# **Experimental Evidence on Buy Now Pay** Later Usage and Understanding

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#### Abstract

Buy Now Pay Later (BNPL) recently has become one of the popular innovations in the Fintech payment sector which allows consumers to spread the cost of a product over a number of months, generally, without interest. While this payment feature offers flexibility to a number of consumers, there is a growing concern on some consumers taking up more debt than they can afford to repay coupled with lack of understanding of related terms and conditions, resulting in financial adversity. Through an online trial, we will study the causal effect of BNPL on consumer spending patterns, disentangling the selection and treatment effects of BNPL. Additionally, we test for effective ways to improve consumer comprehension of BNPL products and their terms and conditions.

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## Introduction

Buy Now Pay Later (BNPL) is a short-term consumer credit product that has grown rapidly across the globe in recent years. It is a short-term credit product with the option to pay for a purchase in more than one fixed repayment schedule, where typically, a down payment is due at sale. BNPL can offer benefits to liquidity constrained consumers, as interest rates are low to zero, making it generally cheaper than alternatives such as credit cards and it is also easier to access for traditionally underserved groups (DiMaggio et al., 2022). However, consumer protection concerns have arisen globally amid signs of financial distress among certain vulnerable users.<sup>4</sup> In particular, some consumers take on multiple BNPL loans or stack BNPL on top of other debt and display a low understanding of the often-hidden costs of BNPL such as late fees and debt collection. In this research project, we conduct a hypothetical online shopping experiment with a nationally representative panel of consumers in Ireland, with the objective of better understanding the links between BNPL usage and consumer spending. We will also evaluate the impact of disclosures on consumer comprehension.

BNPL is a growing feature of consumer markets, globally. BNPL accounted for 2.9% of global e-com transaction value in 2021 and is projected to reach 5.3% by 2025.<sup>5</sup> In Ireland, the market is relatively nascent by international standards and BNPL became subject to regulation in May 2022.<sup>6</sup> In the UK, BNPL spending increased 21.4 times between January 2019 and December 2021, with £2.7 billion worth of BNPL transactions during 2020 (Gathergood et al., 2022).<sup>7</sup> BNPL products are often offered at the point of sale by merchants who partner with a credit provider, although BNPL can also be offered directly to consumers by a credit provider before purchase. One of the incentives for retailers to pay a fee to BNPL providers for the service is to boost sales, both at the extensive and intensive margin and indeed a recent German experimental study finds that when BNPL is available sales increase by 20% (Berg et al, 2023).

BNPL shares some similar features to the credit card market. Studies in the latter point to a temporal separation of benefits and costs in a consumer's mind and an inaccurate perception of sunk costs during the purchase process (Soman, 2001; Prelec & Loewenstein, 1998). There is also evidence of increased consumer willingness to spend when payments are deferred (Feinberg, 1986; Prelec and Simester (2001), Raghubir and Srivastava (2008)). Several studies suggest that present biased behaviour drives credit card borrowing (David Laibson, 1997; Ernst Fehr, 2002) with higher debt among such consumers (Meier and Sprenger (2010) in context of credit cards). Analyzing consumption patterns of consumers using pay later versus pay-as-you-go products in a lab experiment, Werthschulte (2020) finds that the 'pay later' option significantly increases consumption, specifically "wasteful consumption". Bian et al (2023) and DiMaggio et al. (2022) both find that new BNPL access boosts spending among Chinese and US users respectively, but the debt implications differ - while Chinese households don't increase indebtedness, DiMaggio finds that new US BNPL users are more likely to incur overdraft and low balance fees. In another US study, Papich (2022) finds that while access to BNPL increases non-BNPL borrowing among US consumers, overall debt past due decreases while credit scores increase. Consumers may be overconfident

<sup>&</sup>lt;sup>4</sup> See for example UK Citizens Advice and Financial Conduct Authority (FCA), US Consumer Financial Protection Burea (CFPB) and Australian Securities and Investments Commission (ASIC).

<sup>&</sup>lt;sup>5</sup> https://worldpay.globalpaymentsreport.com/en

<sup>&</sup>lt;sup>6</sup> This essentially means BNPL providers must comply with certain rules in relation to creditworthiness assessments and advertising.

<sup>&</sup>lt;sup>7</sup> https://www.fca.org.uk/publication/corporate/woolard-review-report.pdf

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and underestimate the time to pay off debt (Soll et al. (2013) in US credit card context, especially those with low numeracy) or frequently roll over debts and borrow more (Chin and Romeo, 2022).

