

A Comparison of Preferences and Traits between Self-Employed Workers and Employees

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October 2023

Abstract

We compare self-employed workers and employees on their preferences and traits. To this end, we implemented a survey, including incentivized economic experiments, among the Dutch working population ($N = 4,282$). Data from the survey are enriched with demographic variables from register data by Statistics Netherlands. Our data contain a rich set of preferences and traits, including economic preferences, social preferences, personality traits, and cognitive traits, which allows us to provide an extensive picture of the differences between the two groups. Additionally, we measure preferences with both incentivized economic experiments and self-assessed survey questions, which allows us to compare these different elicitation methods. We find that self-employed workers are more willing to take risks, more patient, more optimistic, and more willing to reciprocate negatively, compared to employees. They also have lower financial management skills and report lower trust in institutions and higher trust in other people. Results from incentivized experiments are largely in line with the results from survey questions for risk and social preferences, but contrasting results are found for time preferences with self-employed workers making less patient choices. Self-employed workers do not differ on average from employees in other preferences and traits, such as self-control, financial literacy, ambiguity aversion, and overconfidence.

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1 Introduction

The average share of self-employed workers has remained roughly stable across the European Union over the past two decades (at around 15%). At the same time, the composition of the group of self-employed is continuously changing (Cowling et al., 2019; Eurofound, 2017).¹ For example, the share of self-employed workers without personnel (solo self-employed) increased, especially in the services and public sector, while the share of self-employed workers in agriculture decreased (Eurofound, 2017). In terms of demographic composition, there has been a decrease in the gender gap and self-employed workers are becoming older on average (Cowling et al., 2019).

Given that the labor market is constantly changing and the individuals who comprise the group of self-employed vary across countries and time, several authors have called for the need to keep research on self-employment up-to-date and test “established” relationships (Cowling et al., 2019; Simoes et al., 2016). In line with this, we build on previous work posing the question “Who are the self-employed?” (e.g., Cowling, 2000; Cowling et al., 2019; Beugelsdijk and Noorderhaven, 2005; Walter and Heinrichs, 2015; Simoes et al., 2016). Specifically, we examine differences between self-employed workers and employees on a wide variety of preferences and traits, including economic preferences, social preferences, personality traits, and cognitive traits. To this end, we implemented a survey, including incentivized economic experiments, among the Dutch working population ($N = 4,282$).

Having an accurate picture of who the self-employed are is important because businesses ultimately arise from the actions of individuals (Baron, 2004). The entrepreneurial process involves, for example, operating in complex environments (Baron, 2004), bearing risks (Ekelund et al., 2005), and believing in the feasibility and successfulness of business ideas (Frese and Gielnik, 2014; Koellinger et al., 2007). Consequently, it may be expected that cognitive traits, risk preferences, and optimism are characteristics that play a role in the decision to become self-employed. In this study, we empirically examine these and other characteristics of the Dutch self-employed and investigate how they compare to employees.

A better understanding of the self-employed and how they compare to employees also provides insights that can aid adequate policy-making. For example, risk and time preferences have been shown to correlate with investment (e.g., Beauchamp et al., 2017; Dohmen et al., 2011; Menkhoff and Sakha, 2017) and saving decisions (e.g., Sutter et al., 2013; Falk et al., 2018),

¹The OECD (2023) defines self-employment as “the employment of employers, workers who work for themselves, members of producers’ co-operatives, and unpaid family workers.”

respectively. Insights into such characteristics, therefore, allow for more targeted policies that incorporate differences as well as similarities between employees and self-employed workers. This is particularly relevant in recent years as self-employed workers have been in the spotlight of policy debate, mainly due to the changing composition of the group of self-employed (Eurofound, 2017). The past years have, for instance, seen an increase in the number of solo self-employed who are similar to employees regarding the labor, knowledge, and skills they offer, but often lack the social and employment protection that employees enjoy. If those solo self-employed are also similar to employees in their preferences and traits this can be taken into account for policies that target this group.

The first contribution of our study is that we explore a rich set of preferences and traits within the same large and heterogeneous population sample, including economic preferences (risk, higher-order risk, ambiguity aversion, and time), social preferences (solidarity, altruism, and reciprocity), personality traits (self-control, procrastination, trust, overconfidence, and optimism), and cognitive traits (financial literacy, financial management, and cognitive reflection). This allows us to provide an extensive picture of the differences between self-employed workers and employees. The second contribution is that we measure several economic and social preferences with both incentivized economic experiments, where decisions have real financial consequences (revealed preference methods), and self-assessed survey questions (stated preference methods). This allows us to investigate whether we find consistency between people’s behavior in incentivized economic experiments and their own self-assessed preferences.

We find that self-employed workers are more willing to take risks, more patient, and more optimistic, compared to employees. They are also more willing to reciprocate negatively, have lower trust in institutions, have higher trust in other people, and report lower financial management skills. In the incentivized tasks, self-employed workers take slightly more risks, exhibit slightly more solidarity, and are less patient than employees. Self-assessed preferences and behavior in incentivized tasks largely coincide when it comes to risk and social preferences but diverge for time preferences. Compared to employees, self-employed workers also indicate that they have more self-control, state to be more altruistic, and score higher on cognitive reflection and financial literacy. However, these effects are not robust to adding demographic control variables. Self-employed workers do not differ from employees regarding prudence, temperance, ambiguity aversion, procrastination, positive reciprocity, and overconfidence.

The remainder of the paper is structured as follows. In Section 2, we discuss the implementation of our study. Section 3 is divided into subsections covering a set of related preferences and

traits. Each subsection includes a motivation for including these preferences and traits, related literature, the experimental/survey design, and results. In Section 4, we discuss the results and conclude.

2 Procedures

The data were collected in a two-wave online survey in May and June of 2020 conducted in collaboration with Statistics Netherlands and research agency Flycatcher.² Statistics Netherlands selected the stratified random sample, which allowed us to link the survey and experimental data with register data. Flycatcher programmed the online survey and experiments and collected the data. A total of 18,000 Dutch employees and 18,000 self-employed were randomly selected and invited through physical letters to participate in the online study. In total, 4,282 Dutch residents completed both waves. Data from the survey are enriched with demographic variables from register data of Statistics Netherlands.

Using the register data, we classify individuals according to their occupation status. We identify 2,397 (56%) as employed, 1,505 (35%) as self-employed, and 380 (9%) as other (e.g., student, retiree, unemployed).³ In the analysis, we exclude participants classified as other because they are neither employed nor self-employed, leaving 3,902 individuals.

The two waves of the survey included different sets of incentivized elicitation tasks, which are explained in detail in the next section. One out of five participants, among those who completed both waves, was randomly selected to receive a payment based on their decisions in one randomly selected incentivized task. In addition, one iPad was raffled off among those participants who completed both waves. Possible earnings ranged from €0 up to €186 depending on the task. The average earning among the participants selected for payment was €77.10 ($SD = 41.33$).⁴ The median completion time was 46 and 51 minutes respectively in waves 1 and 2. Participants were fully informed about these procedures in advance.

²A complete overview of the material is available at <http://bit.ly/pbbs-main>.

³Some individuals are classified as “other” because the drawing of the sample and the survey did not take place exactly at the same time.

⁴Participants thus earned €15.42 on average. At the time of the study, this was roughly 50% above the net hourly minimum wage in the Netherlands (it was €9.70 per hour for a 40-hour workweek in 2020, see <https://bit.ly/wage-Dutch>, last retrieved May 2023).

3 Comparison of Self-Employed and Employees

We first report demographic characteristics of our sample and their relationship with self-employment. Thereafter, each subsection investigates differences between self-employed workers and employees for a set of related preferences and/or traits. We follow the same structure in each subsection. In particular, we (i) provide motivation for investigating the relationship between self-employment and the respective set of preferences and/or traits, (ii) summarize related literature, (iii) describe the survey and/or experimental design, and (iv) discuss the key findings related to that specific aspect of our study.⁵ The analysis in each subsection consists of descriptive results by means of cumulative distribution plots, non-parametric Mann-Whitney U (MWU) tests, and parametric analysis in the form of Ordinary Least Squares (OLS) regression analyses, both with and without controls. The dependent variables in the regressions are standardized (z-score) for the sake of interpretability.⁶

3.1 Basic Demographic Characteristics

There are a number of studies that investigate the role of basic demographic characteristics and their relationship with self-employment (Simoes et al., 2016 provide an extensive review). In terms of relevant basic demographic characteristics for self-employment, Simoes et al. (2016) discuss sex, age, marital status, having children, education, migration background, and access to financial resources. We report descriptive statistics of these demographic characteristics for our sample in Table 1 and investigate differences between employees and self-employed workers with regression analyses presented in Table 2.

For sex, it is consistently found that men are more likely to be self-employed than women (e.g., Koellinger et al., 2013; Leoni and Falk, 2010; Stefanović and Stošić, 2012; Verheul et al., 2012) and we find a similar relationship in our sample ($p < 0.001$). The relationship between age and self-employment is found to exhibit an inverted U-shaped pattern in several longitudinal studies, meaning that people are more likely to become self-employed with increasing age but that the effect reverses at a certain point (Blanchflower, 2004; Caliendo et al., 2014; Georgellis et al., 2005). We similarly find an inverted U-shaped pattern for age (the joint significance test of age and age-squared yields $p < 0.001$). For marital status, the majority of studies document

⁵In our literature review, we broadly consider related studies that investigate the characteristics of self-employed workers. Not all studies compare self-employed workers with employees and hence not all results are directly comparable. Providing a broad overview of the literature, however, will provide insight into the relationship that we can expect to find.

⁶Except generalized trust because it is a dichotomous variable.

Table 1: Descriptive Statistics - Demographics

	Full Sample	Employees	Self-Employed	Min	Max
	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)		
Sex	0.43	0.45	0.39	0	1
Age	46.52 (11.68)	44.38 (11.95)	49.93 (10.36)	20	87
Marital Status (=Single)	0.33	0.37	0.27	0	1
Marital Status (=Married)	0.58	0.55	0.63	0	1
Marital Status (=Widowed)	0.01	0.01	0.01	0	1
Marital Status (=Divorced)	0.08	0.08	0.09	0	1
Children (=Yes)	0.67	0.63	0.74	0	1
Education Level (=Low)	0.04	0.04	0.04	0	1
Education Level (=Middle)	0.25	0.26	0.22	0	1
Education Level (=High)	0.46	0.46	0.44	0	1
Education Level (=Unknown)	0.25	0.23	0.29	0	1
Migration Background (1=Native)	0.87	0.87	0.87	0	1
Household Wealth	367,168 (716,687)	231,201 (464,927)	583,629 (954,652)	-949,069	13,662,027
Household Income	45,051 (83,314)	42,646 (99,879)	48,881 (45,710)	-23,839	4,844,076

Notes: Data refers to January 1, 2020 (for the variables marital status, children, education level, household wealth, and household income) or to the date on which the participant filled in the first wave of the survey (for the variable age). Marital status (=married) includes registered partnership. Household income refers to spendable income and is adjusted for the size and composition of the household. Household wealth and income may be negative for self-employed individuals who incurred losses with their business. The sample size is $N = 3,902$ for the entire sample, $N = 2,397$ for the sample of employees, and $N = 1,505$ for the sample of self-employed workers. There is one observation missing for household wealth and income.

a positive relationship between being self-employed and being married (e.g., Ahn, 2010; Eliasson and Westlund, 2013; Özcan, 2011). In our sample, self-employed workers are somewhat more likely to be married compared to employees (63% vs 55%), but the effect is not statistically significant ($p = 0.207$) in the regression. Concerning having children, there is some evidence that having young children relates positively with self-employment (Lin et al., 2000; Wellington, 2006). We find that self-employed workers in our sample are more likely to have children than employees (74% vs 63%), but the difference is not statistically significant ($p = 0.628$) in the regression.

Empirical results on the role of education and its relationship with self-employment are ambiguous. Previous studies suggest a positive relationship (e.g., Bates, 1995; Kim et al., 2006), a negative relationship (e.g., Bruce, 1999; Clark and Drinkwater, 2000), no relationship (Block and Wagner, 2010; Van Der Sluis et al., 2008), or a U-shaped relationship, meaning that both individuals with low and high levels of education are more likely to become self-employed than those with an intermediate education level (Poschke, 2013). A possible explanation for these

Table 2: Self-Employment and Basic Characteristics

	Self-Employed (y/n)
Sex (=Female)	-0.05*** (0.01)
Age	0.03*** (0.01)
Age Squared	-0.00*** (0.00)
Marital Status (=Married)	-0.02 (0.02)
Marital Status (=Widowed)	-0.15 (0.08)
Marital Status (=Divorced)	0.02 (0.03)
Children (=Yes)	0.01 (0.02)
Education Level (=Middle)	-0.01 (0.04)
Education Level (=High)	-0.02 (0.04)
Education Level (=Unknown)	-0.03 (0.04)
Migration Background (=Native)	-0.02 (0.02)
Household Wealth (Quintile=1)	-0.09*** (0.02)
Household Wealth (Quintile=2)	-0.06* (0.02)
Household Wealth (Quintile=4)	0.14*** (0.02)
Household Wealth (Quintile=5)	0.27*** (0.03)
Household Income (Quintile=1)	0.17*** (0.02)
Household Income (Quintile=2)	0.05* (0.02)
Household Income (Quintile=4)	-0.00 (0.02)
Household Income (Quintile=5)	0.10*** (0.02)
Constant	-0.34** (0.12)
Observations	3901
Adjusted R^2	0.131

Notes: Robust standard errors in parentheses. Baselevels: Sex (=Male), Marital Status (=Single), Children (=No), Education Level (=Low), Migration Background (=Non-Native), Household Wealth (Quintile=3), Household Income (Quintile=3). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

contradicting results is that the results depend on the country of investigation (Blanchflower, 2004; Cowling, 2000). We find no effect of education in our sample both for middle-educated

($p = 0.674$) and higher-educated ($p = 0.530$), compared to lower-educated individuals.⁷

For migration background, Simoes et al. (2016) report that the above-average likelihood of immigrants to become self-employed is a “widely accepted and studied fact” (p. 793). This positive relationship between self-employment and migration background has for instance been documented in the United States for foreign-born individuals (Fairchild, 2009) and in Sweden for non-Western immigrants (Andersson and Hammarstedt, 2011; Joonas, 2010). It is important to note, however, that the majority of these studies (and the studies cited therein) are country-specific and report data from the year 2000 or earlier. The relationship observed may be specific to the country or to the period of investigation (Naudé et al., 2017). A recent report by OECD/European Commission (2021), for example, shows that the majority of European countries either have higher self-employment rates among natives or similar rates between natives and immigrants. For the Netherlands, the report shows little difference in the percentage of self-employed people among natives and non-natives in the Netherlands. In line with this, we find no relationship between self-employment and migration background ($p = 0.291$).

