key was derived according to the information in the interviews.

5.1.2. The Present Research

The purpose of the research presented in this chapter was to develop a novel psychometric measure of creditworthiness using an image-based format and establish its dimensionality, reliability, and face, content, convergent, and discriminant validities. The overall aim is that the responses on the instrument can then be used to provide the host organisation (a UK-based micro-lender) with a complimentary measure of a loan applicant's creditworthiness to use alongside its existing underwriting methods. The current studies in this chapter were guided by the standard measure development processes (DeVellis, 2017; Furr, 2011; Irwing & Hughes, 2018; Lane et al., 2016; Luyt, 2012; Price, 2017; Rust et al., 2020), and the rest of this chapter is organised accordingly:

- **Step 1**. The first step in the development process was to inductively generate potential items for the measure using the customer and underwriter interviews (see the previous chapter, Chapter 4).
- **Step 2**. These items were appraised and refined in an iterative, mixed methods study (Study 2a). This study used two in-person workshops and an online questionnaire with host organisation stakeholders and subject-matter experts (SMEs) to (a) gather feedback on and subjectively evaluate the items; (b) keep, edit, or drop the items; and thus, (c) establish their face and content validity.
- **Step 3**. The remaining items were subject to a quantitative pilot with participants akin to the target population (Study 2b). The aim of this study was to (a) statistically evaluate and reduce the number of items and/or options within the items; (b) determine the underlying structure of the measure; and subsequently, (c) establish its reliability and construct validity.

5.2. Step 1: Item Writing

Item generation relied on the qualitative information inductively obtained from the customer and underwriter interviews in Study 1b (see Chapter 4); thus, providing theoretical and content validity support for the initial item pool. This qualitative information took the form of behavioural, affective, or cognitive indicators, examples of which for each of the nine psychological characteristics are presented in Table 5.1. To aid the item writing process, the indicators for each characteristic were grouped further (while allowing for duplication) in a spreadsheet according to their content/sub-themes, such as similar situations, subject-matter, adjectives, feelings, behaviours, thoughts, motives, attitudes, and whether they were associated with effective or ineffective loan repayment behaviour. This created easily identifiable sub-themes that were instrumental for item writing. For example, one cluster of statements for the Pro-Lender Orientation characteristic contained all the different ways that the micro-lender has been described (in terms of actual adjectives or more abstract concepts); a list of good/bad reasons for a micro-loan for the Anti-Debt Attitude characteristic; or, for Coping Tendency, a group of similar situations and the variety of responses individuals had to them.

Table 5.1. *Example Indicators of the Psychological Characteristics of Consumer Creditworthiness Identified in Chapter 4*

Psychological Characteristics	**Example Behavioural, Cognitive, and Affective Indicators**	
	Positive	**Negative**
Responsibility & Integrity	Feels uncomfortable if they do not pay their bills Is straightforward with the underwriter about the defaults on their credit report and why they are there Is honest about their financial situation to the underwriters from the beginning Updates the lender about any financial problems, just in case	Feels that they can get away with not paying the loan because nobody is going to come to their house to take their TV or their couch Feels that if there is a lack of consequences for loan non-payment, then they probably would not repay it Does not let the lender know when their financial circumstances or other details change

Psychological Characteristics	Example Behavioural, Cognitive, and Affective Indicators	
	Positive	Negative
Conscientiousness	Sits down every Sunday night and works out what they can and cannot afford to do that week Tries to go shopping only when it is the sale Asks the underwriter a lot of questions during the loan application process Takes their time with decisions; does not make snap decisions	Ends up buying things they do not like because they are tired Has clothes from 2-3 years ago that they have never worn Failed to realise how the monthly interest on the loan would add up Forgets about an upcoming payment and ends up getting a bank charge
Humility & Compliance	Is respectful to the underwriters Is not the sort of person that wants the best of everything, that has to have everything, but would rather get something that is functional Feels fine and reacts okay when they do not get something that they want	Believes that they should not need to justify why they need a loan; they just need that money Would not repay the loan, if they get approved for a lower loan amount than what they wanted Likes living the high life Is used to getting their way
Vigilance & Financial Consciousness	Knows what is in their bank account all the time, every time Can accurately project their spending Is aware of their credit history	Is always surprised by how little they have in their bank account when they check it Does not know how much they spend on utilities per month
Coping Tendency	If the borrower feels that they cannot manage the loan payments, they just cut their spending When the borrower is struggling with loan payments, they negotiate with the lender and make some arrangement	When the borrower receives a letter in the mail, they hide it in drawers because it might be from lenders When the borrower makes a mistake with their finances, they feel (they get) judged a lot and do not want to deal with it
Pro-Lender Orientation	Believes that the lender is not just the building, but it is the people running it for the business to function Believes that the lender is understanding and will really understand what they are going through and will help them a lot emotionally	Does not care about whether the lender would continue to operate in the future Believes that the lender is simply out to make a profit at the customers' expense

Psychological Characteristics	**Example Behavioural, Cognitive, and Affective Indicators**	
	Positive	**Negative**
Anti-Debt Attitude	Does not think a Christmas present is a good reason for a loan Believes that a life without loans is better	Thinks that if they take out more loans, then they can sort out their other loans
'Can Do' Beliefs	Believes that they are quite good with money Feels that the future looks good Believes that the loan repayments will be manageable and have little impact on their lifestyle	Believes that money is too unpredictable, and they cannot feature in everything Feels like they are struggling financially
Reputation & Credit Access Concern	Wants to improve their credit report Wants to be able to borrow from this lender in the future	Does not care about their credit score Believes that a loan is just free money

Note. See Chapter 4 for the construct definitions and other details.

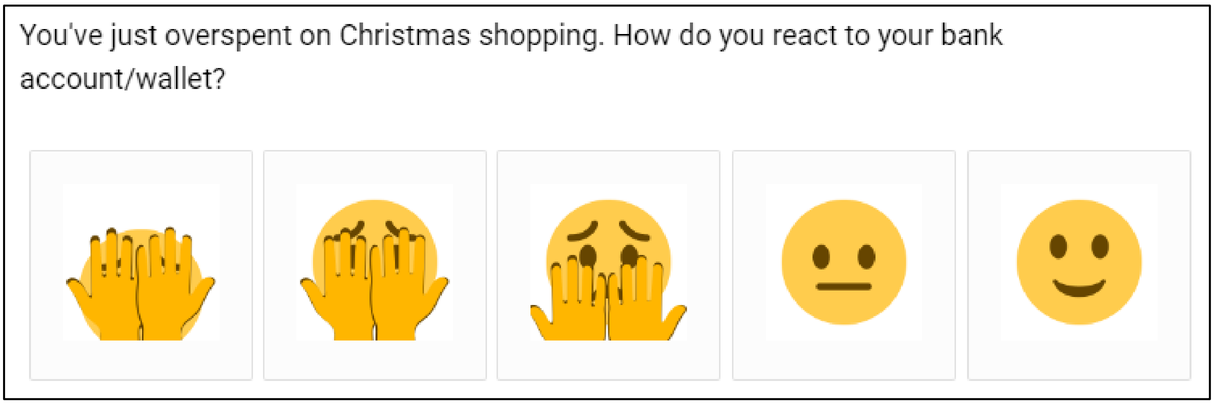
Next, the question/prompt part of the items were written based on these sub-themes. The prompts were written in such a way that the responses could either be on a relative scale (likert/scale-like; e.g., not important – important) or be multiple-choice/multi-select (e.g., potential behavioural responses to a hypothetical situation). Because the response options are images, prompts tapping into specific emotions, activities, things, locations, or certain ideas were prioritised for it is easier to represent those things visually. The general aim was to draft 20-40 items per characteristic, with an absolute minimum of ten, as per best practice guidelines (Rust et al., 2020, p. 23). In the end, however, the volume of the source material (i.e., the customer and underwriter interviews from Study 1b, Chapter 4) largely dictated the number of items that were drafted, ranging from 14 to 97 per characteristic.

When the time came to creating the image responses, the researcher found it useful to consult resources produced by the Unicode Consortium, especially their *Unicode Emoji Charts* (Unicode, 2019). This organisation is responsible for consistent representation of text across different digital platforms, and since both letters and icons are just abstracted symbols used for communication (S. McCloud, 2001), emojis officially came under Unicode's scope in 2007. As a result, their documentation on and lexicographical research regarding emoji groups, keywords, meaning, symbolism, (mis)interpretation, usage, proposals and so on served as instrumental guidance in designing the response options. Thus, images for the options were either (a) created from scratch by the thesis author using vector graphics; (b) used icons and photos obtained from open source, zero licence (CC0), or free licence with attribution (CC BY) websites (e.g., *Unsplash*, *icons8*); and/or (c) utilised photos that had already been purchased by the host organisation under the necessary licensing agreements. In general, simple iconographic images were preferred over the more complex and photorealistic ones, as that made them more universal (rather than specific) and allowed for greater control over the visual details, levels of abstraction, and the meaning communicated (McCloud, 1993). Examples of the types of items that were created can be seen in Figure 5.1.

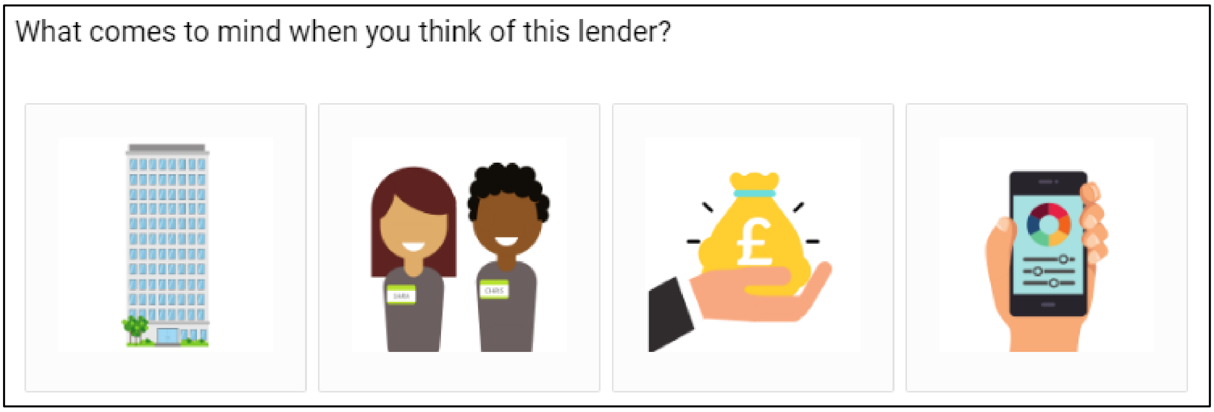
In the end, a preliminary pool of 708 items was created directly from customers' and underwriters' actual statements. Although initial ideas involved creating an item bank or parallel test forms (e.g., see Parshall et al., 2002) to combat customers gaming the measure, improve test security, and reduce item familiarity from repeated loan applications, it then became clear that the volume of items required for this would not be possible. This is given how time-consuming creation of image-based items can be, contrasted against the practical time constraints of delivering the applied research project. As a result, a notable proportion of the draft items were never fully created, in favour of creating images for items only with most pertinent content (see Figure 5.2 for an overview). What then followed was the subjective item evaluation stage (i.e., Study 2a) as is advocated by several psychometric development guidelines (DeVellis, 2017; Forsyth et al., 2004; Krosnick & Presser, 2010; Lane et al., 2016; Rust et al., 2020).

Figure 5.1. *Illustration of the Items Created for the Image-Based Creditworthiness Measure*

Example item for the Coping Tendency subscale:



Example item for the Pro-Lender Orientation subscale:



Example item for the ‘Can Do’ Beliefs subscale:

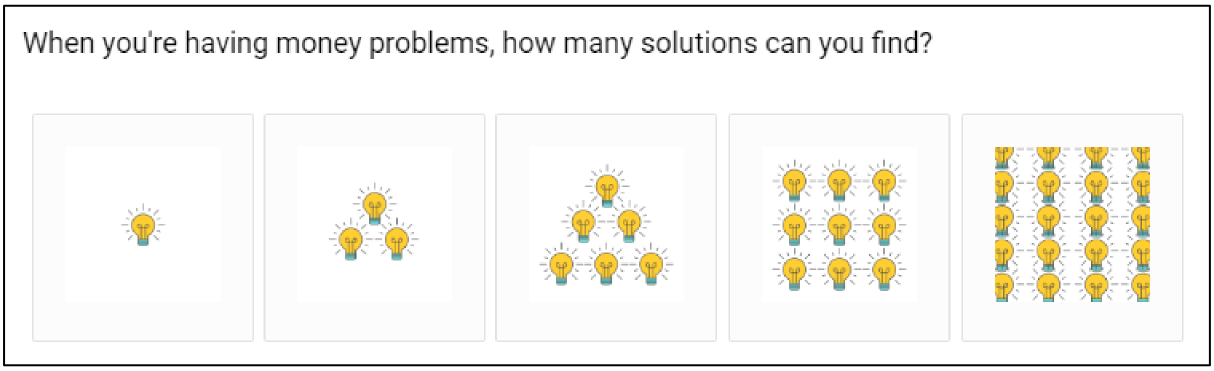
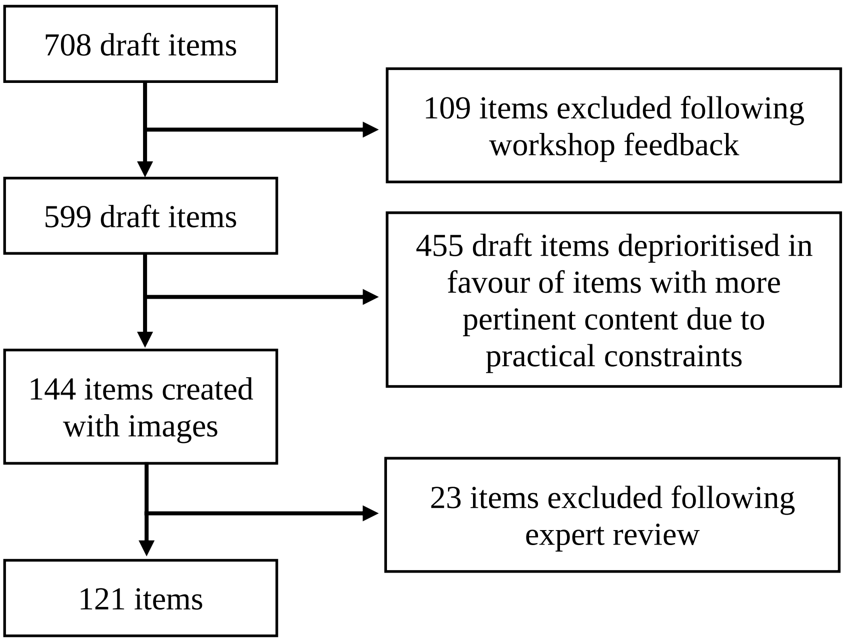


Figure 5.2. *Item Development Process in Study 2a*



5.3. Step 2: Subjective Validation (Study 2a)

Study 2a employed a predominantly qualitative research design with some quantitative elements and involved two stakeholder workshops (*n* = 10) and independent expert evaluation of the items (*n* = 9). As per best practice (e.g., DeVellis, 2017), the goal of this study was to provide subjective validation and refinement of the initial item pool prior to conducting a pilot. Specifically, the aim was to further ascertain/ensure the measure's content validity, establish its face validity, review its items, and improve the quality of these items. Furthermore, the stakeholder workshops held a subsidiary goal of aiding with the buy-in of the measure and aligning of goals, as is often required in applied selection and assessment research (Roe, 2005). All materials and procedures for this study were approved by the Psychology Department Research Ethics Committee at City, University of London (*ETH1819-0972*; see Appendix A3.1 for the materials).

5.3.1. Stakeholder Workshops

5.3.1.1. Participants

A total of ten stakeholders took part across the two item review workshops. Participants were key stakeholders from the hosting organisation and those who have contact and direct experience with the target population (i.e., the micro-lender's customers). Most of the participants have had some sort of direct experience with the customers. Two of the participants were members of the senior management team, seven worked on the online loan application process, and one was an ex-underwriter who moved from a front office to a back-office role.

5.3.1.2. Procedure

Each of the two workshops lasted approximately an hour and took place in late July 2019 at the host organisation's main office, during work hours. The study involved qualitative discussions regarding the items' face validity and overall quality. The author led the workshops and made notes of the points raised during discussion. To begin, participants were introduced to the purpose of the workshop, signed the consent forms, and were briefed on the general principles of good items in this context (i.e., concise with minimal reading, clear and intuitive, relevant to the customers, and the type of items customers would be inclined to answer). Next, each item (or groups of variations of items) was presented in a slideshow and participants were asked to

- share their first impressions;
- think of the item from the perspective of a customer (i.e., what would a customer think of it, how relevant is the item to them, how relevant is the item to the context of a loan application);
- say if they feel the item has content, image, or language issues; and
- voice any other suggestions or feedback they might have.

Some of the items were presented alongside each other since they were variants, sharing the same response options, or having the same question but different response options. Furthermore, some of the items presented had completed images as response options, while others had descriptions of images provided instead (i.e., draft items).

In total, 76 items were reviewed in these two workshops. The first workshop was dedicated to four of the psychological characteristics of creditworthiness and the second workshop was dedicated to the remaining five characteristics.

5.3.1.3. Results

In general, there was a lot of praise for the face validity/fidelity of the items in terms of how true to the customer experience they were, as well as the engagement effect of image-based items. Some of the feedback that was implemented following the workshops included wording improvements, removal/addition of text labels to clarify the images, changes regarding how some concepts were being visually represented (e.g., [un]certainty), and shortening of scale-like items to 3-4 response options where possible to reduce visual noise (from a UX/UI perspective) and to make things simpler for the customer. However, one of the most influential pieces of feedback was that some items cannot work because of how they might impact the new customers' perception and expectation of the lender and loans, since those items are too negative or candid, for example. As a result, many of the Coping Tendency items about specific financial situations (e.g., "You just received a text about a missed loan payment. Where does your mind take you?") had to either be dropped completely or paraphrased to be more generic or covert (e.g., "During difficult financial times, you tend to..."). Similarly, many of the Pro-Lender Orientation items had to be changed substantially, for instance, removing the negative ends of bipolar scale-like items that are specific to the lender (e.g., for the item "How comfortable do you feel borrowing form this lender?", removing the response options depicting discomfort and unease, leaving the neutral option as the most "negative" one) and extending the number the positive end options to compensate. Furthermore, seeing as this measure is for new customers, the stakeholders felt that it is important to have a "Don't Know" option, since some of the applicants may not feel any way about the micro-lender yet.

All in all, 109 items were dropped as a direct result of the workshop feedback and many more were modified. As can be seen in Figure 5.2, of the 599 draft items remaining, 144 became completed items that were reviewed in the next stage of item development process—expert evaluation.

5.3.2. Expert Evaluation

5.3.2.1. Participants

Next, an expert evaluation of the remaining items was conducted to substantiate the content validity and improve the quality of the novel creditworthiness measure. Nine subject-matter experts were recruited through the researchers' personal contacts and self-selected themselves into the study. The participants were a mix between experts in scale development/item writing and experts in the creditworthiness assessment domain and familiarity with the target population.

5.3.2.2. Procedure

The expert evaluation was conducted using the *Qualtrics* online platform. Once the participants signed the consent form, the item writing experts were briefed on the relevant credit context and the target population, and the credit experts were familiarised with principles of good item writing. Participants were then given the instructions for evaluating the items and presented a random item one at a time. For each item presented, they made the following evaluations (see Appendix A3.1 for the materials):

1. Using the definitions provided, participants assessed the item's fit with the respective psychological characteristic of creditworthiness on a 4-point scale from *(1) not relevant* to *(4) highly relevant*. This helped ascertain the items' content validity (cf. Polit & Beck, 2006).
2. They identified any potential problems with the item (e.g., a socially acceptable response is implied, the topic of the question is too sensitive etc.) from a 21-point-checklist, which was adapted from the questionnaire appraisal coding scheme by Willis and Lessler (1999). The experts had the opportunity to add further details and suggestions, if they identified any issues with the item, and mention any other problems that were not covered by the checklist.
3. Lastly, the participants provided open-ended feedback, impressions, and/or suggestions if they had anything else to add.

Overall, the respondents could review as few or as many items as they wanted and leave and return to the evaluation form whenever. The aim was for each item to receive at least two evaluations.

5.3.2.3. Results

Each of the 144 items was reviewed by 2-4 experts (*M* = 2.61, *SD* = 0.71). The content validity of each individual item was calculated as the proportion of participants giving it a rating of *(3)* or *(4)* on its fit with the respective psychological characteristic of creditworthiness. On average, each item had 0.61 (*SD* = 0.79) potential problems identified and was rated as relevant by 86% (*SD* = 28%) of the experts, 109 items (76%) having a universal (i.e., 100%) agreement rate. These agreement ratings correspond to .86 and .76 average and universal agreement Content Validity Indices (CVIs) respectively (Polit & Beck, 2006).

Items rated poorly (i.e., *(1)* or *(2)* on their fit with their respective psychological characteristic) by at least one expert had their quality appraisal checklist and open-ended suggestions carefully examined and were subsequently edited or removed. All the other items that had potential problems identified and/or prompted suggestions for improvement were also inspected and edited accordingly or removed if it was felt that the items could not be edited adequately within the given timeframe. Most of the feedback and subsequent item modification involved language edits to make the question part of the item clearer and more accessible, as well as image edits to reduce ambiguity regarding potential interpretation or remove bias/assumption.

Following this, 121 items remained, which were then included in the next stage of the instrument evaluation process—a quantitative pilot of the measure.

5.4. Step 3: Quantitative Pilot (Study 2b)

Study 2b employed a quantitative, cross-sectional design and roughly followed the standard questionnaire development processes of item analysis, factor analysis, and construct analysis (e.g., DeVellis, 2017; Lane et al., 2016; Rust et al., 2020). The aim was to statistically evaluate and further refine the 121 items for the image-based creditworthiness measure to ensure the instrument is parsimonious, reliable, and valid. All materials and procedures for this study were approved by the Psychology Department Research Ethics Committee at City, University of London (*ETH1920-0187*; see Appendix A3.2 for the materials).

5.4.1. Method

5.4.1.1. Participant Selection & Recruitment

The sample (N = 459) was recruited from the online participant crowdsourcing platform *Prolific*. This platform was chosen because it is more UK-centric, and has repeatedly been shown to produce good quality data, especially in comparison to other platforms such as *Amazon MTurk* (e.g., S. Palan & Schitter, 2018; Peer et al., 2017). To support the external validity of the pilot, the aim was to have a random participant sample that resembles the target population (i.e., the loan applicants at the host organisation). Because loans at the host organisation are aimed at anyone who may not otherwise be eligible for a loan from a bank (see Chapter 2 for more information), individuals seeking credit from non-traditional/non-bank lenders are likely to reflect the desired population. Thus, the primary inclusion criterion was individuals who have applied for a loan (regardless of the outcome) with a micro-lender, pawnbroker, payday lender, doorstep lender, and/or other bad credit lender in the UK in the past 10 years. Narrowing the population down to those with somewhat recent experience of applying for a loan with a non-bank lender also ensures that participants can answer the Pro-Lender Orientation items and other items specific to the loan application context well. To further ensure a good match to the target population, only participants who also meet the host organisation's basic loan eligibility requirements were included in the pilot—aged 18 or older, living in the UK for at least six months, and have a household income (salary and/or benefits) of at least £400 per month.

The participants self-selected themselves into a quick (< 30 seconds) screener study to ensure they match the aforementioned inclusion criteria, following which they were invited to take part in the full study. Since there is a distinct UK and non-UK nationals customer behaviour segmentation at the host organisation (see Chapter 2 for details) the recruitment strategy aimed to achieve a sample balanced between these two sub-populations. The researcher also targeted lower-SES as more likely to have the necessary non-bank loan application experience. Moreover, to help ensure a good balance between participants with salaries and participants on benefits, the recruitment for the screener study opened on a weekend and took place over 2.5 weeks in March 2020.

When refining items of a newly developed psychometric measure, item-to-participant ratios between 1:10 and 1:100 are generally recommended (see Costello & Osborne, 2005), but a minimum ratio of 1:3 is also acceptable (Velicer & Fava, 1998; Worthington &

Whittaker, 2006). This is especially the case since statistical simulations have shown that the absolute sample size and factor loadings magnitude tend to play a larger role in factor stability than the ratios (Guadagnoli & Velicer, 1988; MacCallum et al., 1999). As such, a sample size of at least 363 participants was aimed for to allow for adequate exploration of the measure's structure while keeping participant costs down.

Among the UK nationals, 1,600 participants took part in the screener survey and 1,189 of these (74%) were screened out due to not meeting the inclusion criteria (*n* = 1,185) or failing to consent (*n* = 4). Among the non-UK nationals, 1,095 participants took part in the screener survey and 972 participants (89%) were screened out due not meeting the inclusion criteria (*n* = 965), failing to consent (*n* = 3), or discontinuing their participation in the study (*n* = 4). Overall, 534 participants were eligible for the study. Of these, 56 participants (11%) were lost to follow-up (i.e., did not respond to the study invitation following the screener), and 19 participants (4%) were excluded due to failing the attention checks (*n* = 4), failing to consent (*n* = 4) or discontinuing their participation in the study (*n* = 11; see Appendix A3.3 for the recruitment flow figure). This resulted in the final sample of 459 participants, giving an item-to-participant ratio of almost 1:4 which is adequate.

5.4.1.2. Participant Characteristics

The participants in the sample (*N* = 459) were between 19 and 71 years old (*M* = 35.57; *SD* = 9.99), 68% female and primarily UK nationals (78%). Almost half (44%) of the participants were university-level educated, with a median household income of £1,700 a month (*SD* = £687), and an average, self-reported socioeconomic status (SES) of 3.51 (*SD* = 1.06). The SES was measured using MacArthur's Scale (N. E. Adler et al., 2000) which asks participants to place themselves on one of ten rungs of a ladder, with 1 representing people who are worst off and 10 who are best off. This measure has shown great predictive validity for health and wellbeing above objective SES and evokes better respondent reactions than objective measures (Garza et al., 2017; Singh-Manoux et al., 2005). The majority were employed in some capacity (50% full-time, 24% part-time and 2% self-employed), with the most common employment sectors being healthcare and retail. More than a third (36%) received benefits, with Child Benefits and Universal Credit being the most common.

5.4.1.3. Measures

5.4.1.3.a. Image-Based Creditworthiness Measure. The image-based creditworthiness measure consisted of 121 items designed to measure nine psychological characteristics of creditworthiness (see Section 5.2 for the characteristics and details of the item generation process). Of the 121 items, 80 (66%) were in a scale-like/ordinal format comprising of 3–7 ordered response options; 16 (13%) were forced-choice items (i.e., comprising of only two response options); and 25 (21%) used a multiple-choice format comprising of 4–31 discrete/nominal response options (with majority having six response options). Of the 25 multiple-choice items, five were multi-select which means they allowed multiple responses. The response options were a mixture between behavioural, affective, and cognitive manifestations of the nine psychological characteristics in image form.

5.4.1.3.b. Keying & Construct Validation Measures. To establish the construct validity of the novel creditworthiness measure and to aid with keying of its image response options (see Section 5.1.1.2), 17 previously validated scales of conceptually relevant characteristics were included in the pilot (see Table 5.2 for the details of these scales). These instruments were identified using the literature and were chosen based on three key criteria: (a) its construct alignment to the psychological characteristics of the novel creditworthiness measure, (b) brevity of the instrument, and (c) its psychometric validity and reputation. Instruments were slightly modified whenever necessary to meet these selection standards (e.g., by abbreviating the measure). The full list of these scales' items is provided in Appendix A3.2.

Table 5.2. *Overview of the Scales Conceptually Related to the Psychological Characteristics of Consumer Creditworthiness, Grouped by the Latter*

Scale	Characterised by	Items [a]	Example Item [b]	Std. Cronbach's α [c]	Notes
Responsibility & Integrity					
Sincerity and Fairness (HEXACO-60; Ashton & Lee, 2009)	An individual's tendency to be genuine in interpersonal relations and to avoid fraud and corruption.	Six items; with higher scores indicating higher honesty.	"I'd be tempted to use counterfeit money, if I were sure I could get away with it" (R)	.77	To represent the Integrity sub-component of Responsibility & Integrity.
Responsibility (Adjective Checklist of Conscientiousness; Costantini et al., 2015)	An individual's tendency to be reliable, dependable, responsible, accountable, and trustworthy.	Eight items/adjectives (two of which are distractors) on a 5-point scale ranging from *(1) it does not describe me at all* to *(5) it describes me completely* in response to the statement, "How do each of the following adjectives describe you as a person?" Higher scores indicate higher responsibility.	"Dependable"	.85	To represent the Responsibility sub-component of Responsibility & Integrity. The use of both adjective- and behaviour-based scales ensures a more balanced measure of responsibility.
Responsibility (BIC; J. J. Jackson et al., 2010)	An individual's tendency to be dependable, reliable, and accountable for their actions and obligations.	Six items on a 5-point scale ranging from *(1) never* to *(5) very often* in response to the statement, "In the past year, how often did you take part in each of the following behaviour?" Higher scores indicate higher responsibility.	"Oversleep for class or work" (R)	.75	
Conscientiousness					
Organisation, Diligence and Prudence (HEXACO-	An individual's tendency to seek order, particularly in one's physical surroundings,	Six items; with higher scores indicating higher conscientiousness.	"I plan ahead and organize things, to avoid	.72	Only these three Conscientiousness subscales were used (out of possible four; i.e., omitting Perfectionism) because

Scale	Characterised by	Items [a]	Example Item [b]	Std. Cronbach's α [c]	Notes
60; Ashton & Lee, 2009)	work hard, deliberate carefully and inhibit impulses.		scrambling at the last minute."		they have been established as most central to the conscientiousness construct (Costantini & Perugini, 2016).
		Humility & Compliance			
Modesty and Greed Avoidance (HEXACO-60; Ashton & Lee, 2009)	An individual's tendency to be modest and unassuming and to be uninterested in possessing lavish wealth, luxury goods, and signs of high social status.	Four items; with higher scores indicating higher humility.	"Having a lot of money is not especially important to me."	.61	To represent the Humility sub-component of Humility & Compliance.
Compliance (IPIP-NEO-PI-R; Johnson, 2014)	An individual's tendency to be cooperative rather than antagonistic towards others.	Four items; with higher scores indicating higher compliance.	"I love a good fight." (R)	.66	To represent the Compliance sub-component of Humility & Compliance. Due to constraints of survey length, four most pertinent items were selected based on factor loadings in prior research (Maples et al., 2014).
		Vigilance & Financial Consciousness			
Financial Consciousness, adapted from Gould's (1988) Health Consciousness Scale	An individual's level of awareness, engagement, and proactive involvement in promoting their own financial well-being.	Nine items; with higher scores indicating higher financial consciousness.	"I reflect about my finances a lot."	.86	To represent the Financial Consciousness sub-component of Vigilance & Financial Consciousness. Health was replaced with finances and the new items were reviewed by a third party (a chartered occupational psychologist).
Prevention Orientation (General Regulatory Focus Measure; Lockwood et al., 2002)	An individual's focus on safety, responsibilities, vigilance, and the avoidance of negative outcomes.	Five items; with higher scores indicating higher vigilance.	"I often worry that I will fail to accomplish my financial goals."	.54	To represent the Vigilance sub-component of Vigilance & Financial Consciousness.