This project aims to answer the following questions. First, what is the impact of BNPL on consumer spending, as measured in a hypothetical online shopping exercise? Does BNPL lead to participants spending a higher fraction of their notional budget and purchasing an additional discretionary product? Our experimental set-up where participants are randomly exposed to either a "Debit Only", "BNPL Only" or Debit/BNPL" checkout allows us to disentangle adverse selection and moral hazard in BNPL spending, thus contributing to the literature on the causal effect of BNPL on consumer spending.

Second, do disclosures affect consumer comprehension and usage of BNPL? Adams et al. (2022) tests the addition of risk information, an extra decision point and the removal of enhanced branding in a one round hypothetical online shopping scenario in the UK and finds that each treatment individually increases consumer comprehension, while the combination reduce consumer usage of BNPL. We study the effect of disclosures on BNPL comprehension among consumers and its usage in the Irish context at extensive and intensive margins.

# **Research Strategy**

# Sampling

## **Assignment to Treatment**

We will conduct a hypothetical online shopping experiment via Gorilla. A well-known survey firm in Ireland, is contracted to recruit 3,000 respondents (n=3,000). The sample will be nationally representative. To take part in the survey, a respondent must be between 18 and 65 years and be an online shopper.

The survey will take approximately 20 minutes to complete. At the beginning of the experiment, participants will be screened based on whether they are online shoppers. Participants will then be asked questions related to financial services usage (including credit cards and overdrafts), socio-demographic characteristics, financial literacy, delayed gratification, financial distress, financial efficacy, and attention. Participants will proceed to the online shopping task where they will be randomly assigned to one of four treatment arms or a control group, varying in payment option (Debit Card, BNPL) and BNPL disclosures. The shopping task involves choosing between a generic and a luxury version of a product during three separate rounds of shopping, with each participant given a notional budget constraint of  $\notin 1,000$ . While the three rounds of shopping task require participants to buy either the luxury version or the generic version of the product using the available payment option, there will be a fourth round of shopping where participants can choose whether to buy an additional discretionary product, and if so, whether they wish to use debit card or BNPL for payment. After completing the shopping task, participants will be asked about BNPL comprehension, recall of prices, and their checkout experience. Table 1 summarizes the experimental arms in this study, while Figure 1 provides an overview of the experiment. Treatment 1, 2 and 3 identifies the causal effect of BNPL on consumer spending under varying levels of BNPL availability (Figure 2), whereas Treatment 4 will help us understand the role of disclosures in consumer comprehension about BNPL (Figure 3).

Control (Checkout options: Debit/BNPL; No	This option most closely mirrors a real current day
BNPL Disclosures)	shopping experience (other than additional payment
	options like credit cards, gift vouchers etc.) with
	BNPL risk attributes shrouded. During the first three
	rounds of shopping, participants can choose whether
	to use Debit Card or BNPL for their purchase.
Treatment 1 (Checkout options: Debit Only; No	Participants in this group will be able to use only debit
BNPL Disclosures)	card as their method of payment for the first three
	rounds of shopping. As a result, full price of the
	product will be deducted from the budget of these
	participants.
Treatment 2 (Checkout options: BNPL Only;	Participants in this group will be able to use only
No BNPL Disclosures)	BNPL as their method of payment for the first three
	rounds of shopping. As a result, only one-third of the
	product price will be deducted from the budget of
	these participants at the time of the experiment and
	participants would commit to paying the rest of the
	amount in the next two months.
Treatment 3 (Checkout options: Debit Only for	At the beginning of the experiment, participants in this
the first two rounds of shopping but informed at	group will be informed that they can use only Debit
· · · ·	
the beginning that BNPL will be available from	Card for the first two rounds of shopping and a new
third round onwards; No BNPL Disclosures)	payment method (BNPL) where they can postpone
	two-third of the payments to later date will be
	available from third round onwards.
Treatment 4 (Checkout options: Debit/BNPL;	This option mirrors the control group except that
With BNPL Disclosures)	participants will be shown a disclosure related to
	BNPL during each round of shopping to make it
	clearer that BNPL is a credit product, late fees apply,
	and unpaid debts could be sent to a debt collector.