Lastly, empirical evidence suggests that there is a positive relationship between entry to self-employment and household wealth (e.g., Johansson, 2000; Fairlie and Krashinsky, 2012). The main argument is that individuals with higher wealth can use their own capital when starting a business and are more likely to receive external funding because they have more collateral (Simoes et al., 2016). Our data does not allow us to make any causal statements, however, we similarly find that, compared to individuals in the middle quintile, those in the first and second quintiles are less likely to be self-employed, while those in the fourth and fifth quintiles are more likely to be self-employed. Regarding income, we find a U-shaped pattern, meaning that those in the lowest quintile (1) and highest quintile (5) are most likely to be self-employed.

3.2 Risk Preferences and Ambiguity Aversion

It is often assumed that self-employed workers bear more risk than employees, for example, because the earnings of self-employed generally have higher variance (Ekelund et al., 2005). Consequently, the relationship between risk preferences and self-employment has been studied extensively. There are a number of studies that find a negative relationship between self-employment and risk aversion (e.g., Ahn, 2010; Brown et al., 2011; Dohmen et al., 2011; Ekelund et al., 2005). At the same time, there is research suggesting that this relationship is more nuanced

⁷The education data from CBS is unfortunately incomplete, which we capture with the category “Unknown” in the regressions. Specifically, the education level is missing for 1,128 participants (26% of our sample).

as results may depend on the measure that is used (e.g., Åstebro et al., 2007; Georgalos, 2018; Hamböck et al., 2017). For example, in a sample of Dutch entrepreneurs, managers, and employees, Koudstaal et al. (2016) find that, while entrepreneurs view themselves as less risk-averse than others, they do not make less risk-averse choices than managers in incentivized choice tasks. Charness et al. (2020) do not find any relationship between risk aversion and self-employment for five different measures of risk aversion, including one hypothetical question and four different incentivized choice tasks in a sample of the Dutch population.

Research on the relationship between higher-order risk preferences (prudence and temperance) and self-employment is limited. Prudence can be interpreted as downside risk aversion, which implies precautionary saving (Kimball, 1990). A prudent individual, therefore, prefers to increase their savings with an increase in background risk. Temperance concerns the relationship between portfolio risk and background risk (Kimball, 1993). A temperate individual will take less investment risk when background risk increases. Noussair et al. (2014) elicit higher-order risk preferences in the Netherlands and do not find any relationship with self-employment.

Individuals who start and run their own businesses also face substantial ambiguity. Therefore, it has been hypothesized that self-employed workers are less averse to ambiguity. The empirical evidence is mixed, however. Some studies find a negative relationship between self-assessed ambiguity aversion and self-employment (Begley and Boyd, 1987; Chye Koh, 1996; Schere, 1982), while others find no such relationship (Babb and Babb, 1992). More recent studies investigate the relationship between self-employment and ambiguity aversion using incentivized experiments and report no differences between self-employed workers and a control group (Holm et al., 2013; Koudstaal et al., 2016).

Method. We elicited risk preferences using both incentivized experimental measures and survey questions. Higher-order risk preferences and ambiguity aversion were elicited only with incentivized experimental measures.

We included two incentivized experimental measures for risk preferences. First, we implemented an adapted version of the convex time budget (CTB; Andreoni and Sprenger, 2012; Potters et al., 2016), which jointly elicits risk and time preferences. In this measure, participants face 24 decision tasks where they are asked to divide a budget of €75 between an earlier date, 8 weeks from the day of participation, and a later date, either 16 weeks or 24 weeks from the day of participation. The decisions differ from each other in terms of the interest that is paid out for waiting longer and the risk that is involved. The element of risk is introduced by making

allocations to the later date uncertain in some decision tasks (it was paid with a 100%, 90%, 70%, or 50% chance depending on the task). We use a simple count measure to infer risk preferences from decisions. Specifically, we focus on tasks that involve risk and classify each decision the participant makes as risk-averse (RA), risk-neutral (RN), or risk-seeking (RS). An aggregate measure is then created by counting the number of decisions classified as RA (with weight=-1), RN (with weight=0), and RS (with weight=1) separately for the two different time periods (i.e., 16 weeks or 24 weeks) and taking the average. Larger values of this variable are thus associated with a higher willingness to take risks in the experiment.

Second, we implemented five different multiple price lists (MPLs) in the tradition of Holt and Laury (2002).⁸ An MPL is a list of binary decision situations. In the case of risk preferences, participants are asked to choose between a safer and riskier lottery in each decision situation. The list is designed such that either the safer or the riskier lottery becomes more attractive when moving down the list. The point where the participant switches to the option that becomes more attractive provides an indication of the risk preference. In this study, participants made ten choices in each MPL. We take the average number of risky lottery choices over all five MPLs as a measure of risk preference. Larger values of this variable are thus associated with a higher willingness to take risks in the experiment.

The self-reported survey questions for risk preferences are based on the work by Dohmen et al. (2011). Participants self-identify as being more or less willing to take risks on an 11-point Likert-scale from “not at all willing to take risks” (0) to “very willing to take risk” (10) either in general (GRQ), or in specific domains. The specific domains include willingness to take risks in their personal finances (FRQ), occupation (CRQ), and health (HRQ). We asked these questions in both waves of the study and average the response for our analysis.

Higher-order risk preferences were elicited using an incentivized experimental measure developed by Noussair et al. (2014). Prudence was elicited with five binary decision situations. In each decision situation, participants receive a lottery that yields a high or a low outcome with equal probability. Participants are then asked to choose whether they want to add a zero-mean lottery to the state of high wealth or to the state of low wealth. Prudent decision-makers prefer

⁸We implemented three different types of MPLs: (i) two MPLs where participants choose between two non-degenerate lotteries with probabilities that are varied when moving down the list and outcomes that stay constant within each list (e.g., Holt and Laury, 2002), (ii) two MPLs where participants choose between one degenerate lottery with outcomes that are varied when moving down the list and one non-degenerate lottery with constant probabilities and outcomes (e.g., Cohen et al., 1987), (iii) one MPL where participants choose between two non-degenerate lotteries with constant probabilities and one outcome is varied when moving down the list (e.g., Drichoutis and Lusk, 2016). In Bokern et al. (2023), we show that correlations between these measures range .60 – .88 when controlling for measurement error.

to add the lottery to the state of high wealth. Temperance was elicited with another five binary decision situations. In this case, participants received a lottery that yields the same outcome with equal probability. Participants are then asked to choose whether they want to aggregate or disaggregate two identical zero-mean lotteries. Temperate decision-makers prefer disaggregation of the lotteries. We take the number of prudent (temperate) choices as a measure of prudence (temperance).

Ambiguity aversion was elicited using an incentivized experimental measure consisting of two MPLs, following Cettolin and Riedl (2019). In both MPLs, participants face eleven decision situations, where they are asked to choose between a risky lottery with known probabilities of winning and an ambiguous lottery with unknown probabilities of winning. In addition, participants can state indifference between both lotteries, in which case a fair random device chooses between the options for them. The probabilities in the lotteries are displayed on a screen with red and blue balls in urns. The urn representing the risky lottery contains 10 red or blue balls in a known and displayed proportion. The urn representing the ambiguous lottery contains 10 red or blue balls as well, but in an unknown proportion. To indicate this, the urn is made opaque. Participants are informed that the proportion of red and blue balls in the ambiguous urn stays the same within each MPL as well as between the two MPLs. The proportion of red and blue balls in the risky urn varies from all red in the first row of both MPLs to all blue in the last row. The two MPLs differ only with respect to the color associated with winning the lottery. We take the average number of risky urn choices over both MPLs as a measure for ambiguity aversion.

More detailed information can be found in Appendix C.1, including the parameters used for the experiments, screenshots of the tasks and instructions, and the exact wording of the survey questions.

Results. Figure 1 displays cumulative distribution plots of the responses to our risk, higher-order risk, and ambiguity measures, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panels (a) and (b) show that self-employed workers take somewhat more risk in our incentivized measures, but the difference appears to be small. The difference is larger in Panel (c), which shows that self-employed workers in our sample state on average to be more willing to take risks in general compared to employees.⁹ Panels (d)-(f) show that the differences between self-employed workers and employees are negligible for

⁹The figures for the domain-specific risk questions (FRQ, CRQ, and HRQ) look very similar and hence are omitted here.

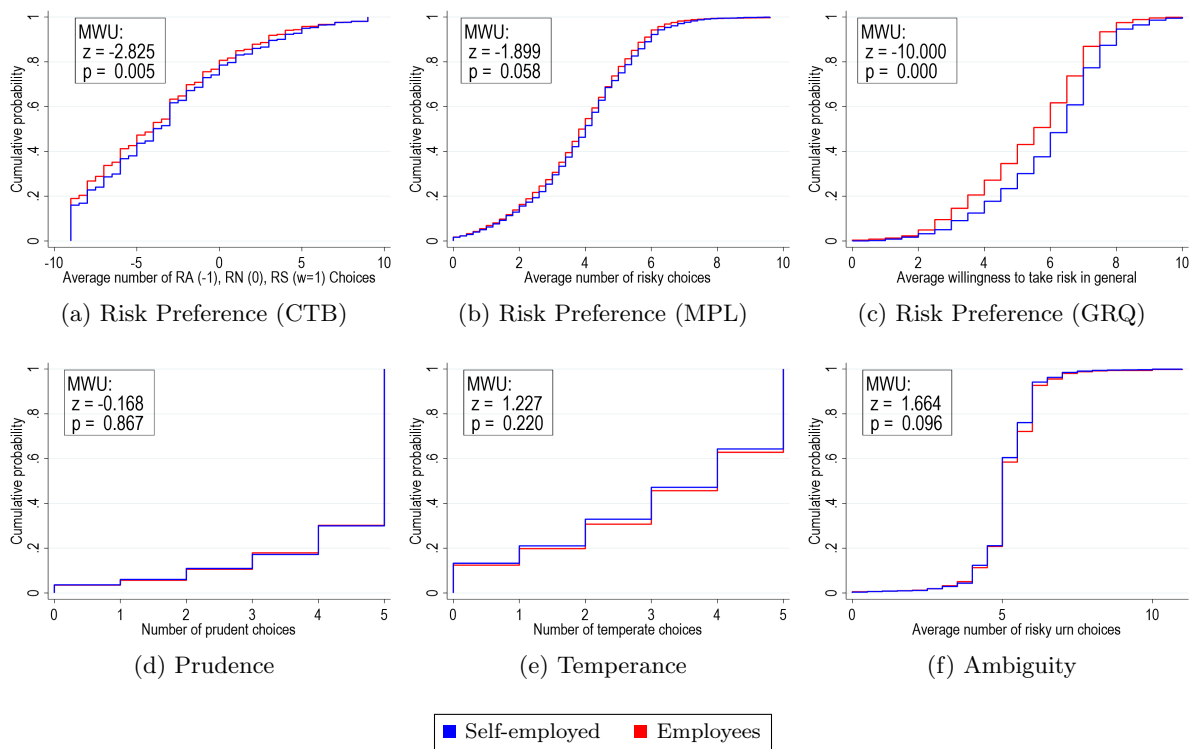


Figure 1: Risk Preferences and Ambiguity Aversion (Cum. Dist.)

Notes: figures show the cumulative distributions of risk preferences measured with the CTB (a), MPLs (b), GRQ (c), prudence (d) temperance (e), and ambiguity aversion, separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,902$.

higher-order risk preferences and ambiguity aversion.

Table 3 shows the regression results for our standardized risk, higher-order risk, and ambiguity measures both without (panel i) and with (panel ii) control variables. The results largely confirm our descriptive observations and non-parametric test results. First, in panel (i) we find evidence in favor of a relationship between self-employment and risk-taking in the CTB ($p = 0.006$) and MPLs ($p = 0.048$) and the observed relationships are robust to adding control variables in panel (ii). The effect size is relatively small, however, as the coefficients for CTB and MPL in both panels imply that being self-employed increases risk-taking by less than one-tenth of a standard deviation. Second, there is a clear relationship between self-employment and self-reported willingness to take risks in general in regressions with and without controls ($p < 0.001$ in both cases). The coefficients imply that self-employed workers are on average about one-third

of a standard deviation more willing to take risks in general compared to employees.¹⁰ Third, we find no differences between self-employed workers and employees for prudence, temperance, and ambiguity aversion in both regressions with and without controls.