Scale	Characterised by	Items [a]	Example Item [b]	Std. Cronbach's α [c]	Notes
Coping Tendency					
Adaptation of the Revised-COPE (Zuckerman & Gagne, 2003)	An individual's tendency to use self-help, approach, accommodation, avoidant, and/or self-punishment coping when under stress.	Twenty items on a 4-point unipolar scale ranging from *(1) I usually don't do this at all* to *(4) I usually do this a lot* in response to "The following 20 statements are about how you typically cope with stressful situations. Please read each statement and indicate how frequently you do each of the following:" With higher scores indicating higher coping of that kind (e.g., Self-Help Coping).	"I drink alcohol or take drugs, in order to think about it less." (Maladaptive Coping)	.80	Mean-centred score to create an overall score that ranges from adaptive to maladaptive coping.
Pro-Lender Orientation					
Trust and Trustworthiness (adaptation of Sekhon et al., 2014)	An individual's belief in the lender's trustworthiness and the degree of uncertainty they feel towards the lender.	Ten items; with higher scores indicating higher lender trust and trustworthiness.	"I trust this lender to do what they say they will do."	.93	To represent the Lender Trust sub-component of Pro-Lender Orientation.
Commitment (adapted from the Organisational Commitment Scale; N. J. Allen & Meyer, 1990)	An individual's relationship with the lender, specifically in terms of the commitment to being their customer.	Four items; with higher scores indicating higher lender commitment.	"I am very happy being this lender's customer."	.74	To represent the Lender Commitment sub-component of Pro-Lender Orientation.
Empathy (adapted from ACME; Vachon & Lynam, 2016)	An individual's capability to respond emotionally to the lender and understand the lender's perspective.	Four items; with higher scores indicating higher lender empathy.	"I don't really care if this lender is doing well." (R)	.61	To represent the Lender Empathy sub-component of Pro-Lender Orientation.
Anti-Debt Attitude					
Consumer Attitudes to Debt (Lea et al., 1995)	An individual's attitude towards debt, focusing on the degree of comfort or	Ten items; with higher scores indicating higher anti-debt attitude.	"Borrowing money is	.72	Due to constraints of survey length, ten items from Lea et al.'s (1995) Consumer Attitudes to

Scale	Characterised by	Items [a]	Example Item [b]	Std. Cronbach's α [c]	Notes
	discomfort they have with indebtedness.		sometimes a good thing." (R)		Debt were selected on the basis of factor loadings from prior research.
		'Can Do' Beliefs			
Optimism (Life Orientation Test-Revised; Scheier et al., 1994)	An individual's dispositional tendency towards generalised favourable expectations for their future.	Six items; with higher scores indicating higher optimism.	"In uncertain times, I usually expect the best."	.88	To represent the Optimism sub-component of 'Can Do' Beliefs. Distractors were not included as per standard procedure since the items are already mixed up with the items from other scales (see Section 5.4.1.4).
Financial Locus of Control (Mewse et al., 2010)	An individual's beliefs about the control they have over their financial situations.	Four items; with higher scores indicating higher financial internal locus of control.	"To a great extent my finances are controlled by accidental happenings." (R)	.33	To represent the Locus of Control sub-component of 'Can Do' Beliefs. Despite the scale's low Cronbach's alpha in the present sample, the scale was kept since it was combined to reflect the overall 'Can Do' Beliefs construct.
Financial Self-Efficacy (Mewse et al., 2010)	An individual's belief in their ability to manage their financial situations successfully.	Three items; with higher scores indicating higher financial self-efficacy.	"When I have a money problem, I can usually find at least one solution."	.75	To represent the Self-Efficacy sub-component of 'Can Do' Beliefs.
		Reputation & Credit Access Concern			
Concern for Reputation (de Cremer & Tyler, 2005)	An individual's degree of worry and care about how they are perceived and evaluated by others.	Seven items; with higher scores indicating higher reputation concern.	"I find it difficult if others paint an incorrect image of me."	.82	To represent the Reputation Concern sub-component of Reputation & Credit Access Concern. Unfortunately, no suitable existing scale was found to represent the Credit Access Concern subcomponent of

Scale	Characterised by	Items [a]	Example Item [b]	Std. Cronbach's α [c]	Notes
					Reputation & Credit Access Concern.

[a] Unless otherwise specified, the items are on a 5-point Likert scale ranging from *(1) strongly disagree* to *(5) strongly agree*.

[b] (R) denotes reverse coded items.

[c] The standardised Cronbach's alpha (α) reported is for the present sample (N = 459).

5.4.1.3.c. Overclaiming Measure. Because the creditworthiness assessment context is a high-stakes one and the measure is self-report, it is important that the responses on the image-based creditworthiness measure are not easily distorted due to faking or impression management. It is common practice to include a measure of such response distortion during the development process of an individual-differences self-report instrument, and then, remove items that are highly susceptible to this bias (cf. Rust et al., 2020). Although several such measures exist (e.g., Marlowe-Crowne Scale, Crowne & Marlowe, 1960, 1964; BIDR, Paulhus, 1991), more recent research has shown that overclaiming (i.e., self-enhancement operationalisation as the tendency to claim knowledge about non-existent items) is superior as a measure of biased response style compared to more traditional scales, since only overclaiming measures have been shown to be independent of personality (Bensch et al., 2019; Bing et al., 2011; Kemper & Menold, 2014; Kuncel & Borneman, 2007; Paulhus et al., 2003; Paulhus & Dubois, 2014; Paulhus & Harms, 2004). This is especially important in cases when developing a measure of constructs, such as Responsibility & Integrity, that are very similar to what traditional self-enhancement scales measure, as it is our case (Graziano & Tobin, 2002; McCrae & Costa, 1983). Therefore, the present study included its own overclaiming measure that was based on Paulhus et al.'s (2003) *Overclaiming Questionnaire* (OCQ).

The overclaiming measure for this study was created that would seamlessly blend into the rest of assessment without arising suspicion (although OCQ has been shown to be effective as a measure even with disclosure; see K. Williams et al., 2014) and presented it as a "Financial Awareness Questionnaire". The participants were instructed to rate their familiarity with financial terms on 5-point scale from *(1) never heard of it* to *(5) very familiar*. In line with other overclaiming measures' designs (e.g., Brummelman et al., 2015; e.g., Paulhus et al., 2003), the present overclaiming measure contained 15 items, three of which (i.e., 20%) were foils and 12 were real financial terms. An example real item would be "early repayment charges" and an example foil item would "elastic income rate". A couple of lists and glossaries of financial terms were consulted to create the measure. The real terms were selected according to whether our target population would have likely to at least have heard of them (i.e., excluded any real items that participants are likely to pick *(1) never heard of it*), based on the author's familiarity with the population as well as verified by the host organisation's subject-matter experts. The foils were created by "remixing" phrases/words from real terms and then "Googling" the foil term to make sure it does not actually exist. The three foils were selected to resemble the 12 real terms and thus appeared plausible to a non-expert. Any foils that looked like spelling errors were excluded. To exclude any participants that might have cheated on this overclaiming measure, the researcher simply asked them at the end of the study whether they looked up or "Googled" any of the financial terms.

5.4.1.4. Procedure

Participants that were eligible for the study (see Section 5.4.1.1) were directed to a survey administered using the Qualtrics online platform. Upon reading and signing the study consent form (see Appendix A3.2), participants were randomly assigned to either complete a set of text-based scales first and the image-based creditworthiness measure second or vice versa, to control for potential order effects. The set of text-based scales comprised of debt attitude, coping tendency, and personality scales as described earlier (see Section 5.4.1.3.b), excluding the pro-lender orientation scales. The personality scales whose items were rated on a 5-point Likert scale from *(1) strongly disagree* to *(5) strongly agree* were combined/mixed-in together, their order randomised, and included an attention check item to help ensure the quality of the response data ("Please select somewhat disagree for this statement"; Meade & Craig, 2012). The image-based creditworthiness measure comprised of all the items described earlier (see Section 5.4.1.3.a), apart from lender-specific items and items that do not make sense outside of a loan application context (e.g., "Do you think you will be eligible for this loan?") as these were presented later, presented in a randomised order. Another attention check item was mixed-in among the image-based creditworthiness measure, instructing participants to "Please select the picture of the rabbit" from three photos: a lion, a rabbit, and a dog.

Following the completion of the text-based scales and the image-based creditworthiness measure, participants were asked to provide further details about the most recent experience they had with a non-bank lender (e.g., the name of the lender, the outcome of the loan application) and were reminded of their responses in the screener survey. As well as providing useful information, these questions served as memory-probes/contextualising cues for the final sets of items. Next were the (loan application) context-specific items from the image-based creditworthiness measure, presented in a random order, with instructions to think back to the most recent loan with the non-bank lender the participant named and to imagine that they are applying with this lender again, for a similar loan, and answering questions as if they are part of the application form. Participants were then randomly assigned to either complete a text-based lender attitude scale(s) first and the lender-specific items from the image-based creditworthiness measure second or vice versa. Afterwards, participants completed the overclaiming measure presented as a self-reported financial awareness questionnaire, reported their demographic information, and were debriefed. Everyone that completed the study and did not fail the attention checks were paid for their participation.

5.4.1.5. Data Analytic Strategy

All analysis and data management were performed using R (R Core Team, 2020). For each of the keying/construct validation scales, item scores were averaged to find the overall scale score. Higher scores indicated greater levels of the construct being measured. To calculate the overall coping tendency, mean-centred scoring was used, whereby the average tendency towards adaptive or maladaptive coping responses to stressful situations was used, centred around the individual's mean response to all coping items (i.e., similar approach to value importance ratings; Sandy et al., 2017; Schwartz & Boehnke, 2004). The overclaiming measure was scored in accordance with Paulhus & Petrusic (2007) creating average accuracy (i.e., rating real items as familiar and foils as unfamiliar) and bias (i.e., a response tendency to claim familiarity for all items) scores across the four possible cut-offs on the five-point scale.

5.4.1.5.a. Individual Item Analysis. Prior to keying, the response options on the image-based creditworthiness measure were individually examined and dropped, if they displayed any of the following problems: (a) not being endorsed by anyone, (b) being significantly ($p < .01$) influenced by presentation order effects, and/or (c) having a significant ($p < .01$) association with the overclaiming bias scores (while controlling for overclaiming accuracy scores; see Paulhus & Petrusic, 2007). In most cases, dropping one or several of the options would render the entire item unusable, meaning most of the items to which the dropped options belonged were dropped too. The slightly more stringent significance level of $p < .01$ (as opposed to the more traditional $p < .05$) was used to avoid committing Type I error and thus, dropping options/items due to chance. Chi-squared tests were used to evaluate the association between choosing an option and the order in which the participant saw the measures (i.e., saw text-based measures first or saw image-based measures first). Associations between response options and overclaiming bias scores (c in Signal Detection Theory) were evaluated using linear regression, with the response option as the predictor variable, bias scores as the dependent variable, and overclaiming accuracy scores (d' or sensitivity in Signal Detection Theory) controlled for. A negative, significant coefficient implied the response option being influenced by overclaiming. Those that admitted to looking up or "Googling" any of the 15 financial terms on the overclaiming measure (n = 2) were excluded from the overclaiming analysis.

5.4.1.5.b. Keying Procedure. The image-based items were keyed using a hybrid procedure, with empirical as the primary and theoretical as the secondary key (Bergman et al., 2006). For the empirical key, regularised regression (LASSO; Tibshirani, 1996) was used in a similar manner as outlined in Leutner et al. (2017; i.e., existing measure as the outcome and individual response options as predictors; also see Hilliard et al., 2022b), with the main difference being that Leutner et al. (2017) used the regression for overall scoring of the measure, rather than keying of individual items as in the present study. The primary benefit of LASSO over regular regression is its ability to efficiently deal with multicollinearity and/or overfitting by retaining unique predictors with the strongest and most consistent performance across random sub-samples, while shrinking the rest of the predictors to zero. As a result, LASSO models are more parsimonious and replicate better than standard regression. Using the *glmnet* package in R (Friedman et al., 2010), the LASSO's lambda parameter for every item's empirical key was trained 100 times using 10-fold cross-validation (CV), averaging across the mean error curves. Then, the lambda with the smallest CV error was used to fit the model, validating it against a random 20% hold-out subsample. If the correlation between the predicted values and true values was less than .30 (i.e., the empirical key demonstrated poor fit), then that item's empirical keying was either partially or fully replaced with theoretical keying. See Table 5.3 for an example where the empirical key was partially replaced by the theoretical key (specifically, for response option *E*) to create the final, hybrid key. The theoretical key was determined prior to the pilot and was derived from the interview data, during item development. Based on whether the response option was associated with effective or ineffective loan repayment behaviour, the designated positive option was assigned a score of *2*, each negative option a score of *-2*, distractors got a score of *0*, and anything in-between got scores in-between (e.g., *-1*, *1*).

Table 5.3. *Example of the Hybrid Keying Procedure in Case Empirical Key Demonstrated Poor Fit*

Key	**Response Options' Scores**				
	A	B	C	D	E
Primary (Empirical)	-0.77	0.08	0.57	1.17	0.67
Secondary (Theoretical)	-2	-1	0	1	2
Final (Hybrid)	-0.77	0.08	0.57	1.17	2.00

5.4.1.5.c. Item Analysis & Exploratory Factor Analysis (EFA). To create a psychometrically valid, yet concise scale, the inter-item and item-total correlations were examined before entering the correlation matrix into the EFA. Since the measure being developed is multidimensional, many of the conventional item-whole correlations (e.g., *raw.r, r.drop*, and *std.r*) tend to over-inflate the correlations for the sub-scales that have retained most of the items by this stage of exploration. Therefore, the specific type of item-total correlation used (*r.cor*) is based on Cureton (1966), whereby the item overlap is corrected by subtracting the item variance and replacing it with the best estimate of the common variance (see the R package *psych* for further details; Revelle, 2019). Thus, items were excluded due to very low corrected item-total (< .10) and/or inter-item correlations (< |.10|) to ensure they are tapping into similar constructs. Similarly, to eliminate redundant items, those with very high inter-item correlations (> |.70|) were removed, retaining the better performing item each time. These cut-off scores were quite relaxed/wide/liberal to avoid dropping too many items early on.

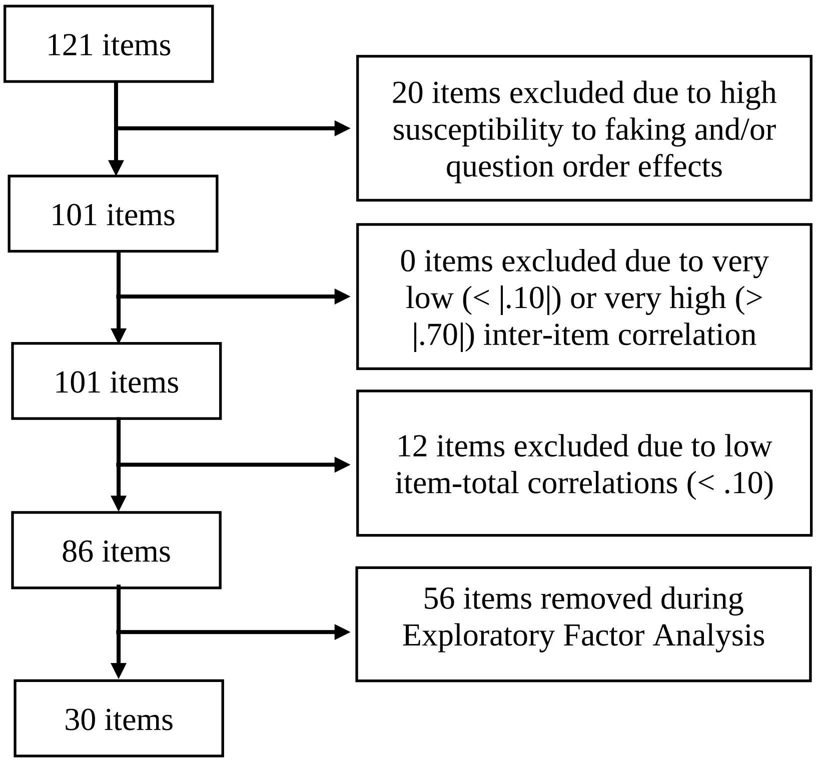
Following the item analysis, the suitability of the data for factor analysis was assessed using the Bartlett's Test of Sphericity (Bartlett, 1951) and the Kaiser, Meyer, Olkin (KMO) measure of sampling adequacy (Kaiser, 1970; Kaiser & Rice, 1974). The criteria used to determine factorability of the correlation matrix were a significant Bartlett's test at alpha level of .05 and KMO-MSA above .50 respectively. The decision regarding how many factors to extract was guided by parallel analysis, since it is among the most accurate factor-retention methods (Fabrigar et al., 1999; Henson & Roberts, 2006). The extraction method for the EFA was Ordinary Least Squares (OLS) with oblique (direct oblimin) rotation. This extraction method was chosen in line with the correlation approach described earlier, since OLS is more robust to violations of multivariate normality, response distributions skew, and non-continuous variables (Fabrigar & Wegener, 2012; Flora et al., 2012; C.-T. Lee et al., 2012). Oblique rotation was chosen because it would be unreasonable to expect the factors to be completely independent. The items were removed iteratively, one-by-one depending on whether they have a) the lowest factor loadings, and/or b) the highest cross-loadings, on their dominant/primary factor, effectively making the cut-off criteria for (cross-)loadings more stringent. After each removal, a parallel analysis was re-run, the number of factors was adjusted (if necessary), and the EFA was re-run accordingly. In line with several guidelines (e.g., Guadagnoli & Velicer, 1988; MacCallum et al., 1999; Stevens, 2002), factor loadings of ~.25 were deemed to be sufficient for the present sample size (N = 459).

Lastly, the convergent and discriminant validities of the measure were evaluated. The final EFA structure was used to create standardised factor scores (mean of 0 and standard deviation of 1). Following Grice (2001), factor score indeterminacy was evaluated for each scoring approach before creating the scores, and because the *tenBerge* method (ten Berge et al., 1999) performed the best, that is what was used. This method finds score weights such that the correlation between factors for an oblique solution is preserved. The associations between factor scores and scores on existing/previously validated measures of similar constructs, overclaiming scores, and participants' socio-demographic characteristics were then evaluated. For continuous variables, Pearson correlation was used, where statistically significant ($p < .05$ following Holm correction for multiple testing; Holm, 1979), medium-to-large correlations coefficients (labelled according to Funder & Ozer, 2019) were taken as evidence of convergent validity, and (very) low coefficients and non-significant correlations were taken as evidence of discriminant validity. For categorical variables, Bayesian ANOVA and/or multiple regression (depending on the scenario) were used, using the *BayesFactor* package in R (Morey & Rouder, 2018). Bayesian approach was preferred over the frequentist one due to its ability to quantify the evidence in favour of either the null or the alternative hypothesis, rather than just the probability of obtaining the findings assuming the null hypothesis is true (Dienes, 2014; Wagenmakers et al., 2018). This is especially practical for monitoring group differences in construct scores and justifying whether further research is necessary to investigate the results (Rouder, 2014). Bayes factor (BF_{10}) was used for interpretation, with strength of evidence reported in accordance with Jeffrey's (1983) classification.

5.4.2. Results

As can be seen in Figure 5.3, the image-based creditworthiness measure was refined from 121 to 30 best-performing items.

Figure 5.3. *Item Selection Process for the Image-Based Creditworthiness Measure in Study 2b*



5.4.2.1. Preliminary Analyses

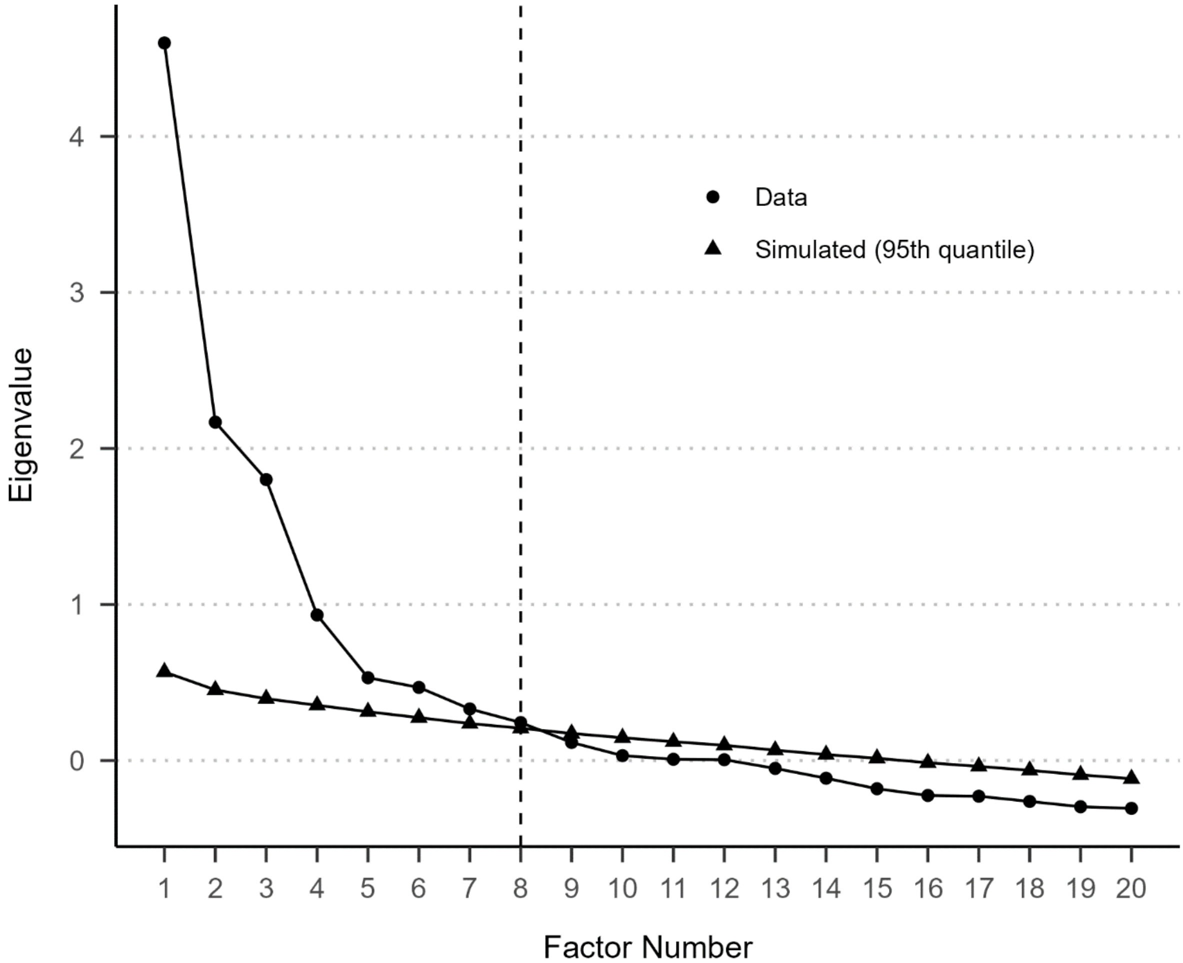
Prior to keying, option-level analysis identified 20 problematic items (out of 121 items) that were highly susceptible to faking and/or question order effects. These items were removed from the item pool. Further 13 response options (from three different items) that were significantly susceptible to faking and/or question order effects (n = 5) or had zero endorsements (n = 8) were also removed from analysis. However, because they belonged to multiple-choice or multiple-select items with an excess of response options, the items themselves remained. Next, the empirical keys for the items were created and the items were keyed in accordance with the strategy described earlier (see Section 5.4.1.5.b for details). Out of 101 items, 41 items had fully empirical keys, 33 had fully theoretical keys, and 27 had hybrid keys.

After keying the items, the inter-item correlation matrix was examined to identify overly redundant or low discrimination items, but no items were excluded based on very low (< |.10|) or very high (> |.70|) inter-item correlation. Then, item-total correlations were evaluated, where a total of 12 items with item-total correlations below .10 were iteratively removed from the sample. Overall, 86 items remained for the factor analysis.

5.4.2.2. Exploratory Factor Analysis (EFA)

EFA was conducted on the remaining 86 items using the *psych* package in R (Revelle, 2019). The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, KMO-MSA = .81 (*meritorious* according to Kaiser & Rice, 1974), and all KMO-MSA values for individual items were > .56, which is above the acceptable limit of .50. The Bartlett's test of sphericity was also highly significant, χ^2 (3655) = 12,261, $p < .001$, indicating that correlations between items are sufficiently meaningful for factor analysis. The initial parallel analysis suggested retaining twelve factors. Factors were extracted with Ordinary Least Squares (OLS) factoring and oblique (direct oblimin) rotation. Thus, in accordance with the data analytic strategy described earlier (see Section 5.4.1.5.c), items with low factor loadings, high cross-loadings were iteratively removed, until 30 best-performing items remained. The EFA on these remaining 30 items revealed eight correlated factors that explained 46.6% of the total item variance (see Figure 5.4 for the parallel analysis scree plot). This provided adequate fit to the data, χ^2 (223) = 411.66, $p < .001$, χ^2/df = 1.85, RMSEA = .04, 90% CI [.04, .05], TLI = .90. As can be seen in Table 5.4, the factors were unidimensional and had good convergent validity—all primary factor loadings were greater than (or equal to) .35 and averaged out to greater than .50 for each factor (greater than .60 for most of the factors). The internal consistency reliability for each factor ranged from adequate (.64) to excellent (.82). The factors also demonstrated great discriminant validity. All primary factor loadings were greater than their secondary loadings by at least .20 (see Table 5.4), and factor intercorrelations were modest, ranging from .01 to .46 (see Table 5.5). Thus, the factors were predominantly uncorrelated and distinct.

Figure 5.4. *Parallel Analysis Scree Plot for the Final 30 Items*



Note. The number of factors suggested by the parallel analysis is indicated with a vertical dashed line.

Table 5.4. *Exploratory Factor Analysis (EFA) Pattern Matrix (30 items)*

Items	Factor loading							
	1	2	3	4	5	6	7	8
Factor 1: Pro-Lender Orientation (α = .80)								
1. Item 1 (9es)	**.83**	.09	-.07	.00	.07	-.04	.00	-.05
2. Item 2 (14ms)	**.81**	-.01	.08	-.05	.00	.01	-.02	.05
3. Item 3 (6s)	**.70**	.00	-.09	.08	-.05	-.02	-.01	-.03
4. Item 4 (4s)	**.65**	-.06	.07	.02	-.08	.08	.01	.01
5. Item 5 (13mc)	**.45**	-.06	.12	-.06	-.03	.06	.02	.09
6. Item 6 (1mc)	**.35**	-.05	.04	.07	.09	.01	-.03	.06
Factor 2: 'Can Do' Beliefs (α = .82)								
1. Item 1 (rc3s)	.05	**.73**	.05	.04	-.01	.08	.04	-.05
2. Item 2 (rc8s)	.00	**67**	-.01	.21	-.01	.10	-.03	-.10
3. Item 3 (vig1)	-.04	**.62**	.06	-.06	.06	-.03	.04	-.01
4. Item 4 (7s)	.07	**.54**	.01	-.02	.09	-.12	.07	.16
5. Item 5 (10mc)	.00	**.50**	-.05	-.04	.13	.00	.01	.11

Items	Factor loading							
	1	2	3	4	5	6	7	8
6. Item 6 (5s)	.03	**.49**	-.01	-.09	.08	.07	.00	.19
7. Item 7 (6s)	.05	**.49**	.00	-.11	.09	-.01	.10	.08
Factor 3: Financial Reputation Concern (α = .80)								
1. Item 1 (rc1s)	.00	.07	**.84**	.00	-.02	.00	.03	-.01
2. Item 2 (rc10s)	.05	-.13	**.74**	.03	.08	-.02	.07	-.04
3. Item 3 (rc2s)	-.07	.08	**.64**	.06	-.03	.05	-.06	.05
Factor 4: Credit Access Concern (α = .69)								
1. Item 1 (rc6s)	-.04	.03	.07	**.76**	.03	-.03	.01	.02
2. Item 2 (rc5s)	.10	-.08	-.06	**.61**	.00	.00	.12	.00
3. Item 3 (rc7s)	.05	.16	.15	**.50**	.00	.01	-.07	.07
Factor 5: Emotional Appraisal Tendency (α = .70)								
1. Item 1 (c3)	-.02	-.04	.02	.04	**.78**	.04	.02	.00
2. Item 2 (c2)	.04	.06	-.02	-.04	**.60**	.04	-.02	-.01
3. Item 3 (c4)	.00	.24	.05	.02	**.44**	-.03	-.06	.07
Factor 6: Responsibility & Integrity (α = .64)								
1. Item 1 (ri11)	-.01	.06	.00	-.06	-.02	**.71**	-.01	.06
2. Item 2 (ri10)	-.03	.03	.00	.00	.13	**.63**	-.03	-.02
3. Item 3 (ri14)	.08	-.18	.05	.12	.01	**.41**	.15	.03
4. Item 4 (ri16)	.06	.03	-.02	.04	-.04	**.37**	.18	.05
Factor 7: General Reputation Concern (α = .73)								
1. Item 1 (rc9s)	.00	.03	-.01	.07	.01	.02	**.77**	-.04
2. Item 2 (rc4s)	-.04	.03	.06	-.06	-.01	-.02	**.71**	.03
Factor 8: Humility & Compliance (α = .66)								
1. Item 1 (7mc)	.00	-.01	.00	.04	-.01	.03	.01	**.79**
2. Item 2 (6s)	-.01	.01	-.06	.00	.04	.01	-.05	**.59**

Note. N = 459. The extraction method was OLS with an oblique (direct oblimin) rotation. Factor loadings above .30 are in bold. Standardised Cronbach's alphas (α) are reported.

Table 5.5. *Factor Correlations*

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Pro-Lender Orientation	1.00	.	.	.	.	.	.	.
2. 'Can Do' Beliefs	0.16	1.00	.	.	.	.	.	.
3. Financial Reputation Concern	0.05	0.18	1.00	.	.	.	.	.
4. Credit Access Concern	**0.20**	0.18	**0.37**	1.00	.	.	.	.
5. Emotional Appraisal Tendency	0.06	**0.46**	**0.19**	0.05	1.00	.	.	.
6. Responsibility & Integrity	0.08	**0.26**	0.13	0.09	**0.27**	1.00	.	.
7. General Reputation Concern	0.06	0.11	**0.40**	**0.24**	0.12	0.15	1.00	.
8. Humility & Compliance	0.01	**0.19**	0.02	-0.07	**0.27**	**0.26**	-0.03	1.00

Note. N = 459. Correlations > |.18| are significant at p < .001 and are highlighted in bold. Correlations > |.14| are significant at p < .01. Correlations > |.10| are significant at p < .05. All following Holm correction for multiple testing (Holm, 1979).

Upon examination of the item loadings after rotation, the factors were interpreted as follows—Factor 1 represents Pro-Lender Orientation, Factor 2 ‘Can Do’ Beliefs, Factor 3 Financial Reputation Concern, Factor 4 Credit Access Concern, Factor 5 Emotional Appraisal Tendency, Factor 6 Responsibility & Integrity, Factor 7 General Reputation Concern, and Factor 8 Humility & Compliance. Overall, the face validity of the factors was excellent (i.e., the factors made sense). However, these factors and their items did not perfectly align with the characteristics and their definitions set out in the initial framework in Chapter 4; therefore, see Table 5.6 below for the revised definitions.