*Table 1: Description of Control/ Treatments* 

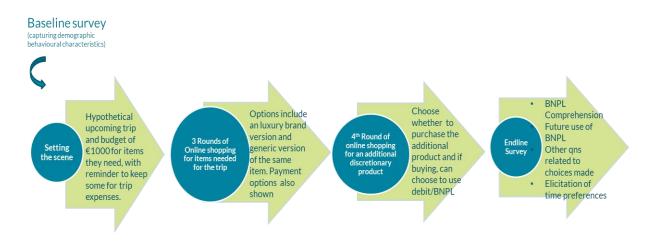
## Hypotheses

We expect to test the following primary hypotheses in the study:

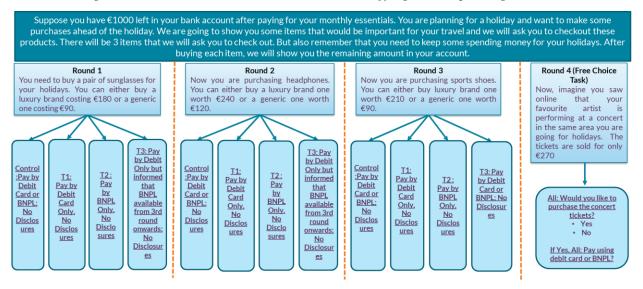
- 1. **BNPL increases consumer spending:** When BNPL is available as a payment option, consumers spend more, compared to when BNPL is not available as a payment option (Control vs T1). Consumers are likely to spend more using BNPL compared to debit card (T1 vs T2). Information about BNPL as an available payment option for future purchases increase spending (T3 vs T1; measured by participant spending in first two rounds of shopping).
- 2. BNPL leads to purchases of additional discretionary product: When BNPL is available as a payment option, consumers are more likely to purchase an additional discretionary product, compared

to when BNPL is not available a payment option (Control vs T1). Consumers who made past payments by BNPL are more likely to purchase an additional discretionary product as compared to consumers who made past payments by debit card (T1 vs T2).

- 3. **Making past payments by BNPL leads to sustained usage of BNPL:** Consumers who made past payments by BNPL are more likely to purchase an additional discretionary product using BNPL as compared to consumers who made past payments by debit card (Control vs T1, T1 vs T2).
- 4. **Disclosures improve BNPL comprehension and reduce usage:** Saliently presenting disclosures relating to payment methods improve consumer comprehension, reduce BNPL usage at intensive and extensive margins (Control vs T4).
- 5. **Recall:** Consumers are less likely to recall price of items purchased using BNPL, compared to non-BNPL option.
- 6. **Borrowing experience matters:** Experienced borrowers are more likely to correctly anticipate the higher spending and use of short term credit for purchases. Also, borrowers perceive themselves to be time consistent.
- 7. **Individual and financial characteristics matter for BNPL usage:** The treatment effects of interventions on BNPL usage is heterogeneous based on individual and financial characteristics of participants (such as financial literacy, money management skills, etc.).



#### Figure 1: Basic Set-up of Experiment



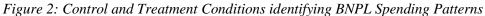


Figure 3: Control and Treatment Conditions relating to BNPL Disclosures

Suppose you have €1000 left in your bank account after paying for your monthly essentials. You are planning for a holiday and want to make some purchases ahead of the holiday. We are going to show you some items that would be important for your travel and we will ask you to checkout these products. There will be 3 items that we will ask you to check out. But also remember that you need to keep some spending money for your holidays. After buying each item, we will show you the remaining amount in your account.



## **Sampling Frame**

The population of interest for this trial is people who use online shopping methods. The rational for targeting this group: this population will most likely be exposed to, and with some choosing to use, online BNPL products in real-life situations. International evidence suggests that purchases funded via BNPL can be impulsive with consumers spending more than they intended or buying products that they did not need and, in some cases, regretting these purchases later and / or having to cut back on basics to pay for impulsive purchases bought via BNPL (Berg et al., 2023; ASIC, 2020). While BNPL is available offline for purchases in Ireland, (e.g. for furniture and large appliances), it must be applied for online and we believe such purchases tend to be more considered. Moreover, newer providers who are targeting strong BNPL growth

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in Ireland exclusively provide BNPL online. For the purposes of our online trial, therefore, we will exclude people who have no experience shopping online. Our expected sample size is 3000 individuals who will be reached with the help of a survey company who will send the link for completing the survey to a nationally representative sample.