Table 3: Risk Preferences and Ambiguity Aversion (Regressions)

	CTB	MPL	GRQ	Prudence	Temperance	Ambiguity
(i) Without Controls						
Self-Employed	0.09** (0.03)	0.06* (0.03)	0.32*** (0.03)	0.00 (0.03)	-0.04 (0.03)	-0.05 (0.03)
Constant	-0.03 (0.02)	-0.01 (0.02)	-0.12*** (0.02)	0.02 (0.02)	0.01 (0.02)	0.03 (0.02)
Observations	3902	3902	3902	3902	3902	3902
Adjusted R^2	0.002	0.001	0.025	0.000	0.000	0.000
(ii) With Controls						
Self-Employed	0.08* (0.04)	0.04* (0.02)	0.35*** (0.03)	0.02 (0.03)	-0.01 (0.04)	-0.02 (0.02)
Constant	0.17 (0.26)	-0.34* (0.14)	1.27*** (0.25)	0.69** (0.26)	-0.17 (0.26)	0.28* (0.12)
Observations	3901	3901	3901	3901	3901	3901
Adjusted R^2	0.012	0.032	0.084	0.007	0.018	0.005

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth (quintiles), and household income (quintiles). Data on wealth and income is missing for one individual. Table A1 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.3 Time Preferences, Procrastination and Self-Control

Self-employment often involves bearing costs in the short term with the expectation of long-term gains. This trade-off between consumption today and consumption in the future is a fundamental concept in economics and is captured by an individual’s time preferences (Cohen et al., 2020; Wang et al., 2016). Research on the relationship between time preferences and self-employment is to the best of our knowledge limited, however. Andersen et al. (2014) elicit time preferences with incentivized measures in a field experiment with Danish entrepreneurs. Their results suggest that entrepreneurs are on average slightly more patient than the general population.

Self-control and procrastination are two psychological traits closely related to time preferences. Self-control has been defined as a preference for larger delayed rewards over smaller immediate rewards (Fujita, 2011), thus individuals with high self-control are expected to be more

¹⁰The effect sizes for the domain-specific risk questions are 0.36 ($p < 0.001$), 0.50 ($p < 0.001$), and 0.23 ($p < 0.001$) for FRQ, CRQ, and HRQ, respectively, in regression with controls (reported in Table A1).

patient as well. The relationship between self-control and self-employment recently started to get attention. Baron et al. (2016) investigate the role of self-control as a mediator for self-efficacy. They find that entrepreneurs with higher self-control are better able at restraining themselves from setting unattainable goals and therefore have better-performing companies. Thus, while self-control is not directly studied as a determinant for self-employment, it suggests that individuals with higher self-control may be more successful in setting up and maintaining their own businesses. Van Gelderen et al. (2015) investigate the role of self-control in the intention-action gap of entrepreneurs and find that self-control positively moderates the relation between intention and action. Thus, individuals with higher self-control are more likely to act on their intention to set up their own business than those with lower self-control. Procrastination is the phenomenon of delaying things one intends to do, thus the choice to delay an immediate cost (Klingsieck, 2013). Nguyen et al. (2013) study procrastination in the workplace using survey questions and conclude that individuals who score high on procrastination are less likely to retain jobs that require high motivational skills. Therefore, we may expect self-employed workers to score lower on procrastination compared to the general population.

Method. We elicited time preferences using both survey questions and incentivized experimental measures. Self-control and procrastination were elicited only with survey questions.

We included two incentivized experimental measures for time preferences. First, we implemented an adapted version of the CTB, as discussed in Section 3.2. To infer time preferences from the decisions made in the CTB, we simply take the average euro amount a participant allocates to late period in risk-less decision situations (i.e., where the later payoff was obtained with a 100% chance). Larger values for this variable are thus associated with more patience of the decision-maker.

Second, we implemented two different MPLs in the spirit of Coller and Williams (1999). In each MPL, participants are asked to make nine binary decisions between €75 at an early date (8 weeks from the day of participation) and varying amounts at a later date (either 16 or 24 weeks from the day of participation). Moving down the list, the amounts at the later date increase, yielding interest rates between 0% and 26.7% over the delay period. The point where the participant switches to the option at the later date provides an indication of their time preference. We take the average number of later-date choices over both MPLs as a measure of patience.

The self-reported survey questions for time preferences are based on the work by Falk et al.

(2022). Participants identified themselves as being more or less willing to give something up today to benefit from it in the future on an 11-point Likert scale ranging from “not at all willing” (0) to “very willing” (10). The question was asked twice, once referring to the near future and once referring to the distant future. We asked these questions in both waves of the study and average the response for our analysis (hereafter GTQ).

Self-control was elicited using the brief self-control scale (Tangney et al., 2004). This scale is composed of 13 statements that aim to capture how much self-control individuals have (e.g., “I am good at resisting temptation” or “I have a hard time breaking bad habits”). Participants were asked to indicate the extent to which each statement reflected how they typically are on a 5-point Likert scale ranging from “not at all” (1) to “very much” (5). The items are converted into an aggregate scale by taking the sum of all responses.

Procrastination was elicited with a non-incentivized survey question based on Falk et al. (2022). Participants were asked to indicate to what extent a statement describes them on an 11-point Likert scale ranging from “does not describe me at all” (0) to “describes me perfectly” (10). The statement elicited whether participants have the tendency to delay tasks, even when they know it would be better to perform them right away.

More detailed information can be found in Appendix C.2, including the parameters used for the experiments, screenshots of the tasks and instructions, and the exact wording of the survey questions.

Results. Figure 2 displays cumulative distribution plots of the responses to our time preference, self-control, and procrastination measures, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panel (a) shows that self-employed workers are somewhat less patient in the CTB measure for patience. At the same time, we find no differences in patience in our MPL measure. In contrast to the results in our incentivized measures, we find in panels (c) and (d) that self-employed workers assess themselves as more patient and having higher self-control compared to employees. We find no difference between self-employed workers and employees in their self-assessed tendency to procrastinate in panel (e).

The regression results without control variables in panel (i) of Table 3 corroborate our descriptive observations and non-parametric test results. In particular, we find a small negative relationship between self-employment and our incentivized CTB measure ($p = 0.011$) and no relationship with our MPL measure ($p = 0.309$). At the same time, self-employed workers assess themselves as more patient ($p < 0.001$) and with higher self-control ($p = 0.002$). The

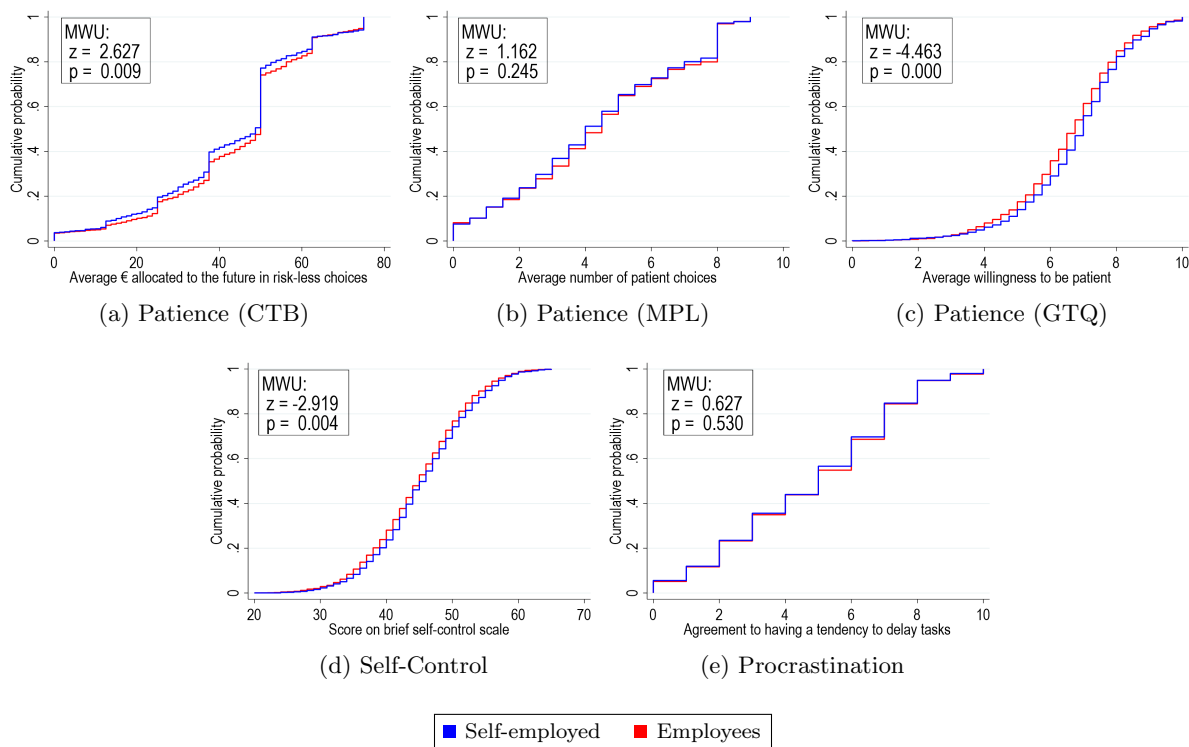


Figure 2: Time Preferences, Self-Control and Procrastination (Cum. Dist.)

Notes: figures show the cumulative distributions of time preferences measured with the CTB (a), MPLs (b), and GTQ (c), self-control (d), and procrastination (e), separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,902$.

results change somewhat when adding controls to the regressions in panel (ii). Most notably, we no longer find a difference between self-employed workers and employees in terms of their self-assessed self-control. On the other hand, we find that the effect size of our GTQ measure increases when adding controls to about one-fifth of a standard deviation. No differences are found between self-employed workers and employees in terms of self-assessed tendency to procrastinate in both regressions with and without controls.

Table 4: Time Preferences, Self-Control, and Procrastination (Regressions)

	CTB	MPL	GTQ	Self-Control	Procrastination
(i) Without Controls					
Self-Employed	-0.08*	-0.03	0.13***	0.10**	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	0.05*	0.02	-0.03	-0.05**	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Observations	3902	3902	3902	3902	3902
Adjusted R^2	0.001	0.000	0.004	0.002	-0.000
(ii) With Controls					
Self-Employed	-0.09*	-0.06	0.18***	-0.03	0.03
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Constant	0.16	0.35	0.29	-0.70**	-0.06
	(0.24)	(0.22)	(0.26)	(0.27)	(0.26)
Observations	3901	3901	3901	3901	3901
Adjusted R^2	0.017	0.029	0.099	0.054	0.017

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth, and household income. Data on wealth and income is missing for one individual. Table A2 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4 Solidarity Preferences and Altruism

Self-employed workers are sometimes painted as self-centered or egoistic actors (e.g., Caliendo et al., 2012; Harms et al., 2020). In line with this, we may expect that self-employed workers are less altruistic and exhibit less preference for solidarity. The relationship between altruism and self-employment has been studied indirectly, but the results are mixed. On the one hand, there is substantial evidence suggesting that there is a positive relationship between narcissism and self-employment or the intention to become self-employed (Burger et al., 2023 review the literature). In turn, there is some evidence that individuals who score high on narcissism behave less altruistically (He and Zhu, 2016), which would suggest that the self-employed may be less altruistic compared to the general population. On the other hand, Tietz and Parker (2014) exploit longitudinal data of self-employed workers in the US and find that they give more to charity compared to the general population. The relationship between self-employment and solidarity preferences is to the best of our knowledge so far unexplored.

Method. We elicited solidarity preferences with an incentivized experimental measure and altruism with a survey question.

Solidarity preferences were elicited with an incentivized experimental measure in the form of

a modified version of the solidarity game introduced by Selten and Ockenfels (1998). Participants were anonymously matched with another participant in the study and were confronted with one of the following four possible situations: (i) both participants win an amount of €80 (with 50% probability), (ii, iii) one participant wins an amount of €80 and the matched other nothing or vice versa (both with 20% probability), (iv) both receive nothing (with 10% probability). Following Riedl et al. (2019), we then elicited solidarity preferences towards different age groups using the strategy method (Selten, 1967). Specifically, for the situation in which the participant received money but their partner did not, they had to decide how much they were willing to transfer to (a) a young participant (between 16 and 34 years), (b) a middle-aged participant (between 35 and 64 years), and (c) an old participant (65 years and older). Here, we take the average amount of money sent over all age groups as a measure of solidarity preferences.

Altruism was elicited with a non-incentivized survey question based on Falk et al. (2022). Participants self-identified as being more or less willing to give to a good cause without expecting anything in return on an 11-point Likert scale ranging from “not at all willing” (0) to “very willing” (10). The question was asked in both waves of the study. We use the average response for our analysis.

More detailed information can be found in Appendix C.3, including the parameters used for the experiments, screenshots of the tasks and instructions, and the exact wording of the survey questions.

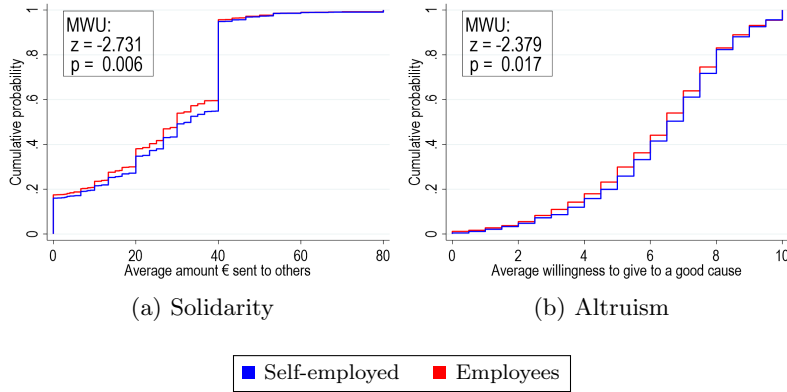


Figure 3: Solidarity Preferences and Altruism (Cum. Dist.)