Table 5.6. *Psychological Characteristics’ Definitions for the Psychometric Measure of Creditworthiness Following the EFA*

Psychological Characteristic	Definition
Pro-Lender Orientation	Tendency to favourably evaluate, have positive feelings towards, trust, empathise with, and worry about the lender
Financial Reputation Concern	Desire to achieve, protect, and maintain a good reputation *among lenders*
General Reputation Concern	Desire to achieve, protect, and maintain a good reputation *in general*
Credit Access Concern	Desire to have access to and command over financial products and resources
‘Can Do’ Beliefs	Belief in oneself, one’s financial abilities, in the future (i.e., optimism), and in control over one’s life
Emotional Appraisal Tendency	Habitual emotional responses to stressful situations that vary in terms of their adaptiveness or maladaptiveness
Responsibility & Integrity	Tendency to be governed by an abstract moral obligation to other people and to society at large
Humility & Compliance	Tendency to view self as ordinary, to expect little from one's social world, and to react in a self-effacing manner to conflict and unmet expectations

5.4.2.3. Convergent & Discriminant Validities

Next, the convergent validity of the creditworthiness measure was evaluated by examining the correlations of its factors with existing measures of similar constructs. The descriptive statistics for the scales used can be seen in Table 5.7. Overall, the factor scores' associations with related scales were quite strong (see Table 5.8 for details). Majority of the factors had large-to-very-large correlations with their respective validation scales (effect sizes labelled according to Funder & Ozer, 2019). For instance, the Pearson's product-moment correlation between the 'Can-Do' Beliefs on the new measure and a total score on theoretically equivalent scales of Optimism, Locus of Control, and Self-Efficacy was positive, statistically significant, and large (r = .32, 95% CI [.23, .40]). Similarly, Humility & Compliance (r = .46, 95% CI [.39, .53]), Responsibility & Integrity (r = .55, 95% CI [.48, .61]), Reputation Concern (r = .68, 95% CI [.63, .73]), Emotional Appraisal Tendency (r = .44, 95% CI [.36, .51]), and Pro-Lender Orientation (r = .82, 95% CI [.78, .84]) each had very large, positive, and statistically significant association with the existing, conceptually-analogous measures. Credit Access Concern and Financial Reputation Concern did not have dedicated, directly related scales to assess them against, as such their largest absolute correlates are examined—the existing Consumer Attitudes to Debt (r = -.29, 95% CI [-.38, -.21], medium effect size), and the Concern for Reputation scales (r = .32, 95% CI [.23, .40], large effect size) respectively.

Table 5.7. *Descriptive Statistics for the Scales Conceptually Related to the Psychological Characteristics of Consumer Creditworthiness*

Scale	No. of items	M	SD	Range [a]	Std. Cronbach's α	Skew	Kurtosis
Responsibility & Integrity total score	18	3.74	0.62	1.71–5.00	.83	-0.38	0.19
Honesty	6	3.43	0.94	1.00–5.00	.77	-0.23	-0.72
Responsibility total score	12	4.05	0.58	1.58–5.00	.85	-1.00	1.19
Responsibility (adjectives)	6	4.08	0.69	1.00–5.00	.85	-1.11	1.73
Responsibility (behaviour)	6	4.02	0.65	1.83–5.00	.75	-0.83	0.38
Conscientiousness	6	3.41	0.75	1.17–5.00	.72	-0.33	-0.16
Humility & Compliance total score	8	3.78	0.65	1.88–5.00	.69	-0.39	-0.38
Humility	4	3.53	0.79	1.25–5.00	.61	-0.32	-0.43
Compliance	4	4.03	0.79	1.25–5.00	.66	-0.67	-0.13
Vigilance total score	14	3.74	0.53	1.63–5.00	.81	-0.56	0.66
Financial Consciousness	9	3.92	0.68	1.44–5.00	.86	-0.69	0.34
Prevention Orientation	5	3.57	0.64	1.00–5.00	.54	-0.56	0.36
Coping Tendency total score	20	0.12	0.84	-2.44–2.32	.80	-0.05	-0.43
Self-Help Coping	3	2.22	0.78	1.00–4.00	.71	0.31	-0.56
Avoidant Coping	5	1.77	0.53	1.00–4.00	.56	0.84	0.60
Approach Coping	3	2.72	0.63	1.00–4.00	.63	-0.08	-0.33
Accommodation Coping	5	2.50	0.59	1.00–4.00	.66	-0.02	-0.46
Self-Punishment Coping	4	2.95	0.74	1.00–4.00	.80	-0.35	-0.73
Pro-Lender Orientation total score	18	2.62	0.76	1.00–4.83	.93	-0.07	-0.57
Lender Trust	10	2.98	0.89	1.00–5.00	.93	-0.15	-0.48
Lender Commitment	4	2.36	0.88	1.00–5.00	.74	0.19	-0.79
Lender Empathy	4	2.52	0.79	1.00–5.00	.61	0.06	-0.40
Anti-Debt Attitude	10	3.14	0.55	1.80–4.70	.72	0.30	-0.07
'Can Do' Beliefs total score	13	3.04	0.64	1.17–4.78	.85	0.11	-0.25
Optimism	6	2.59	0.92	1.00–5.00	.88	0.22	-0.62
Locus of control	4	3.23	0.58	1.50–5.00	.33	0.15	0.23
Self-efficacy	3	3.29	0.91	1.00–5.00	.75	-0.50	-0.42
Reputation Concern	7	3.51	0.76	1.00–5.00	.82	-0.58	0.28

Note. $N = 459$.

[a] Maximum possible range is 1.00–5.00 for all scales apart from Coping Tendency (-3.00–3.00) and all the Coping Tendency subscales (1.00–4.00).

Table 5.8. *Correlations of Factor Scores and Previously Validated Scales*

Factor Scores	Previously Validated Scales								
	Responsibility & Integrity TS	Conscientiousness	Humility & Compliance TS	Vigilance TS	Coping Tendency TS	Pro-Lender Orientation TS	Anti-Debt Attitude	‘Can-Do’ Beliefs TS	Reputation Concern
F1	.09 [-.00, .18]	.08 [-.02, .17]	-.05 [-.14, .04]	-.03 [-.12, .06]	.14 [.05, .23]	**.82***** **[.78, .84]**	-.31*** [-.39, -.22]	.11 [.02, .20]	.05 [-.05, .14]
F2	.24*** [.16, .33]	.30*** [.22, .38]	.02 [-.07, .11]	.04 [-.05, .13]	.49*** [.42, .56]	.15 [.06, .24]	-.07 [-.16, .02]	**.62***** **[.56, .68]**	.01 [-.08, .10]
F3	.16* [.07, .25]	.30*** [.22, .38]	-.07 [-.16, .02]	.29*** [.21, .37]	.23*** [.14, .32]	.11 [.02, .20]	-.03 [-.13, .06]	.26*** [.17, .34]	**.32***** **[.23, .40]**
F4	.06 [-.03, .15]	.10 [.01, .19]	-.16 [-.25, -.07]	.23*** [.15, .32]	.09 [-.00, .18]	.18** [.09, .27]	**-.29***** **[-.38, -.21]**	.16 [.06, .24]	**.24***** **[.15, .32]**
F5	.31*** [.22, .39]	.30*** [.22, .38]	.08 [-.01, .17]	.06 [-.03, .15]	**.44***** **[.36, .51]**	.08 [-.01, .18]	-.04 [-.13, .06]	.50*** [.43, .57]	-.04 [-.13, .05]
F6	**.55***** **[.48, .61]**	.39*** [.31, .46]	.23*** [.14, .32]	.12 [.03, .21]	.33*** [.25, .41]	.09 [.00, .18]	-.05 [-.14, .04]	.26*** [.17, .34]	.09 [-.00, .18]
F7	.15 [.06, .24]	.17* [.08, .25]	-.13 [-.22, -.04]	.23*** [.14, .32]	.17* [.08, .25]	.09 [-.00, .18]	-.10 [-.19, -.01]	.18** [.09, .27]	**.68***** **[.63, .73]**
F8	.36*** [.28, .44]	.27*** [.19, .36]	**.46***** **[.39, .53]**	.01 [-.08, .10]	.38*** [.30, .46]	.01 [-.08, .10]	-.05 [-.14, .04]	.32*** [.23, .40]	-.12 [-.21, -.03]

Note. N = 459. Values in square brackets indicate the 95% confidence intervals for each correlation. Values in bold denote the most closely related scales to the factor in question. TS = Total Score. F1 = Pro-Lender Orientation, F2 = ‘Can Do’ Beliefs, F3 = Financial Reputation Concern, F4 = Credit Access Concern, F5 = Emotional Appraisal Tendency, F6 = Responsibility & Integrity, F7 = General Reputation Concern, F8 = Humility & Compliance.

* p < .05, ** p < .01, *** p < .001 (all following Holm correction for multiple testing; Holm, 1979).

To further ensure construct validity of the newly created measure, its associations with participant demographics and self-enhancement bias measures were examined. None of the eight factor scores were found to be susceptible to faking or significant desirability inflation. For instance, the association of Pro-Lender Orientation with the overclaiming bias score (while controlling for the overclaiming accuracy score) was statistically non-significant and virtually zero (std. beta = -0.02, 95% CI [-0.05, 0.02], $t(454) = -0.86$, $p = .388$), with the overall model explaining statistically non-significant and very weak proportion of variance (adj. $R^2 = -.002$, $F(2, 454) = 0.54$, $p = .585$).

Meanwhile, some of the factors were significantly related to socio-demographic differences (see Tables 5.9 and 5.10 for details). For example, of the eight factors, four correlated positively and significantly with the self-reported Socioeconomic Status (SES) score: 'Can Do' Beliefs ($r = .24$, 95% CI [.16, .33], $t(454) = 5.36$, adj. $p < .001$), Responsibility & Integrity ($r = .21$, 95% CI [.12, .30], $t(454) = 4.61$, adj. $p < .001$), and General Reputation Concern ($r = .24$, 95% CI [.15, .33], $t(454) = 5.30$, adj. $p < .001$) with medium effect size and Financial Reputation Concern ($r = .18$, 95% CI [.09, .26], $t(454) = 3.84$, adj. $p < .001$) with small. Highest education level attained also correlated significantly with majority of the factors (five out of eight) but with small-to-very-small effect sizes (*rs* = |.10|-.19). Furthermore, all but two of the factors (Pro-Lender Orientation and Humility & Compliance) were positively and significantly correlated with income, albeit primarily with small effect size (*rs* between .13 and .27). With regards to age, younger people scored moderately and significantly higher on Financial Reputation Concern ($r = -.26$, 95% [-.34, -.17], $t(457) = -5.69$, adj. $p < .001$) and Credit Access Concern ($r = -.19$, 95% CI [-.28, -.10], $t(457) = -4.17$, adj. $p < .001$) than older individuals. Lastly, the number of dependents was not significantly related to any of the factor scores (*rs* = .01–.08).

In terms of group differences, there was strong evidence that income type had an effect on General ($BF_{10} = 40.81$) and Financial Reputation Concerns ($BF_{10} = 35.82$), 'Can Do' Beliefs ($BF_{10} = 2,428$), and Emotional Appraisal Tendency ($BF_{10} = 23.16$), with those on benefits scoring lower than those on a salary or on a salary and benefits. There was strong evidence of an ethnicity effect on Pro-Lender Orientation ($BF_{10} = 45.79$) and moderate evidence of an ethnicity effect on Credit Access Concern ($BF_{10} = 7.25$), with Asian participants scoring higher than White or Black participants. There was also strong evidence of a gender effect on General ($BF_{10} = 23.61$) and Financial Reputation Concerns ($BF_{10} = 243$), with women scoring higher on both. There was strong evidence of a nationality effect, with non-UK nationals scoring higher on General Reputation Concern (BF_{10} = 112), 'Can Do' Beliefs (BF_{10} = 32.72), and Emotional Appraisal Tendency (BF_{10} = 10.33) than UK nationals. Lastly, there was moderate evidence of a marital status effect on 'Can Do' Beliefs (BF_{10} = 6.05), with those married or in civil partnerships scoring higher than those in non-cohabiting relationships, divorced, or single. All group differences effects were small in size, apart from the effect of income type on 'Can Do' Beliefs which was medium. Other group differences had either weak-to-no evidence of an effect or strong evidence against one. See Table 5.10 for further details.

Table 5.9. *Intercorrelations of Factor Scores and Participants' Socio-Demographic Characteristics*

Factor Scores	Age	Number of Dependents	SES Score	Income	Max. Education Level
F1	-.03	.01	.04	-.06	-.10
F2	-.11	.05	**.24**	.17	.19
F3	**-.26**	.05	.18	**.27**	.15
F4	-.19	.08	.09	.18	.14
F5	-.06	.05	**.21**	.12	.07
F6	.08	.07	.04	.11	.00
F7	-.07	.01	**.24**	.13	.17
F8	.11	.01	.07	-.01	.04

Note. N = 459. Correlations > |.18| are significant at p < .001 and are highlighted in bold. Correlations > |.14| are significant at p < .01. Correlations > |.10| are significant at p < .05. All following Holm correction for multiple testing (Holm, 1979). SES = Socioeconomic Status. F1 = Pro-Lender Orientation, F2 = 'Can Do' Beliefs, F3 = Financial Reputation Concern, F4 = Credit Access Concern, F5 = Emotional Appraisal Tendency, F6 = Responsibility & Integrity, F7 = General Reputation Concern, F8 = Humility & Compliance.

Table 5.10. *Socio-Demographic Group Differences in the Factor Scores*

Characteristic	F1			F2			F3			F4			F5			F6			F7			F8		
	M	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**
Gender																								
Female (*n* = 309)	-0.06	0.97	0.38	-0.09	0.98	2.51	0.13	0.95	**243**	0.03	0.99	0.14	-0.04	1.02	0.17	-0.02	0.98	0.10	0.11	0.94	**23.61**	-0.01	0.97	0.08
Male (*n* = 149)	0.12	1.03		0.18	1.03		-0.27	1.05		-0.08	1.02		0.09	0.95		0.04	1.05		-0.23	1.08		0.02	1.07	
Ethnicity																								
Asian (*n* = 9)	1.34	0.82	**45.79**	1.01	0.97	0.75	0.41	0.86	2.25	0.62	0.93	**7.25**	0.02	0.68	0.03	-0.18	1.21	0.20	0.37	1.21	0.19	-0.22	0.97	0.50
Black (*n* = 22)	0.08	0.80		0.09	0.85		0.49	0.82		0.45	0.91		0.12	0.82		-0.45	1.05		0.27	0.71		-0.31	0.99	
Mixed (*n* = 17)	0.33	1.01		-0.07	0.64		0.31	0.87		-0.09	0.95		0.20	1.18		-0.06	0.92		0.29	0.78		-0.49	1.05	
White (*n* = 408)	-0.05	0.99		-0.02	1.01		-0.05	1.01		-0.04	0.99		-0.02	1.01		0.03	0.99		-0.04	1.01		0.04	1.00	
Other (*n* = 2)	-0.38	0.49		0.14	0.68		0.63	0.80		1.98	0.20		-0.04	1.42		0.50	1.02		0.20	1.62		0.28	0.18	
Nationality																								
Non-UK (*n* = 99)	0.06	0.92	0.11	0.31	0.99	**32.72**	0.22	0.92	1.64	0.24	0.92	2.85	0.28	1.04	**10.33**	0.07	0.97	0.12	0.34	0.80	**112**	0.00	0.93	0.09
UK (*n* = 360)	-0.02	1.01		-0.08	0.99		-0.06	1.01		-0.06	1.01		-0.08	0.98		-0.02	1.01		-0.09	1.03		0.00	1.02	
Marital Status																								
Single (*n* = 153)	0.00	1.04	0.00	-0.05	0.93	**6.05**	-0.18	1.04	0.28	0.03	1.05	0.01	-0.13	0.89	0.02	-0.08	1.01	0.02	-0.02	1.00	0.01	-0.08	1.04	0.01
Married/ Civil Partnership (*n* = 127)	0.02	0.96		0.28	1.04		0.01	0.94		0.01	0.96		0.05	1.06		0.10	0.99		0.02	0.94		-0.04	1.00	
Living with Partner (*n* = 101)	-0.08	1.01		-0.05	1.07		0.22	1.02		0.07	1.10		0.15	1.09		-0.03	1.03		0.02	1.08		0.13	1.02	
Divorced (*n* = 46)	0.01	0.96		-0.22	0.89		-0.04	1.00		-0.09	0.85		-0.04	0.96		-0.14	1.00		-0.20	0.98		0.01	0.86	
Non-Cohabiting Relationship (*n* = 32)	0.18	0.91		-0.40	0.89		0.18	0.86		-0.26	0.77		-0.02	1.01		0.26	0.85		0.23	1.00		0.09	0.93	

Characteristic	F1			F2			F3			F4			F5			F6			F7			F8		
	M	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**	**M**	**SD**	**BF10**
Income Type																								
Salary (*n* = 275)	-0.01	0.97	0.01	0.16	1.03	**2,428**	0.11	0.99	**35.82**	0.11	0.98	0.90	0.10	1.03	**23.16**	0.08	0.94	0.06	0.10	0.98	**40.81**	0.07	0.94	0.03
Benefits (*n* = 80)	0.03	1.02		-0.45	0.87		-0.35	1.02		-0.28	1.07		-0.39	1.00		-0.18	1.08		-0.40	1.02		-0.06	1.07	
Salary & Benefits (*n* = 85)	0.00	1.03		-0.16	0.82		0.07	0.93		-0.04	0.93		0.10	0.78		-0.07	1.06		0.13	0.98		-0.12	1.05	
Other (*n* = 19)	0.08	1.05		0.28	1.13		-0.48	0.86		-0.18	1.07		-0.28	1.04		-0.01	1.13		-0.28	0.79		-0.20	1.27	

Note. Bayesian ANOVA with a Cauchy (0, *r* = 1/sqrt(2)) prior (0.707) vs. the null model with intercept only. Factors with BF10 bigger than three are in bold. F1 = Pro-Lender Orientation, F2 = ‘Can Do’ Beliefs, F3 = Financial Reputation Concern, F4 = Credit Access Concern, F5 = Emotional Appraisal Tendency, F6 = Responsibility & Integrity, F7 = General Reputation Concern, F8 = Humility & Compliance.

5.4.2.4. Additional Analysis

One of the practical considerations important to the host organisation was how long the measure would take to complete. Therefore, the completion time for the 30 items was estimated by summing the time each participant spent on the pages that displayed the questions that remained in the final measure. The median completion time for the 30 items was 2 min 33 s and majority of the participants (78%) responded in 5 min or less. This was deemed to be an adequate length of assessment for practical purposes.

5.5. Discussion

Over the course of the studies presented in this chapter, a novel image-based psychometric measure of consumer creditworthiness was developed, and its validity and reliability were examined. This psychometric was created with the goal of helping identify creditworthy borrowers in a UK micro-lending context as part of their online application process, as well as general exploration of the psychological characteristics relevant to debt repayment behaviour. The measure was based upon the context-specific framework of five dispositional traits and four attitudes/beliefs outlined in Chapter 4, derived from 85 semi-structured interviews with micro-lender borrowers and underwriters (Study 1b). The final version of the measure consisted of 30 multiple-choice and rating-scale items, with images as response options, assessing eight factors (three dispositional traits and five attitudes/beliefs).

5.5.1. Content & Face Validities

By directly drawing on the detail-rich, context-specific, empirical data (i.e., the customer and underwriter interviews in Study 1b, Chapter 4) as the basis for the psychometric items, content validity support for the initial item pool was provided. Indeed, the item writing process was the first step in helping ensure the content validity. Similarly, the feedback provided as part of the stakeholder workshops and expert evaluation online surveys in Study 2a ascertained the content validity further. The Content Validity Indices (CVIs) of the initial 144 items as judged by the subject-matter experts were .86 (average CVI) and .76 (universal agreement CVI). This is adequate for the most part, since many prior researchers have presented CVIs of .80 and higher as acceptable (e.g., Grant & Davis, 1997; Polit & Beck, 2006). Following elimination of the inadequate items, the average CVI for the remaining 121 items increased to .97, which would be judged as excellent content validity according to several researchers’ recommendations (e.g., Polit & Beck, 2006; Waltz et al., 2017). The main limitation, however, is that due to some items being judged by just two experts, even perfect agreement (i.e., CVIs = 1.00) would be statistically inadequate according to chance-/probability-based criteria (e.g., Ayre & Scally, 2014; Lynn, 1986).

The face validity of newly developed measure was also found to be satisfactory, as based on the positive feedback during the stakeholder workshops. Furthermore, although no comments were explicitly sought as part of the quantitative pilot of the measure (Study 2b), one of the participants reached out nonetheless with the following positive feedback:

> *"I really like how you constructed this survey with pictures. I've not done one like this before and found it much easier to relate to and express emotive feelings than just dictionary words. I hope it has the desired outcome for you as well. Good luck with your research"*

5.5.2. Construct Validity & Internal Consistency

Based on the EFA findings in Study 2b, the novel psychometric measure taps into eight correlated, but distinct factors of psychological characteristics of consumer creditworthiness (see Tables 5.4–5.6). Although this factor structure was notably different from the theoretical framework established/outlined in Chapter 4, it nonetheless captured a similar range of characteristics. Indeed, as summarised in Table 5.11 below, the measure appears relatively psychometrically robust, demonstrating good-to-excellent reliability and construct validity. Moderate-to-very-strong corelations between the factors on the image-based measure and previously established/validated text-based scales of similar constructs demonstrated excellent convergent validity of this novel measure.

Table 5.11. *Summary of the Factors' Psychometric Properties*

Factor (# of items)	**Reliability *(std. Cronbach's α)***	**Structural Validity *(average factor loadings)***	**Convergent Validity *(abs. correlation with related scales)***
Pro-Lender Orientation (6)	.80	.64	.82
Financial Reputation Concern (3)	.80	.74	.32
General Reputation Concern (2)	.73	.74	.68
Credit Access Concern (3)	.69	.62	.29
'Can Do' Beliefs (7)	.82	.57	.62
Emotional Appraisal Tendency (3)	.69	.60	.46
Responsibility & Integrity (4)	.64	.54	.56
Humility & Compliance (2)	.66	.69	.46

As for why some factors did not become part of the factor structure, there appear to be several factors at play. Notably, half of the Vigilance & Financial Consciousness items were removed early on in Study 2b due to high faking susceptibility, which is the highest relative proportion for any of the characteristics and on par with the number of items removed for the 'Can Do' Beliefs factor in terms of absolute values. It seems that this factor simply did not work in terms of its items, and perhaps is better assessed with objective (rather than self-report) items, for instance, comparing reported weekly/monthly spending on shopping and objective values using bank statements. Other than that, in the initial, twelve-factor EFA solution, it was interesting to see how many of the anticipated psychological characteristics were present—three of the factors were dominated by Reputation & Credit Access Concern items, another three were predominantly loaded by 'Can Do' Beliefs items, two represented Conscientiousness items the most, and the remaining four factors concerned themselves with Pro-Lender Orientation, Responsibility & Integrity, Humility & Compliance, and Anti-Debt Attitude items respectively. However, further examination of factor loadings made it apparent that Conscientiousness and Anti-Debt Attitude items cross-loaded in non-trivial ways across several other factors (e.g., Anti-Debt Attitude items negatively cross-loaded with Pro-Lender Orientation and positively cross-loaded with Reputation & Credit Access Concern; Conscientiousness items cross-loaded with 'Can Do' Beliefs and with Responsibility & Integrity). While this could be representative of flaws in the items, it seems more likely that this is an extension of the finding in Study 1b (semi-structured interviews; Chapter 4) whereby the psychological characteristics most relevant to an individual's repayment behaviour would vary notably from person-to-person. For instance, borrowers that are motivated to repay by their desire to avoid debt and their strict views with regards to the appropriate uses of debt are likely to be distinct from the borrowers that are motivated by the prospect of having better priced and bigger loans in the future.

Lastly, with just 30 engaging items that would take the majority five minutes or less, the measure is a quick and easy assessment that can be integrated into an existing loan application process.

5.5.3. Limitations & Future Directions

The studies in the present chapter have several limitations that should be noted. Firstly, two of the factors (General Reputation Concern and Humility & Compliance) comprised of only two items in the final pattern matrix (see Table 5.4). This is generally against EFA best practices, since constructs with fewer than three items are considered weak and unstable (Costello & Osborne, 2005). Nonetheless, the factors' otherwise desirable psychometric properties (see Table 5.11) and the practical need for a brief scale justified retaining these two factors. Secondly, the participants in the quantitative pilot of the measure (Study 2b) were all recruited from Prolific, rather than from the actual host organisation's customer population. Although there was quite a healthy distribution (and hence variety) of scores on the scales used for empirical keying and convergent validity evaluation, this online sample could still limit the generalisability of the present results. Therefore, in the next chapter in this thesis, a replication study with a real micro-loan applicant population further ascertains the construct validity of the measure. Thirdly, not all key psychometric properties of the measure have yet been established—namely the criterion validity and the stability (test-retest reliability) aspects. Hence, the next study in this thesis (in the next chapter) evaluates these and further ascertains the overall construct validity of the scale and its sub-scales.

5.5.4. Summary

All in all, the image-based measure developed and evaluated in the present chapter demonstrated psychometric soundness with regards to its reliability, and content, face, and construct validities. The latter, however, was obtained with an online participant sample similar to the target population, in a low-stakes, low-fidelity context, making the findings necessarily preliminary. Indeed, the two studies have been largely exploratory, and so it remains to be seen whether the results hold up in a high-stakes, high-fidelity context. Hence, the next chapter moves on to validate this measure in a live, applied setting at the host organisation by testing replication of its factor structure and evaluate its criterion validity in a longitudinal study.

Chapter 6. Validating a Novel Psychometric Measure of Consumer Creditworthiness

6.1. Introduction

Over the course of the present thesis, the psychological characteristics that predict micro-loan repayment behaviour have been explored. The systematic review in Chapter 3 identified four general characteristics most strongly and consistently related to creditworthiness according to past research. In Chapter 4, interviews with borrowers and underwriters recontextualised some of the characteristics from the systematic review and identified a further five characteristics relevant to the UK micro-lending context. In the previous chapter, Chapter 5, development of a novel psychometric measure to assess the nine characteristics resulted in a 30-item instrument measuring a portion of these characteristics. In this penultimate chapter, the researcher builds further on the findings so far; the influence and relevance of these psychological characteristics on micro-loan repayment behaviour is quantified by administering the psychometric instrument developed in Chapter 5 as part of the online application process for individuals seeking to borrow from a UK micro-lender. Doing so also addresses the second research question of this thesis: “Can these psychological characteristics be used in an applied setting?”; thus, validating the measure.

The overall goal of the current investigation is to assess the psychometric properties of the novel image-based creditworthiness measure in an applied, high-stakes context—as part of the loan application process at the host organisation (a UK-based micro-lender). This is particularly important because the nature of the measure (i.e., a measure intended to be used in a credit application) raises concern regarding response distortion (intentional or otherwise). Indeed, past credit research has shown that psychometric validation data collected in a low-stakes setting study may not be valid in a high-stakes setting where response distortion is likely (Dlugosch et al., 2018). The present study focuses on individuals that have never borrowed from the host organisation before as they present the most pertinent and complex risk (see Chapters 1 and 2). This helps ensure the relevance, practicability, and ecological validity of the findings. Specifically, the aim of this study is to examine (a) the construct/internal validity (through confirmatory factor analysis) and (b) the criterion/external validity (through structural equation modelling) of the measure. Thus, the main research questions are twofold:

1. *To what extent does the structure of the image-based creditworthiness measure from Study 2b (Chapter 5) replicate in an applied sample?*
2. *How well can these psychological characteristics predict creditworthy repayment behaviour in a high-stakes, longitudinal study?*

By conducting a longitudinal study, the direction of causality is being considered (psychological characteristics impacting creditworthy behaviour rather than vice versa), and by observing objective repayment data, the accuracy of the outcome criterion is ensured.

6.2. Method

This study was reviewed and approved by the Psychology Department Research Ethics Committee at City, University of London (*ETH1920-0187*; see Appendix A4.1 for the materials).

6.2.1. Procedure & Participants

Between 9th of June and 31st of August 2020 (T1), 560 micro-loan borrowers volunteered to participate in the present study as part of their application process (only offered to 15% of the applications, to not impact business as usual) and subsequently took out a loan with the host organisation. They were all new customers. On 24th of October (T3), eight weeks after the last application, loan repayment data was extracted from the host organisation database (see Figure 6.1 for the timeline overview). As a result, length of loan repayment behaviour (T2) ranged from 2 to 4.5 months (M = 3.0, SD = 0.7). Notably, the T1 recruitment period coincided with the host organisation’s scorecard re-training period (i.e., reject inference test) whereby all scorecard risk bands (within policy) were approved for a loan to prevent restriction of range for training data.

Figure 6.1. *Study Design Timeline*

2020				
June	July	August	September	October
T1 – Loan Application(s)				**T3**[a]
T2 – Loan Repayment				

Note. T1 = Time 1. T2 = Time 2. T3 = Time 3.

[a] *T3 - Loan repayment data pulled from the host organisations' database*

The participants were 57% female and almost all UK nationals (94%). Their ages ranged from 18 to 70 (M = 33.54, SD = 9.89), with monthly incomes between £580 and £6,800 (M = £1,640.27, SD = £622.68). Half of the participants had salaried income (53%), a fifth (20%) were relying exclusively on benefits, with the rest having a mixture of both. The most common loan purpose was *emergencies* (47%), followed by *purchases* (22%), and *housing* (14%), with the total amount lent ranging from £100-£1,696 (M = £335.05, SD = £253.04). The majority (71%) did not have any CCJs and a third (32%) had no recent (in the last 12 months) defaults on their credit bureau record. For complete socio-demographic, loan, and credit bureau information of the validation sample, refer to the tables in Appendix A4.2.

Because information for all applications was available to the researcher, it was possible to test for sample selection bias as it could be a serious concern. A total of 5,474 applicants (out of 5,682; 96% response rate) completed the novel psychometric measure during T1 (the sample recruitment period). Of those, 1,558 were approved for a loan (29% approval rate), and of those, 560 applicants took out the loan offered (36% conversion rate). The composition of the study sample was compared against those that did not complete the measure during the loan application, and against those that were declined/not approved for the loan. UK nationals (96%) and English speakers (96%) were significantly more likely to respond to the measure/take part in the study than non-UK nationals (93%), χ^2 (1, 5682) = 7.21, p = .007, and non-English speakers (93%), χ^2 (1, 5682) = 7.21, p = .007. No other significant demographic differences were found. Thus, there was an overall small selection effect due to the psychometric assessment.

Although there did not seem to be many issues with the selection into the study, the timing of the study is of note—it took place during the COVID-19 pandemic and towards the end of the first national lockdown in the UK. This time saw increased unemployment rates (rising from 3.8% at the end of 2019 to 5.2% by the end of 2020; ONS, 2022c), decreased economic growth (GDP falling by 9.3% in 2020; ONS, 2022b), and all-around uncertainty about the near future. These pressures meant that some borrowers might have struggled to repay their loans more than they normally would. Recognising that, the host organisation initially stopped all lending until April 2020 and restarted lending by providing smaller loan amounts to new borrowers (with the possibility of increasing the amount via a *TopUp*, see Chapter 2). Furthermore, the host organisation introduced payment holidays that would defer loan repayment without interest or charges and without affecting the borrower's credit file.