#### **Statistical Power**

With a sample of 3000 nationally representative individuals (600 individuals in each arm), we will be able to detect following minimum detectable effect sizes (MDES) for the different sets of outcome variables as described in Table 2. All the power calculations were done based on the mean and standard deviations of outcome variables obtained from a nationally representative survey conducted by the Central Bank of Ireland.

Outcome Variable	MDES	Baseline Mean and	Power	Alpha
		Standard Deviation		
Spending using BNPL	5.74%	250	0.8	0.05
	(14.37 p.p)	(SD: 100)		
BNPL Usage	34.66%	0.15	0.8	0.05
	(0.052 p.p)	(SD: 0.36)		
BNPL Comprehension	13.33%	0.54	0.8	0.05
	(0.072 p.p)	(SD: 0.5)		

Table 2: Statistical Power

## **Attrition from the Sample**

Attrition is not an issue for this trial since this requires only one-time participation. We will pilot the experiment to help us refine the details of the experiment to try to reduce non-completion of survey. To adjust for participants who may not complete the survey, we will oversample to make sure the target sample is reached and only the completed sample will be used for analysis.

# **Fieldwork**

#### Instruments

We mainly rely on participants' decisions during the shopping game to measure the impact of BNPL on consumer spending patterns. Also, we will measure consumer comprehension of BNPL and recall of purchases made during the shopping exercise. We explore the following set of primary outcomes outlined below in

Table 3.

Table 3: Primary	Outcomes
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Primary Outcomes		
Variable	Definition	
Amount of money spent	Total amount spent by participant during the shopping exercise	
Purchase of an additional	Binary Variable (0/1) indicating if the participant chooses to buy an	
discretionary product	additional discretionary product at the end of the shopping exercise.	
BNPL Usage	<ul> <li>Binary Variable (0/1) indicating if the participant chooses BNPL during each round of shopping task, wherever BNPL is a payment option.</li> <li>Number of times participant chooses BNPL in first three rounds of shopping task, wherever BNPL is a payment option.</li> </ul>	
	<ul> <li>Binary Variable (0/1) indicating if the participant chooses BNPL in fourth round of shopping if participant decides to purchase an additional discretionary product in round 4.</li> </ul>	
BNPL Comprehension	<ul> <li>Correct answers to questions relating to the BNPL payment method measured as dichotomous variable and standardized score for the following questions:</li> <li>Is BNPL a credit product?</li> <li>What is the interest rate under BNPL?</li> <li>When is the second installment due for the purchase?</li> <li>Is late fee involved in case of late/non-repayment?</li> <li>What is the amount of late fee involved in case of late/non-repayment?</li> <li>Will the debt be transferred to debt collection agencies in case of late/non-repayment?</li> </ul>	

We will also collect data on other aspects of the purchase as described below in

Table 4.

Secondary Outcomes		
Variable	Definition	
Recall of cost of each item purchased	Dichotomous variable indicating if the participant correctly recalls the price of each item purchased.	

Table 4: Secondary Outcomes

Recall of total amount spent	Dichotomous variable indicating if the participant correctly recall amount spent during the shopping.
Recall of future commitments amount	Dichotomous variable indicating if the participant correctly recall amount they have to pay in future as part of the shopping.
Estimation of probability of higher spending during shopping	Correctly estimating the probability of overspending (defined as spending over 50 <sup>th</sup> percentile) during shopping
Estimation of probability of using short-term credit during shopping	Correctly estimating the probability of using BNPL during shopping in any of the four shopping rounds.
Likelihood of future use	Variable measuring the likelihood that participant will use BNPL in future (not at all likely, moderately likely, and extremely likely).
Recommend to others	Variable measuring the likelihood that participant will recommend BNPL to a friend or family member (not at all likely, moderately likely, and extremely likely).

In addition, we will also collect data on individual characteristics that can be used as control variables for the regression analysis. The variables are defined as below in Table 5.

Individual Characteristics		
Variable	Definition	
Age	Age of the respondent	
Gender	Gender of the respondent	
Location	County in which the respondent currently live	
Education	Highest level of education respondent has completed categorized as: no formal education, primary education, secondary education, and third-level education.	
Employment	Current employment status of the respondent categorized as: Working for payment or profit, looking for first regular job/unemployed, Student, Looking after home/family, Retired from employment, Unable to work due to permanent sickness or disability.	
Income	Current annual income of the respondent before deductions and tax categorized as: Less than $(0,000,000,000,000,000,000,000,000,000,$	
Shopping Online	Categorical variable indicating how often participant shop online.	