Notes: figures show the cumulative distributions of solidarity (a), and altruism (b), separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,902$.

Results. Figure 3 displays cumulative distribution plots of the responses to our altruism and solidarity measures, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panel (a) shows that self-employed sent slightly more money to others on average in the solidarity game compared to employees. In line with this, we find in panel (b) that self-employed workers rate themselves as slightly more altruistic compared to employees.

Table 5: Solidarity Preferences and Altruism (Regressions)

	Solidarity	Altruism
(i) Without Controls		
Self-Employed	0.08*	0.08*
	(0.03)	(0.03)
Constant	-0.04	-0.03
	(0.02)	(0.02)
Observations	3902	3902
Adjusted R^2	0.001	0.001
(ii) With Controls		
Self-Employed	0.07*	0.04
	(0.03)	(0.03)
Constant	-0.07	-0.73**
	(0.26)	(0.27)
Observations	3901	3901
Adjusted R^2	0.008	0.046

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth, and household income. Data on wealth and income is missing for one individual. Table A3 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The regression results without control variables in panel (i) of Table 3 corroborate our descriptive observations and non-parametric test results. In particular, we find a small positive relationship between self-employment and our incentivized solidarity measure ($p = 0.015$) as well as our non-incentivized altruism measure ($p = 0.013$). The effect size is similar in both measures, corresponding to about one-tenth of a standard deviation. The results are not entirely robust, however, to adding controls. The effect size for solidarity remains similar ($p = 0.030$) but the effect size of the altruism question decreases and the coefficient is no longer statistically significant ($p = 0.218$).

3.5 Trust and Reciprocity

Trust is considered a critical trait for entrepreneurship and consequently has received much attention in the entrepreneurship literature (see Welter, 2012 for a review). A difficulty of studying trust, however, is that there are many different definitions of trust and therefore it has been studied in many forms (Welter, 2012). We limit our review to studies that investigate either generalized trust (trust in other people) or institutional trust (trust in public, private, or political institutions) as a personality trait and investigate its relationship with self-employment. Generalized trust was studied with survey questions, for example, in a sample of Canadian minorities (Nakhaie et al., 2009), a sample of the German population (Caliendo et al., 2012), and a sample including 53 countries (Kwon and Sohn, 2021). Nakhaie et al. (2009) do not find a relationship between generalized trust and self-employment, while Caliendo et al. (2012) find that trust in other people positively affects the likelihood of being self-employed. Kwon and Sohn (2021) distinguish between self-employment and entrepreneurship and find that entrepreneurship, but not self-employment, is positively associated with generalized trust.¹¹ Van Dalen and Henkens (2022) measure trust in pension institutions in the Netherlands and find a negative association with self-employment.

The role of positive and negative reciprocity as determinants of being self-employed was studied by Caliendo et al. (2012). Positive reciprocity refers to rewarding the kind actions of others, while negative reciprocity relates to punishing the unkind actions of others (Dohmen et al., 2008). Caliendo et al. (2012) study the relationship between reciprocity and self-employment using survey questions in a German representative sample. They find no relationship between self-employment and positive reciprocity and weak evidence that self-employed workers show lower negative reciprocity than the employed. Their results also suggest a weak positive relationship between negative reciprocity and the probability of exiting self-employment.

Method. We elicited trust and reciprocity with survey questions. The exact wording of the questions can be found in Appendix C.4.

We elicited both generalized and institutional trust with survey questions used by Statistics Netherlands (2012). Generalized trust was elicited with a binary question that asked participants whether they think people can be trusted in general. The binary answer possibilities stated,

¹¹Kwon and Sohn (2021) distinguish between entrepreneurship and self-employment by dividing the group of self-employed workers according to a variable that measures the nature of tasks that they are engaged with. If the individual states at least a seven on a range from 1 “mostly routine tasks” to 10 “mostly creative”, then the self-employed worker is considered an entrepreneur.

“You cannot be careful enough” (0) or “Most people can be trusted” (1). Institutional trust was measured by asking participants to indicate their level of trust in several institutions on a 4-point Likert scale ranging from “no trust at all” (1) to “a lot of trust” (4). The institutions included the justice system, police, the Lower House of Parliament, banks, pension funds, large companies, science, the current pension system, and the future pension system.¹² We conducted an exploratory principal-component factor analysis (with oblimin rotation) to investigate whether we can reduce the number of variables into fewer factors. We find clear evidence in favor of three factors: trust in public institutions (justice system, police, lower house of parliament, and science), trust in private institutions (banks and large companies), and trust in the pension system (pension funds, current pension system, future pension system). The individual items are converted into scales by taking the sum of the individual items in each factor.

Positive and negative reciprocity were elicited using non-incentivized survey questions based on Falk et al. (2022). In particular, participants were asked to indicate to what extent a statement describes them on an 11-point Likert scale from “does not describe me at all” (0) to “describes me perfectly” (10). The statements elicited whether they are willing to return a favor (positive reciprocity) and are willing to take revenge when treated unjustly (negative reciprocity).

Results. Figure 4 displays cumulative distribution plots of the responses to our trust and reciprocity measures, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panels (a), (b), and (c) show that self-employed workers indicate to be less trusting of public, private, and pension institutions compared to employees. Interestingly, when it comes to generalized trust (trust in other people) in panel (d), we find that self-employed workers tend to be more likely than employees to respond that they trust others. Panels (e) and (f) show the results for positive- and negative reciprocity respectively. We find no difference between self-employed workers and employees when it comes to positive reciprocity, but find that self-employed workers rate themselves higher on negative reciprocity compared to employees.

The regression results without control variables in panel (i) of Table 6 corroborate our descriptive observations and non-parametric test results. Compared to employees, self-employed workers indicate to be less trusting of public ($p = 0.004$), private ($p < 0.001$), and pension

¹²In the last item, participants could also answer “I don’t know”. At the time of the survey, a change in the Dutch pension system was under discussion. As there was no decision on the new system at the time of the survey, participants may have been unsure about what this would look like, which is why we included the option “I don’t know”.

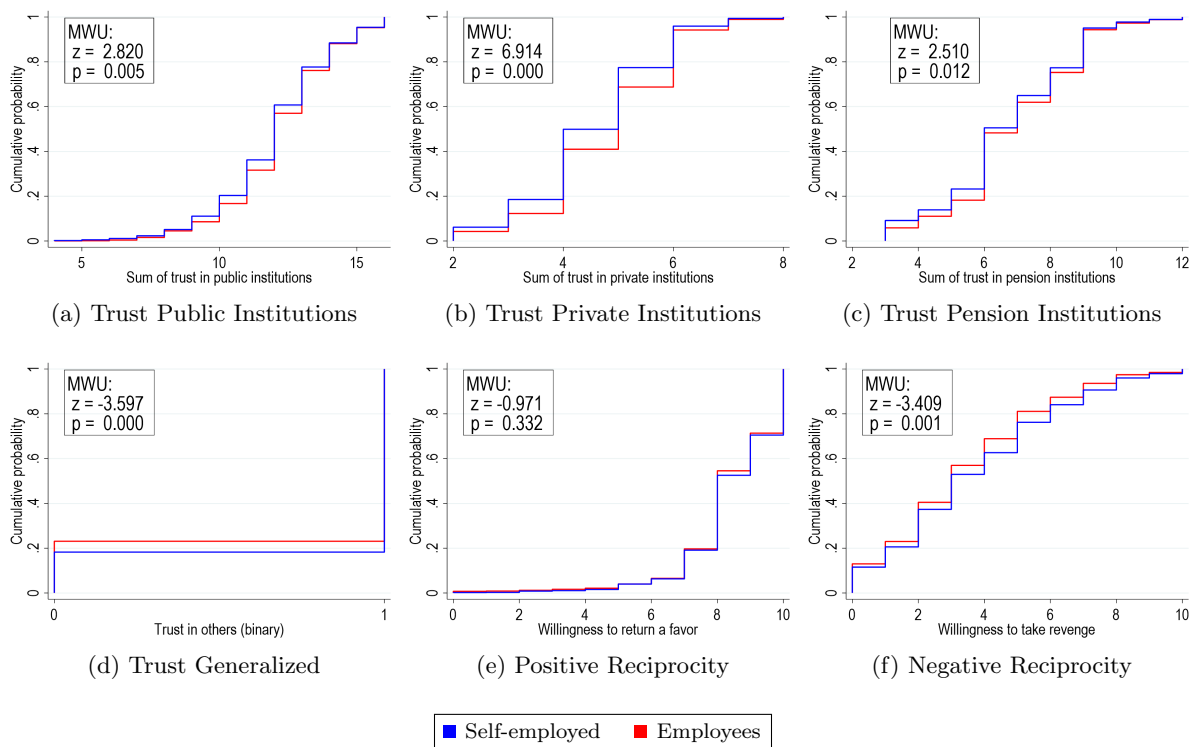


Figure 4: Trust and Reciprocity (Cum. Dist.)

Notes: figures show the cumulative distributions of trust in public institutions (a), trust in private institutions (b), trust in pension institutions (c), generalized trust (d), positive reciprocity (e), and negative reciprocity, separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,109$ for pension trust and $N = 3,902$ otherwise. The number of observations is smaller for pension trust because individuals who answered “I don’t know” are excluded.

($p = 0.006$) institutions, whereas they are more trusting of other people ($p < 0.001$). We observe no difference for positive reciprocity ($p = 0.139$) and a positive effect for negative reciprocity ($p < 0.001$). Turning to panel (ii), where we run the regression with control variables, we find largely the same results. The coefficients in panel (ii) increase somewhat for trust in public ($p < 0.001$) and pension ($p < 0.001$) institutions to about one-eighth and one-fifth of a standard deviation, respectively. On the other hand, the effect size of generalized trust ($p = 0.022$) decreases somewhat to three percent. The effect size of trust in private institutions ($p < 0.001$) similarly decreases slightly but remains to be about one-fifth of a standard deviation. The effect size of negative reciprocity ($p < 0.022$) decreases as well to about one-thirteenth of a standard deviation.

Table 6: Trust and Reciprocity (Regressions)

	Public Trust	Private Trust	Pension Trust	Generalized Trust	Positive Reciprocity	Negative Reciprocity
(i) Without Controls						
Self-Employed	-0.10** (0.03)	-0.23*** (0.03)	-0.10** (0.04)	0.05*** (0.01)	0.04 (0.03)	0.12*** (0.03)
Constant	0.05* (0.02)	0.11*** (0.02)	0.03 (0.02)	0.77*** (0.01)	-0.00 (0.02)	-0.04* (0.02)
Observations	3902	3902	3109	3902	3902	3902
Adjusted R^2	0.002	0.012	0.002	0.003	0.000	0.003
(ii) With Controls						
Self-Employed	-0.13*** (0.03)	-0.21*** (0.03)	-0.21*** (0.04)	0.03* (0.01)	0.05 (0.03)	0.08* (0.03)
Constant	-0.42 (0.26)	0.79** (0.25)	-0.00 (0.31)	0.46*** (0.11)	0.18 (0.25)	-0.58* (0.26)
Observations	3901	3901	3108	3901	3901	3901
Adjusted R^2	0.080	0.048	0.045	0.053	0.006	0.048

Notes: Dependent variables, except generalized trust, are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth, and household income. The number of observations is smaller for pension trust because individuals who answered “I don’t know” are excluded. Table A4 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.6 Optimism and Overconfidence

Starting a business requires believing in the feasibility of the idea and becoming successful (Frese and Gielnik, 2014; Koellinger et al., 2007), even in the face of low expected returns and high failure rates (Cassar, 2010; Simon and Shrader, 2012). Consequently, (over-)optimism and overconfidence are two closely related personality traits that have been studied extensively in the context of self-employment (Frese and Gielnik, 2014; Simoes et al., 2016). Optimism is defined as a more general view that “good things will happen” (Ästebro et al., 2014). Overconfidence has been studied in various ways, as discussed by Moore and Healy (2008), who define three types of overconfidence. First, people may overestimate their own performance, ability, level of control, or chances of success (overestimation). Second, people may believe that they are better than others (overplacement or better than average). Third, people may report excessive certainty regarding the accuracy of their beliefs (overprecision). Empirically, overconfidence and optimism are hard to distinguish, and the terms have been used interchangeably in previous literature (Ästebro et al., 2014). For example, Cooper et al. (1988) asked entrepreneurs to state the odds of their own business succeeding and find that a third of the respondents perceives those odds as 10 out of 10, despite reporting much lower odds for the success of other companies

similar to their own. It is not clear whether this measures overconfidence or optimism. Åstebro et al. (2014) conclude from a review of the empirical literature that there is some evidence suggesting a positive relationship between self-employment and either optimism, overestimation, or overplacement. Evidence on the relationship between self-employment and overprecision is mixed.

Method. We elicited optimism and overconfidence with survey questions. The exact wording of the questions can be found in Appendix C.5.

We elicited optimism with an adapted version of the Optimism-Pessimism-2 Scale (SOP2; Kemper et al., 2017). This scale consisted of two questions where participants were asked to indicate how optimistic and pessimistic they are in general on an 11-point Likert scale ranging from “not optimistic at all” (0) to “very optimistic” (10) and “not pessimistic at all” (0) to “very pessimistic” (10). The answers are converted into a scale by reversing the scores of the pessimism question and then taking the sum of both responses.