6.2.2. Measures

6.2.2.1. Psychometric assessment

The psychometric assessment was the image-based creditworthiness measure consisting of 30 multiple-choice and rating-scale items, with images as response options, which were developed in Chapter 5 (see the chapter for more details). The items measured eight psychological characteristics of creditworthiness—Responsibility & Integrity, Humility & Compliance, Emotional Appraisal Tendency, Pro-Lender Orientation, 'Can Do' Beliefs, Financial Reputation Concern, General Reputation Concern, and Credit Access Concern. However, owing to an administration error by the host organisation, four of the 30 items that were meant to be piloted were not implemented correctly. Specifically, two items were shown the incorrect response options, one item was left out, and the multiple-select item (i.e., "Select all that apply") did not accept multiple responses. Thus, data analysis was conducted on the 26 correctly administered items.

6.2.2.2. Loan application

As part of the loan application, participants reported a wide variety of socio-demographic, economic, and other information, including gender, age, marital status, income, expenditure, and loan purpose. In addition, they opted into a credit bureau check which included information on past and current debt repayment behaviour, such as number of defaulted accounts, number of CCJs, debt amount, amount of arrears, and number of late payments in the past six months. This captured a range of theoretically relevant variables for predicting creditworthiness.

6.2.2.3. Loan performance

Lenders and creditworthiness researchers most commonly use default or write-off (i.e., when the loan has been written-off and transferred to a debt collection agency) as the main measure of loan performance (e.g., Baklouti, 2014; Karlan, 2005; Puri et al., 2017). However, because the host organisation does not write-off loans until they are at least four months in arrears, and most of the loans in the present study have been on the books for less than four months, this would be an inappropriate metric to use. Instead, the number of months in arrears was used—another common loan performance metric in the literature (e.g., Bieker & Yuh, 2015; Gathergood, 2012b; Herzenstein et al., 2011). The number of months in arrears the loan is at the time when the repayment data was pulled from the database (T3 in Figure 5.1). This is a snapshot outcome that does not consider behaviour of the borrower throughout the loan, so to counter that another measure of loan performance was used—fraction of time in arrears, which is the number of days a borrower has spent being behind on their loan repayments as a proportion of the total number of days that they have had their loan(s) for.

This outcome summarises the repayment behaviour throughout the duration of the loan, regardless of the state of the loan at the time when repayment data was pulled from the host organisation's database, and it has also been used in prior creditworthiness research (e.g., Gerardi, Goette, et al., 2013). Values of 0 indicate never being in arrears (good loan performance) and values approaching 1 indicate always being in arrears (bad loan performance). This *delinquency outcome* differentiates well between those that miss a payment once or twice, but make-up for it straight-away, compared to those that delay getting out of arrears despite missing the same number of payments. For instance, if a borrower has had their loan(s) for 100 days misses one payment but makes it up the next day, then they would have only been in arrears for one day, i.e., 0.01 fraction of time in arrears. Meanwhile, a borrower who has had a loan for the same amount of time misses one payment and does not make it up until 7 days later, would then be 0.07 fraction of time in arrears. Because every customer has been on the books for varying periods, both loan performance outcomes are controlled for the number of days they have been on the books.

Table 6.1 contains information on the distributions of the two repayment behaviour measures in our sample. The average (mean) borrower in our sample is behind on their payments 50% of the time (*SD* = 37%) and is 0.83 months in arrears (*SD* = 1.09) at the end of the study. However, majority of the borrowers (57%) are 0 months in arrears at the end of the study.

Table 6.1. *Distribution of Loan Performance Measures*

Loan Performance Measures	Mean (SD)	Min–Max	Skew	Kurtosis	Percentiles		
					25	50	75
Fraction of time in arrears	0.50 (0.37)	0–0.99	-0.13	-1.56	0.11	0.54	0.86
Months in arrears	0.83 (1.09)	0–4	0.96	-0.43	0.00	0.00	2.00

6.2.3. Data Analysis Strategy

The data analysis comprised of two main parts. Firstly, Confirmatory Factor Analysis (CFA) of the psychometric measure was conducted to test the construct measurement model identified in the prior chapter (see Study 2b in Chapter 5). Secondly, having established the model of construct measurement, models of structural relations between constructs were tested using Structural Equation Modelling (SEM).

All data management and analysis were performed using R (R Core Team, 2020). There was no missing data.

6.2.3.1. Confirmatory Factor Analysis (CFA)

The CFA on the final 26 items was performed with the *lavaan* package (Rosseel, 2012) in *R.* Maximum Likelihood (ML) estimation was used. In accordance with the literature (Hooper et al., 2008), the following fit indices were used to assess model fit:

- Relative Chi-Square ($\chi 2$/df): an absolute fit index which adjusts for sample size, with values < 3.00 being considered reasonable fit;
- Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR): absolute fit indices that measure the mean residual, with values < .08 suggesting reasonable fit and < .05 suggesting close fit;
- Comparative Fit Index (CFI): a relative fit index that compares the researcher’s model with the baseline model, with values > .90 indicating good fit; and
- Parsimony Comparative Fit Index (PCFI): a relative fit index that is a parsimony-corrected version of CFI, with values > .50 indicating good fit.

As argued by Barrett (2007), model fit was also evaluated in accordance to competing models by using Chi-Square analysis or comparing AIC and BIC values as appropriate. Lower AIC and BIC values are indicative of better fit.

Common Method Bias (CMB) is a well-known issue encountered in psychometric measurement research whereby item characteristics, such as scale formats and anchors, systematically influence responses producing artefactual covariance irrelevant to the construct being measured (Podsakoff et al., 2003; Tourangeau et al., 2000). To test for it, zero and equal constraints models with a CMB latent variable were compared using Chi-Square analysis as recommended by the literature (Simmering et al., 2015). Common scale format of importance items (i.e., “How important is X to you?”) was used as the source of potential method bias.

To evaluate the structural validity of the factors, various convergent and discriminant validity measures were calculated. Specifically, convergent validity is considered good when the Average Variance Extracted (AVE) is larger than .50 (Bagozzi & Yi, 1988; Hair et al., 2010). Meanwhile, discriminant validity is established when the Maximum Shared Variance (MSV) and the Average Shared Variance (ASV) are smaller than the AVE and when the square root of the AVE is greater than the factor correlations (Fornell & Larcker, 1981; Hair et al., 2010).

Lastly, factor scores based on the final measurement model were created to be used for further analysis.

6.2.3.2. Structural Equation Modelling (SEM)

SEM was the analysis of choice because it allows to model the effects of psychological characteristics on multiple outcome variables at the same time. This statistical approach also allows to model further latent variables (i.e., Bad Credit History and Capacity factors), which is good for theoretical precision and increases the statistical power for inferential tests of structural parameters (Kline, 2016; Pearl, 2009).

The SEM was performed with the *lavaan* package (Rosseel, 2012) in *R.* The same fit indices as for CFA were used to assess model fit and competing models were also proposed. Prior to fitting the SEM models, multivariate skew and kurtosis were statistically evaluated with Mardia’s (1970) estimates. Simulation studies have found that serious problems may exist when univariate skewness is >= 2.0 and kurtosis is >= 7.0 (Curran et al., 1996). Because Mardia tests of multivariate skew and kurtosis indicated moderate violation of the multivariate normality of the data (std. skew = 26.83, $p < .001$; std. kurtosis = 4.37, $p < .001$), and the data contains categorical and binary variables, the WLSMV estimation method was used (as recommended by Gana & Broc, 2019). WLSMV (which stands for *Weighted Least*

Squares Mean and Variance Adjusted) is a robust version of the DWLS estimation technique that is based on the generalised least squares method and uses a polychoric or a polyserial correlation matrix in its calculations (T. A. Brown, 2006; Gana & Broc, 2019; Muthén, 1993).

6.3. Results

6.3.1. Confirmatory Factor Analysis (CFA)

The eight-factor structure of the measure identified in the pilot study (Study 2b, Chapter 5) represented poor fit to the responses of the validation sample, χ^2 (271) = 788.90, $p < .001$, χ^2/df = 2.91, RMSEA = .06, CFI = .79, PCFI = .66 (see Table 6.2 for more details). Inspection of both the modification indices and the standardised residual covariances indicated that the model was not accounting for the variance in one Pro-Lender Orientation and one Responsibility & Integrity items, which were subsequently dropped. In addition, error between two similarly phrased items (Financial Reputation Concern and Credit Access Concern items) was covaried. This model represented better (but still not great) fit to the data, $\chi2$ (223) = 627.78, p < .001, $\chi2$/df = 2.82, RMSEA = .06, CFI = .84, PCFI = .68 (Table 6.2). Examination of the correlations between the latent variables identified variables strongly related to each other, hypothesised to be part of the same higher-order factors. Forming these second-order factors and dropping a further three items due to poor fit, drastically improved model fit, from AIC = 782 to AIC = 455 and from BIC = 1,115 to BIC = 685 (see Model 3 in Table 6.2).

Table 6.2. *Goodness-of-Fit Indices for the Five Models Tested*

Model	Factor Structure	χ^2	df	χ^2/df	RMSEA [90% CI]	SRMR	CFI	PCFI	AIC	BIC
1. Initial model from Study 2b, Chapter 5	26 items with eight first-order factors	788.90***	271	2.91	.06 [.05, .06]**	.06	.79	.66	948.90	1,295.13
2. Modified initial model	24 items with eight first-order factors	627.78***	223	2.82	.06 [.05, .06]*	.06	.84	.68	781.78	1,115.04
3. Hierarchical model	21 items with eight first-order and two second-order factors	349.34***	178	1.96	.04 [.04, .05]	.06	.91	.77	455.34	684.73
4. Hierarchical model with CMB [a]	21 items with eight first-order and two second-order factors, and an equal-constrained CMB factor	338.78***	177	1.91	.04 [.03, .05]	.05	.92	.77	446.78	680.49
5. Simplified model with CMB	21 items with three first-order factors and an equal-constrained CMB factor	507.06***	184	2.76	.06 [.05, .06]*	.06	.83	.73	601.06	804.47

Note. N = 560. CMB = Common Method Bias. CI = Confidence Interval.

[a] Final CFA model.

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

Next, the Common Method Bias (CMB) tests were conducted, whereby the common scale format of importance items (i.e., “How important is X to you?”) was used as the source of potential method bias (see Table 6.3 for the details of the tests). A chi-square test between an unconstrained and a zero-constrained CMB models was significant, χ^2 (7) = 63.62, p < .001, meaning measurement bias was detected. A test of equal specific bias (i.e., comparing unconstrained and equal-constrained CMB models) demonstrated that this bias is evenly distributed, χ^2 (6) = 9.06, p = .170. Thus, the equally constrained *Importance Items* CMB factor was retained for subsequent analyses (see Model 4 in Table 6.2).

Table 6.3. *Summary of the Common Method Bias (CMB) Tests*

Model	χ^2	df	Δ df	Δ χ^2	p
Unconstrained	329.72	171	-	-	-
Zero-constrained	393.34	178	7	63.62	< .001
Equal-constrained	338.78	177	6	9.06	.170

Lastly, a simplified version of Model 4 was fitted where the second-order factors were converted to larger first-order factors without any further factor levels (see Model 5 in Table 6.2). Worse fit indices and higher AIC and BIC of Model 5 indicate that the hierarchical model (Model 4) is superior to the non-hierarchical model (Model 5). As a result, Model 4 was chosen as the final CFA model. Overall, the final measurement model demonstrated good fit, χ^2 (177) = 338.78, p < .001, χ^2/df = 1.91, RMSEA = .04 with 90% CI: [.03, .05], CFI = .92, SRMR = .05 (see Model 4 in Table 6.2 for the details). The model comprised the following three factors (see Figure 6.2):

- Integrity & Reputation, with Integrity (two items), General Reputation Concern (two items), Financial Reputation Concern (three items), and Credit Access Concern (two items) as first-order sub-scales;
- Financial Resilience, with ‘Can Do’ Beliefs (five items), Emotional Appraisal Tendency (two items), and Humility & Compliance (two items) sub-scales; and
- Pro-Lender Orientation (three items), with no sub-scales.

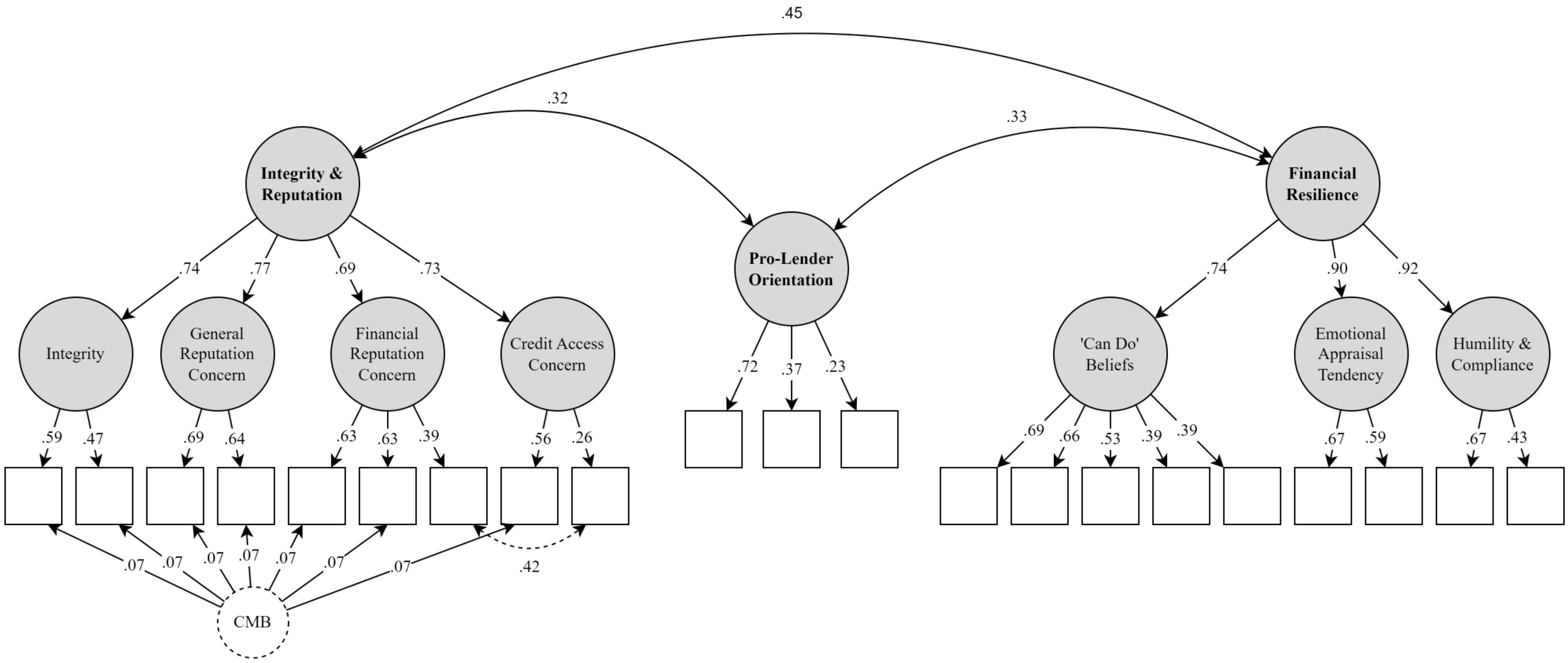
The structural validity of these three latent traits was good (see Table 6.4). The convergent validity (AVE) was strong for two of the factors (AVE > .50), with the Pro-Lender Orientation scale suffering from somewhat low convergent validity (AVE = .24), likely due to the broadness of the items representing the factor. Virtually all item loadings were greater than .40. The correlations of the three major scales were estimated to be between .32 and .45, and discriminant validity was excellent (see Table 6.4). Thus, the three factors are distinct and somewhat interrelated constructs.

Table 6.4. *Structural Validity Measures of the Three Main Factors*

Factor/Scale	**Convergent Validity (AVE)**	**Discriminant Validity**			**Correlations**		
		MSV	**ASV**	$\sqrt{AVE}$	**1**	**2**	**3**
1. Integrity & Reputation	.54	.20	.15	.73	-	-	-
2. Financial Resilience	.73	.20	.16	.86	.45	-	-
3. Pro-Lender Orientation	.24	.11	.11	.49	.32	.33	-

Note. *N* = 560. AVE = Average Variance Extracted; MSV = Maximum Shared Variance; ASV = Average Shared Variance.

Figure 6.2. *The CFA Diagram of the Final Model Fit*



Note. CMB = Common Method Bias. All CMB paths are constrained to be equal. For the sake of visual clarity, residuals are not depicted in the figure. Double-head arrows represent correlations/covariances. The dotted line represents covaried errors between two similarly phrased items. All modelled correlations and path coefficients are significant ($p < .05$). See the main text for details of the model.

Table 6.5 shows the internal consistency and test-retest reliabilities of the ten dimensions of the creditworthiness measure, respectively. The internal consistency was poor to good, ranging from α = .37, CR = .43 to α = .74, CR = .89 at the factor level and from α = .26, CR = .29 to α = .66, CR = .67 at the facet level (Table 6.5). It was notably low for Credit Access Concern, Humility & Compliance, and Pro-Lender Orientation (sub-)scales, which had only 2-3 items each (see Table 6.5). This is to be expected since internal consistency is frequently underestimated for shorter scales (McNeish, 2018; Sijtsma, 2009). Although internal consistency is the most reported type of reliability, test-retest stability is more informative for this type of measure as it is used to make inferences in the long-term (i.e., loan repayment behaviour). Indeed, according to research, test-retest reliability is more important for scale validity than internal consistency (McCrae et al., 2011).

One-hundred-and-nineteen applicants applied to the micro-lender more than once and completed the full questionnaire both times during the data collection period. The length of time between the two measurement timepoints ranged from 1 to 11 weeks (*M* = 4.95, *SD* = 2.26). The test-retest reliability for all the scales and sub-scales ranged between .71 and .88 (see Table 6.5 below). This is regarded as a high level of reliability since the applicants received very similar scores when completing the measure on different occasions. After at least a month (1–2.5 months), the test-retest reliability decreases to .69-.82 (see Table 6.5 below). This suggests that the psychological characteristics assessed by the measure are still relatively stable after a month, but are also likely to change slightly over time. Nonetheless, test-retest reliability is still the preferred reliability to report over internal consistency measures (McCrae et al., 2011).

Table 6.5. *Reliability of the (Sub-)Scales*

(Sub-)Scale	**# of items**	**Internal Consistency**		**Test-Retest Reliability (Pearson's *r*)**	
				Time Period	
		Composite Reliability (CR)	Standardised Cronbach's Alpha (α)	Between 1 and 11 weeks (n = 119)	Between 1 and 2.5 months only (n = 88)
1. Integrity & Reputation	9	.82	.63	.80	.72
Integrity	2	.44	.54	.79	.72
General Reputation Concern	2	.61	.64	.79	.71
Financial Reputation Concern	3	.57	.61	.84	.77
Credit Access Concern	2	.29	.26	.76	.69
2. Financial Resilience	9	.89	.74	.83	.78
'Can Do' Beliefs	5	.67	.66	.88	.82
Emotional Appraisal Tendency	2	.57	.57	.81	.75
Humility & Compliance	2	.47	.45	.84	.79
3. Pro-Lender Orientation	3	.43	.37	.71	.71

Note. N = 560, unless otherwise specified.

Table 6.6 shows the means, standard deviations, mins, max, skew, and kurtosis of the (sub-)scales for the creditworthiness measure. For the most part, the skew and kurtosis values of the (sub-)scales are low, revealing that the distribution of the factor scores are approximate to a normal distribution. The exceptions to that are the Financial Resilience scale and its two sub-scales: Humility & Compliance and Emotional Appraisal, which are leptokurtic (i.e., more concentrated about the mean) and negatively skewed (Table 6.6).

Table 6.6. *Mean (M), Standard Deviation (SD), Minimum (Min), Maximum (Max), Skew, and Kurtosis of the Creditworthiness Measure (Sub-)Scales*

Scales/Sub-Scales	M	SD	Min	Max	Skew	Kurtosis
1. Integrity & Reputation	0.12	0.07	-0.08	0.23	-0.58	-0.41
Integrity	0.09	0.07	-0.16	0.19	-1.04	0.37
General Reputation Concern	0.29	0.21	-0.59	0.57	-0.81	-0.03
Financial Reputation Concern	0.14	0.10	-0.27	0.28	-0.94	0.23
Credit Access Concern	0.05	0.03	-0.07	0.13	-0.17	-0.25
2. Financial Resilience	0.24	0.11	-0.29	0.39	-1.54	3.40
'Can-Do' Beliefs	0.34	0.15	-0.28	0.55	-1.10	1.16
Emotional Appraisal Tendency	0.29	0.15	-0.53	0.48	-1.91	5.43
Humility & Compliance	0.22	0.10	-0.29	0.36	-1.68	4.00
3. Pro-Lender Orientation	0.70	0.33	-0.28	1.15	-0.82	-0.06

Note. N = 560.

While most of the factors from Study 2b (Chapter 5) remained following the CFA, the interpretation and naming of the two second-order factors requires some clarification. The Integrity & Reputation factor seems to tap into the general tendency to value the importance of social systems surrounding promise keeping and one's reputation. It appears to mirror the Reputation & Credit Access Concern construct identified in the qualitative interviews (Study 1b, Chapter 4), with the addition of the Integrity sub-scale, which is thematically relevant to the main factor. Meanwhile, the Financial Resilience factor seems to tap into a personality-based resource of protection against experiencing psychological distress. The reason why the collection of 'Can Do' Beliefs, Humility & Compliance, and the Emotional Appraisal Tendency sub-scales was interpreted as *Resilience* was because they all seem to lead to favourable emotions, whether that may be through situational interpretations, emotional and behavioural reactions, or general positive affect. Hence, the image-based psychometric measure yields seven sub-scale scores and/or three scale scores. For the revised definitions of the (sub-)scales, see Table 6.7 below.

Table 6.7. *Reinterpreted (Sub-)Scale Definitions & Operationalisations for the Psychometric Measure of Creditworthiness Following the CFA*

(Sub-)Scale	Definition
1. Integrity & Reputation	A general tendency to value the importance of social systems surrounding promise keeping and one's reputation (whether this is in general or just among lenders to gain access to credit)
Integrity	Tendency to be governed by a general moral obligation to others
General Reputation Concern	Desire to achieve, protect, and maintain a good reputation *in general*
Financial Reputation Concern	Desire to achieve, protect, and maintain a good reputation *among lenders*
Credit Access Concern	Desire to have access to and command over financial products and resources
2. Financial Resilience	A personality-based resource of protection against experiencing psychological distress
'Can Do' Beliefs	Belief in oneself, one's financial abilities, in the future, and in control over one's life
Emotional Appraisal Tendency	Tendency to positively appraise potentially stressful, loan-related situations
Humility & Compliance	Tendency to feel content and to react in a self-effacing manner to unmet expectations
3. Pro-Lender Orientation	Tendency to favourably evaluate and have positive feelings towards the host organisation

6.3.2. Structural Equation Modelling (SEM)

Because credit history and capacity are the two key characteristics commonly used in creditworthiness assessment (see Chapter 1), latent variables to reflect them were generated. The relevant observed variables from the credit bureau and the application form (for the credit history and capacity factors respectively) were selected and using exploratory factor analysis refined into the variables seen in Table 6.8. The researcher chose to represent these as latent factors, rather than just using specific variables, as it is better for theoretical precision and increases the statistical power for inferential tests of structural parameters (Kline, 2016; Pearl, 2009). For example, while income is a classical measure of a borrower's capacity (Abrahams & Zhang, 2008), it is only one component of a broad concept that is best captured using several variables. Similarly, the researcher chose to not rely on the credit bureau's credit score for the Bad Credit (Payment) History factor since it is influenced by factors other than payment behaviour (e.g., credit utilisation and credit types) that are theoretically irrelevant here and would be better suited to be their own factors. See Table 6.8 for the details on the additional two latent variables created to represent the credit history and capacity factors.

Table 6.8. *Structure of the Additional Latent Factors*

Latent Factors	Observed Variables	Loadings
Bad Credit History		
	Number of defaulted accounts (as a % of all accounts)	.80
	Number of accounts defaulted in the last 12 months	.73
	Worst ever arrears (in months)	.67
	Number of CCJs	.62
	Number of accounts with worst payment status of 0 in the last 24 months (ordered quantile normalised)	-.44
Capacity		
	Net Disposable Income (NDI; Box-Cox transformed)	.86
	NDI as a proportion of income	.81
	Loan payments (host organisation's only) as a proportion of NDI (log-transformed)	-.69

Note. All income and expenditure values are per month. Some of the variables were normalised prior to being fitted, with the methods being chosen depending on what produced the lowest Pearson P-test statistic for normality.

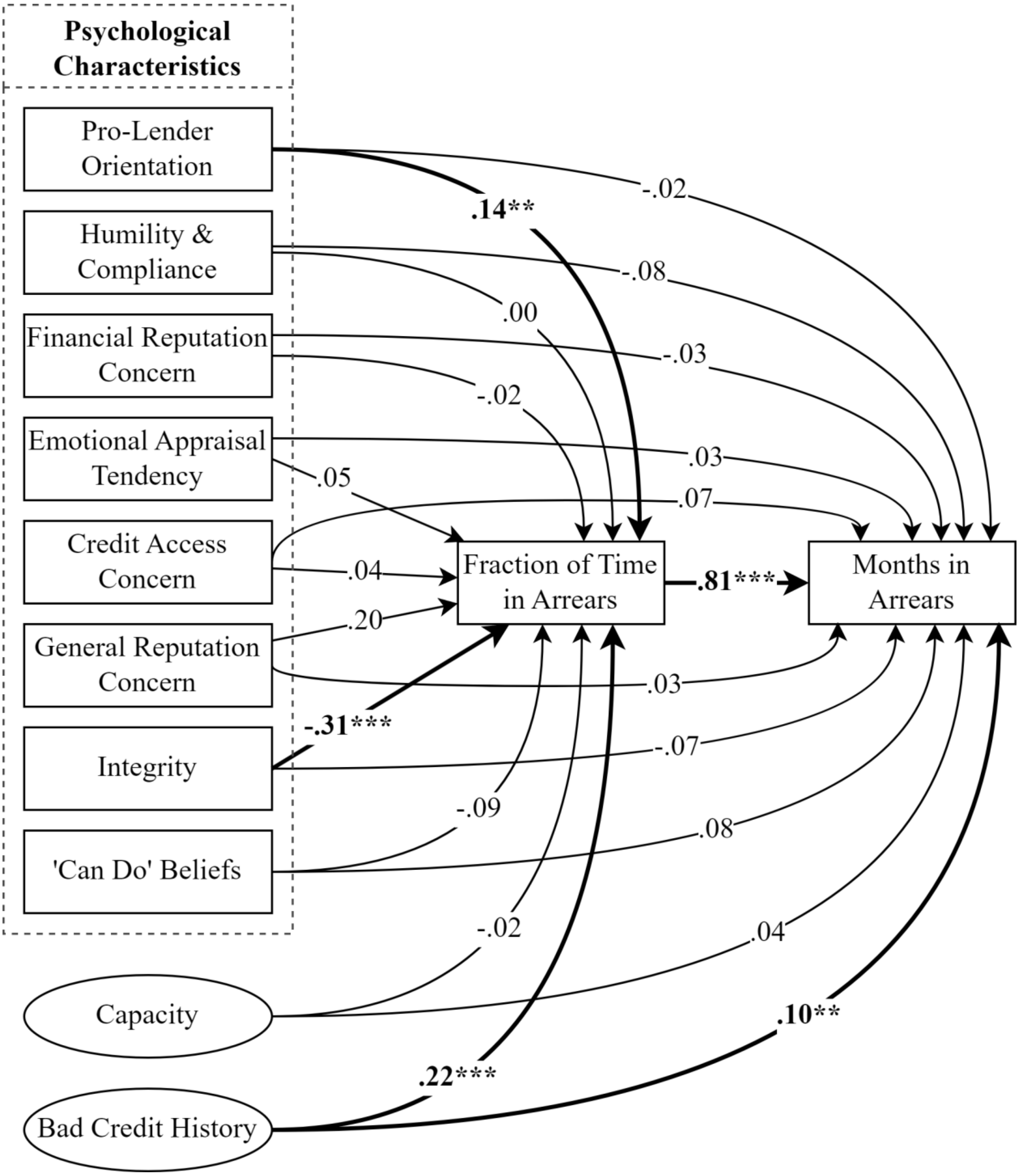
Some of the most common control variables that are frequently included in the study of creditworthiness prediction were also included (either as controls or as main variables of interest). This includes demographics, such as age and nationality (e.g., see Bekele et al., 2016; Dorfleitner et al., 2017; Klinger et al., 2013), and context variables, such as loan purpose (e.g., see Baesens et al., 2005; Iyer et al., 2016). Furthermore, date on books was controlled for due to the variety of lengths of repayment behaviour observation periods for different borrowers (*range* = 2–4.5 months).

The lowest level of the psychometric scores was fitted (i.e., the eight sub-scales), due to the sub-scales explaining significantly more of the variance in the criterion outcomes than just the three higher-order factors (average 10% vs. 4%). See Figure 6.3 for the final model. The overall model fit was good, χ^2 (156) = 288.39, $p < .001$, χ^2/df = 1.85, RMSEA = .04 [.03, .05], CFI = .87, SRMR = .08.

The psychometric scores were found to partially predict repayment behaviour (Fraction of Time in Arrears, FTA) and loan state (Months in Arrears, MIA; see Figure 6.3). The direct effect of Pro-Lender Orientation was significant on FTA, $B = .136$ [.036, .236], $SE = .051$, $z = 2.67$, $p = .008$, but not on MIA, $B = -.018$ [-.089, .052], $SE = .036$, $z = -0.51$, $p = .612$. The indirect effect of Pro-Lender Orientation on MIA was significant, $B = .111$ [.029, .192], $SE = .042$, $z = 2.66$, $p = .008$, but the total effect was non-significant, $B = .092$ [-.02, .205], $SE = .057$, $z = 1.61$, $p = .107$. The direct effect of Integrity was significant on FTA, $B = -.307$ [-.488, -.126], $SE = .092$, $z = -3.32$, $p < .001$, but not on MIA, $B = -.084$ [-.213, .046], $SE = .066$, $z = -1.27$, $p = .204$. However, the total effect of Integrity on MIA was significant, $B = -.333$ [-.523, -.144], $SE = .097$, $z = -3.45$, $p < .001$, as was the indirect effect, $B = -.25$ [-.397, -.102], $SE = .075$, $z = -3.32$, $p < .001$. Thus, FTA was found to fully mediate the relationship between Integrity and MIA. None of the other psychological characteristics had significant effects on the repayment behaviour or loan state ($p > .05$).

In addition, Bad Credit History had a significant direct effect on FTA, $B = .218$ [.127, .31], $SE = .047$, $z = 4.68$, $p < .001$, and on MIA, $B = .096$ [.027, .164], $SE = .035$, $z = 2.74$, $p = .006$. The indirect, $B = .177$ [.103, .252], $SE = .038$, $z = 4.68$, $p < .001$, and total, $B = .273$ [.174, .372], $SE = .051$, $z = 5.39$, $p < .001$, effects on MIA were also significant. Thus, the effect of Bad Credit History on MIA was partially mediated by FTA (Proportion Mediated = .65). The Capacity latent variable was not predictive of FTA or MIA ($p > .05$; see Figure 6.3).

Figure 6.3. *The Final Model of Psychological Characteristics, Bad Credit History, and Capacity on Loan Repayment Behaviour*



Note. Standardised path coefficients. For the sake of visual clarity, control variables are omitted from the figure and are as follows: date on books, age (log-transformed), nationality (binary; UK vs. non-UK), and loan purpose (dummy); see the main text for details.