#### Table 5: Individual Characteristics

Financial Products	Dichotomous variable indicating if the respondent owns, either on their own
Owned	
Owned	or jointly, the following financial products: current account, credit card,
	savings account, car loan, personal loan, mortgage, overdraft, investments,
	crypto assets, loan from a licensed moneylender, in-store credit, or other.
Digital Financial	Dichotomous variable indicating if the respondent owns digital financial
Products Owned	products.
Late in making loan	Dichotomous variable indicating if the respondent has ever been late in
repayments	making repayments of loans, they have taken in the past 12 months.
Had difficulty in making	Dichotomous variable indicating if the respondent has ever had difficulty in
loan repayments	making repayments of loans, they have taken in the past 12 months.
Credit Card Usage	Variable recording the frequency of credit card usage categorized as: Very
	Often (more than 2-3 times a week), Somewhat often (More than 2-3 times
	a month), Not very often (2-3 times a year), Never, I don't have a credit card.
Financial Literacy	Standardized index based on correct answers provided by the participant to
	the three questions measuring financial literacy.
Overconfidence	Variable indicating number of answers respondent thinks they got correct
	out of the three questions measuring financial literacy.
Delayed Gratification	Standardized index based on respondent's agreement to three questions
	related to financial habits (strongly disagree to strongly agree):
	• It is hard for me to resist buying things I cannot afford.
	• When someone gives me money, I prefer to spend it right away.
	<ul> <li>I manage my money well.</li> </ul>
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Financial Distress	Standardized index based on participant response to three questions related
	to financial distress:
	1. Thinking about any consumer debts you have, to what extent is keeping
	up with the repayment of them and any interest payments a financial
	burden? Would you say it was:
	<ul> <li>A heavy burden</li> </ul>
	<ul> <li>Somewhat of a burden</li> </ul>
	<ul> <li>Not a problem at all</li> </ul>
	<ul> <li>I have no consumer debts.</li> </ul>
	<ol> <li>Which one of the following statements best describes how well you are</li> </ol>
	keeping up with your bills and credit commitments at the moment?
	• Having real financial problems and have fallen behind with many
	of them.
	• Falling behind with some of them
	• Keeping up with all of them, but it is a constant struggle.
	• Keeping up with all of them, but it is a struggle from time to time.
	• Keeping up with all of them without any difficulties
	• Don't have any commitments.
	3. In the past 12 months, how often have you run out of money before the
	end of the week or month and needed to use a credit card or overdraft to
	get by?

	o Always	
	• Most of the time	
	<ul> <li>Sometimes</li> </ul>	
	• Hardly ever	
	o Never	
Financial Self-efficacy	Standardized index based on respondent's agreement to three questions	
	related to financial self-efficacy (totally true to totally false):	
	• It is hard to stick to my spending plan when unexpected expenses arise.	
	• When unexpected expenses occur, I usually have to use credit.	
	• I lack confidence in my ability to manage my finances.	
Attention	Variable measuring how often participant read the terms and conditions	
	carefully while making financial decisions (options range from "totally true"	
	to "totally false").	
Number of BNPL	Number of BNPL providers participant has used in the past 12 months.	
providers used		
Number of BNPL	Number of BNPL agreements participant has had at one time in the past 12	
contracts	months.	

## **Data Collection**

The project will involve a survey with an experimental component. The survey and experiment will be compiled using an online survey / experiment building tool. The data collection process will be done through an online trial of approximately 20 minutes.

The data will likely be collected within a month or less depending on how long it takes the survey company to find survey participants to fully complete the trial. The process will take approximately 20 minutes for participants to complete and will involve three steps: survey participants will answer a set of questions, they will then undertake a hypothetical online shopping task, followed by answering another set of questions). The respondents will not be contacted after they complete the survey as this is a one-time engagement.

## **Data Processing**

Data processing will involve cleaning the data, managing the data, and analyzing the data. Data will be reviewed after the session each day to check for errors, if any. We anticipate data processing to start after the desired sample is reached and the data is transferred to the research team anonymously. The research team will share the ownership over the processed data which will be used and stored in cloud and local computers. Data processing is expected to finish within four weeks.

# **Empirical Analysis**

# **Balancing Checks**

We will first perform t-test to test balance across control and treatment groups on individual characteristics such as gender, age, income, etc.