We measured overconfidence by asking participants to judge how many financial literacy questions (see Section 3.7) they thought they had correct after answering them. We, therefore, measure overconfidence as overestimating one’s own performance (Moore and Healy, 2008). The measure was constructed by taking the number of answers that the participant thought to have correct and subtracting the number of actual correct answers. A positive score therefore indicates overconfidence and a negative score underconfidence.

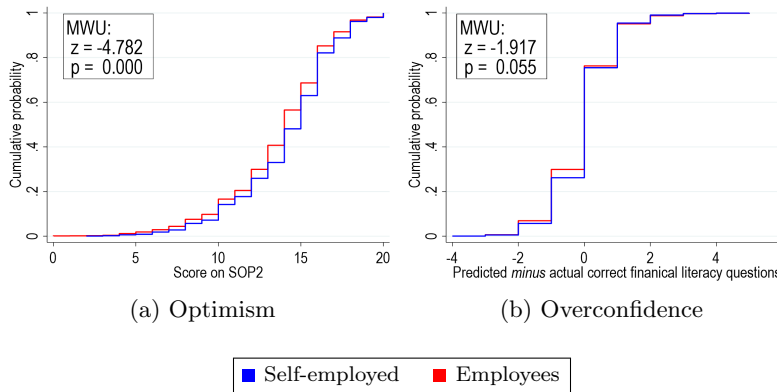


Figure 5: Optimism and Overconfidence (Cum. Dist.)

Notes: figures show the cumulative distributions of optimism (a) and overconfidence (b), separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,902$.

Results. Figure 5 displays cumulative distribution plots of the responses to our optimism and overconfidence measures, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panel (a) shows that self-employed workers indicate to be more optimistic compared to employees. Panel (b) shows very weak evidence of a relationship between self-employment and overconfidence, which appears to be driven by employees who are on average slightly more *under*-confident compared to self-employed workers.

The regression results without control variables in panel (i) of Table 7 corroborate our descriptive observations and non-parametric test results. The coefficients for optimism ($p < 0.001$) and overconfidence ($p = 0.109$) are both positive, but the latter is very weak. The effect sizes become smaller when adding controls to the regression in panel (ii). The coefficient for optimism ($p = 0.001$) is about one-tenth of a standard deviation.

Table 7: Optimism and Overconfidence (Regressions)

	Optimism	Overconfidence
(i) Without Controls		
Self-Employed	0.15*** (0.03)	0.05 (0.03)
Constant	-0.06** (0.02)	-0.04 (0.02)
Observations	3902	3902
Adjusted R^2	0.005	0.000
(ii) With Controls		
Self-Employed	0.11*** (0.03)	0.01 (0.03)
Constant	-0.80** (0.26)	-0.38 (0.27)
Observations	3901	3901
Adjusted R^2	0.029	0.017

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth, and household income. Data on wealth and income is missing for one individual. Table A5 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.7 Cognitive Reflection, Financial Literacy, and Financial Management

Self-employed workers generally operate in a complex environment and have to be able to recognize opportunities that can be profitably exploited (Baron, 2004). Moreover, they are often responsible for their own insurance, pension-building, and other financial matters. Therefore,

several authors have studied the relationship between self-employment and cognitive ability (Hartog et al., 2010; Levine and Rubinstein, 2017) and more recently financial literacy. Specifically, Ćumurović and Hyll (2019) find a positive relationship between financial literacy and being self-employed using German survey data. Riepe et al. (2020) investigate the role of financial literacy and its interaction with risk aversion using survey and experimental data from the Netherlands. They found that risk aversion played a role in the likelihood of being self-employed for individuals with below-average financial literacy scores, but no such relationship was found for individuals with above-average financial literacy scores. Struckell et al. (2022) find a positive relationship between financial literacy and self-employment in the United States. The relationship between self-employment and financial management is to the best of our knowledge so far unexplored. Given that self-employed workers are largely responsible for their own financial matters, including insurance and pension-building, financial management is a particularly important skill for this group.

Method. We elicited cognitive reflection and financial literacy with multiple-choice questions that could be answered correctly or incorrectly. Financial management was elicited with survey questions. The exact wording of the questions can be found in Appendix C.6.

We elicited cognitive reflection with the cognitive reflection test (CRT; Frederick, 2005). The CRT consists of three questions with a seemingly intuitive answer that is incorrect. Individuals should be able to provide the correct answer if they take time to reflect on their answers. Cognitive reflection thus measures participants' ability to override an intuitive heuristic. We take the number of correct answers as a measure of cognitive reflection.

Financial literacy was elicited using five multiple-choice financial literacy questions (Lusardi and Mitchell, 2014). The questions are designed to test how knowledgeable participants are concerning financial matters in the domain of interest rates, stocks, and mortgages. As a measure of financial literacy, we take the number of correct answers.

Financial management was elicited using a scale proposed by Antonides et al. (2011). The scale contains four statements concerning how individuals deal with financial affairs (e.g. paying bills on time). Participants were asked to indicate the extent to which they agreed with each statement on a 5-point Likert scale ranging from "totally disagree" (1) to "totally agree" (5). As a measure of financial management, we take the sum of the responses to the individual items.

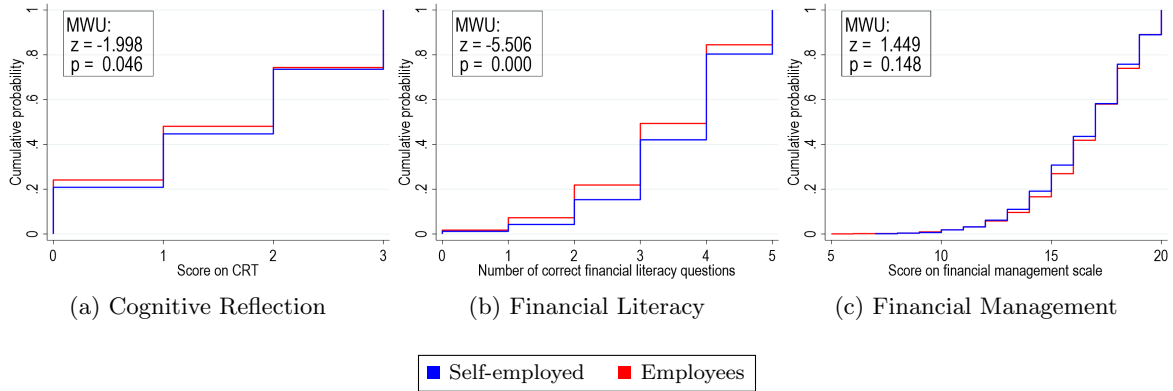


Figure 6: Cognitive Reflection, Financial Literacy, and Financial Management (Cum. Dist.)

Notes: figures show the cumulative distributions of cognitive reflection (a), financial literacy (b), and financial management (c), separated for self-employed and employees. The boxes in each figure display the results from a Mann-Whitney U (MWU) test. $N = 3,902$.

Results. Figure 6 displays cumulative distribution plots of the correct number of answers to our cognitive reflection and financial literacy questions, as well as the responses to our financial management questions, separated for employees and self-employed workers. The text boxes in the figure report p-values from MWU tests. Panel (a) shows that self-employed workers tend to have slightly more correct answers in the CRT. They do even better on financial literacy as indicated by panel (b). There appears to be no relationship between self-employment and financial management in panel (c).

The regression results without control variables in panel (i) of Table 8 corroborate our descriptive observations and non-parametric test results. The coefficients for cognitive reflection ($p = 0.040$) and financial literacy ($p < 0.001$) are both positive, whereas there is no effect for financial management ($p = 0.162$). The results are not robust, however, to adding controls in panel (ii). In particular, the effects found for cognitive reflection and financial literacy vanish entirely, which can mainly be attributed to the inclusion of sex and wealth as control variables. On the other hand, we now find a negative relationship between self-employment and self-assessed financial management ($p < 0.001$).

Table 8: Cognitive Reflection, Financial Literacy, and Financial Management (Regressions)

	Cognitive Reflection	Financial Literacy	Financial Management
(i) Without Controls			
Self-Employed	0.07* (0.03)	0.19*** (0.03)	-0.05 (0.03)
Constant	-0.02 (0.02)	-0.07** (0.02)	0.01 (0.02)
Observations	3902	3902	3902
Adjusted R^2	0.001	0.008	0.000
(ii) With Controls			
Self-Employed	0.00 (0.03)	0.02 (0.02)	-0.18*** (0.03)
Constant	-0.22 (0.25)	-0.02 (0.16)	-0.74** (0.25)
Observations	3901	3901	3901
Adjusted R^2	0.111	0.130	0.067

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. The regression reported in panel (ii) controls for sex, age, age-squared, marital status, children, education level, migration background, household wealth, and household income. Data on wealth and income is missing for one individual. Table A6 reports full regressions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Discussion and Conclusion

In this paper, we investigated differences in demographic characteristics and a wide range of preferences and traits between self-employed workers and employees in a large sample of the Dutch working population. Among this sample, we implemented a survey, including incentivized economic experiments, in which we elicited economic preferences (risk, higher-order risk, time, ambiguity aversion), social preferences (solidarity, altruism, and reciprocity), personality traits (self-control, procrastination, trust, overconfidence, and optimism), and cognitive traits (cognitive reflection, financial literacy, and financial management). Data from the survey were enriched with demographic variables from register data provided by Statistics Netherlands.

We find that self-employed workers differ in some preferences and traits, but also share similarities. First, self-employed workers indicate that they have a higher willingness to take risks compared to employees, corroborating previous studies (e.g., Ahn, 2010; Brown et al., 2011; Dohmen et al., 2011; Ekelund et al., 2005). In line with their self-assessment, they also take more risks in the incentivized economic experiments, but the effect size is small. As discussed, previous studies have found mixed results concerning differences between self-employed and employees in risk-taking in incentivized experiments (see Bokern et al., 2021 for a review). The small effect size

that we find suggests that a statistically significant effect can only be detected with a sufficiently large sample size. Further research is needed to shed light on why such differences are found between stated and revealed preference methods for measuring risk preferences (see also Mata et al., 2018). We do not find any differences between self-employed workers and employees for higher-order risk preferences (prudence and temperance), corroborating Noussair et al. (2014), and ambiguity aversion, in line with previous studies that examine ambiguity aversion with incentivized tasks (Holm et al., 2013; Koudstaal et al., 2016).

Second, self-employed workers indicate that they are more patient than employees. At the same time, self-employed workers behave slightly less patiently than employees when it comes to their decisions in incentivized experiments. This finding contrasts Andersen et al. (2014), who found that self-employed individuals behaved slightly more patiently in incentivized choice tasks. Our results, therefore, do not allow for any conclusive statements about the difference between self-employed workers and employees in their time preferences. We find no differences between self-employed workers and employees in their self-assessed self-control and tendency to procrastinate, which is contrary to our expectation based on indirect evidence in the literature.

Third, compared to employees, self-employed workers indicate that they are slightly more altruistic and send slightly more to others on average in the solidarity game. These results are in line with Tietz and Parker (2014) who found that self-employed workers give more to charity, and contrasts our hypothesis that self-employed workers may be less altruistic because they are found to be more narcissistic (Burger et al., 2023). It is important to note, however, the effect size for both these effects is small and becomes statistically insignificant for self-assessed altruism when adding control variables. If anything, we thus find that self-employed workers are slightly more altruistic.

Fourth, self-employed workers have less trust in institutions (public, private, and pension) and somewhat more trust in other people compared to employees. This is in line with van Dalen and Henkens (2022) who similarly find that self-employed workers have lower trust in pension institutions. The small but positive relationship between self-employment and generalized trust is in line with Caliendo et al. (2012) and Kwon and Sohn (2021) who found a similar relationship in samples of entrepreneurs.

Fifth, compared to employees, self-employed workers are more optimistic, which is largely in line with previous literature (Ästebro et al., 2014). We do not find any difference between self-employed workers and employees in their overconfidence. Note, however, that this pertains to overconfidence measured as “overestimation” in financial literacy. As discussed, there exist

different types of overconfidence (Moore and Healy, 2008) and we cannot generally conclude from our results that there is no relationship between overconfidence and self-employment.

Lastly, we find that self-employed workers score lower on financial management. No differences are found between self-employed workers and employees in their cognitive reflection and financial literacy, after controlling for demographic characteristics. This result contrasts recent findings suggesting a positive relationship between financial literacy and self-employment (Ćumurović and Hyll, 2019; Struckell et al., 2022).

Our results are particularly relevant for policymakers in the Netherlands who have been increasingly concerned about the socio-economic position of the self-employed, including the adequacy of their retirement savings (e.g., Ministry of Social Affairs and Employment, 2021). The self-employed tend to make little use of traditional pension saving instruments (Zwinkels et al., 2017) and have significantly lower pension replacement rates than employees (de Bresser and Knoef, 2015; Knoef et al., 2017; Knoef et al., 2016; Zwinkels et al., 2017). In response to this concern, the adequacy of retirement saving by the self-employed is addressed in the proposed pension reform in the Netherlands (Ministry of Social Affairs and Employment, 2022).¹³ At the same time, the lower levels of trust in institutions should be addressed to increase the willingness of this group to accept involvement by various institutions in their financial decisions.

In conclusion, we provide direct evidence of differences and similarities between self-employed workers and employees in terms of their demographics, preferences, and traits, in a unique dataset of the Netherlands. We corroborate several findings from previous literature but also find some novel results. The results contribute to a better understanding of who the self-employed are and are relevant to currently ongoing policy debates surrounding self-employment in the Netherlands, but also in other countries in the EU.

¹³In particular, the new pension agreement contains a clause that stipulates that pension funds may experiment with simplification of retirement saving for the self-employed in the second pillar. The aim of these experiments is to stimulate the self-employed to build up sufficient retirement savings. This experiment lasts up to four years, after which the effects will be evaluated and decisions will be made about more structural changes. Participation in the experiments by the self-employed is voluntary.