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

Overall, high Pro-Lender Orientation, low Integrity, and bad credit history were significant predictors of spending a higher proportion of loan time in arrears, which in turn, predicted the number of months in arrears at the end of the study period. The psychometric scores, credit history, capacity and the controls accounted for 10.4% of the variance in FTA and (with FTA) 77.7% of the variance in MIA.

6.4. Discussion

The primary aim of the present research was to validate the novel image-based psychometric measure of psychological characteristics of creditworthiness in a longitudinal, high-fidelity study. As part of this validation effort, the influence of psychological characteristics on debt repayment behaviour was also examined. The findings indicate that (a) the measure's structure did not replicate exactly in the new context, but it showed good psychometric properties, nonetheless; and (b) psychological characteristics of Integrity and Pro-Lender Orientation had a significant effect on loan repayment behaviour.

6.4.1. Internal Validity—CFA

While the image-based measure's structure from the previous study (Study 2b, Chapter 5) did not replicate perfectly in the new context, it showed good psychometric properties, nonetheless. The model fit was satisfactory, χ^2 (143) = 326.82, $p < .001$, χ^2/df = 2.29, RMSEA = .05 [.04, .06], CFI = .86, SRMR = .07, and the structural validity of the factors was good too (see Table 6.4). Moreover, the present CFA model included all the same sub-scales/factors identified in the previous study, albeit slightly adjusted. While the present model fit was worse off than the one in Study 2b (Chapter 5), χ^2 (223) = 247.87, $p < .001$, χ^2/df = 1.11, RMSEA = .04 [.04, .05], this in part could be due to the administration error that rendered four of the 30 items unusable; thus, potentially making it harder to tap into the necessary factors.

The image-based measure demonstrated excellent test-retest reliability (average r = .78, $p < .001$; see Table 6.5), especially considering the small number of items for certain (sub-)scales, and the relatively small sample size. This was higher than another similarly formatted image-based inventory (average r = .63 in Leutner et al., 2017), and similar to what is typically observed for more traditional Likert-type scales such as the Big Five (r = .69 to .76 in a meta-analysis by Viswesvaran & Ones, 2000), despite some of the sub-scales tapping into more transient psychological characteristics, such as attitudes and beliefs. This seems to support the notion that image-based measures create more salient responses due to their visual content (Meissner & Rothermund, 2015; Paunonen et al., 1990). Although it should be noted that some image-based items contained just three response choices, compared to the five or seven on a typical Likert scale, which would reduce the likelihood of different responses. In addition, the test-retest time periods in this study were also relatively short (i.e., 1-11 weeks, $M = 4.95$, $SD = 2.26$), possibly allowing for confounding effects of memory to seep in.

Internal consistency was not quite as excellent, especially for the sub-scales (average $\alpha = .58$ and average CR = .71; see Table 6.5). However, this is not surprising, since majority of the factors were formed with just 2-3 items and internal consistency tends to be underestimated for shorter scales, as well as for items covering broader content (McNeish, 2018; Sijtsma, 2009). Furthermore, test-retest reliability is arguably more relevant in this context, due to our interest in the effects of psychological characteristics months after they were initially measured. Indeed, if the measures were highly intertemporally unstable, then it would bring into questions the extent to which any findings could be attributed to psychological differences rather than some other (unmeasured) extraneous variable. Research supports this notion that test-retest reliability is more important for scales validity than internal consistency (McCrae et al., 2011).

6.4.2. External Validity—SEM

A moderate and statistically significant negative relationship between Integrity and loan repayment delinquency was found. This was in line with prior studies that found various conceptualisations of integrity, honesty, and morality to be associated with creditworthiness (e.g., Featherstone et al., 2007; Guiso et al., 2013; Herzenstein et al., 2011; Leyshon et al., 2006). Indeed, even the magnitude of the standardised coefficient (-.307 in this study) was of similar magnitude to past research (-.30 in Klinger et al., 2013). These findings suggest that Integrity has a key influence on micro-loan repayment behaviour. The results also demonstrate that it is feasible to assess a borrower's integrity using a psychometric measure during a loan application process accurately enough for it provide predictive power. Interestingly, based on the standardised, absolute coefficients/path weights in SEM, Integrity had more effect on Fraction of Time in Arrears than Bad Credit History (|.307| vs. |.218|, respectively). Although this should be interpreted with caution, this result is particularly promising and has strong implications for the utility of psychological characteristics to supplement credit history in assessing consumer creditworthiness.

Contrary to the relationship theorised, high Pro-Lender Orientation exacerbated loan repayment problems. There was a small and statistically significant relationship between Pro-Lender Orientation and Fraction of Time in Arrears. This result could be explained as the individual high in Pro-Lender Orientation being too friendly and casual with the micro-lender and thus, not really treating the loan like a contract. It could also be that high Pro-Lender Orientation reflects someone being unrealistic and overly "pro-lender" for a first-time borrower. If the effect of Pro-Lender Orientation is due to impression management, then it is in the opposite direction to prior research (e.g., Herzenstein et al., 2011; Stockham & Hesseldenz, 1979). Further research is necessary to explore the potential mechanisms behind this unexpected effect.

In sum, borrowers who scored lower on Integrity and higher on Pro-Lender Orientation were significantly associated with repayment delinquency. The results were robust in controlling for a broad set of socio-demographic, financial, and credit history variables. These psychometric variables significantly improved the models' predictive validity over models with only the default and fraud scorecards included, explaining an additional 2% of variance in delinquency. Although this is a fairly small performance improvement over the existing scorecard, especially when compared to prior studies (e.g., Björkegren & Grissen, 2018; Klinger et al., 2013), it would still be regarded valuable in an industry context.

Overall, some of the psychological characteristics from previous studies adequately translated to the unique context of this thesis—micro-loans in the UK. This was a novel finding due to the paucity of psychological studies on creditworthiness characteristics in such setting, since most micro-lending studies are conducted in non-Western countries (e.g., Carpenter & Williams, 2014; Klinger et al., 2013).

6.4.3. Limitations & Future Research

These interesting findings notwithstanding, there are some important limitations of the present study that should be noted. The first main drawback is the length of the observation period. Whilst the criterion outcome data gathered was highly objective, the limited time span (2–4.5 months of repayment behaviour) prevented us from delineating debt repayment behaviours more rigorously. Indeed, when compared to the timeframes employed in previous research on debt repayment behaviour, the majority tend to allow for at least a year of debt repayment behaviour to be observed, with most borrowers having either defaulted or fully repaid their loan(s) (e.g., see Baklouti, 2013; Gerardi, Goette, et al., 2013; Lin et al., 2017; Lindblad & Riley, 2015; Savitha & Kumar K., 2016). By contrast, 90.5% of the loans in the present study are still live (9.5% were fully repaid, ignoring *Top-Ups*), and approximately 30% are not clearly headed towards default either way (see Table A4.2 in Appendix A4.2 for details). Thus, future research over a longer period of time would be able to provide more definitive evidence of the effect of the psychological characteristics on micro-loan repayment behaviour.

The second main drawback of the present study is the sample selection bias. While the sample was representative of the population of interest in most respects, it did under-represent the non-UK and non-English speakers population. This is evident in that non-UK nationals and non-English speakers were significantly less likely to take part in the study compared to UK nationals and English-speakers (see Section 6.2.1), as well as when compared to the overall population composition for that year (6% non-UK nationals in this study sample vs. 10% in all of 2020; see Table 2.1 in Chapter 2). This lowers the certainty regarding the strength/magnitude of the effects of the predictor variables on the outcome variables. Specifically, the standardised coefficients of the paths are dependent upon the standard deviations of the variables, which could be over- or under-estimated compared to the overall population's standard deviation due to the under-representation of the population of interest. The underrepresentation could be explained by the non-UK and non-English-speakers population more likely to feel hesitant about taking part in a research study, to feel uncertain about what it means, and not being used to taking part in research studies. Therefore, future research could target this population more, by making the psychometric measure more integrated with the loan application or by making the measure compulsory. A much larger overall sample could also "smooth out" the selection bias to where any of its possible effects on the data become negligible.

6.4.4. Summary

All in all, creditworthiness among UK micro-loan borrowers was significantly predicted by psychological characteristics of Pro-Lender Orientation and Integrity in this applied setting study. This relationship was significant alongside the usual variables used in credit scoring (e.g., credit history and capacity). The other psychological characteristics (i.e., General Reputation Concern, Financial Reputation Concern, Credit Access Concern, 'Can Do' Beliefs, Emotional Appraisal Tendency, and Humility & Compliance) were found to not be predictive of repayment behaviour. These results indicate that it is possible to assess a borrower's psychological characteristics using a psychometric measure during a loan application process accurately enough for these characteristics to provide predictive power. Another important contribution of this study is the validation of the image-based creditworthiness measure. In the context of the whole thesis, the present study provided further support for the main tenet: that, psychological characteristics play an important role in understanding and explaining micro-loan repayment behaviour.

The following, final chapter draws upon the entire thesis to summarise and critique the key results and synthesise the various theoretical and applied implications. The chapter includes a discussion of the implications of the findings for future research into psychological characteristics of creditworthiness.

Chapter 7. General Discussion

As outlined in Chapter 1, consumer credit is a critical industry that provides individuals with access to funds that can improve their welfare by absorbing financial shocks, providing access to necessary goods or services, or by facilitating business creation. However, the industry's widespread reliance on credit history for creditworthiness assessment has become one of the main obstacles to fair and affordable credit access. Similarly, the academic literature to date has avoided exploring and establishing alternative determinants of creditworthiness, especially those that are neither socio-demographic nor economic in nature. Meanwhile, prior psychological studies have long established the importance of psychological constructs in determining financial and debt behaviour. The present thesis aimed to address the limitations of the literature and these credit assessment practices by exploring the psychological characteristics that characterise creditworthy borrowers (Chapters 3 and 4) and consequently developing (Chapter 5) and validating (Chapter 6) a novel pictorial psychometric scale of consumer creditworthiness for a UK-based micro-lender; thus, addressing the two broad questions posed at the outset of the thesis:

1. *What psychological characteristics predict micro-loan repayment behaviour?*
2. *Can these psychological characteristics be used in an applied setting?*

The rest of this chapter provides a recap of the thesis' studies, followed by a discussion of their contributions and implications. The limitations of the present research and its future directions are also examined.

7.1. Summary of the Empirical Results

In Chapter 3 (Study 1a), the systematic literature review of 34 empirical studies identified integrity, conscientiousness, perceived control, and prosocial orientation as psychological characteristics most strongly and consistently related to creditworthiness. Each of those characteristics had between five and eight studies examining them, spanning a range of locations and contexts; although still predominantly, North America- and mortgage-based.

In Chapter 4 (Study 1b), 85 semi-structured interviews with borrowers (*n* = 50) and underwriters (*n* = 35) recontextualised some of the characteristics from the systematic review and identified a further five relevant to the UK micro-lending context. Specifically, there were five dispositional traits (i.e., Responsibility & Integrity, Conscientiousness, Humility & Compliance, Vigilance & Financial Awareness, and Coping Tendency) and four attitudes/beliefs (i.e., Pro-Lender Orientation, Anti-Debt Attitude, 'Can Do' Beliefs, and Reputation & Credit Access Concern) that differentiated creditworthy individuals from non-creditworthy ones in the qualitative study.

In Chapter 5 (Studies 2a and 2b), a novel, image-based psychometric measure was developed to assess the nine characteristics from the interview study. Over 700 draft items were narrowed down to 121 following a mixed methods, subjective validation study (Study 2a) that comprised of two stakeholder focus groups (n = 10) and an online feedback questionnaire with subject-matter experts (n = 9). These 121 items were then piloted and refined further in a cross-sectional, quantitative study (Study 2b) with 459 online participants who are comparable to the target population. In the end, a 30-item image-based psychometric measure was created, tapping into a portion of the characteristics from the interview study (see Table 7.1). This measure demonstrated psychometric soundness with regards to its reliability, and content, face, and construct validities.

Lastly, in Chapter 6 (Study 3), 560 micro-loan borrowers responded to the image-based psychometric measure as part of their loan application process at the host micro-loan organisation, and their repayment behaviour was tracked over the next 2–4.5 months. In this longitudinal, field study, the measure's structure did not replicate exactly from Study 2b, but it demonstrated good psychometric properties (structural validity, internal consistency, and test-retest reliability), nonetheless. The psychological characteristics of high Integrity and low Pro-Lender Orientation emerged as significant predictors of good loan repayment behaviour, and thus, creditworthiness. This relationship was significant alongside the usual variables used in credit scoring (e.g., credit history and capacity), while the other psychological characteristics were found to not be predictive of repayment behaviour.

Overall, the five empirical studies in this thesis have explored and quantified the psychological characteristics of creditworthy micro-loan borrowers. Since the exact dimensions of these characteristics have notably changed across the studies as a result of the previous ones, see Table 7.1 for an overview of the constructs' evolution across all of the studies, and see Table 7.2 for an overview of the psychometric measures' evolution during the final two studies.

Table 7.1. *Construct Dimensions Evolution*

Type	Study 1a – Systematic Literature Review	Study 1b – Qualitative Interviews	Study 2 - Pilot	Study 3 - Validation
Trait	Integrity	Responsibility & Integrity	Responsibility & Integrity	Integrity
Trait	Conscientiousness	Conscientiousness	-	-
Attitude	Perceived Control	'Can Do' Beliefs	'Can Do' Beliefs	'Can Do' Beliefs
Attitude	Prosocial Orientation	Pro-Lender Orientation	Pro-Lender Orientation	Pro-Lender Orientation
Trait	-	Coping Tendency	Emotional Appraisal Tendency	Emotional Appraisal Tendency
Trait	-	Humility & Compliance	Humility & Compliance	Humility & Compliance
Trait	-	Vigilance & Financial Reputation	-	-
Attitude	-	Anti-Debt Attitude	-	-
Attitude	-	Reputation and Credit Access Concern	General Reputation Concern	General Reputation Concern
Attitude	-		Financial Reputation Concern	Financial Reputation Concern
Attitude	-		Credit Access Concern	Credit Access Concern

Note. Study 1a is reported in Chapter 3, Study 1b in Chapter 4, Study 2 in Chapter 5, and Study 3 in Chapter 6.

Table 7.2. *Scale Facets and their Items Number Evolution across the Three Main Versions of the Psychometric Measure*

Version 1 (before Study 2b)	# items	Version 2 (after Study 2b)	# items	Version 3 (after Study 3)	# items
Responsibility & Integrity	17	Responsibility & Integrity	4	Integrity	2[a]
Conscientiousness	20	-	-	-	-
‘Can Do’ Beliefs	13	‘Can Do’ Beliefs	7	‘Can Do’ Beliefs	5
Pro-Lender Orientation	14	Pro-Lender Orientation	6	Pro-Lender Orientation	3[a]
Coping Tendency	9	Emotional Appraisal Tendency	3	Emotional Appraisal Tendency	2[a]
Humility & Compliance	9	Humility & Compliance	2	Humility & Compliance	2
Vigilance & Financial Awareness	10	-	-	-	-
Anti-Debt Attitude	15	-	-	-	-
		General Reputation Concern	2	General Reputation Concern	2
Reputation & Credit Access Concern	14	Financial Reputation Concern	3	Financial Reputation Concern	3
		Credit Access Concern	3	Credit Access Concern	2[a]

Note. Study 2b was the quantitative pilot of the psychometric measure (see Chapter 5). Study 3 was the high-fidelity, longitudinal validation of the psychometric measure (see Chapter 6).

[a] The number of items was impacted by an administration error by the host organisation (see Chapter 6 for details).

7.2. Thesis Contributions & Implications

A key tenet that compelled the present research inquiry is that individual psychological differences play a role in loan repayment behaviour. Prior studies have long highlighted the psychological underpinnings of different financial behaviours and outcomes (e.g., Kamleitner et al., 2012; Lea et al., 1995; Norvilitis et al., 2006; Rustichini et al., 2016). Consistent with this literature, Studies 1a, 1b, and 3 (Chapters 3, 4, and 6 respectively) unanimously found that psychological characteristics are indeed relevant to creditworthy behaviour. To date, psychological predictors of creditworthiness have been poorly researched in the literature. Indeed, the systematic literature review in Study 1a was the first of its kind to systematically outline the psychological factors that are associated with creditworthiness (to the best of the author's knowledge).

On the question of *which* psychological characteristics predict repayment behaviour the present studies paint a nuanced picture. Collectively, Studies 1a, 1b, and 3 all provided support for Integrity as a psychological characteristic of creditworthiness. Indeed, across all three studies it was consistently the most important trait, with Integrity having the largest number of studies (n = 8) with the most consistent support in the systematic review (Study 1a); Responsibility & Integrity being the most frequently occurring characteristic present in 92% of all interviews in Study 1b; and in the longitudinal validation study (Study 3), Integrity had the largest standardised effect on micro-loan repayment behaviour among other psychological characteristics. This remarkable finding is in accord with numerous past studies that demonstrated a positive association between good repayment behaviour and various conceptualisations of honesty, morality, and integrity (e.g., Ding et al., 2009; Featherstone et al., 2007; Guiso et al., 2013; Herzenstein et al., 2011; Klinger et al., 2013; Leyshon et al., 2006). Perhaps the most compelling result is that Integrity had better predictive validity for repayment behaviour than the Bad Credit History factor in Study 3, as based on the standardised, absolute coefficients in SEM (|.307| vs. |.218|, respectively). Because the practical need motivating the present research inquiry is partly based on problems with credit history (see Chapter 1 for details), this finding is especially noteworthy and has strong implications for the utility of psychological characteristics to supplement credit history in assessing consumer creditworthiness in a micro-loan context. More granular research comparing these two predictors is needed to establish the validity of this result, since standardised path coefficients are biased by the sample population.

Interestingly, Pro-Lender Orientation as identified in Study 1b performed unexpectedly in Study 3, predicting lower creditworthiness when the qualitative study suggested it would predict higher instead. It is possible that the type of Pro-Lender Orientation that the researcher intended to tap into (i.e., the lender-specific prosociality as explained in the discussion of Chapter 4) was not actually measured. Or perhaps, it is the lender specificity that makes the relationship opposite to the one hypothesised. After all, previous studies of Prosocial Orientation have tended to be rather consistent in their findings of a positive relationship with creditworthiness (e.g., Carpenter & Williams, 2014; Stockham & Hesseldenz, 1979). Indeed, the only prior study that examined lender-specific prosociality (i.e., trust towards banks in that study) found a positive association between it and creditworthiness (Guiso et al., 2013). Further research is necessary to explore the potential mechanisms behind this unexpected result.

With regards to the other psychological characteristics, the findings are more mixed. Evidence from Study 1b (Chapter 4) suggests that there are at least nine distinct psychological characteristics of creditworthiness, and each offers unique information in explaining micro-loan repayment behaviour. Although some of these characteristics were either identical or similar to the ones identified in the systematic literature review (Study 1a, Chapter 3), there were also five additional characteristics identified in Study 1b. This has important practical implications for both future research and applied contexts, in that characteristics should be context specific. Unfortunately, these findings are rather difficult to interpret beyond that because not all characteristics translated between Study 1b and Study 3 (see Table 7.1 and Table 7.2). For instance, 'Can Do' Beliefs was not predictive of creditworthiness in Study 3 unlike prior research on Perceived Control, which is part of the 'Can Do' Beliefs conceptualisation (e.g., Ding et al., 2009; Henning & Jordaan, 2016; Kuhnen & Melzer, 2018; Lindblad & Riley, 2015; Mewse et al., 2010; Tokunaga, 1993).

7.2.1. Theoretical Contributions & Implications

The theoretical contributions of this thesis are situated within the broader research goal of understanding the role of individual differences on loan repayment behaviour and what it means to be creditworthy. As outlined in Chapter 1 and summarised in Figure 1.2, there is a multitude of factors that impact the criterion outcomes of creditworthiness, but psychological characteristics of consumer creditworthiness have especially been understudied. The present thesis addressed this gap in the literature and demonstrated the importance of psychological characteristics for understanding and predicting credit behaviour. In particular, it provides support for the trait theory approach (Allport, 1937; Cattell, 1943; Eysenck, 1998) towards creditworthiness research (e.g., as used in Klinger et al., 2013; Stockham & Hesseldenz, 1979), whereby creditworthy behaviour is assumed to vary as a function of internal behavioural dispositions (i.e., traits). In this case, the trait of Integrity was predictive of actual repayment behaviour in a high-stakes context (Study 3) and traits of Responsibility & Integrity, Conscientiousness, Humility & Compliance, Vigilance & Financial Consciousness, and Coping Tendency were identified as characteristic of creditworthiness in Studies 1a and 1b (Chapters 3 and 4). However, this is not to say that this thesis supports the most traditional interpretation of trait theory, but rather a more expanded conceptualisation of personality in general that is still situated within the psychometric paradigm, but also includes less stable characteristics such as attitudes and beliefs (e.g., McCrae & Costa, 2008). After all, several attitude and belief constructs were determined to be characteristics of consumer creditworthiness across the studies in this thesis (e.g., Pro-Lender Orientation, ‘Can Do’ Beliefs, Reputation & Credit Access Concern). Meanwhile, there was little evidence to support the behavioural economics or reasoned action approaches towards creditworthiness research.

The results of the thesis also offer important theoretical implications regarding *how* future creditworthiness research should be conducted. Future research ought to consider definition, measurement, and study design issues pertaining to psychological characteristics and consumer creditworthiness, as outlined in Chapters 1 (general introduction) and 3 (systematic review). For example, it is important that different debt-related behaviour (e.g., choosing, borrowing, and repayment) are not conflated because creditworthiness specifically relates to the risk associated with the borrower failing to honour their debt obligation. This was supported by the differences in the relevant psychological characteristics identified by this thesis and those identified by Kamleitner et al.’s (2012) non-systematic review that did not distinguish between three different credit behaviours (credit choosing, borrowing, and repayment; see Chapter 3 for more details). Therefore, future creditworthiness research should make sure appropriate criterion outcomes are examined (e.g., bankruptcy, foreclosure, default, missed payments, repayment problems, delinquency, arrears, and expert credit risk evaluations), and not amount of debt, debt ratios, or subjective burden. Similarly, psychological characteristics should be examined using measures that have construct validity.

7.2.2. Methodological Contributions

The present thesis has not only identified novel psychological characteristics of consumer creditworthiness, but it also developed a novel image-based measure of creditworthiness following a methodological paradigm that is relatively uncommon in credit research. This measure demonstrated promising reliability and validity (factorial, divergent, convergent, and criterion), while its development process managed to strike a delicate balance between best practice and applied research. The conceptualisation of the psychological characteristics and the subsequent content validity of the measure came from a large, systematic, and comprehensive interview study (Study 1b, Chapter 4), whereby 85 interviews triangulated between micro-loan borrowers and underwriters provided a wealth of context-rich information to generate items from. Following best practice (e.g., DeVellis, 2017), the measure was both qualitatively and quantitatively evaluated—reviewed by stakeholders and other subject-matter experts and then piloted (Studies 2a and 2b, Chapter 5). In addition, the longitudinal validation of the measure (Study 3, Chapter 6) took place in a high-stakes context using an objective criterion outcome, providing excellent ecological validity. However, the applied nature of this research also introduced some limitations that had to be worked around. This ranged from the administration error encountered in the final study to how constructs had to be limited in their measurement scope due to potentially negative borrower perception (e.g., see Section 5.3.1 in Chapter 5). Furthermore, the image-based response format used for this measure is also novel and methodologically interesting. All in all, other researchers and/or practitioners can follow the development process outlined here to create their own psychometric measures of creditworthiness relevant to their credit context.

7.2.3. Practical Implications

There are several practical applications of this thesis that should be noted. Firstly, the present research demonstrated that it is possible to predict actual micro-loan repayment behaviour using psychological characteristics assessed as part of a real loan application. Therefore, inclusion of psychological characteristics (particularly Integrity and Pro-Lender Orientation) as part of consumer creditworthiness assessments could help micro-lenders and other lenders working with the *credit invisibles* population (i.e., those with no or with a limited credit history) to be fairer and more accurate in their loan provision. As a result, *credit invisibles* who struggle to absorb financial shocks or improve their economic situations could then gain access to more affordable credit previously unavailable to them; thus, improving their welfare (Bruhn & Love, 2014; Cull et al., 2014), increasing social inclusion (Fernández-Olit et al., 2018; Gloukoviezoff, 2007), and reducing poverty (Erhardt, 2017; GPFI, 2016; Koku, 2015).

Secondly, the present research helps establish a theoretical basis for the development of other alternative data assessments, impacting the relative validity, accuracy, and fairness of these creditworthiness evaluations. Based on the results of this thesis, rationality-based characteristics (as informed by the behavioural economics approach) or characteristics related to the *desire for the good*, *desire for now*, and *desire to use credit* (according to the non-systematic review by Kamleitner et al., 2012), for instance, are likely to be theoretically inadequate; thus, perpetuating the same inequality as credit bureau data and leading to unexpected and undesirable consequences (Consumer Financial Protection Bureau, 2017; Yu & McLaughlin, 2014). Instead, creditworthiness characteristics measured by alternative data should be underpinned by the Five Cs of Credit framework and/or the dimensions of trustworthiness (consisting of competence, commitment, and virtuous character) to be more aligned with the latest evidence in the academic literature. Overall, the psychological characteristics identified across the studies in this thesis, the Five Cs framework, and the trustworthiness dimensions could be used to guide the credit industry's continuous introduction of alternative data assessments to help prevent the characteristics being assessed from being arbitrary and theoretically (and hence ethically) problematic.

7.3. Research Limitations & Future Directions

Nonetheless, the present research has several limitations which should stimulate and guide further research on the topic.

One limitation pertains to the image-based psychometric measure. While the focus of the second research question of this thesis was to demonstrate the viability of such a measure, in the end, the instrument lacked the breadth of its source material—the interviews with micro-loan borrowers and underwriters. Many of the potential items were not created due to the time and project-scope constraints, resulting in limited coverage of the constructs established during the qualitative exploration interviews study (Study 1b, Chapter 4). For instance, by the end of the quantitative pilot (Study 2b, Chapter 5), the items assessing the Responsibility & Integrity characteristic were primarily centred around fidelity to promises. Meanwhile, other elements of the construct, such as sincerity, forthrightness, and accountability, were not covered by the items' content. Although this is especially important for the Responsibility & Integrity construct since it was the strongest creditworthiness differentiator in Studies 1a, 1b, and 3 (Chapter 3, 4, and 6 respectively), this issue also concerns other characteristics that were limited in their scope by their items (e.g., Coping Tendency) or failed to converge into measurable factors all together (e.g., Conscientiousness, Vigilance & Financial reputation; see Table 7.1). Hence, the image-based measure would benefit from further development and examination, whereby additional items (e.g., for the Responsibility & Integrity construct) are created to better tap into all aspects of the constructs of interest.

For the conclusions drawn from the validation pilot (Study 3, Chapter 6), the biggest question that remained is why Pro-Lender Orientation had the opposite relationship with creditworthiness to the one hypothesised. Borrowers who scored higher on Pro-Lender Orientation were more likely to be in arrears throughout the duration of their loan. While some possible explanations have been proposed (e.g., genuine excessive friendliness and relaxed attitude towards the lender or highly disingenuous impression management), further research needs to be undertaken before the association between Pro-Lender Orientation and creditworthiness is more clearly understood.

Lastly, it is important that the applied implications stemming from these findings are put into practice to further establish their viability. Thus, evidence-based psychometric measures should be used as part of consumer creditworthiness assessments to evaluate the impact that selection based on these would have. Indeed, while it is hoped that the thesis' findings will benefit the *credit invisibles* (i.e., those with thin- or no credit history), this population was not explicitly focused on in the research inquiry. Future research could then measure the repayment behaviour of loan applicants without credit history (and so they would ordinarily be automatically rejected) but who meet the capacity and the psychometric measures criteria.

7.4. Conclusion

Taken together, the findings in this thesis support the notion that psychology has an important role in understanding and improving the accuracy and fairness of credit risk assessments. By exploring the psychological characteristics of creditworthiness in a UK micro-loan context, the present thesis made several important contributions. Firstly, the systematic review of the psychological characteristics associated with consumer creditworthiness (Study 1a, Chapter 3) was first of its kind and resulted in the development of a four-factor framework. This framework can guide further investigations in this area, leading to a better understanding of the underlying mechanisms that contribute to debt non-payment. Secondly, evidence from explorative, qualitative interviews (Study 1b, Chapter 4) suggests that there are at least nine distinct elements of psychological characteristics associated with creditworthiness in a UK micro-loan setting. Thirdly, the development of a psychometric measure for assessing psychological characteristics of creditworthiness (Studies 2a and 2b, Chapter 5) is a significant achievement in an ongoing iterative process. Lastly, the longitudinal, field validation of this measure (Study 3, Chapter 6) indicated that psychological characteristics are predictive of repayment behaviour even in conjunction with credit history and capacity. This was the first-ever empirical exploration of the relationship between psychological characteristics and actual debt repayment behaviour in a UK micro-loan context. Overall, this thesis provides a good knowledge base from which to build and more fully understand the relevance of various psychological characteristics to creditworthiness. These findings could direct the credit industry towards more valid and justifiable alternative credit assessments that go beyond credit history without perpetuating further inequality and unfairness, thus, improving the welfare and social inclusion of those who struggle to gain access to affordable credit.

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Appendices

A1. Additional Details for the Systematic Literature Review (Chapter 3)

See Table A1.1 for information on the methodological quality assessment criteria and see Table A1.2 for the details of all the studies included in the systematic review.

Table A1.1. *The Methodological Quality Assessment Criteria for the Included Studies*

Study Design	Quality Criteria	Explanation (as specific to the present review)
	MMAT (out of 5)	
Qualitative	Appropriate qualitative approach	The specific qualitative approach used is appropriate for the research question.
	Adequate data collection	The type of data and the method of data collection are adequate to address the research question, with any modifications to the method during the study clearly justified.
	Adequate data analysis	The data analysis method is adequate considering the research question and the qualitative approach used.
	Justified results interpretation	The interpretation of the results is clearly supported by the data collected.
	Overall cohesion	There are clear links between the data sources, collection, analysis, and interpretation.
Quantitative non-randomised	Population representativeness	Inclusion and exclusion criteria are clear; reasons why some eligible individuals did not participate are provided; and attempts are made to achieve a sample that represents the target population.
	Appropriate measures	The measures of psychological characteristics are either validated and reliability tested or are theoretically derived and justified.
	Complete outcome data	At least 80% of the participants contributed to all of the measures (B. H. Thomas et al., 2004).

Study Design	Quality Criteria	Explanation (as specific to the present review)
	Consideration of confounders	Relevant financial confounders, such as income and net worth, are taken into consideration (e.g., by controlling for them in the regression models).
	Departures from exposure	If there were changes in the participant's creditworthiness status, these were adequately adjusted for.
Quantitative descriptive	Sample relevance	The source of the sample is relevant to the target population and the sampling procedure is clearly justified
	Population representativeness	Inclusion and exclusion criteria are clear; reasons why some eligible individuals did not participate are provided; and attempts are made to achieve a sample that represents the target population.
	Appropriate measures	The measures of psychological characteristics are either validated and reliability tested or are theoretically derived and justified.
	Low non-response bias risk	Respondents and non-respondents were not significantly different in terms of creditworthiness; reasons for non-response were adequate; and/or non-respondents were statistically corrected for.
	Appropriate statistical analysis	Statistical analysis is clearly stated and justified in terms of the research question and the study design and does not limit interpretation of the results.
	Additional Assessment (out of 3)	
N/A	Consideration of causality	The study design is longitudinal instead of cross-sectional to help establish the direction of causality between psychological characteristics and creditworthiness.
	Outcome measurement accuracy	The criterion outcomes of creditworthiness are measured accurately as they are observed instead of being self-reported.
	Ecological validity	Ecological validity of the study is preserved by utilising a realistic (as opposed to artificial) study

Study Design	Quality Criteria	Explanation (as specific to the present review)
		setting which is representative of the conditions in the wider world.