Additionally, we plan to use a joint test of orthogonality to test balance across control and treatment groups. First, we run the following linear regression:

$$Treat = a + \Sigma b_i X_i + u$$

where the dependent variable *Treat* is the category of relevant treatment or control group, a is the constant term,  $X_i$ 's are the individual demographic characteristics such as gender, age, income, etc. We would then test the joint hypothesis,  $b_i = b_j$  for  $i \neq j$  with an F test to check for balance between each of treatment group and control group.

## **Treatment Effects**

To estimate the causal effect of treatments in this study, we perform the following empirical specification for participant i:

$$Y_i = \alpha_i + \beta_i T_i + \gamma_i X_i + \varepsilon_i$$

where we define  $Y_i$  to be the outcome variable as described in

#### Table 3 and

Table 4 for participant *i*,  $T_i$  refers to treatment conditions explained in Table 1 and,  $X_i$  is defined as the vector of household and individual level controls.

## **Heterogeneous Effects**

To test whether treatment effects vary heterogeneously across groups with specific individual level characteristics, we will re-run the empirical specification, interacting the treatment with variable of interest for heterogeneity.

We will study the following dimensions of heterogeneity as defined in Table 6.

Individual Characteristics	
Variables	Definition
Shopping Online	Categorical variable indicating how often participant shop online
Financial Products Owned	Dichotomous variable indicating if the respondent owns, either on their own or jointly, the following financial products: current account, credit card, savings account, car loan, personal loan, mortgage, overdraft, investments, crypto assets, loan from a licensed moneylender, in-store credit, or other

Table 6: Heterogenity Analysis

Digital Financial Products Owned	Dichotomous variable indicating if the respondent owns
Digital Tillancial Tioducts Owned	digital financial products.
Loan behavior – Number of loans	Number of consumers loans taken by participant in the
Loan behavior – Number of Ioans	
The second state of the se	past 12 months.
Loan behavior – Late or had difficulty in	Participant was late in making payments or had difficulty
making loan repayments	making loan repayments in the past 12 months.
Financial Literacy	Standardized index based on correct answers provided by
	the participant to the three questions measuring financial
	literacy.
Overconfidence	Variable indicating number of answers respondent thinks
	they got correct out of the three questions measuring
	financial literacy.
Delayed Gratification	Standardized index based on respondent's agreement to
	three questions related to financial habits (strongly
	disagree to strongly agree):
	• It is hard for me to resist buying things I cannot afford.
	• When someone gives me money, I prefer to spend it
	right away.
	• I manage my money well.
Financial Distress	Standardized index based on participant response to three
	questions related to financial distress:
	4. Thinking about any consumer debts you have, to what
	extent is keeping up with the repayment of them and
	any interest payments a financial burden? Would you
	say it was:
	• A heavy burden
	• Somewhat of a burden
	$\circ$ Not a problem at all
	• I have no consumer debts.
	5. Which one of the following statements best describes
	how well you are keeping up with your bills and credit
	commitments at the moment?
	• Having real financial problems and have fallen
	behind with many of them.
	<ul> <li>Falling behind with some of them</li> </ul>
	<ul> <li>Keeping up with all of them, but it is a constant</li> </ul>
	struggle.
	• Keeping up with all of them, but it is a struggle
	from time to time.
	• Keeping up with all of them without any difficulties.
	• Don't have any commitments.

	<ul> <li>6. In the past 12 months, how often have you run out of money before the end of the week or month and needed to use a credit card or overdraft to get by?</li> <li>Always</li> <li>Most of the time</li> <li>Sometimes</li> <li>Hardly ever</li> <li>Never</li> </ul>
Financial Self-efficacy	<ul> <li>Standardized index based on respondent's agreement to three questions related to financial self-efficacy (totally true to totally false):</li> <li>It is hard to stick to my spending plan when unexpected expenses arise.</li> <li>When unexpected expenses occur, I usually have to use credit.</li> <li>I lack confidence in my ability to manage my finances.</li> </ul>
Attention	Variable measuring how often participant read the terms and conditions carefully while making financial decisions (options range from "totally true" to "totally false").
Number of BNPL providers used	Number of BNPL providers participant has used in the past 12 months.
Number of BNPL contracts	Number of BNPL agreements participant has had at one time in the past 12 months.
Time preference	Average willingness to pay to not use short term credit in the next six months over different levels of fixed payment.