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Appendix A Additional Results

A.1 Full Regression Tables

Table A1: Risk Preferences and Ambiguity Aversion (Full Regressions)

	CTB	MPL	GRQ	FRQ	CRQ	HRQ	Prudence	Temperance	Ambiguity
Self-Employed	0.08* (0.04)	0.04* (0.02)	0.35*** (0.03)	0.36*** (0.03)	0.50*** (0.03)	0.23*** (0.03)	0.02 (0.03)	-0.01 (0.04)	-0.02 (0.02)
Sex (=Female)	-0.20*** (0.03)	-0.14*** (0.02)	-0.36*** (0.03)	-0.40*** (0.03)	-0.15*** (0.03)	-0.14*** (0.03)	0.06* (0.03)	0.24*** (0.03)	-0.02 (0.01)
Age	-0.02 (0.01)	-0.02** (0.01)	-0.05*** (0.01)	-0.03** (0.01)	-0.02 (0.01)	-0.02 (0.01)	0.02* (0.01)	0.01 (0.01)	0.01* (0.01)
Age Squared	0.00 (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00** (0.00)
Marital Status (=Married)	-0.01 (0.04)	-0.01 (0.02)	-0.18*** (0.04)	-0.20*** (0.04)	-0.09* (0.04)	-0.14*** (0.04)	0.01 (0.04)	0.05 (0.04)	-0.02 (0.02)
Marital Status (=Widowed)	-0.34* (0.15)	0.05 (0.13)	-0.13 (0.17)	-0.12 (0.16)	0.22 (0.16)	0.04 (0.16)	-0.11 (0.20)	-0.10 (0.20)	-0.13 (0.08)
Marital Status (=Divorced)	0.10 (0.07)	-0.02 (0.04)	0.04 (0.07)	-0.03 (0.07)	0.02 (0.07)	-0.02 (0.07)	-0.03 (0.07)	-0.02 (0.07)	0.02 (0.03)
Children (=Yes)	0.07 (0.04)	0.05* (0.02)	0.17*** (0.04)	0.16*** (0.04)	0.03 (0.04)	0.03 (0.04)	-0.05 (0.04)	-0.13** (0.04)	0.00 (0.02)
Education Level (=Middle)	-0.01 (0.08)	0.06 (0.05)	-0.06 (0.08)	0.03 (0.08)	0.06 (0.09)	0.03 (0.09)	0.16 (0.09)	-0.08 (0.08)	0.03 (0.04)
Education Level (=High)	0.03 (0.08)	0.10* (0.04)	-0.07 (0.08)	0.10 (0.08)	0.12 (0.08)	0.01 (0.09)	0.29*** (0.09)	-0.13 (0.08)	0.02 (0.04)
Education Level (=Unknown)	0.03 (0.09)	0.07 (0.05)	-0.04 (0.08)	0.02 (0.08)	0.04 (0.09)	-0.06 (0.09)	0.14 (0.09)	-0.07 (0.08)	0.02 (0.04)
Migration Background (=Native)	0.04 (0.05)	0.04 (0.03)	0.05 (0.05)	0.01 (0.05)	-0.00 (0.05)	0.14** (0.05)	0.01 (0.05)	0.00 (0.05)	-0.03 (0.02)
Household Wealth (Quintile=1)	-0.08 (0.05)	0.04 (0.03)	0.09 (0.05)	-0.01 (0.05)	0.10 (0.05)	0.04 (0.05)	-0.04 (0.05)	0.19*** (0.05)	-0.02 (0.02)
Household Wealth (Quintile=2)	0.02 (0.05)	0.06* (0.03)	0.02 (0.05)	-0.02 (0.05)	0.03 (0.05)	0.04 (0.05)	0.00 (0.05)	0.02 (0.05)	-0.04 (0.02)
Household Wealth (Quintile=4)	-0.01 (0.05)	0.02 (0.03)	-0.10* (0.05)	-0.08 (0.05)	-0.06 (0.05)	-0.05 (0.05)	-0.03 (0.05)	0.04 (0.05)	-0.01 (0.02)
Household Wealth (Quintile=5)	-0.03 (0.06)	0.02 (0.03)	0.01 (0.05)	0.07 (0.05)	-0.07 (0.05)	-0.07 (0.05)	0.01 (0.05)	0.05 (0.06)	0.01 (0.02)
Household Income (Quintile=1)	-0.01 (0.05)	-0.04 (0.03)	-0.08 (0.05)	-0.09 (0.05)	0.03 (0.05)	-0.01 (0.05)	-0.03 (0.05)	-0.03 (0.05)	-0.00 (0.02)
Household Income (Quintile=2)	-0.03 (0.05)	-0.01 (0.03)	-0.05 (0.05)	-0.04 (0.05)	-0.03 (0.05)	-0.01 (0.05)	-0.04 (0.05)	-0.03 (0.05)	-0.02 (0.02)
Household Income (Quintile=4)	0.06 (0.05)	0.05 (0.03)	0.13** (0.05)	0.09* (0.05)	0.07 (0.05)	0.00 (0.05)	-0.07 (0.05)	-0.03 (0.05)	-0.03 (0.02)
Household Income (Quintile=5)	0.09 (0.05)	0.10*** (0.03)	0.17*** (0.05)	0.16** (0.05)	0.12* (0.05)	0.04 (0.05)	-0.07 (0.05)	-0.07 (0.05)	-0.01 (0.02)
Constant	0.27 (0.27)	-0.34* (0.14)	1.26*** (0.26)	0.85** (0.26)	0.35 (0.26)	0.60* (0.26)	-0.63* (0.26)	-0.33 (0.27)	0.30* (0.12)
Observations	3901	3901	3901	3901	3901	3901	3901	3901	3901
Adjusted R^2	0.012	0.032	0.084	0.097	0.070	0.043	0.007	0.018	0.005

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Time Preferences, Self-Control, and Procrastination (Full Regressions)

	CTB	MPL	GTQ	Self-Control	Procrastination
Self-Employed	-0.09*	-0.06	0.18***	-0.03	0.03
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Sex (=Female)	-0.00	-0.02	-0.22***	0.12***	-0.10**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Age	-0.02	-0.00	0.00	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age Squared	0.00	-0.00	-0.00*	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Marital Status (=Married)	-0.08	-0.04	-0.10*	0.12**	-0.14***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Marital Status (=Widowed)	0.20	0.06	0.30	0.10	-0.11
	(0.22)	(0.14)	(0.16)	(0.18)	(0.19)
Marital Status (=Divorced)	-0.06	-0.07	0.03	0.20**	-0.15*
	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)
Children (=yes)	0.02	-0.04	0.04	-0.01	-0.05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Education Level (=Middle)	-0.00	0.02	0.10	0.01	0.08
	(0.08)	(0.07)	(0.09)	(0.09)	(0.08)
Education Level (=High)	0.14	0.26***	0.30***	0.17*	0.11
	(0.08)	(0.07)	(0.09)	(0.09)	(0.08)
Education Level (=Unknown)	-0.01	0.07	0.10	0.06	-0.04
	(0.09)	(0.08)	(0.09)	(0.09)	(0.09)
Migration Background (=Native)	0.22***	0.11*	0.00	-0.07	0.04
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Household Wealth (Quintile=1)	-0.06	-0.14**	-0.08	-0.16**	0.07
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Household Wealth (Quintile=2)	0.02	-0.02	-0.02	-0.06	0.08
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Household Wealth (Quintile=4)	0.03	0.09*	0.06	0.11*	0.01
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Household Wealth (Quintile=5)	0.06	0.18***	0.21***	0.19***	-0.02
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Household Income (Quintile=1)	-0.03	-0.00	-0.03	-0.02	0.05
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Household Income (Quintile=2)	0.05	-0.01	-0.07	0.08	-0.06
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Household Income (Quintile=4)	0.09	-0.04	-0.00	0.03	-0.02
	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)
Household Income (Quintile=5)	0.07	-0.06	0.01	-0.00	-0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Constant	0.25	0.49*	0.40	-0.53	-0.18
	(0.25)	(0.23)	(0.26)	(0.27)	(0.27)
Observations	3901	3901	3901	3901	3901
Adjusted R^2	0.017	0.029	0.099	0.054	0.017

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Solidarity Preferences and Altruism (Full Regressions)

	Solidarity	Altruism
Self-Employed	0.07*	0.04
	(0.03)	(0.03)
Sex (=Female)	0.04	0.27***
	(0.03)	(0.03)
Age	-0.01	0.00
	(0.01)	(0.01)
Age Squared	0.00	0.00
	(0.00)	(0.00)
Marital Status (=Married)	0.06	0.00
	(0.04)	(0.04)
Marital Status (=Widowed)	0.06	-0.18
	(0.22)	(0.16)
Marital Status (=Divorced)	0.00	-0.09
	(0.07)	(0.07)
Children (=Yes)	-0.02	-0.00
	(0.04)	(0.04)
Education Level (=Middle)	-0.07	0.30**
	(0.09)	(0.09)
Education Level (=High)	-0.01	0.49***
	(0.09)	(0.09)
Education Level (=Unknown)	-0.01	0.29**
	(0.09)	(0.09)
Migration Background (=Native)	0.01	-0.08
	(0.05)	(0.05)
Household Wealth (Quintile=1)	0.09	0.06
	(0.05)	(0.05)
Household Wealth (Quintile=2)	0.12*	0.01
	(0.05)	(0.05)
Household Wealth (Quintile=4)	0.00	0.02
	(0.05)	(0.05)
Household Wealth (Quintile=5)	-0.06	-0.03
	(0.05)	(0.05)
Household Income (Quintile=1)	-0.02	-0.02
	(0.05)	(0.05)
Household Income (Quintile=2)	-0.01	-0.12*
	(0.05)	(0.05)
Household Income (Quintile=4)	-0.01	0.05
	(0.05)	(0.05)
Household Income (Quintile=5)	-0.01	0.15**
	(0.05)	(0.05)
Constant	-0.13	-0.77**
	(0.27)	(0.28)
Observations	3901	3901
Adjusted R^2	0.008	0.046

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Trust and Reciprocity (Full Regressions)

	Public	Private	Pension	Generalized	Pos. Reciprocity	Neg. Reciprocity
Self-Employed	-0.13*** (0.03)	-0.21*** (0.03)	-0.21*** (0.04)	0.03* (0.01)	0.05 (0.03)	0.08* (0.03)
Sex (=Female)	-0.10*** (0.03)	0.06 (0.03)	-0.14*** (0.04)	-0.01 (0.01)	-0.10** (0.03)	-0.36*** (0.03)
Age	-0.02 (0.01)	-0.03* (0.01)	-0.03 (0.01)	-0.00 (0.00)	-0.00 (0.01)	0.03** (0.01)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00** (0.00)
Marital Status (=Married)	-0.03 (0.04)	0.11* (0.04)	0.05 (0.05)	-0.00 (0.02)	-0.05 (0.04)	-0.09* (0.04)
Marital Status (=Widowed)	-0.18 (0.19)	0.33* (0.15)	0.18 (0.17)	0.05 (0.07)	-0.21 (0.29)	-0.28* (0.13)
Marital Status (=Divorced)	-0.06 (0.07)	0.17* (0.07)	-0.08 (0.07)	-0.02 (0.03)	0.06 (0.06)	-0.12 (0.07)
Children (=Yes)	0.06 (0.04)	0.13** (0.04)	0.08 (0.05)	0.02 (0.02)	-0.05 (0.04)	0.06 (0.04)
Education Level (=Middle)	0.36*** (0.10)	-0.02 (0.08)	0.13 (0.09)	0.14*** (0.04)	0.09 (0.09)	-0.02 (0.09)
Education Level (=High)	0.77*** (0.09)	-0.03 (0.08)	0.30** (0.09)	0.27*** (0.04)	0.12 (0.09)	-0.18* (0.09)
Education Level (=Unknown)	0.37*** (0.10)	-0.04 (0.08)	0.18 (0.09)	0.15*** (0.04)	0.15 (0.09)	-0.04 (0.09)
Migration Background (=Native)	0.17*** (0.05)	0.05 (0.05)	0.06 (0.05)	0.10*** (0.02)	0.01 (0.05)	-0.03 (0.05)
Household Wealth (Quintile=1)	-0.03 (0.05)	-0.07 (0.05)	-0.06 (0.06)	0.01 (0.02)	0.06 (0.05)	-0.02 (0.05)
Household Wealth (Quintile=2)	-0.05 (0.05)	-0.11* (0.05)	-0.03 (0.05)	-0.01 (0.02)	-0.02 (0.05)	-0.00 (0.05)
Household Wealth (Quintile=4)	0.10* (0.05)	0.02 (0.05)	0.06 (0.05)	0.01 (0.02)	0.10* (0.05)	0.02 (0.05)
Household Wealth (Quintile=5)	0.05 (0.05)	0.12* (0.05)	0.08 (0.06)	0.02 (0.02)	-0.02 (0.05)	0.07 (0.05)
Household Income (Quintile=1)	-0.15** (0.05)	-0.10 (0.05)	-0.04 (0.06)	-0.06** (0.02)	0.07 (0.05)	-0.13* (0.05)
Household Income (Quintile=2)	-0.08 (0.05)	-0.03 (0.05)	0.04 (0.05)	-0.01 (0.02)	0.05 (0.05)	0.06 (0.05)
Household Income (Quintile=4)	0.03 (0.05)	0.01 (0.05)	-0.00 (0.05)	0.02 (0.02)	0.00 (0.05)	0.05 (0.05)
Household Income (Quintile=5)	0.11* (0.05)	0.15** (0.05)	0.23*** (0.06)	0.04* (0.02)	-0.00 (0.05)	0.13* (0.05)
Constant	-0.24 (0.27)	0.95*** (0.26)	0.09 (0.32)	0.51*** (0.11)	0.05 (0.26)	-0.44 (0.27)
Observations	3901	3901	3108	3901	3901	3901
Adjusted R^2	0.080	0.048	0.045	0.053	0.006	0.048