Note. MMAT = Mixed Methods Appraisal Tool (Q. N. Hong et al., 2018).

Table A1.2. *Details of the Studies Included in the Systematic Review*

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Adams et al., 2014)	Quantitative (Longitudinal). High ecological validity.	Not specified (US)	Respondents of the National Longitudinal Survey of Youth (NLSY79; N = 2,071)	Cognitive ability (Armed Services Qualification Test completed in 1980; Bureau of Labor Statistics, 2014). Risk preference (two choice-based questions completed in 1993; Bureau of Labor Statistics, 2014). Long-run patience and present bias (two choice-based questions completed in 2006; Bureau of Labor Statistics, 2014).	Self-reported. “Whether they or their spouse/partners have ever declared bankruptcy” (Adams et al., 2014, p. 44).	• Cognitive ability, risk and time preferences did not predict filing for bankruptcy ($p > .10$), when smoking status and demographics are controlled for.	4/5 + 2/3
(Atlas et al., 2017)	Quantitative (Cross-Sectional). Low ecological validity.	Mortgage (US)	Homeowners with a mortgage (N = 206–215, depending on the model)	Present bias, long-term discounting, loss aversion, diminishing sensitivity and probability distortion (20 decision-making pairs from an adaptable time preference task; Authors’ own with statistical methodology by Toubia et al., 2013). Cognitive reflection (three item Cognitive Reasoning Scale; Frederick, 2005). Morality of strategic	Self-reported. Willingness to strategically default as elicited by “the amount of value the home would need to lose for the respondent to walk away from the mortgage” (Atlas et al., 2017, pp. 418–419).	• Less present-bias ($p < .05$) and more long-term discounting ($p < .01$) predicted a greater willingness to strategically default. • Loss aversion, diminishing sensitivity, probability distortion, cognitive reasoning, and morality of strategic default were all non-significant ($p > .05$).	4/5 + 0/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
				default (six items; Authors' own).			
(Baklouti, 2014)	Quantitative (Longitudinal). High ecological validity.	Microfinance loans (Tunisia)	Entrepreneurs (*N* = 251 for training the model, *N* = 126 for testing the model)	Miscalibration (ten-item Confidence Quiz; Russo & Schoemaker, 1992). Better-than-average (three-item five-point Likert scale; Author's own). Illusion of control (three-item five-point Likert scale; Author's own). Emotional Intelligence (33-item five-point Likert scale; Schutte et al., 1998).	Observed. Had not repaid their loans at due date (i.e., default and legal follow-up).	• Entrepreneurs with higher empathy and better utilisation of emotion were less likely to default. • Miscalibration, better-than-average, illusion of control, perception and management of own emotions were not selected into the classification model.	3/5 + 3/3
(Barros & Botelho, 2012)	Quantitative (Cross-sectional). Low ecological validity.	Mortgage (Brazil)	Former MBA students (*N* = 133)	Hope (a scenario describing an individual with either high or low hope; Authors' own).	Self-reported. The likelihood of the individual in the scenario getting the loan.	• Stronger levels of hope in a scenario were associated with a higher perceived likelihood of obtaining the loan ($p < .001$).	4/5 + 0/3
(Bieker & Yuh, 2015)	Quantitative (Longitudinal). High ecological validity.	Not specified (US)	Respondents of the 2010 wave of the Survey of Consumer Finances (*N* = 4,924)	Future-oriented time preference (assessed based on whether "the household head [indicated] that the household saves the income of one family member and spends the other, spends its regular income and saves other income, or saves	Self-reported. Delinquency of two months or more.	• With various factors controlled for, households with a future-oriented time preference were less likely to experience delinquency than households with a present-oriented time preference ($p < .001$).	4/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
				regularly by putting money aside each month"; Bieker & Yuh, 2015, p. 82).			
(Carpenter & Williams, 2014)	Quantitative (Longitudinal). High ecological validity.	Microfinance loans (Paraguay)	Women in a group-loan program (*N* = 136)	Non-verbal IQ (three items from Raven's Progressive Matrices; Raven et al., 2003). Risk-seeking/-aversion (binary lottery experiment; Cardenas & Carpenter, 2013). Patience-impatience (four items from a discounting task; Authors' own). Altruism (hypothetical Dictator Game; Forsythe et al., 1994).	Observed. Repayment problems "based on the administrative records and cross-reports from participant interviews" (Carpenter & Williams, 2014, p. 124).	• Higher non-verbal IQ ($p < .10$), altruism ($p < .05$), and risk-aversion ($p < .01$) were all significantly related to lower loan repayment problems. • Risk-seeking and patience-impatience had no effect on repayment problems ($p > .10$).	5/5 + 3/3
(Chalise & Anong, 2017)	Quantitative (Longitudinal). High ecological validity.	Consumer loans and mortgage (US during the Great Recession)	Respondents of the 2007-2009 waves of the Survey of Consumer Finances (*N* = 3,857)	Income certainty (two-point item; Board of Governors of the Federal Reserve System, 2011). Attitude to credit use, future income expectation, and willingness to take risks (one three-point item each; Board of Governors of the Federal Reserve System, 2011).	Self-reported. Financial distress—payments on loans and mortgages were always on time before the Great Recession but were behind during.	• Willingness to take above average risk predicted lower likelihood of financial distress compared to those willing to take substantial or high risk ($p < .05$). • Income certainty, attitude to credit use, and future income expectation did not predict financial distress ($p > .05$).	4/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Ding et al., 2009)	Quantitative (Cross-sectional). Low ecological validity.	Credit card (Taiwan)	Credit card users (*N* = 448)	Locus of control (an abbreviated 11 items scale; Barnett & Lanier, 1995). Risk-taking propensity (culturally-adjusted 11 items from Jackson Personality Inventory; D. N. Jackson, 1976). General ethical judgements regarding credit card use (four scenarios evaluated according to three seven-point Likert items; Authors' own).	Self-reported. An overall intention to not repay credit card expenses based on a scenario-based intention anchored with *highly unlikely* to *highly likely* and an actual intention anchored with *never* to *always*.	• High external locus of control lead to stronger intentions to not repay both directly ($p < .05$) and indirectly ($p < .01$) as mediated by general ethical judgements (i.e., by judging ethically questionable behavior to be morally acceptable). • High risk-taking lead to stronger intentions to not repay ($p < .01$) but only indirectly as mediated by general ethical judgements. • Judging behaviors that involve "actively benefiting from illegal activities" ($p < .05$) and "passively benefiting at the expense of others" ($p < .01$) as morally acceptable was significantly related to the intention to not repay. • However, judging behaviors that involve "actively benefiting from questionable actions" or have "no harm" had no significant	4/5 + 0/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						effect on intention to not repay (p > .05).	
(Featherstone et al., 2007)	Quantitative (Cross-sectional). Low ecological validity.	Agricultural loans (US)	Agricultural loan lenders (N = 596)	Honesty (farmer is described as either honest or dishonest in an application scenario; Authors' own).	Observed. Whether the lender approves or denies the loan application.	• Honesty significantly improved the likelihood of being approved (p < .001), even with the FICO score, financial record keeping, productive standing, and credit risk controlled for.	5/5 + 1/3
(Ganzach & Amar, 2017)	Quantitative (Longitudinal). High ecological validity.	Mortgage (US)	Respondents of the National Longitudinal Survey of Youth (NLSY79; N for Study 1 = 2,228; N for Study 2 = 2,423)	*Study 1*: Intelligence (Armed Forces Qualifying Test completed in 1980; Bureau of Labor Statistics, 2014). *Study 2:* Intelligence (Armed Forces Qualifying Test completed in 1980; Bureau of Labor Statistics, 2014). Openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Ten-Item Personality Inventory; Bureau of Labor Statistics, 2014).	Self-reported. High Consequence Debt (HCD) repayment difficulty—if failed to pay "mortgages for more than two months in the last three years," or if likely to fail to pay "mortgages in the next six months" (Ganzach & Amar, 2017, p. 103).	*Study 1:* • With demographics and financial factors controlled for, lower intelligence predicted HCD repayment difficulty (p < .05), with financial factors partially mediating the relationship. *Study 2:* • With demographics and financial factors controlled for, lower intelligence (p < .05), lower conscientiousness (p < .001), higher openness (p < .05), and higher neuroticism (p < .001) all significantly predicted HCD	5/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						repayment difficulties, with financial factors partially mediating the intelligence and repayment difficulties relationship. • Extraversion and agreeableness had no predictive effects on HCD repayment difficulties ($p > .05$).	
(Gathergood, 2012a)	Quantitative (Longitudinal). High ecological validity.	Mortgage (UK)	Respondents to all 18 waves of the British Household Panel Survey (BHPS; N = 44,547)	Psychological health (12-item General Health Questionnaire; Institute for Social and Economic Research., 2010).	Self-reported. More than two months late on housing payments (rent or mortgage) in the last 12-months.	• Those who were not initially behind on housing payments but had worse psychological health were later more likely to be two months late on their payments compared to those with better psychological health ($p < .001$).	3/5 + 2/3
(Gathergood, 2012b)	Quantitative (Cross-sectional). High ecological validity.	A mixture of ten credit products (UK)	Respondents to the DebtTrack survey (N = 1,234)	Impulsive behavior regarding purchases (“impulsive spending”), present time preference for consumption (“heavy discounter”), and general confusion regarding financial services (“confused by finance”; a five-point Likert item each; Authors’ own).	Self-reported. One-month and three-month delinquency on at least one credit item, where delinquency is defined as “a missed minimum payment on a credit/store card, or a missed contractual payment	• With demographics and financial literacy controlled for, “impulsive spending” predicted both 1-month and 3-month delinquency ($p < .01$). It is suggested that this relationship is at least partially mediated through the types of	4/5 + 1/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
					on a repayment loan" (Gathergood, 2012b, p. 593).	consumer credit used and exposure to financial shocks. • "Confused by finance" and "heavy discounter" had no effect on delinquency ($p > .05$).	
(Gerardi, Goette, et al., 2013)	Quantitative (Longitudinal). High ecological validity.	Mortgage (US)	Borrowers that took out subprime mortgages in 2006-2007 (*N* for fraction of time in delinquency and fraction of payments missed = 322, *N* for foreclosure initiated = 318)	Numerical ability (five ability questions; Banks & Oldfield, 2007). Verbal ability (one question from a verbal fluency test; Lang et al., 2005). Discount factor (two items from a discounting task; Authors' own). Impatience (an 11-point Likert item; Authors' own). Risk-aversion (an experimental switching measure; Barsky et al., 1997).	Observed. Three measures of delinquency—"the fraction of time a borrower is behind by at least one mortgage payment, […] the fraction of mortgage payments missed, [… and whether] foreclosure proceedings have been initiated by the lender [… which are normally initiated when] 120 days delinquent" (Gerardi, Goette, et al., 2013, p. 15).	• After controlling for a range of variables (e.g., verbal ability, discount factor, impatience, and risk-aversion), lower numerical ability was associated with a higher risk of all three measures of delinquency ($p < .01$ for the fraction of time and payments measures; $p < .05$ for the foreclosure measure). • After controlling for a range of variables (e.g., numerical ability, discount factor, impatience, and risk-aversion), verbal ability was not related to the fraction of time or payments behind on a mortgage payment ($p > .10$); however, lower verbal ability predicted	5/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						foreclosure proceedings being initiated ($p < .05$).	
(Guiso et al., 2013)	Quantitative (Cross-sectional). Low ecological validity.	Mortgage (US)	Homeowners from the Chicago Booth Kellogg School Financial Trust Index Survey (N = 2,846–4,159, depending on the model)	Views about strategic default morality (a dichotomous item; Authors' own). Anger about the current economic situation, trust toward banks and expectations about housing price appreciation (a five-point Likert item each; Authors' own). Attitudes regarding implementation of a cap on executive compensation and additional regulation of the financial sector (a dichotomous item each; Authors' own). Risk-aversion (a ten-point Likert item; Dohmen et al., 2011). Subjective probability of unemployment (one item rating from 0 to 100; Authors' own).	Self-reported. Declared willingness to strategically default on mortgage when the equity shortfall is equal to $50K and when the equity shortfall is equal to $100K.	• Those with higher subjective probability of becoming unemployed, who do not feel strategic default is morally wrong, are angrier about the economic situation, trust banks less, believe government should impose a cap on executive compensation, and should regulate the financial sector more were all more willing to strategically default ($p <$ .01) when the equity shortfall was equal to $50K and $100K, when controlling for a range of variables. • Risk-aversion and house price expectation had no effect on willingness to strategically default ($p >$ .10), when controlling for a range of variables.	3/5 + 0/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Henning & Jordaan, 2016)	Qualitative (Delphi technique). High ecological validity.	Agricultural loans (South Africa)	"Credit analysts and managers from a commercial bank, […] all involved in the decision-making process relating to the granting of credit" (Henning & Jordaan, 2016, p. 4; *N* = 9)	Willingness to repay, leadership and human relations, creativity and innovation, internal locus of control, self-confidence, self-efficacy, persistence, planning, passion, opportunity seeking, risk management, conflict management, need for achievement, positivity, positive attitude, tenacity, and commitment and confidence.	Self-reported. Characteristics that positively influence repayment ability.	• All psychological constructs had high consensus levels among experts, apart from internal locus of control which had reasonable consensus. • The three most important constructs were commitment and confidence, opportunity seeking, and planning.	5/5 + 2/3
(Herzenstein et al., 2011)	Quantitative (Longitudinal). High ecological validity.	Peer-to-peer loans (US)	Prosper.com borrowers (*N* = 728)	Trustworthy, successful, hardworking, economic hardship, moral and religious identity claims made in the loan listings (manual qualitative coding; Miles & Huberman, 1994).	Observed. Four criterion outcomes - loan paid ahead of schedule and in full; loan was current and paid as scheduled; payments 1-4 months late; or had defaulted.	• Borrowers claiming a trustworthy "identity were more likely to pay ahead of time than pay on time ($p < .05$)" (Herzenstein et al., 2011, p. S146). • "Borrowers claiming a moral identity were more likely to pay on time than pay late ($p < .10$) or default ($p < .05$)" (Herzenstein et al., 2011, pp. S146-7). • "Borrowers claiming the economic hardship identity were more	4/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						likely to default ($p <$ .001), pay late ($p < .10$), or pay on time ($p < .01$) than pay their loans ahead of time" (Herzenstein et al., 2011, p. S147). • The successful, hardworking, and religious identities did not predict loan performance ($p > .10$).	
(Hill, 1994)	Qualitative (Interviews). High ecological validity.	Not specified (US)	Collectors from a collections agency ($N = 12$)	Cooperation and agreeableness characterised by giving all the information needed easily and providing additional contact information, due to the "[fear] of the unknown consequences of having debts with a collections agency or need to pay off debts to make large credit purchases such as cars or homes" (Hill, 1994, p. 26).	Self-reported. Whether the indebted consumers pay their debts to the collection agency.	• Consumers who are moderately cooperative and agreeable tend to pay their debts. • Those debtors that are overly solicitous or openly confrontational and uncooperative tend to not pay their debts.	5/5 + 2/3
(Juan, 2011)	Qualitative (Interviews). High ecological validity.	Credit card (Philippines)	Delinquent credit card holders ($N = 5$), credit card holders with delayed or missing payments (N	Self-control or control of consumerist tendencies characterised by spending within their means, absence of	Observed. Delinquent credit card holders, credit card holders with delayed or missing	• The issue of self-control appeared to be salient for some of the delinquent cases, but in	3/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
			= 3), and timely payers (*N* = 2)	reckless spending, prudence in their spendings and methodically keeping track of their expenses against their income.	payments, and timely payers.	general, delinquents represented a wide range of consumerist tendencies and only one case demonstrated reckless spending. • Timely payers demonstrated self-control.	
(Karlan, 2005)	Quantitative (Longitudinal). High ecological validity.	Microfinance loans (Peru)	Female members of FINCA, a non-profit *village banking* organization (*N* for Panel A [proportion passed in Trust Game] = 397; *N* for Panel B [proportion returned in Trust Game] = 307; *N* for Panel C [cooperation in Public Goods Game] = 864; *N* for Panel D and E [trust relative to society and to the group] = 794)	Trust relative to society and relative to the group (three questions each on trust, fairness, and helping others from the General Social Survey; Davis et al., 2004). Proportion passed and returned (Trust Game; Author's own). Cooperation (Public Goods Game; Author's own).	Observed. Two criterion outcomes - default on the loan; and being dropped from the program for default or discipline (a more accurate measure of default since actual default may not be disclosed).	• Smaller proportion returned in the Trust Game ($p < .05$) and lower General Social Survey score relative to society ($p < .01$) predicted loan default and being dropped out for default or discipline a year later. • Higher proportion passed in the Trust Game predicted being dropped out for default or discipline ($p < .05$) but did not predict loan default ($p > .10$). • Public goods game behavior and General Social Survey score relative to the group did not have any predictive effects ($p > .10$).	3/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Klinger et al., 2013)	Quantitative (Longitudinal). High ecological validity.	Microfinance and SME loans (Colombia, Peru, Kenya, and South Africa)	SME and microfinance borrowers in lower-income countries from six different banks (*N* = 1,434)	Openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (a Big Five personality traits self-report inventory provided by a commercial test provider). Integrity (78-item commercially available integrity assessment that measures attitudes towards theft and dishonesty and is based on the Reid Report and the Personnel Selection Inventory; Ash, 1970, 1971; London House Press, 1980). Intelligence (digit span recall and ravens progressive matrices from WAIS-III; Wechsler, 1997).	Observed. Default - 30 days or more in arrears.	• With effects fixed across banks, lower conscientiousness and lower integrity significantly predicted default ($p < .01$). • Neuroticism, extroversion, openness, agreeableness, digit span, and ravens progressive matrices were all non-significant predictors of default ($p > .10$).	4/5 + 3/3
(Kropp et al., 2009)	Quantitative (Longitudinal). Low ecological validity.	Microfinance loans (US and China)	College students from three colleges (*N* = 102)	Perceived family income compared to the average (one item four-point scale; Authors' own).	Observed. Whether the loan was repaid	• Perceived family income compared to the average did not predict repayment behavior overall ($p > .10$). • But for US and not Chinese college students, perceiving income as average,	2/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						above average, and far above average predicted lower repayment rates (*p* < .001), when controlled for gender and amount lent.	
(Kuhnen & Melzer, 2018)	Quantitative (Longitudinal). High ecological validity.	Not specified (US)	Respondents to the National Longitudinal Survey Youth 1979, Child and Young Adult sample (NLSY79CYA; *N* = 8,078)	Self-efficacy (seven-item four-point Likert-type Pearlin Mastery scale; Bureau of Labor Statistics, 2009). Patience (respondent's attitude as assessed by the interviewer; Bureau of Labor Statistics, 2009). Risk-aversion (three-items four-point Likert-type scale; Bureau of Labor Statistics, 2009). Cognitive ability (Peabody Individual Achievement Test; Bureau of Labor Statistics, 2009).	Self-reported. Three criterion outcomes—more than 60 days behind on payments for credit card, vehicle loans, mortgage, or other type of loans; accounts in collection; and foreclosure, repossession, or bankruptcy.	• Lower self-efficacy (*p* < .01), less risk-aversion (*p* < .10), and less patience (*p* < .01) were related to being at least 60 days behind on debt payments, but not cognitive ability (*p* > .10). • Lower self-efficacy, less patience, and higher cognitive ability were related to having accounts in collection (*p* < .01), but not risk-aversion (*p* > .10). • Lower self-efficacy and lower cognitive ability were related to experiencing foreclosure, repossession, or bankruptcy (*p* < .05), but not risk-aversion or patience (*p* > .10).	5/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Leyshon et al., 2006)	Qualitative (Interviews, observations, focus groups). High ecological validity.	Doorstep loans (UK)	National, regional and branch managers, agents, and credit controllers in three different moneylending firms (*N* = 9+)	Trustworthiness, characterised by actions such as honesty and openly declaring financial difficulties.	Observed. Paying according to terms (good customers), not according to terms (limbo customers), or not paying at all (bad customers).	• All good and some limbo customers demonstrated the personal characteristics of trustworthiness.	5/5 + 3/3
(Lindblad & Riley, 2015)	Quantitative (Longitudinal). High ecological validity.	Mortgage (US during the Financial Crisis)	Participants of the Community Advantage Program that targets low-income and/or minority borrowers (*N* = 641)	Mental health (a dichotomous item from the short-form health survey; Ware et al., 1996). Sense of control (four items from the Perceived Stress Scale; S. Cohen et al., 1983). Stress from mortgage or rent payment and stress from home maintenance (one three-point Likert-type item each; Authors' own).	Observed. Experienced a foreclosure sale, loan modification, or neither between beginning of 2008 and the end of 2013.	• The loan modification group ($p < .01$), but not the foreclosure group ($p > .10$), was significantly more likely to experience mental health problems than the "neither" group. • The loan modification and foreclosure groups had lower sense-of-control than the "neither" group (no significance value available). • The loan modification and foreclosure groups had higher levels of stress than the "neither" group (no significance value available).	3/5 + 3/3
(L. McCloud & Dwyer, 2011)	Quantitative (Longitudinal). High ecological validity.	Not specified (US)	Respondents of the 2004 wave of the Survey of Consumer Finances (*N* = 4,159)	General acceptance of credit (one item dichotomous measure; Board of Governors of	Self-reported. Two criterion outcomes - declared bankruptcy in the past five years,	• Lower general, but higher specific acceptance of credit	4/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
				the Federal Reserve System, 2006). Specific acceptance of credit (five item dichotomous measure; Board of Governors of the Federal Reserve System, 2006).	and delinquent on payments for more than two months in the past five years.	predicted bankruptcy ($p < .01$). • Higher specific ($p < .001$), but not general ($p > .05$) acceptance of credit predicted payments delinquency. • However, these results significantly interacted with whether the respondent was lower-, middle-, or upper-class, as based on income.	
(Mewse et al., 2010)	Quantitative (Cross-sectional). High ecological validity.	Not specified (UK)	Debtors who received Warning of Court Action (WOCA) letters (*N* for Model 2a [optimism, self-efficacy, and locus of control] = 56; *N* for Model 3a [social identity] = 159)	Social identity of debtors (nine Likert-type items; Authors' own). Optimism (six Likert-type items from the Life Orientation Test-Revised; Scheier et al., 1994). Internal locus of control (four finance-specific items from Rotter's Locus of Control scale; Lefcourt, 1976). Financial self-efficacy (three finance-specific items from the General Self-Efficacy Scale; Schwarzer & Jerusalem, 1995).	Observed or self-reported. Engagement - whether the debtor "made a full payment to the creditor, or [came] to an arrangement to pay the debt in instalments, within the time allowed by the WOCA." (Mewse et al., 2010, p. 1024).	• Higher financial self-efficacy ($p < .001$), more internal locus of control ($p < .05$), and higher perceived ease of leaving the debtor identity ($p < .001$) were all associated with higher likelihood of engagement. However, in a model considering all three, only financial self-efficacy remained predictive. • Optimism, debtor group belonging, debtor group differences, discrimination of debtors, and ease of joining the debtor group	2/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
						did not predict engagement (*p* > .10).	
(Moulton, 2007)	Qualitative (Interviews). High ecological validity.	Consumer and commercial loans (US)	Lenders at for-profit banks, credit unions and non-profit community and economic development creditors (*N* = 38)	Respectful and obedient (characterised by being “punctual, polite, and able to follow directions”), clean (characterised by a “clean appearance of self, home, and place of business”), stable and reliable (characterised by possessing values of “work ethic, strong family orientation, patience, and confidence”), and competent (characterised by “speaking well, being organized, and demonstrating knowledge of one’s finances”; Moulton, 2007, pp. 314–315).	Self-reported. Perceived risk by lenders.	• A respectful, obedient, clean, competent, stable, and/or reliable borrower, as assessed through specific behavioural cues, is perceived to be a good risk; especially when the credit scores are moderate or when information provided is ambiguous.	5/5 + 2/3
(Samanta & Ray, 1980)	Quantitative (Longitudinal). High ecological validity.	Agricultural loans (India)	Farmers (*N* = 160)	Risk orientation (six items from the Risk Preference Scale; Supe, 1969).	Observed. Whether the loan was repaid on time.	• Lower risk orientation was associated with a higher likelihood of failing to repay the loans on time (*p* < .01).	3/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Ssebagala, 2016)	Quantitative (Longitudinal). High ecological validity.	Not specified (South Africa)	Respondents to the three waves (2002, 2005, and 2006) of the Cape Area Panel Study (CAPS; N = 2,549)	Perceived financial situation (a five-point Likert item; Author's own).	Self-reported. Experiencing arrears in the past 12 months.	• Worse perceived financial situation predicted higher likelihood of being delinquent ($p < .01$), while controlling for the ability to pay.	4/5 + 2/3
(Stockham & Hesseldenz, 1979)	Quantitative (Longitudinal). High ecological validity.	Student loans (US)	Student loan recipients (N = 878)	Thinking introversion, theoretical orientation, estheticism, complexity, autonomy, religious orientation, social extroversion, impulse expression, personal integration, anxiety level, altruism, political outlook, masculinity-femininity, and response bias (Omnibus Personality Inventory; Heist & Yonge, 1968).	Observed. Payers are those repaying the loan faithfully for at least a year and those who have paid off their loan. Non-payers are everyone else.	• Less anxious, less ethical, less interested in being with people, more socially alienated, more liberal, more rebellious, more interested in artistic activities, and more logical students with more tolerance for complexity and less biased responses were significantly more likely to be non-payers ($p < .001$). • There were no significant differences between payers and non-payers on the following scales - thinking introversion, autonomy, religious orientation, and masculinity-femininity ($p > .10$).	3/5 + 3/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
(Taujanskaite et al., 2016)	Qualitative (Delphi technique). High ecological validity.	Consumer loans (Lithuania)	Experts with experience of working with non-performing loans and dealing with insolvency issues of personal clients (N = 24)	Irrational consumer behavior characterised by "[compromising of] economic logic, […] irrational consumption, and full or partial ignorance of budget constraints" (Taujanskaite et al., 2016, p. 410).	Self-reported. Consumer insolvency.	• Irrational consumer behavior was one of the most important factors for predicting an individual's insolvency according to expert evaluations. The weight of influence was approximately 30%.	4/5 + 2/3
(Tokunaga, 1993)	Quantitative (Cross-sectional). High ecological validity.	Credit card (US)	Two groups of credit card holders—those who have experienced credit problems (N = 69) accessed through Consumer Credit Counseling Services and those who have not (N = 62)	Internal control, control by powerful others, and control by chance factors (21-item locus of control scale; Levenson, 1973). Self-efficacy (23-item self-efficacy measure; Sherer et al., 1982). Self-esteem (10-item Rosenberg scale; Rosenberg, 1965). Power/prestige, retention, and anxiety money attitudes (22-item Money Attitude Scale; Yamauchi & Templer, 1982). Risk-seeking in gain and loss situations (16 decision-making situations; adapted from Hershey & Schoemaker, 1980). Sensation seeking (40-item Sensation	Observed. Experienced serious financial problems such as credit delinquency and debt-to-income ratio over 100%.	• Those in the financial problems group had lower levels of internal locus of control (p < .05), lower self-efficacy (p < .05), lower sensation seeking (p < .05), and lower risk-seeking preference in gain situations (p < .01), "viewed money more as a source of power and prestige [(p < .05) …], were more anxious about financial matters [(p < .05), … and] expressed less concern about retaining their money [(p < .01)]" (Tokunaga, 1993, p. 303) - all compared to the control group.	4/5 + 2/3

Author(s) & Publication Date	Study Design & Ecological Validity	Type of Credit (Study Context)	Population (Sample Size)	Psychological Constructs Assessed (Measures Used)	Criterion Outcomes & Their Types	Brief Findings	MMAT + Additional Quality Scores [a]
				Seeking Scale; Zuckerman, 1979).		• No differences were observed in terms of self-esteem, chance factors and powerful others locus of control, and risk-seeking preference in loss situations ($p > .05$).	
(Xiao, Ahn, et al., 2014)	Quantitative (Longitudinal). High ecological validity.	Credit card (US)	University students who have at least one credit card ($N = 771$)	Subjective financial knowledge (single item five-point scale; Authors' own).	Self-reported. Frequency of paying credit card bills on time within the previous 6 months (Lyons, 2008).	• Higher subjective credit knowledge at time 1 significantly predicted paying credit card bills on time at time 2 ($p < .01$), while controlling for payment of credit card bills at time 1.	3/5 + 2/3

Note. MMAT = Mixed Methods Appraisal Tool (Q. N. Hong et al., 2018). If several models are reported, the sample size and the findings of the most robust one(s) are reported.

[a] For more information, see the method section in Chapter 3.

A2. Additional Details for the Semi-Structured Interviews (Chapter 4)

A2.1. Materials for Study 1b

The following section contains the materials for Study 1b, including invitation emails, information sheets, consent form, demographic forms, debrief, and the interview guide. Please note that the formatting of the materials has been altered to preserve space.

INVITATION EMAIL
(UNDERWRITERS)

[Host organisation] is sponsoring a research project that will examine what makes people creditworthy. We want to gain qualitative insight into the informal and non-policy based assessments that underwriters make when approving or rejecting a loan. This is an important and interesting area of research, as it can improve our understanding of how to make underwriting for micro-loans fairer and more responsible.

The project will involve a one-to-one interview at your place work, during the work day. The interview will last maximum an hour and will be fully confidential. The interview will focus on recent underwriting situations that you took part in. These situations will be as follows:

- A situation when you did not grant someone a loan based on your assessment
- A situation when you granted someone a loan based on your assessment and they always or almost always repaid on time
- A situation when you granted someone a loan based on your assessment and they missed their payments or were written off

More information about the project can be seen in the information sheet and consent form attached.

If you would like to participate, please contact Natalia Mladentseva from City, University of London on Natalia.Mladentseva@city.ac.uk with times and days suitable for you. It will then be arranged with your area manager that your shift is covered for the duration of the interview.

Thank you in advance for your participation.

INVITATION EMAIL
(CUSTOMERS)

[Host organisation] is sponsoring a research project that will examine the repayment behaviour of people who have taken out a micro-loan. We are interested in finding out more about the motivations, actions and thinking processes of a wide variety of borrowers. This is an important and interesting area of research as it can improve our understanding of how to make underwriting for micro-loans fairer and more responsible.

The project will involve a one-to-one interview at your local [host organisation] store or at the [host organisation] headquarters located in Bloomsbury, at a time and day suitable for you. The interview will last maximum an hour and will be fully confidential. The interview will involve recalling recent situations to do with repaying of your loan. You will be given a £20 voucher at the beginning of the interview to cover travel expenses and as a thank you for taking part.

More information about the project can be seen in the information sheet and consent form attached.

If you would like to participate, please contact Natalia Mladentseva from City, University of London on Natalia.Mladentseva@city.ac.uk with times and days suitable for you.

Thank you in advance for your participation.

INFORMATION SHEET

(UNDERWRITERS)

Title of study

Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

Our goal is to understand what makes people creditworthy. We want to gain qualitative insight into the informal and non-policy based assessments that underwriters make when approving or rejecting a loan. The estimated duration of this study is November 2017 to February 2018. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?