Notes: Dependent variables, except generalized trust, are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Optimism and Overconfidence (Full Regressions)

	Optimism	Overconfidence
Self-Employed	0.11*** (0.03)	0.01 (0.03)
Sex (=Female)	0.05 (0.03)	-0.21*** (0.03)
Age	-0.00 (0.01)	0.01 (0.01)
Age Squared	0.00 (0.00)	-0.00 (0.00)
Marital Status (=Married)	0.03 (0.04)	0.00 (0.04)
Marital Status (=Widowed)	0.11 (0.17)	0.20 (0.25)
Marital Status (=Divorced)	0.18** (0.06)	0.12 (0.07)
Children (=Yes)	0.11** (0.04)	0.01 (0.04)
Education Level (=Middle)	0.32** (0.10)	0.03 (0.10)
Education Level (=High)	0.41*** (0.10)	0.05 (0.10)
Education Level (=Unknown)	0.32** (0.10)	0.04 (0.10)
Migration Background (=Native)	0.08 (0.05)	-0.14** (0.05)
Household Wealth (Quintile=1)	0.00 (0.05)	-0.03 (0.06)
Household Wealth (Quintile=2)	0.03 (0.05)	0.00 (0.05)
Household Wealth (Quintile=4)	-0.00 (0.05)	-0.00 (0.05)
Household Wealth (Quintile=5)	-0.03 (0.05)	-0.10 (0.05)
Household Income (Quintile=1)	-0.15** (0.06)	-0.06 (0.06)
Household Income (Quintile=2)	0.02 (0.05)	-0.02 (0.05)
Household Income (Quintile=4)	0.03 (0.05)	-0.01 (0.05)
Household Income (Quintile=5)	0.13** (0.05)	0.05 (0.05)
Constant	-0.66* (0.27)	-0.29 (0.28)
Observations	3901	3901
Adjusted R^2	0.029	0.017

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: Cognitive Reflection, Financial Literacy, and Financial Management (Full Regressions)

	CRT	Literacy	Management
Self-Employed	0.00 (0.03)	0.02 (0.02)	-0.18*** (0.03)
Sex (=Female)	-0.41*** (0.03)	-0.28*** (0.02)	-0.02 (0.03)
Age	-0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Age Squared	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Marital Status (=Married)	-0.02 (0.04)	0.01 (0.03)	0.06 (0.04)
Marital Status (=Widowed)	-0.20 (0.19)	-0.04 (0.12)	0.06 (0.16)
Marital Status (=Divorced)	-0.17** (0.06)	-0.05 (0.04)	-0.00 (0.07)
Children (=Yes)	-0.00 (0.04)	0.03 (0.02)	-0.18*** (0.04)
Education Level (=Middle)	0.26*** (0.08)	0.16** (0.06)	0.08 (0.09)
Education Level (=High)	0.65*** (0.07)	0.33*** (0.06)	0.20* (0.09)
Education Level (=Unknown)	0.26*** (0.08)	0.21*** (0.06)	0.12 (0.09)
Migration Background (=Native)	0.07 (0.05)	0.09*** (0.03)	0.20*** (0.05)
Household Wealth (Quintile=1)	-0.13* (0.05)	-0.08* (0.03)	-0.38*** (0.06)
Household Wealth (Quintile=2)	-0.15*** (0.05)	-0.07* (0.03)	-0.10* (0.05)
Household Wealth (Quintile=4)	0.04 (0.05)	0.03 (0.03)	0.14** (0.05)
Household Wealth (Quintile=5)	0.11* (0.05)	0.15*** (0.03)	0.31*** (0.05)
Household Income (Quintile=1)	-0.09 (0.05)	-0.03 (0.03)	-0.06 (0.05)
Household Income (Quintile=2)	-0.07 (0.05)	-0.01 (0.03)	0.01 (0.05)
Household Income (Quintile=4)	-0.04 (0.05)	0.04 (0.03)	-0.01 (0.05)
Household Income (Quintile=5)	0.09 (0.05)	0.10*** (0.03)	0.02 (0.05)
Constant	-0.01 (0.26)	0.09 (0.16)	-0.31 (0.26)
Observations	3901	3901	3901
Adjusted R^2	0.111	0.130	0.067

Notes: Dependent variables are standardized (z-score). Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix B Invitation Letters and Welcome Screens

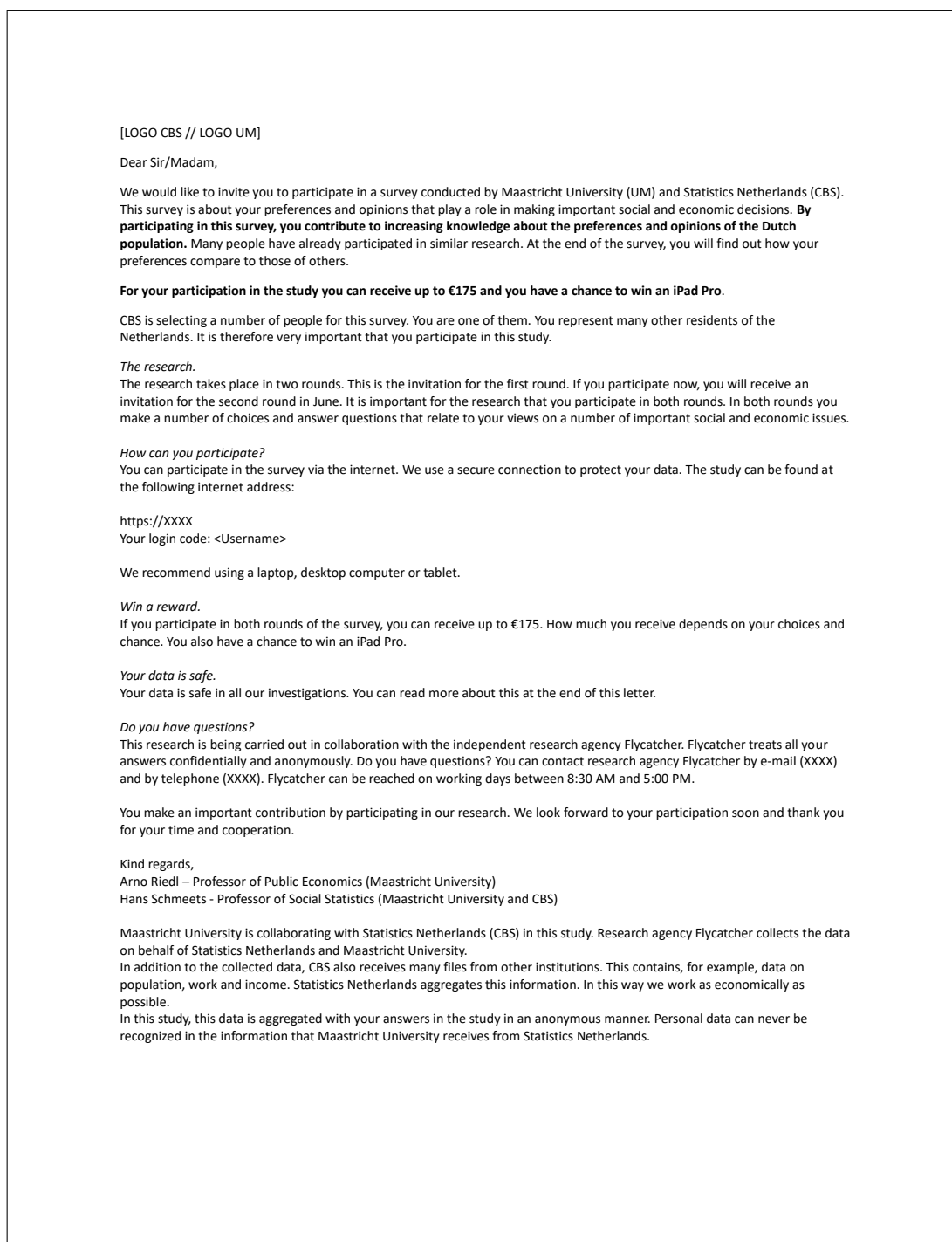


Figure B1: Invitation Letter Wave 1 (Translated from Dutch)

[LOGO CBS // LOGO UM]

Dear Sir/Madam,

You recently participated in round 1 of our survey, conducted by Maastricht University and Statistics Netherlands (CBS). You have also indicated that you want to participate in the 2nd round of our research. Thank you very much for that!

We hereby invite you to participate in the 2nd round. As in the 1st round, the research in this 2nd round is about your preferences and opinions that play a role in making important social and economic decisions. It is **very important for our research that you also participate in this 2nd round**. By participating in both rounds you can also receive up to €175 and you have a chance to win an iPad Pro. You will also receive information about how your preferences compare to those of other participants in the survey.

How can you participate?

You can participate in the survey via the internet. We use a secure connection to protect your data. The study can be found at the following internet address:

<https://XXXX>

Your login code: <Username>

Participating in the study is best done with a laptop, desktop computer or tablet. We therefore recommend that you use one of these devices.

Do you have questions?

This research is carried out in collaboration with the independent research agency Flycatcher. Flycatcher treats all your answers confidentially and anonymously. Do you have questions? You can contact research agency Flycatcher by e-mail (XXXX) and by telephone (XXXX). Flycatcher can be reached on working days between 8:30 AM and 5:00 PM.

With your participation you make an important contribution to increasing knowledge about the preferences and opinions of the Dutch population. We look forward to your participation soon and would like to thank you in advance for your time and cooperation.

Kind regards,

Arno Riedl – Professor of Public Economics (Maastricht University)

Hans Schmeets - Professor of Social Statistics (Maastricht University and CBS)

Maastricht University is collaborating with Statistics Netherlands (CBS) in this study. Research agency Flycatcher collects the data on behalf of Statistics Netherlands and Maastricht University.

In addition to the collected data, CBS also receives many files from other institutions. This contains, for example, data about the population, their work and income. Statistics Netherlands aggregates this information. This is how we work as efficiently as possible.

In this study, this data is aggregated with your answers in the study in an anonymous manner. Personal data can never be recognized in the information that Maastricht University receives from Statistics Netherlands. The privacy of your data is therefore safe.

Figure B2: Invitation Letter Wave 2 (Translated from Dutch)

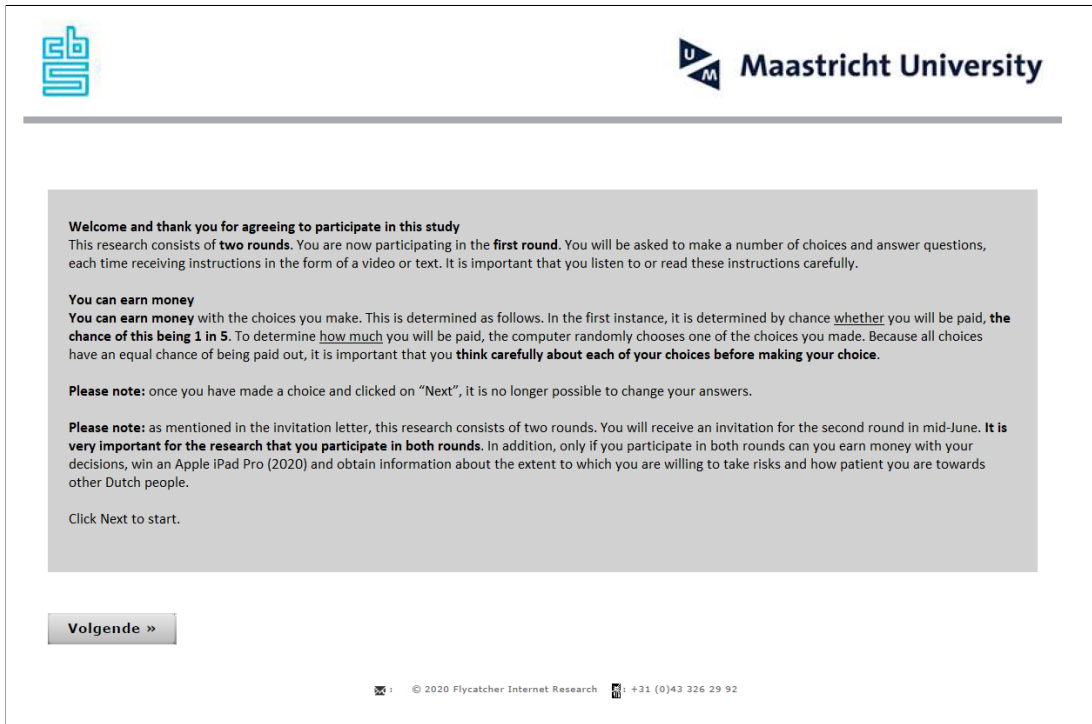


Figure B3: Welcome Screen Wave 1 (Translated from Dutch)