You have been invited because you have good loan performance metrics (RAF, repeat customers, and write off rate) and we want to learn how you make your loan decisions. We also aim to include underwriters from as many store locations as possible. Between about 17 and 33 underwriters will take part in this study.

Do I have to take part?

Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study, or avoid answering questions without being penalised or disadvantaged in any way. This project will not impact your relationship with [host organisation]. If you decide to take part, we will ask you to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?

You will meet the researcher for a one-to-one interview. It will be audio-recorded and will take place at your place of work. This will be at a time suitable for you, but during the work day. The interview will not be longer than an hour and will encourage you to recall recent underwriting situations that you took part in. These situations will be as follows:

- A situation when you did not grant someone a loan based on your assessment
- A situation when you granted someone a loan based on your assessment and they always or almost always repaid on time
- A situation when you granted someone a loan based on your assessment and they missed their payments or were written off

You will meet with the researcher only once. We will also ask you to fill out a brief demographics survey for comparison and reporting purposes.

What do I have to do?

You are expected to answer questions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?

Possible disadvantages and risks have been determined to be minimal, since the interview will take place in your place of work, during the work day. The area manager will ensure that your shift is covered for the duration of the interview.

Although it is unlikely, if you feel upset by the content of the interview and need to seek further support, you may contact a charity listed below:

- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

What are the possible benefits of taking part?

This research will be contributing to the understanding of underwriting for micro-loans. As a result, it may benefit you indirectly by improving the accuracy of the scorecard used by [host organisation] and by making the underwriting process faster. This research might also benefit the wider community by providing access to credit for individuals who previously could not access it, and by making loans provided by [host organisation] fairer and more responsible.

Will my taking part in the study be kept confidential?

Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. Once you have given your consent to participate, you will be given an anonymous code. The code is necessary in case you request for your data to be removed.

The interviews will be transcribed by the researcher only. Once transcribed, the digital audio-recording of the interview will be destroyed. No one apart from the researcher will have access to the original recording of the interview, your consent form, or your contact details. Your data will be kept in an electronic format on a password-protected and encrypted laptop. If the project is abandoned before completion, the data will be destroyed.

What will happen to the results of the research study?

The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymised findings will also be shared with [host organisation] and will be used to inform their underwriting procedures. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?

You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 28th February 2018, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)'*

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?

This study has been approved by City University Psychology Department Research Ethics Committee, PSYETH (R/L) 17/18 07.

Further information and contact details

Student Researcher:

Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:

Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Thank you for taking the time to read this information sheet.

INFORMATION SHEET

(CUSTOMERS)

Title of study

Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

Our goal is to understand the repayment behaviour of people who have taken out a micro-loan. We want to gain qualitative insight into the motivations, actions and thinking processes of a wide range of borrowers. The estimated duration of this study is November 2017 to February 2018. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?

You have been invited because you are a recent [host organisation] customer. We aim to recruit a wide range of customers representing a variety of experiences. Between about 25 and 50 customers will take part in this study.

Do I have to take part?

Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study, or avoid answering questions without being penalised or disadvantaged in any way. This project will not impact your relationship with [host organisation]. If you decide to take part, we will ask you to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?

You will meet the researcher for a one-to-one catch-up. It will be audio-recorded and will take place either at your local [host organisation] store or at the [host organisation] headquarters in Bloomsbury. This will be at a time and day suitable for you, and will not take longer than hour. We will encourage you to recall recent situations to do with repaying your loan that took place in the past year. You will meet with the researcher only once. We will also ask you to answer a couple of basic questions about yourself.

Expenses and Payments

To cover travel expenses and as a thank you for taking part, you will be given a £20 voucher at the beginning of the interview.

What do I have to do?

You are expected to answer questions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?

If finances are a particularly sensitive topic for you, it is possible that you might find the interview upsetting. We do not want to cause you any distress. If you find a question too personal, intrusive or unsettling, you can avoid answering that question or withdraw from the study completely. You will not be penalised or disadvantages in any way. If you need to seek further support, you may contact a charity listed below:

- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

What are the possible benefits of taking part?

This research will be contributing to the understanding of underwriting for micro-loans. So it may benefit you indirectly by ensuring that loans:

- are fair and responsible,
- are faster and more automatic, and
- can be provided to people have trouble accessing credit.

Will my taking part in the study be kept confidential?

Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. Once you have given your consent to participate, you will be given an anonymous code. The code is necessary in case you request for your data to be removed.

The interviews will be transcribed by the researcher only. Once transcribed, the digital audio-recording of the interview will be destroyed. No one apart from the researcher will have access to the original recording of the interview, your consent form, or your contact details. Your data will be kept in an electronic format on a password-protected and encrypted laptop. If the project is abandoned before completion, the data will be destroyed.

What will happen to the results of the research study?

The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymised findings will also be shared with [host organisation] and will be used to inform their underwriting procedures. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?

You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 28th February 2018, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)'*

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?

This study has been approved by City University Psychology Department Research Ethics Committee, PSYETH (R/L) 17/18 07.

Further information and contact details

Student Researcher:

Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:

Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Thank you for taking the time to read this information sheet.

CONSENT FORM

Title of Study: *Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)*
Ethics approval code: PSYETH (R/L) 17/18 07

Please initial box

1.	I confirm that I have read and understood the information sheet for this study. I understand that this will involve being interviewed by the researcher, and allowing the interview to be audiotaped	
2.	This information will be held and processed for the purpose of answering the research question outlined in the information sheet. I understand that all personal information provided by myself will remain confidential and no information that identifies me will be made publicly available	
3.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any consequences.	
4.	I agree to City University London recording and processing this information about me.	
5.	I agree to take part in the above study.	

____________________ ____________________________ _____________
Name of Participant Signature Date

____________________ ____________________________ _____________
Name of Researcher Signature Date

When completed, 1 copy for participant; 1 copy for researcher file.

DEMOGRAPHICS FORM

(UNDERWRITERS)

Title of Study: *Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)*

Ethics approval code: PSYETH (R/L) 17/18 07

Participant Code: ________________

1. Gender

- ❍ Male
- ❍ Female
- ❍ Other: ___________________

2. What is your age?

____

3. Which store are you currently based in?

____

4. Are you a manager?

- ❍ Yes
- ❍ No

5. What is your mandate level?

- ❍ 1-Star
- ❍ 2-Star
- ❍ 3-Star
- ❍ 4-Star

6. How long have you been at [host organisation]?

____

FOR RESEARCHER'S USE

Today's Date: ____________

Rank Number: ______

RAF Numbers:

- ❍ 0-500
- ❍ 500-1,000
- ❍ 1,000+

Repeat Numbers:

- ❍ 0-500
- ❍ 500-1,000
- ❍ 1,000+

Write-Off Rate:

- ❍ 0-10%
- ❍ 10-20%
- ❍ 20+%

DEMOGRAPHICS FORM

(CUSTOMERS)

Title of Study: *Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)*

Ethics approval code: PSYETH (R/L) 17/18 07

Participant Code: ________________

1. Gender

- ❍ Male
- ❍ Female
- ❍ Other: ___________________

2. What is your age?

____

3. What is your nationality?

____

4. Were you referred to [host organisation] by a friend?

- ❍ Yes
- ❍ No

5. Do you use the [host organisation]'s mobile app?

- ❍ Yes
- ❍ No

6. What is your pricing level?

- ❍ Bronze
- ❍ Silver
- ❍ Gold
- ❍ Don't Know

7. How long have you been with [host organisation]?

____

8. How would you describe your experience with loans in general?

- ❍ Novice
- ❍ Competent
- ❍ Expert

FOR RESEARCHER'S USE

Today's Date: ____________________

Origination:

- ❍ Online
- ❍ Offline: ____________________

Customer Group:

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4

DEBRIEF

Exploring Decision-Making and Behaviour in the Micro-Loans Industry (Study 1)

Thank you for taking part in this study. Now that it's finished, we'd like to tell you a bit more about it.

Loan decisions at [host organisation] mostly depend on the underwriter's judgement. To help improve how loan decisions are made, we are interviewing both underwriters and customers. This is to help understand the decisions and behaviours that takes place in the micro-loans industry. Specifically, we want to get:

- detailed accounts of underwriters approving and not approving loans, and
- detailed accounts of customers being able to pay and being unable to pay their loans.

Since this is an explorative study, there are no specific outcomes that we expect. The research might show that underwriters look for specific characteristics in customers when granting loans, and customers who are better at paying on time also elicit those characteristics.

If this research raised concerns and you need to seek further support, you may contact a charity listed below:

- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

We hope you found the study interesting. If you have any other questions, please do not hesitate to contact us at the following:

Student Researcher:

Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:

Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Ethics approval code: PSYETH (R/L) 17/18 07

INTERVIEW GUIDE

M = Main question

F = Follow-up question (may be asked when appropriate)

Questions for Underwriters

M: Can you take me step by step through how you would underwrite a loan for someone?

M: Could you tell me about a time in the past year when you did not grant someone a loan based on your assessment?

> **F:** What characteristics of the individual led you to that decision?
>
> **F:** How would you describe their behaviour in this situation?

M: Could you tell me about a time in the past year when you granted someone a loan based on your assessment and they always or almost always repaid on time?

> **F:** What characteristics of the individual made you make that decision?
>
> **F:** How would you describe their behaviour in this situation?
>
> **F:** What was different about this customer and the other customer(s) we talked about?

M: Could you tell me about a time in the past year when you granted someone a loan based on your assessment and they mostly missed their payments or had to be written off?

> **F:** What characteristics of the individual made you make that decision?
>
> **F:** How would you describe their behaviour in this situation?
>
> **F:** What was different about this customer and the other customer(s) we talked about?

M: What do you think makes a customer creditworthy?

M: Is there anything else you would like to mention?

Questions for Customers

M: Could you tell me about your relationship with [host organisation]?

M: Could you tell me about the most recent loan that you have taken out with [host organisation]?

> **F:** How recently was that?

M: With this loan, have you ever had any late payments?

> **F:** Why couldn't you pay?
>
> **F:** What did you do?
>
> **F:** How did you decide?
>
> **F:** How did that make you feel?
>
> **F:** What was the outcome?
>
> **F:** What did you do to ensure you were able to pay on time?
>
> **F:** Why was it important to you to pay on time?
>
> **F:** How were things set up to make sure you could pay on time?
>
> **F:** Have you ever had any late payments with other [host organisation] loans?

M: Could you tell me more about your experience with loans in general?

M: Why do you think some people are more able to pay on time and some are not?

M: Is there anything else you would like to mention?

A2.2. Example Interview Transcript

The following is an example interview transcript with an underwriter (#2). The interviewer questions are in bold and prefaced with a "Q:".

Q: Could you take me step-by-step through how you would underwrite a loan for someone?

Step-by-step? The customer will come in. We'll greet them. Introduce ourselves and ask what they're in need of, because it might be that they are a brand-new customer or an existing customer. So, we clarify which one they are first. And then we ask them for the amount, we ask them how much they need and the term, how long. And then we ask for purpose for the loan, so we need to find out what they need the loan for. And from that we already get an idea of whether the customer is being honest or not. Because some of them will be like: "Yeah, I just need the money." Then we run them through a validation process, which is doing identity check and credit searches and begin their background history—how long they have been at the address, if they've got children, if they are married or not. Then we run a credit search and then, we do an income and expenditure with them. And the next step from that is the scorecard. So, it might be it comes income is verified and customer is somewhat telling the truth and we don't need to verify their income. Or it might be that something is wrong, and we need to request bank statements to carry on with the loan. And sometimes we need to wait an hour, two hours, sometimes days for them to send their bank statements. And sometimes, they send it straight away and the customer is actually being honest about their expenditure and income. That's how we base the loan on.

Q: Could you tell me more about why you request the bank statements?

It's to back what they said. Bank statements is the only thing you can accept to prove their income and their expenditure, if it needs to be verified.

Q: Just to confirm, do you do just face-to-face loans or do you do over the phone too?

We do over the phone as well.

Q: And how many people do you tend to do over the phone?

Eh… it's 50-50. Sometimes we might do over the phone all day. Sometimes we can have 6-7, not all of them would be approved, but we can have 6-7 over the phone. Sometimes it can be customers coming into the store. It's 50-50. Sometimes we have existing customers that used to come to the store, but because it's raining and they don't want to come, we'll do them over the phone.

Q: Fair enough. Could you tell me about a time in the past year when you did not grant someone a loan based on your assessment?

Yes, for example, actually two weeks ago, I had a customer who was getting very very good income, very very good income and he wanted a small loan. I asked the purpose of the loan, he just said: "I need it." And when I went through income and expenditure with him, he would simply have no expenditure whatsoever. For example, you are getting something like £4,000 a month and only spend £500. So, what are you doing with the other £3,500? It was something like that, it was very small expenditure. If you're getting so much money and not wasting none of it, then why do you need a loan? He wouldn't tell me, so I declined him.

Q: What do you think was going on there?

Could be a number of things. It could be him trying to get loans off loads of people. Could have been him gambling his own money. It could be a variety of reasons, but if they aren't honest with us, then we can't help them.

Q: How would you describe this person's behaviour in this situation?

It was… kind of suspicious. So, he was trying to do everything fast and he was not answering none of my questions. Even when we were running a call validate, there is a number of questions I'm asking him. "Why are you asking me? If I'm born in the UK, why are you asking me this? And why are you doing this? And why are you doing that? I just need the money. Can you hurry up? I don't have time." That was his behaviour, and I was like okay… So, it was a bit strange, yeah.

Q: Okay, was there anything else?

Erm… oh no, when we were on his expenditure part, he just kept on saying: "No, no. I don't spend nothing on travel, nothing on rent, nothing on food, nothing." He just kept on saying nothing, nothing. And when we got onto entertainment, he said: "Oh, well I will spend about £50 or £100." And that was it. You don't live. Okay.

Q: Could you give me another example of when you did not grant someone a loan?

We have the typical when the scoreband comes back and it's a 10—it's a policy decline. We can't do anything. Or, for example, debt management—we can't do anything. Or if, for example, they have too many loans that they are paying up too much money of the income, it is over a certain percentage. We can't give them the loan because we could be over-indebting. Because we follow FCA rules, we can't do it.

But I do disagree with the scoreband sometimes. Because sometimes we get a 10 and from that credit history, we can see that this is really bad. So yeah, that's fine. But then we'll have some people's credit history where it's absolutely nice and clean, but then they'll be a 10 and we can't do nothing to help them, because they are a 10. Some customers, when we are asking them some questions, they are quite honest: "I've had arrears in the past." And some of them say: "Yeah, I'm not even going to get past the checks, but let me try." So, they are quite honest sometimes and we try our best for them, but then if it's a 10, then we can't do anything.

Q: What about when you granted someone a loan based on your assessment and they mostly missed their payments or had to be written off?

There are two instances. So, if they never paid at all before, then somehow became a write-off customer and then paid, I wouldn't be a hundred percent on giving them another loan, because who is to tell me you are not going to do the same again. So, I'll definitely get everything—bank statements, why do you need a loan, I will need the perfect application. And that there are some customers, for example, we have to sell for weekly of two weekly repayments, but in the end, they get paid monthly so they miss one payment, but pay double the next. Miss one payment, pay double the next. So, if we see that they keep doing that for a reason, then we can do the loan for them, because it's a justification reason.

Q: Could you give me a specific, recent example, please?

Ah yeah, so with this whole scoreband thing, only 4-star mandates can approve 8-9. But that is maximum of £200, so that is a risky loan. But sometimes you have a customer with okay credit history, and they give you quite an honest reason, and they give you proper bank statements, but then they don't pay you. So, I've had cases where I've given them £200 and then they just dump it all and then we have to call them, and they don't pick up the phone. That's the worst part, yeah.

Sometimes, sometimes it tends to be kind of those crazy customers that, how do I say… Well, what I would say it's easier for us to get money back from customers on benefits than people that are working. Because for benefit customers we can set for when they get their benefits coming in when on working customers if they say yeah, I get paid tomorrow or next week they could be lying so it's hard. Yeah, but apart from that what sometimes their behaviour can affect it if they are trying to rush us or they are lying about something or if they say yeah, I've been at my address what I think for three years, but then we see on their credit history that they've been there longer, it's like why are you lying, yeah

Q: Is there anything else?

Some of them, some, they try to trick you, so some customers they will be lovely, lovely and you'll say, you'll think that they are the most honest customers and then three weeks later you don't get your money. But then you will have some customers, that you would be like I don't really trust this person and they pay you! So, it's always surprising here, it's always surprising. And then you will have the honest, honest customers which are honest and then the bad customers which are bad. So, it's always a surprise here.

Ah yeah, when I first started here, actually there was an interesting one. I think he was a Spanish guy and he came into the store. It was a couple of months after I started, so obviously I was doing his loan, because I was already doing loans. And I had seen from his previous applications that they kept declining him but there was no actual reason for declining him. I spoke to my manager: "Let's give this guy a chance. I think he is actually an honest guy." And he was like: "OK, but if he doesn't pay, it's on you" and all of that. The customer is actually now a gold customer, still paying us. So yeah it depends on your relationship with the customer. So, if you show them you're willing to give them a chance and help them build their credit history, they will pay you back. If they know you're willing to help them, they will do it.

Q: Could you tell me more about this customer's behaviour, if you remember?

He was really happy that we were able to help him because it was around the Christmas time. And then he came back a few months after, and he was all: "I don't know if you will be able to help me again, but I'm willing to try." And we were able to help him because he never missed a payment. And now he only comes here, and he only wants to speak to me, because he knows I'm the one that was willing to help him. But it's how it is with a lot of customers. Once you help one customer, they will particularly only want to come back to you because they automatically think: "She's going to help me every time." But we have to explain to them that we have to run through the checks and everything, and if everything is ok, then we can do it for them.

And it also happens when you have history with the customer and then they stop paying you. But those people that are honest, honest ones, they will still always come back to say: "I'm having this problem, having that problem. I want to sort it out." And then you can help them by calling collections and setting up an arrangement for the alternative payment. But then you'll see those ones that you've known for a long time and you've always been helping them and then one day they just stop. And you never see them again. And you obviously can't go to their house or anything. But yeah, it's quite hard, yeah.

Q: Could you give me a specific, recent example?

Umm… yes, I had a customer here who works just over there, at one of those restaurants and he took out a loan. He made his first three or four payments, and then he stopped paying. I saw that he stopped paying, so I tried to call the restaurant to speak to him and then they said: “No, he doesn’t work here anymore. He quit.” And then I was like: “Oh, okay, that’s fine.” So, I was like: “We are never getting our money back.” And then a couple of weeks later, I actually went there to get some lunch and he was working there. And it was like awkward because I’m on my lunch break and I’m not at work and I can’t directly speak to him or anything, but he did say to me he was coming in. He had a few problems, but he was coming back to sort everything out and then he did. He paid off his loan.

Q: What do you think happened in this situation?

He did say that he had to leave the country for a while, but then he came back.

Q: Could you tell me more about him as a person?

I only knew him throughout the duration of that loan. But from the fact that he said he would come back and he did pay it all off is ok. It showed that he had intention to pay. And his reason did back up why he was in arrears so yeah.

Q: If you remember, how would you describe this customer’s behaviour from when he applied for the loan?

He was fine. He was kind, chatty. He said what he wanted to do with the loan. He wanted to take an English course, because I think he is French, so he wanted to improve on his English. It was quite honest, he was quite honest and quite kind. He didn't give me any suspicion to decline him or to tell him to go, to give me time to think about it; nothing like that. He was okay.

Q: Was there anything else?

From him? No. But we have some customers that come in and they will come in with the—for example, a brand-new wave 0 will come in and then they will come in with someone who was a write-off. We automatically can see that because the write-off already knows how we works, so he knows what to answer. He knows what we are going to ask. He knows how we are going to do things. And we can tell that they know that they are write-off because how do you know our procedure? And they are always giving the answers and saying: “Oh yeah, yeah, it’s ok. Let them answer, let them answer.” “Maybe! They are doing the application.” So that’s when we try to investigate using the wave 0: “How do you know about [host organisation]? Who referred you? What’s your address? What’s your previous address?” to see if we can link them and find that person. It tends to be so obvious. We’ve even had customers where I'll be doing them, and they’ll be accompanied by a friend and a friend doesn’t sit with them but sits in our waiting area. And when I say: “How do you know about [host organisation]?” “My friend told me.” And then if I say: “Who’s your friend?” And then the other person will be like: “Oh, no, no. It’s fine, it’s fine. I don’t want to receive any money. It’s fine.” It’s because they don’t want us to find their account. And we are not always able to link them. Sometimes we can through association checks, reference checks. Sometimes we can’t just force the person, say, “Give me your name. What’s your name? I want to know who you are.” So those ones, I’d say, are kind of the risky loans where I’m on 50-50 whether I want to give them the money or not because I don't know who you are with.

Q: What do you tend to do in these situations?

If I can see that I can claim the money back, for example, if they get paid every two weeks, I'll give them a small loan and I tell them that they need to build a relationship with us in order to apply for something bigger. But I’ll make sure that, for example, you get paid every two weeks on a Friday, I have to set it up for that day. If I see that you are transferring money left and right, and you never have money in your account, as soon as you get paid you withdraw everything, I won’t be 100% sure

I'm going to collect my money, so why should I give it to you.

Q: Could you give me a recent example?

Oh, I remember, we had a risky one quite a few months ago, because they had a basic account and then their benefits were going into a savings account. But we can't collect money from a savings account, so we have to put the direct debit on the basic account. But we have to trust them that they will transfer the money into the basic account for us to collect it. So, we work on that one, seeing if the customer will really build a relationship with us, see their behaviour. That is how we work those out. But other than that, there is nothing we can say: "Yes, I know she's going to pay. Yes, I don't know she's going to pay." It's a risk. Those ones are a risk.

Q: What decision did you make regarding that customer with the benefits in the savings account?

That particular customer, I actually gave it to her because she came from a friend that referred her who was paying very well. So, if the friend's paying really well and she's *Refer a Friend* (RAF), it's because she trusts her as well.

But there've been other cases where we've seen that the customer gets the money into the savings account, but they don't transfer nothing into their basic account, or they will just transfer the minimum. For example, if they have a direct debit coming out, that's all that they would transfer for that particular direct debit that one. There have been cases where I have declined because I have no back up source to say where I'll get the money from. But you do see some customers transferring all their benefits into the basic account, so we know we've got a back-up source.

Q: Could you tell me more about this type of customer that you have declined?

Because with that particular customer, they had a few more transfers coming in and coming out again. As soon as they come in, they'd come out into a different bank account. So, they'd come in and they'd come out and there were other transactions on there. For example, she had gambling so that one was an automatic: "You are not treating your money well."

Q: How would you describe their behaviour in this situation?

They were fine. Most of them with gambling, they act really fine and calm about it, as if nothing's there. Apart from looking at the bank statements, there is nothing you can tell by just looking or talking to the customer, because they stay really calm, as it it's not theirs. I mean sometimes you might not even know that they are gambling or anything, but let's say, for example, long-time ago when we used to give the money out in the store, cash. We couldn't see any gambling or any kind of suspicious transactions on their bank statement, but as soon we give them the cash. For example, here, here it was really easy to tell. They'd just walk straight across the road and walk into the betting shops. That was all that we could see, and we were like: "There's our money gone!" But that's only after the fact.

Sometimes we only see the real them after everything has been done. I mean, sometimes we even have customers, they are sitting there so lovely to us, kind, answering all the questions. Once we decline them, it's a different person that comes out of them—really rude and stuff like that. So, we just need to know how to control them as well, yeah. But from as long as I've been here it never got violent, and I hope to never see anything like that.

Q: I believe we've covered everything. So just to wrap up, what do you think makes a person creditworthy?

Creditworthy? When you can see that they've actually got quite a few accounts and they are up to date with all their payments. Even their behaviour says it: "Oh no, I don't want to get into arrears. I want to make sure everything's correct for future. I know it's important that's when they show that they are really creditworthy and really care about their credit history. But if they've never had credit history in the past, they are not really creditworthy. Those will be the risky ones that you just base it on how they are, their behaviour. So, if they are ok in store and you are risking to give it to them, and it could be something else, but it could be just a simple fact that they are quite new in the country or they've just turned 18, so they have no credit history. That's when you will start them off and build the relationship with us. These are things that you have nothing to back you up on in advance.

Q: This is an extra question, but I'm curious. Do you have any suggestions of what could be included in the current assessment process?

I'm trying to think… What else could we check… No, I can't think right now… No. Because, for example, they come today, and they are being honest or they are tricking you, once it's done, it's done, we can't go back on it. So, it's quite hard to actually figure out who's the good ones and who's not the good ones.

Q: Is there anything else you'd like to mention?

No… I don't know. Never judge a book by its cover, I guess. You never know what kind of customers you are getting and how they actually are. So just yeah, it is a risk.

Q: Fair enough. Thank you very much for your time.

A2.3. Supplemental Customer & Underwriter Sample Information

See more detailed breakdown of some of the customer and underwriter sample information in Tables A2.1–A2.3 below. In addition, see Tables A2.4–A2.5 for the key characteristics of the participants quoted in the thesis by their participant ID.

Table A2.1. *Customer Nationality (n = 50)*

Nationality	n	%
United Kingdom	28	56
Non-Dual	21	42
Dual	9	18
Non-UK	22	44
Poland	5	10
Portugal	2	4
France	2	4
Romania	2	4
Ireland	2	4
Jamaica	2	4
Sri Lanka	1	2

Nationality	n	%
Cyprus	1	2
Uganda	1	2
Bulgaria	1	2
Zimbabwe	1	2
Angola	1	2
Nigeria	1	2

Table A2.2. *Customer Originating Stores (n = 50)*

Originating Store	n	%
Virtual Store	4	8
West/North-West London	8	16
Kilburn	5	10
Shepherds Bush	3	6
North/North-East London	11	22
Wood Green	4	8
Dalston	4	8
Walthamstow	3	6
East London	7	14
Stratford	2	4
East Ham	2	4
Barking [a]	2	4
Romford	1	2
South London	17	34
Peckham	5	10
Lewisham	5	10
Croydon	4	8
Southwark	2	4
Streatham	1	2
West Midlands	2	4
West Bromwich	1	2
Coventry	1	2
Birmingham	0	0
Dudley [a]	0	0
East Midlands	0	0
Derby	0	0
Leicester	0	0
East of England [a]	1	2
Watford [a]	1	2
Slough [a]	0	0

Note. Includes all possible stores, not only those represented in the sample

[a] Closed at the time of the study

Table A2.3. *Underwriter Stores (n = 35)*

Store	n	%
Virtual Store	6	17
West/North-West London	4	11
Kilburn	3	9
Shepherds Bush	1	3
North/North-East London	6	17
Wood Green	2	6
Dalston	2	6
Walthamstow	2	6
East London	7	20
Stratford	2	6
East Ham	2	6
Romford	3	9
South London	7	20
Peckham	1	3
Lewisham	1	3
Croydon	2	6
Southwark	1	3
Streatham	2	6
West Midlands	2	6
West Bromwich	0	0
Coventry	0	0
Birmingham	2	6
East Midlands	3	9
Derby	1	3
Leicester	2	6

Note. Includes all possible stores open at the time of the study, not only those represented in the sample

Table A2.4. *Quoted Customers' Characteristics*

ID	Repayment Behaviour Group	Nationality	Age	Gender	Marital Status	Number of Dependents	Income Type	Customer Length (Years)	Origination Store
1	Good	UK	32	Female	Single	3	Benefits	4	West Bromwich
3	Perfect	Non-UK (Angola)	28	Female	Single	1	Benefits	< 1	Virtual Store
4	Bad	UK	54	Female	Other	1	Benefits	< 1	Virtual Store
13	Good	UK	54	Female	Single	2	Benefits	< 1	Virtual Store
14	Perfect	UK	32	Male	Single	0	Salary	5	Lewisham
16	Bad	UK	37	Female	Other	1	Salary	2	Peckham
17	Good	UK	44	Male	Married	4	Salary	1	Peckham
21	Write-Off	UK	31	Male	Single	1	Salary	6	Romford
22	Good	Non-UK (Zimbabwe)	33	Male	Single	0	Salary	3	Kilburn
28	Good	UK	63	Female	Divorced	0	Benefits	4	Peckham
29	Good	UK	56	Female	Single	0	Salary	8	Dalston
31	Perfect	UK	42	Male	Divorced	1	Salary	5	Lewisham
36	Bad	UK	45	Male	Married	2	Salary	2	Shepherds Bush
37	Bad	UK	39	Female	Other	2	Salary	2	Walthamstow
41	Perfect	Non-UK (Poland)	47	Male	Married	0	Salary	1	Shepherds Bush
44	Good	UK	30	Male	Divorced	3	Benefits	3	Dalston
48	Perfect	UK	44	Male	Single	0	Salary	2	Watford
49	Good	Non-UK (Romania)	28	Male	Single	0	Salary	< 1	Kilburn
50	Good	Non-UK (Nigeria)	36	Female	Married	0	Salary	5	Stratford

Table A2.5. *Quoted Underwriters' Characteristics*

ID	Store	Star Level	Managerial Responsibilities?	Full or Part Time?	Years at the Host Organisation	Nationality/ Language	Age	Gender
2	Streatham	4-star	Yes	Full time	2	Portuguese	24	Female
3	Streatham	3-star	No	Full time	1	Polish	41	Female
5	Walthamstow	2-star	Yes	Part time	2	Romanian	24	Female
8	Stratford	2-star	No	Full time	< 1	Portuguese	30	Male
9	Romford	4-star	Yes	Full time	4	Farsi	31	Female
12	Virtual Store	3-star	No	Full time	6	Polish	29	Female
14	Croydon	2-star	No	Full time	< 1	Polish	23	Female
18	Birmingham	2-star	No	Full time	4	Urdu	23	Female
26	Virtual Store	3-star	No	Part time	1	Polish	25	Female
30	Kilburn	4-star	Yes	Full time	5	Italian	36	Female
35	East Ham	4-star	Yes	Full time	4	Lithuanian	26	Female

A3. Additional Details for the Pilot Studies (Chapter 5)

A3.1. Materials for Study 2a

The following section contains the materials for Study 2a, including the invitation emails, information sheets, consent forms, debriefs, the SME workshop guide, and the online questionnaire items. Please note that the formatting of the materials has been altered to preserve space.

INVITATION EMAIL
(*SME WORKSHOP)*

[Host organisation] is sponsoring a research project that examines what makes people creditworthy (i.e., the risk associated with the borrower failing to honour their debt obligations). As part of this research, I'm developing and validating a psychometric measure of creditworthiness in micro-lending. I would greatly appreciate your help with evaluating some of the questions I have created so far by attending a workshop at your place of work, during the work day. **It is up to you whether you want to take part.** The workshop will last maximum an hour and will be fully confidential. Fully anonymous notes will be made regarding your feedback and you will **not** be recorded. More information about the project can be seen in the information sheet and consent form attached. These are yours to keep.

If you would like to participate, please reply to this email with the times and days suitable for you. Thank you in advance.

INFORMATION SHEET
(*SME WORKSHOP)*

Title of study
Developing and Validating a Psychometric Measure of Creditworthiness in Micro-Lending (Study 2a)

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
Our goal is to assess subjective question quality of a new creditworthiness measure being developed. The estimated duration of this study is April 2019 to July 2019. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?
You have been invited because you are a key stakeholder at [host organisation] and/or you have contact and experience with the target population. Between 12 and 24 individuals will take part in this study.

Do I have to take part?
Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study or avoid answering questions without being penalised or disadvantaged in

any way. If you decide to take part, we will ask you to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?
You will attend a workshop in your place of work during the work day. As part of this workshop you will provide your thoughts, opinions and reactions to the questions created as part of the creditworthiness measure. No personal information will be required from you and you will not be audio-recorded. Brief notes will be taking regarding your feedback.

What do I have to do?
You are expected to share your thoughts, opinions and reactions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?
There have been no risks identified with taking part in this study.

What are the possible benefits of taking part?
It is not anticipated that participation in this study will benefit you directly. However, this research will be contributing to fairer, more responsible, faster and more automatic underwriting for micro-loans. It is believed that this will particularly benefit those individuals who otherwise have trouble accessing affordable credit.

Will my taking part in the study be kept confidential?
Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party. If the project is abandoned before completion, the data will be destroyed.

What will happen to the results of the research study?
The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymised findings will also be shared with [host organisation] and will be used to inform their underwriting procedures. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?
You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 1st August 2019, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?
If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Developing and Validating a Psychometric Measure of Creditworthiness in Micro-Lending (Study 2a)'*

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square

London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University Psychology Department Research Ethics Committee, ETH1819-1838.

Further information and contact details

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

CONSENT FORM
(*SME WORKSHOP)*

- I confirm that I have read and understood the information sheet for this study. □
- I understand that this study will involve completing questionnaires asking me to evaluate items and providing my expert opinion on their quality. □
- This information will be held and processed for the purpose of answering the research question outlined in the information sheet. I understand that any information I provide will remain confidential and no information that identifies me will be made publicly available. □
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any consequences. □
- I agree to City University London recording and processing this information about me. □
- I agree to take part in the above study. □

______________________ _______________________________ ______________

Name of Participant Signature Date

______________________ _______________________________ ______________

Name of Researcher Signature Date

DEBRIEF
(*SME WORKSHOP)*

Thank you for taking part in this study. Your thoughts and opinions will be used to refine, adjust or drop questions to improve the quality of the new creditworthiness measure being developed. We hope that the use of this measure will lead to fairer, more responsible, faster and more automatic underwriting for micro-loans. It is believed that this will particularly benefit those individuals who otherwise have trouble accessing affordable credit.

We hope you found the study interesting. If you have any other questions, please do not hesitate to contact us at the following:

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Ethics approval code: *ETH1819-0972*

SME WORKSHOP TOPIC GUIDE

Opening:

- What are your first impressions of the following question?

Face validity:

- What do you think [host organisation] customers will think of this question?
- How relevant do you think this question is in the context of a loan application?
- How relevant do you think this question is to [host organisation] customers?

General quality:

- What do you think of the phrasing of the question?
- What do you think of the images used?
- Do you have any other potential problems, suggestions, or other feedback for this question?

INVITATION EMAIL
(*ONLINE QUESTIONNAIRE)*

As part of my PhD research, I'm developing and validating a psychometric measure of creditworthiness (i.e., the risk associated with the borrower failing to honour their debt obligations) in micro-lending. I would greatly appreciate the help of item writers and subject-matter experts with evaluating some of the items I have created so far. **It is up to you whether you want to take part.** You will be asked to rate each item, complete an item quality rubric and respond to some open-ended questions. You can choose to evaluate as many or as few items as you have the time for. To find out more and to take part in this study, please go to *[Qualtrics link]*.

INFORMATION SHEET AND CONSENT FORM
(*ONLINE QUESTIONNAIRE)*

Title of study
Developing and Validating a Psychometric Measure of Creditworthiness in Micro-Lending (Study 2a)

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
Our goal is to assess subjective item quality and face validity of a new creditworthiness measure being developed by identifying any content or language issues. The estimated duration of this study is April 2019 to June 2019. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?
You have been invited because you are a trained item writer (i.e., a researcher with adequate training and experience) or an expert who is familiar with the target population and has adequate understanding of item writing. Between 2 and 10 individuals will take part in this study.

Do I have to take part?
Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study, or avoid answering questions without being penalised or disadvantaged in any way. If you decide to take part, we will ask you to sign a digital consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?
You will be asked to rate items, complete an item quality rubric and respond to some open-ended questions. You can choose to evaluate as many or as few items as you have the time for. This study takes place completely online and you will not be required to meet with the researchers. No personal information will be required from you.

What do I have to do?
You are expected to answer questions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?
There have been no risks identified with taking part in this study.

What are the possible benefits of taking part?
It is not anticipated that participation in this study will benefit you directly. However, this research will be contributing to fairer, more responsible, faster and more automatic underwriting for micro-loans. It is believed that this will particularly benefit those individuals who otherwise have trouble accessing affordable credit.

Will my taking part in the study be kept confidential?
Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. Once you have given your consent to participate, you will be given an anonymous code. The code is necessary in case you request for your data to be removed. Your data will be kept in an electronic format on a password-protected and encrypted laptop. If the project is abandoned before completion, the data will be destroyed.

What will happen to the results of the research study?
The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymised findings will also be shared with [host organisation] and will be used to inform their underwriting procedures. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?
You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 1st July 2019, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?
If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Developing and Validating a Psychometric Measure of Creditworthiness in Micro-Lending (Study 2a)'*

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University Psychology Department Research Ethics Committee, *ETH1819-0972*

Further information and contact details

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Thank you for taking the time to read this information sheet. If you are happy to take part, please tick the following checkboxes:

- I confirm that I have read and understood the information sheet for this study. □
- I understand that this study will involve completing questionnaires asking me to evaluate items and providing my expert opinion on their quality. □
- This information will be held and processed for the purpose of answering the research question outlined in the information sheet. I understand that any information I provide will remain confidential and no information that identifies me will be made publicly available. □
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any consequences. □
- I agree to City University London recording and processing this information about me. □
- I agree to take part in the above study. □

DEBRIEF
(*ONLINE QUESTIONNAIRE)*

Thank you for taking part in this study. Your thoughts and opinions will be used to refine, adjust or drop items to improve the quality of the new creditworthiness measure being developed. We hope that the use of this measure will lead to fairer, more responsible, faster and more automatic underwriting for micro-loans. It is believed that this will particularly benefit those individuals who otherwise have trouble accessing affordable credit.

We hope you found the study interesting. If you have any other questions, please do not hesitate to contact us at the following:

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Ethics approval code: *ETH1819-0972*

ITEM QUALITY EVALUATION

Evaluate the degree to which this item is relevant to each of the following constructs. Definitions are provided in brackets.

	Not relevant	Somewhat relevant	Quite relevant	Highly relevant
Construct 1 (Definition)	o	o	o	o
Construct 2 (Definition)	o	o	o	o
Construct 3 (Definition)	o	o	o	o

Can you identify any of the following problems with the structure of the question (select all that apply)?

▢ The question is too long

▢ There are multiple implicit questions being asked

▢ The question is awkward, ungrammatical or contains complicated syntax

▢ None of the above

[display logic] Please provide any details/suggestions regarding the potential problem

____

Can you identify any of the following problems with the content of the question (select all that apply)?

- ▢ The question can be interpreted in multiple ways
- ▢ The question contains idioms or figures of speech
- ▢ The question contains unclear, complex or specialised terms
- ▢ The frame of reference is unclear
- ▢ The topic of the question is complex
- ▢ The topic of the question is too sensitive
- ▢ The question contains words that are emotionally loaded, offensive or can be stated more "gently"
- ▢ Inappropriate assumptions are made about the respondent or their situation
- ▢ The question inappropriately assumes a constant pattern of behaviour/experiences for situations
- ▢ None of the above

[display logic] Please provide any details/suggestions regarding the potential problem

____

Can you identify any of the following problems with the response options (select all that apply)?

- ▢ The response options can be interpreted in multiple ways
- ▢ A socially acceptable response is implied
- ▢ A difficult mental estimation is required to choose a response option
- ▢ The response options are too sensitive
- ▢ The response options depict stereotypes or are otherwise insulting to a specific group of people
- ▢ People in the response options are diverse
- ▢ There are too many response options
- ▢ There are missing response options
- ▢ The response options overlap
- ▢ None of the above

[display logic] Please provide any details/suggestions regarding the potential problem

____

Do you think this item is problematic in other ways not previously identified? If yes, please provide some notes or suggestions regarding the suspected problem below:

____

If you have any other thoughts, comments or suggestions, please provide below:

____

A3.2. Materials for Study 2b

The following section contains the materials for Study 2b, including the study advert, information sheet, consent form, debrief, and the items adapted from existing measures (Table A3.1). Please note that the formatting of the materials has been altered to preserve space.

STUDY ADVERT

This study is about assessing attitudes, beliefs, and personalities of individuals who have experience with micro-loans, payday loans, pawnbrokers, or doorstep loans in the UK. We need your help in this exploratory stage of developing a questionnaire. You will be asked to answer some image-based and some text-based questions about yourself and about one lender you had experience with.

INFORMATION SHEET AND CONSENT FORM

Title of study
Measuring personality, attitudes, and beliefs of loan applicants

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
Our goal is to create a measure to assess personality, attitudes and beliefs of individuals who have experience with micro-loans, payday loans, pawnbrokers, or doorstep loans in the UK. We need your help in this exploratory stage of developing a personality questionnaire. As a result, you might find overlap or repetition among the questions. The estimated duration of this study is from October 2019 to October 2020. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?
You have been invited because you are based in the UK, over the age of 18 and have experience with micro-loans, payday loans, pawnbrokers, or doorstep loans. Approximately 500 individuals will take part in this study.

Do I have to take part?
Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study or avoid answering questions without being penalised or disadvantaged in any way. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?
You will provide basic information about yourself and your finances and answer some personality-type questions. This study takes place online and you will not be required to meet with the researchers. No personal information will be required from you.

What do I have to do?
You are expected to answer questions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?
It is possible that you might find some questions uncomfortable, and we do not want to cause you any distress. If you find a question too personal, intrusive, or unsettling, you can avoid answering that question or withdraw from the study completely. You will not be penalised or disadvantages in any way. If you need to seek further support, you may contact a charity listed below:

- Money Advice Service - www.moneyadviceservice.org.uk/en/tools/debt-advice-locator
- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

What are the possible benefits of taking part?
This research will be contributing to the understanding of how lending decisions are made. As a result, it may benefit you indirectly by ensuring that loans:

- are fair and responsible,
- are faster and more automatic, and
- can be provided to people have trouble accessing credit.

Will my taking part in the study be kept confidential?
Absolutely. Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party.

What will happen to the results of the research study?
The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymous findings will also be shared with [host organisation] (a micro-lender sponsoring the PhD studentship) and will be used to inform how they make loan decisions. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?
You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 1st November 2019, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?
If you have any problems, concerns, or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Measuring personality, attitudes, and beliefs of loan applicants'*

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City, University of London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City, University of London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study, you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University Psychology Department Research Ethics Committee, ETH1920-0187.

Further information and contact details

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Thank you for taking the time to read this information sheet.

- I confirm that I have read and understood the information sheet for this study
  Yes/No
- I understand that this study involves completing questionnaires about my personality, attitudes and beliefs, as well as providing some basic information about myself
  Yes/No
- This information will be held and processed for the purpose of answering the research question outlined in the information sheet. I understand that any information I provide will remain confidential and no information that identifies me will be made publicly available.
  Yes/No
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any consequences.
  Yes/No
- I agree to City, University of London recording and processing this information about me.
  Yes/No
- If you agree to take part in the above study, please enter your Prolific ID below and click next:

DEBRIEF

Thank you for taking part in this study. Your responses will be used to improve and shorten the questionnaire being developed. We hope that the use of this measure will lead to fairer, more responsible, faster and more automatic decision-making for micro-loans. It is believed that this will particularly benefit those individuals who otherwise have trouble accessing affordable credit.

If this research raised concerns and you need to seek further support, you may contact a charity listed below:

- Money Advice Service - www.moneyadviceservice.org.uk/en/tools/debt-advice-locator
- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

We hope you found the study interesting. If you have any other questions, please do not hesitate to contact us at the following:

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
Dr Lara Zibarras
+44 (0)20 7040 4573
Lara.Zibarras.1@city.ac.uk

Ethics approval code: ETH1920-0187.

Table A3.1. *Items from Existing Measures*

Measure	Items	Response Options
Honesty (HEXACO-60; Ashton & Lee, 2009)	If I want something from someone, I will laugh at that person's worst jokes. I wouldn't pretend to like someone just to get that person to do favours for me. I would never accept a bribe, even if it were very large. I'd be tempted to use counterfeit money, if I were sure I could get away with it. I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed. If I knew that I could never get caught, I would be willing to steal a million dollars.	'Strongly disagree' (1) to 'strongly agree' (5)
Responsibility (Adjective Checklist of Conscientiousness; Costantini et al., 2015)	Dependable Reliable Responsible Trustworthy Undependable Unreliable	'It does not describe me at all' (1) to 'it describes me completely' (5)
Responsibility (BIC; J. J. Jackson et al., 2010)	Oversleep for class or work Miss appointments Forget about an appointment Back out on appointments Fulfil an obligation to someone Forget materials for class or work	'Never' (1) to 'very often' (5)
Conscientiousness (HEXACO-60; Ashton & Lee, 2009)	I plan ahead and organize things, to avoid scrambling at the last minute. When working, I sometimes have difficulties due to being disorganized. I often push myself very hard when trying to achieve a goal. I do only the minimum amount of work needed to get by. I make decisions based on the feeling of the moment rather than on careful thought. I make a lot of mistakes because I don't think before I act. Having a lot of money is not especially important to me.	'Strongly disagree' (1) to 'strongly agree' (5)

Measure	Items	Response Options
Humility (HEXACO-60; Ashton & Lee, 2009)	I would get a lot of pleasure from owning expensive luxury goods. I think that I am entitled to more respect than the average person is. I want people to know that I am an important person of high status.	'Strongly disagree' (1) to 'strongly agree' (5)
Compliance (IPIP-NEO-PI-R; Johnson, 2014)	I love a good fight. I yell at people. I insult people. I get back at others.	'Strongly disagree' (1) to 'strongly agree' (5)
Prevention Orientation (General Regulatory Focus Measure; Lockwood et al., 2002)	I often think about the person I am afraid I might become in the future. I often worry that I will fail to accomplish my financial goals. I often imagine myself experiencing bad things that I fear might happen to me. I frequently think about how I can prevent failures in my life. I am more oriented toward preventing losses than I am toward achieving gains.	'Strongly disagree' (1) to 'strongly agree' (5)
Financial Consciousness, adapted from Gould's (1988) Health Consciousness Scale	I reflect about my finances a lot. I'm very self-conscious about my finances. I'm generally attentive to how I feel about my finances. I'm constantly examining my finances. I'm very involved with my finances. I'm alert to changes in my finances. I'm usually aware of my finances. I'm aware of the state of my finances as I go through the day. I notice how I feel about my finances as I go through the day.	'Strongly disagree' (1) to 'strongly agree' (5)
Adaptation of the Revised-COPE (Zuckerman & Gagne, 2003)	I drink alcohol or take drugs, in order to think about it less. I relive the problem by dwelling on it all the time. I criticise or lecture myself. I blame myself. I brood over my problem nonstop. I say to myself "this isn't real." I blame someone or something for what happened to me. I try to forget the whole thing. I admit to myself that I can't deal with it and quit trying. I take time to express my emotions. I talk to someone about how I feel. I talk to someone to find out more about the situation. I take additional action to try to get rid of the problem. I try to come up with a strategy about what to do. I try hard to prevent other things from interfering with my efforts at dealing with this. I force myself to wait for the right time to do something. I work on staying positive even when things look bad. I accept the reality of the fact that it happened. I look for something good in what is happening. I try to identify something else I care about.	'I usually don't do this at all' (1) to 'I usually do this a lot' (4)
Trust and Trustworthiness (adaptation of Sekhon et al., 2014)	I trust this lender to do what they say they will do. I trust this lender to have my best interests at heart. This lender is very reliable. This lender is always honest with me. This lender is concerned about my best interests. This lender makes every effort to address my needs.	'Strongly disagree' (1) to 'strongly agree' (5)

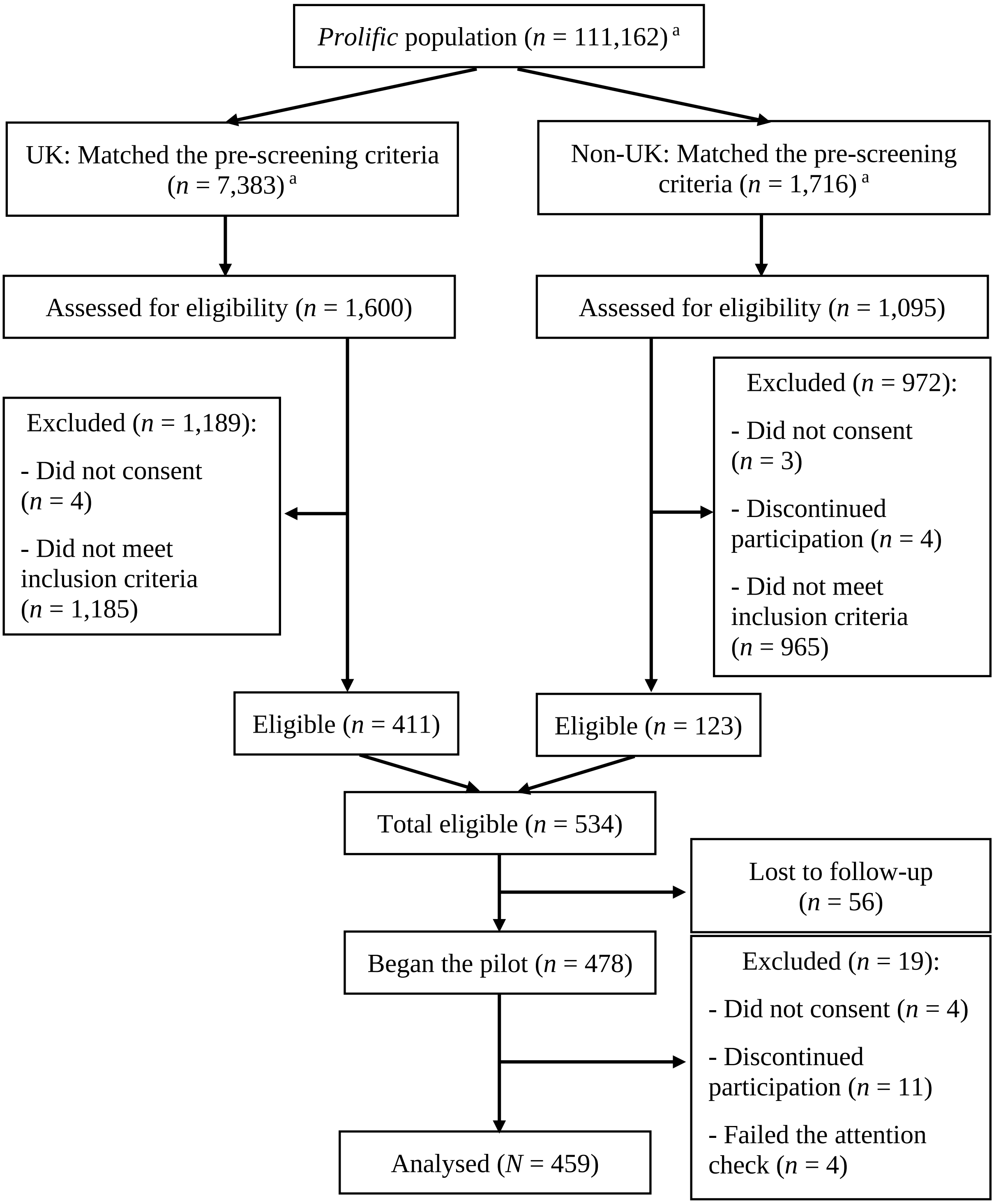
Measure	Items	Response Options
	This lender is efficient This lender is knowledgeable. This lender shows respect for the customers. This lender treats their customers fairly.	
Commitment (adapted from the Organisational Commitment Scale; N. J. Allen & Meyer, 1990)	I am very happy being this lender's customer. I am dedicated to this lender because I fear what I have to lose. I feel that I owe this lender quite a bit because of what they have done for me. This lender has a mission that I believe in and am committed to.	'Strongly disagree' (1) to 'strongly agree' (5)
Empathy (adapted from ACME; Vachon & Lynam, 2016)	I don't really care if this lender is doing well. I sometimes try to imagine how I would feel if I were in this lender's position. I worry about what happens to this lender. I enjoy seeing this lender experiencing problems.	'Strongly disagree' (1) to 'strongly agree' (5)
Optimism (Life Orientation Test-Revised; Scheier et al., 1994)	In uncertain times, I usually expect the best. If something can go wrong for me, it will. I rarely count on good things happening to me. I'm always optimistic about my future. I hardly ever expect things to go my way. Overall, I expect more good things to happen to me than bad.	'Strongly disagree' (1) to 'strongly agree' (5)
Financial Locus of Control (Mewse et al., 2010)	To a great extent my finances are controlled by accidental happenings. When it comes to money, I have often found that what is going to happen will happen. When I make plans concerning money, I am almost certain to make them work. My finances are determined by my own actions.	'Strongly disagree' (1) to 'strongly agree' (5)
Financial Self-Efficacy (Mewse et al., 2010)	When I have a money problem, I can usually find at least one solution. If I owed money that I couldn't repay immediately, I would feel confident in my abilities to sort the situation out. I can usually handle any money problems that come my way.	'Strongly disagree' (1) to 'strongly agree' (5)
Consumer Attitudes to Debt (Lea et al., 1995)	Borrowing money is sometimes a good thing. It is a good idea to have something now and pay for it later. Using credit is basically wrong. Credit is an essential part of today's lifestyle. Being in debt is never a good thing. Borrowed money should be repaid as soon as possible. Most people run up too much debt. It is okay to borrow money to pay for children's clothes. I'd rather go hungry than buy food on credit. Taking out a loan is a good thing because it allows you to enjoy life.	'Strongly disagree' (1) to 'strongly agree' (5)
Concern for Reputation (de Cremer & Tyler, 2005)	I am rarely concerned about my reputation. I do not consider what others say about me. I wish to have a good reputation. If my reputation is not good, I feel very bad. I find it important that others consider my reputation as a serious matter. I try hard to work on my reputation in my relationships with others. I find it difficult if others paint an incorrect image of me.	'Strongly disagree' (1) to 'strongly agree' (5)

Measure	Items	Response Options
Overclaiming Measure (based on OCQ; Paulhus et al., 2003)	Example real item: ‘Early Repayment Charges’ Example foil item: ‘Elastic Income Rate’	‘Never heard of it’ (1) to ‘very familiar’ (5)

A3.3. Further Details on Participant Selection & Recruitment Flow in Study 2b

See Figure A3.1 below for a more detailed breakdown of how participants were recruited and selected across the two target populations (UK and non-UK).

Figure A3.1. *Participant Selection & Recruitment Flow*



[a] This includes active participants only. *Prolific* counts participants as active if they have logged on to the platform at least once in the last 90 days.

A4. Additional Details for the Validation Study (Chapter 6)

A4.1. Materials for Study 3

The following section contains the materials for Study 3, including the study avert, information sheet, consent form, and debrief. Please note that the formatting of the materials has been altered to preserve space.

STUDY ADVERT

Your application is safe and will continue after this study advert.

[Host organisation] has partnered with City, University of London to help us better understand loan applicants. As part of this research, we would like to ask you a few questions that should take less than five minutes. **Taking part is completely optional and will not have any impact on your loan application.** To take part, please read through the information below and indicate your consent. If you don't want to take part, please press next to continue with your application.

INFORMATION SHEET AND CONSENT FORM

Title of study
Measuring personality, attitudes and beliefs of loan applicants

We would like to invite you to take part in a research study. It is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
Our goal is to assess attitudes, beliefs and personalities of loan applicants. The estimated duration of this study is from October 2019 to October 2020. It is being conducted as part of the researcher's PhD thesis in Psychology at City, University of London.

Why have I been invited?
You have been invited because you are applying for an [host organisation] loan. Approximately 500 people will take part in this study.

Do I have to take part?
Participation in this project is voluntary. You can choose not to take part without giving a reason. You can withdraw at any stage of the study or avoid answering questions without being penalised or disadvantaged in any way. **This project will not impact [host organisation]'s decision regarding your loan application or your relationship with [host organisation].** If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?
You will answer some image-based questions about yourself. With your consent, we will also access your anonymous [host organisation] data. This includes your loan application, the application outcome and your repayment behaviour – all with identifiable information removed by [host organisation]. This study takes place completely online and you will not be required to meet with the researchers. No personal information will be required from you.

What do I have to do?
You are expected to answer questions honestly, accurately and to the best of your ability.

What are the possible disadvantages and risks of taking part?
It is possible that you might find some questions uncomfortable, and we do not want to cause you any distress. If you find a question too personal, intrusive or unsettling, you can avoid answering that question or withdraw from the study completely. You will not be penalised or disadvantages in any way. If you need to seek further support, you may contact a charity listed below:

- Money Advice Service - www.moneyadviceservice.org.uk/en/tools/debt-advice-locator
- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)
- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

What are the possible benefits of taking part?
This research will contribute to the understanding of how lending decisions are made. As a result, it may benefit you indirectly by ensuring that loans:

- are fair and responsible,
- are faster and more automatic, and
- can be provided to people have trouble accessing credit.

Will my taking part in the study be kept confidential?
Absolutely. Any information you provide as part of this study is confidential, and no information that could individually identify you will be disclosed in any reports on the project, or to any other party.

What will happen to the results of the research study?
The anonymous results of this study will be used for the write up of the researcher's PhD thesis, and to inform future studies. The anonymous findings will also be shared with [host organisation] and will be used to inform how they make future loan decisions. The results might also be used for further publication(s) in relevant scientific journals, where anonymity will still be maintained. If you would like to receive a copy of the publication(s) or summary of the results, please contact the researchers individually.

What will happen if I don't want to carry on with the study?
You are free to withdraw your participation without explanation or penalty at any time during the study. You are not obliged to take part in this study and should not feel coerced. You can withdraw your data until 1st March 2020, after which it would have been analysed and data withdrawal is not possible.

What if there is a problem?
If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: *'Measuring personality, attitudes and beliefs of loan applicants'*

You could also write to the Secretary at:
Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City, University of London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City, University of London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University Psychology Department Research Ethics Committee, ETH1920-0187.

Further information and contact details

Student Researcher:
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Thank you for taking the time to read this information sheet.

- I confirm that I have read and understood the information sheet for this study
  Yes/No
- I understand that this study involves answering image-based questions about my personality, attitudes and beliefs
  Yes/No
- I am happy to provide access to my anonymous [host organisation] data that includes my loan application information, the application outcome and my repayment behaviour
  Yes/No
- This information will be held and processed for the purpose of answering the research question outlined in the information sheet. I understand that any information I provide will remain confidential and no information that identifies me will be made publicly available.
  Yes/No
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any consequences.
  Yes/No
- I agree to City, University of London recording and processing this information about me.
  Yes/No
- I agree to take part in the above study
  Yes/No

DEBRIEF

Thank you for your response. If you would like to know more about why we ask these questions, please visit our blog [hyperlink removed] for more information. If this research raised concerns and you need to seek further support, you may contact a charity listed below:

- Money Advice Service - www.moneyadviceservice.org.uk/en/tools/debt-advice-locator
- Mind – www.mind.org.uk (0330 123 3393; Mon-Fri, 9am-6pm)

- Samaritans – www.samaritans.org.uk (116 123; free 24-hour helpline)
- Mental Health Foundation – www.mentalhealth.org.uk

For any other questions, please do not hesitate to contact us at the following:

Student Researcher:
Natalia Mladentseva
Natalia.Mladentseva@city.ac.uk

Supervisor:
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Lara.Zibarras.1@city.ac.uk

Ethics approval code: ETH1920-0187.

PLEASE PRESS NEXT TO CONTINUE WITH YOUR APPLICATION.

A4.2. Characteristics of the Validation Sample

See descriptive statistics of the characteristics of the validation sample in Tables A4.1-A4.3 below.

Table A4.1. *Socio-Demographic Characteristics of the Validation Sample (N = 560)*

Characteristic	n	%
Gender		
Female	318	56.8
Male	242	43.2
Marital Status		
Single	379	67.7
Living with Partner	88	15.7
Married/Civil partnership	68	12.1
Divorced	25	4.5
Income Type		
Salary	295	52.7
Benefits	109	19.5
Salary & Benefits Mix	156	27.9
Nationality		
UK	528	94.3
Non-UK	32	5.7
	M (SD)	**Range**
Age	33.54 (9.89)	18–70
Number of Dependants	0.91 (1.23)	0–7
Years in the UK (for non-UK nationals only)	8.04 (5.12)	1.50–20.67
Monthly Income	£1,640.27 (£622.68)	£580–£6,800
Net Disposable Income (% of Income)	54.6% (17.7%)	7.6%–98.4%

Table A4.2. *Loan Characteristics of the Validation Sample (N = 560)*

Characteristic	n	%
Loan Purpose		
Emergencies	265	47.3
Purchases	124	22.1
Housing	78	13.9
Debts	35	6.3
Groceries	32	5.7
Travel	26	4.6
Loan State Snapshot		
Closed (i.e., fully paid)	53	9.5
Live	507	90.5
Current	167	29.8
Late	340	60.7
0 Months in Arrears	99	17.7
1 Month in Arrears	86	15.4
2 Months in Arrears	92	16.4
3 Months in Arrears	59	10.5
4 Months in Arrears	4	0.7
Payment Behaviour Category		
Perfect Payers	90	16.1
Never Paid	61	10.9
	M (SD)	**Range**
Total number of loans taken (*Top-Up* or NFC)	1.34 (0.53)	1–3
Total amount lent	£335.05 (£253.04)	£100.00–£1,696.08
Monthly loan repayments for the first loan	£64.92 (£36.17)	£28.88–£199.28
Number of days passed since the start of the first loan	91.61 (22.79)	54–137
Total days in arrears	45.21 (36.42)	0–129
Total payments in arrears	5.46 (4.90)	0–18

Table A4.3. *Credit Bureau Characteristics of the Validation Sample (N = 560)*

Characteristic	M (SD)	Range
Credit Score	485.14 (54.26)	362–611
FICO Score	514.85 (94.63)	84–644
Credit Gauge Score	144.23 (29.36)	76–225
Number of Share Records	18.89 (22.43)	1–171
Number of open credit lines	8.42 (5.47)	0–33
Total credit outstanding	£6,091.84 (£22,887.30)	£0–£414,054
Debt-to-income ratio	0.10 (0.11)	0–0.70
Revolving credit limit utilisation	52.50 (88.38)	0–993

Characteristic	M (SD)	Range
Total credit arrears	£2,137.26 (£3,541.84)	£0–£37,054
Number of accounts in arrears	3.20 (3.55)	0–18
Current worst arrears months	7.28 (5.69)	0–12
Worst ever arrears months	8.25 (5.25)	0–12
Number of defaulted accounts in the past year	2.65 (2.96)	0–17
Number of defaulted accounts (as a % of all accounts ever)	29.45 (25.66)	0–88.89
Number of inquiries/credit searches in last 3 months	0.81 (1.30)	0–8
	n	**%**
Number of CCJs		
0	400	71.4
1	89	15.9
2	34	6.1
3	23	4.1
4	8	1.4
5	4	0.7
6	2	0.4
Number of accounts defaulted in last 12 months		
0	175	31.2
1	85	15.2
2	64	11.4
3	67	12.0
4	47	8.4
5-9	102	18.2
10-14	18	3.2
15-17	2	0.4
Has Outstanding Home Credit	38	6.8