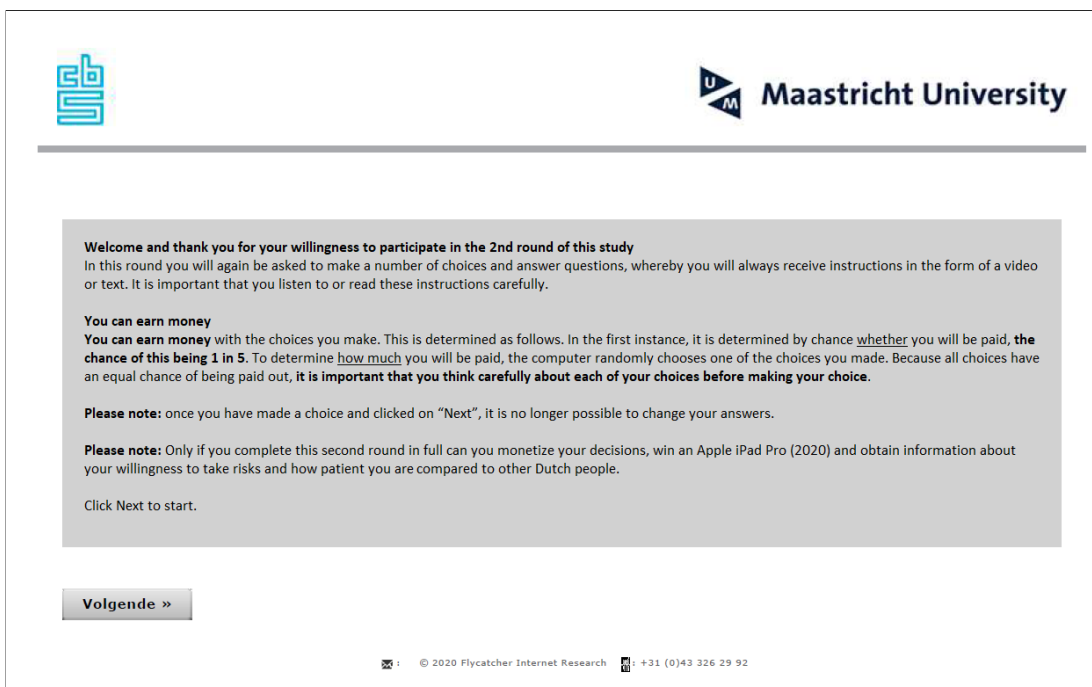


Figure B4: Welcome Screen Wave 2 (Translated from Dutch)

Appendix C Experimental and Survey Design

C.1 Risk Preferences and Ambiguity Aversion

Survey Questions. Table C1 shows the wording of the survey questions to elicit risk preferences.

Table C1: Survey Questions Risk Preferences

Risk Preference	0 “not at all willing to take risks” – 10 “fully prepared to take risks”
General	How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
Domains	People can behave differently in different situations. How would you rate your willingness to take risks in the following areas? How is it ...
Finances	... in your personal financial matters?
Occupation	... in your choice of occupation?
Health	... with your health?

Notes: Questions were asked in Dutch. Sources: Risk (Falk et al., 2022).

Convex Time Budget. The CTB measures risk and time preferences simultaneously. We implemented two sets of the CTB, in total participants made 24 decisions. The parameters were identical in both sets, except that the late payout took place after 16 weeks in the first set and after 24 weeks in the second set. Table C2 summarizes the parameters that were used.

Table C2: CTB Parameters Set 1

Task	t	k	a_t	a_{t+k}	p_{t+k}	$EV(a_{t+k})$	$1+r$	$1+r'$
#1	8	16	€75	€75.00	1	€75.00	1.00	1.00
#2	8	16	€75	€79.50	1	€79.50	1.06	1.06
#3	8	16	€75	€93.00	1	€93.00	1.24	1.24
#4	8	16	€75	€83.40	0.9	€75.00	1.11	1.00
#5	8	16	€75	€88.35	0.9	€79.50	1.18	1.06
#6	8	16	€75	€103.35	0.9	€93.00	1.38	1.24
#7	8	16	€75	€107.10	0.7	€75.00	1.43	1.00
#8	8	16	€75	€113.55	0.7	€79.50	1.51	1.06
#9	8	16	€75	€132.75	0.7	€93.00	1.77	1.24
#10	8	16	€75	€150.00	0.5	€75.00	2.00	1.00
#11	8	16	€75	€159.00	0.5	€79.50	2.12	1.06
#12	8	16	€75	€186.00	0.5	€93.00	2.48	1.24

Notes: Set 2 is identical, except that $k=24$. t =delay period early date in weeks, k =delay period late date in weeks, a_t =amount available at the early date, a_{t+k} = amount available at the late date, p_{t+k} =probability that the payment at the late date is actually paid out, $EV(a_{t+k})$ =expected value of the amount available at the late date, $1+r$ =interest rate over the delay period not adjusted for risk, $1+r'$ = interest rate over the delay period adjusted for risk.

The decision tasks were presented with information on the dates, probabilities, and possible allocations on one screen, using colors for clarity. Figure C1 shows an example of such a decision screen. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C2 shows the screen with instructions and Figure C3 shows the written instructions (translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

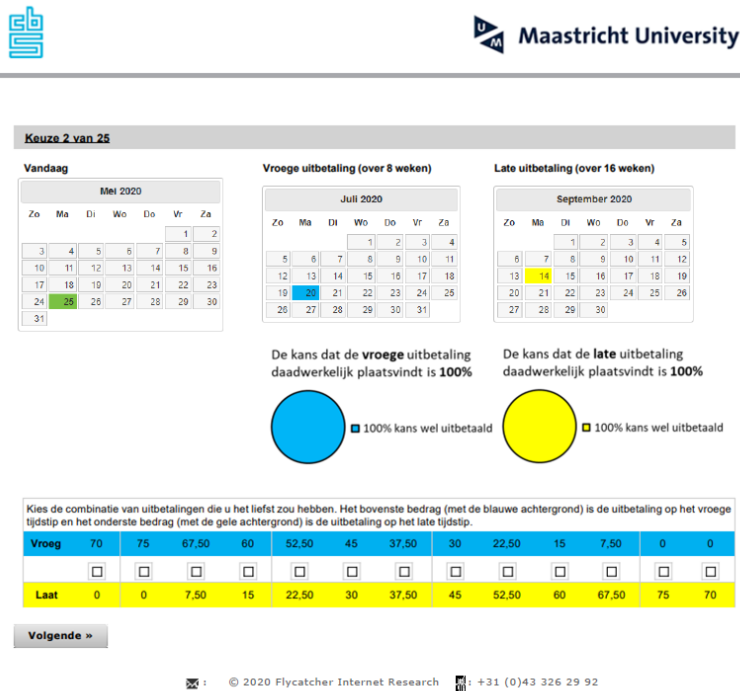


Figure C1: Example Decision Screen CTB

Instructie deel 1 van 4
 In deel 1 van het onderzoek krijgt u 25 keuzesituaties te zien. Bij elke keuzesituatie kiest u **hoeveel geld u op een vroeg en hoeveel geld u op een laat tijdstip wilt ontvangen**. Het geld op het vroeger tijdstip zult u altijd zeker ontvangen. Het geld op het late tijdstip ontvangt u met een bepaalde kans. Bij elke keuzesituatie krijgt u informatie over de kans waarmee u het geld op het late tijdstip zult ontvangen.

Hoe maakt u keuzes?
 Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door [hier](#) te klikken.

Vandaag	Vroege uitbetaling (over 8 weken)	Late uitbetaling (over 12 weken)																																																																																																																																																										
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<p>Kies de combinatie van uitbetalingen die u het liefst zou hebben. Het bovenste bedrag (met de blauwe achtergrond) is de uitbetaling op het vroeger tijdstip en het onderste bedrag (met de gele achtergrond) is de uitbetaling op het late tijdstip.</p>																																																																																																																																																												

Ik bevestig dat ik de instructie goed beluisterd of gelezen heb.

[Volgende >>](#)

Figure C2: Instructions Screen CTB

Instructions Part [1/4]

In part 1 of the study, you will be presented with 24 decision situations. In each decision situation, you choose **how much money you want to receive at an "early" and how much money you want to receive at a "late" time**. You will always receive the money at the early time with certainty. You will receive the money at the late time with a certain probability. In each decision situation, you will get information about the probability with which you will receive the money at the late time.

How do you make choices?

How you make choices is explained using the example below. The example shows a decision situation in which you are asked to divide a sum of money between an amount of money at an early time (in this example July 27) and an amount of money at a late time (in this example August 24). The times will be different in the choices you make later.

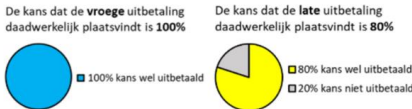
The calendars indicate times relevant to your choice. **Today** (June 1 in this example) is highlighted in **green**. The time of the **early payout** in each decision situation is exactly 8 weeks from today and is marked in **blue**. The time of the **late payout** in this example is 12 weeks from today and is highlighted in **yellow**. **The time of the late payment may differ between decision situations.**

Below the calendars you will see the probability of actually receiving the money at the late time. In this example, this probability is 80% (i.e. a probability of 8 in 10). **This probability can differ between decision situations.**

At the bottom of the page you can see the possible divisions of the amount of money in this example. The top amount (with the blue background) shows the amount of money you will receive at the early time. The bottom amount (with the yellow background) shows the amount of money you will receive at the late time with a certain probability.

Explanation of payments in this example. Do you choose:

- 70**
0 then you would receive **€70** at the **early time** (27 July) and receive **€0** at the **late time** (24 August)
- 30**
56,63 then you would receive **€30** at the **early time** (27 July) and receive **€56,63** at the **late time** (24 August) and is the probability that you receive the money at the late time 80%.
- 0**
93,75 then you would receive **€0** at the **early time** (27 July) and receive **€93,75** at the **late time** (24 August) and is the probability that you receive the money at the late time 80%.



Kies de combinatie van uitbetalingen die u het liefst zou hebben. Het bovenste bedrag (met de blauwe achtergrond) is de uitbetaling op het vroege tijdstip en het onderste bedrag (met de gele achtergrond) is de uitbetaling op het late tijdstip.

Vroeg	70	75	67,50	50	52,50	45	37,50	30	22,50	15	7,50	0	0
Laat	0	0	9,38	18,75	28,13	37,50	46,88	56,25	65,63	75	84,38	93,75	88,75

Figure C3: Written Instructions CTB (Translated from Dutch)

Multiple Price List Risk Preferences. Tables C3 to C7 show the parameters for the MPLs used to elicit risk preferences.

Table C3: MPL Risk List 1

	Option A					Option B				
	p	€	p	€	EV(A)	p	€	p	€	EV(B)
#1	0.1	80	0.9	64	€66	0.1	154	0.9	4	€19
#2	0.2	80	0.8	64	€67	0.2	154	0.8	4	€34
#3	0.3	80	0.7	64	€69	0.3	154	0.7	4	€49
#4	0.4	80	0.6	64	€70	0.4	154	0.6	4	€64
#5	0.5	80	0.5	64	€72	0.5	154	0.5	4	€79
#6	0.6	80	0.4	64	€74	0.6	154	0.4	4	€94
#7	0.7	80	0.3	64	€75	0.7	154	0.3	4	€109
#8	0.8	80	0.2	64	€77	0.8	154	0.2	4	€124
#9	0.9	80	0.1	64	€78	0.9	154	0.1	4	€139
#10	1	80	0	64	€80	1	154	0	4	€154

Notes: EV(A) and EV(B) list the expected value of the related lottery.

Table C4: MPL Risk List 2

	Option A					Option B				
	p	€	p	€	EV(A)	p	€	p	€	EV(B)
#1	0.1	99	0.9	41	€47	0.1	134	0.9	19	€31
#2	0.2	99	0.8	41	€53	0.2	134	0.8	19	€42
#3	0.3	99	0.7	41	€58	0.3	134	0.7	19	€54
#4	0.4	99	0.6	41	€64	0.4	134	0.6	19	€65
#5	0.5	99	0.5	41	€70	0.5	134	0.5	19	€77
#6	0.6	99	0.4	41	€76	0.6	134	0.4	19	€88
#7	0.7	99	0.3	41	€82	0.7	134	0.3	19	€100
#8	0.8	99	0.2	41	€87	0.8	134	0.2	19	€111
#9	0.9	99	0.1	41	€93	0.9	134	0.1	19	€123
#10	1	99	0	41	€99	1	134	0	19	€134

Notes: EV(A) and EV(B) list the expected value of the related lottery.

Table C5: MPL Risk List 3

	Option A				Option B				
	p	€	EV(A)		p	€	EV(B)		
#1	1	52	€52		0.5	30	0.5	130	€80
#2	1	57	€57		0.5	30	0.5	130	€80
#3	1	63	€63		0.5	30	0.5	130	€80
#4	1	68	€68		0.5	30	0.5	130	€80
#5	1	73	€73		0.5	30	0.5	130	€80
#6	1	78	€78		0.5	30	0.5	130	€80
#7	1	82	€82		0.5	30	0.5	130	€80
#8	1	88	€88		0.5	30	0.5	130	€80
#9	1	94	€94		0.5	30	0.5	130	€80
#10	1	101	€101		0.5	30	0.5	130	€80

Notes: EV(A) and EV(B) list the expected value of the related lottery.

Table C6: MPL Risk List 4

	Option A			Option B				
	p	€	EV(A)	p	€	p	€	EV(B)
#1	1	39	€39	0.33	20	0.67	110	€80
#2	1	46	€46	0.33	20	0.67	110	€80
#3	1	56	€56	0.33	20	0.67	110	€80
#4	1	64	€64	0.33	20	0.67	110	€80
#5	1	70	€70	0.33	20	0.67	110	€80
#6	1	75	€75	0.33	20	0.67	110	€80
#7	1	79	€79	0.33	20	0.67	110	€80
#8	1	84	€84	0.33	20	0.67	110	€80
#9	1	88	€88	0.33	20	0.67	110	€80
#10	1	93	€93	0.33	20	0.67	110	€80

Notes: EV(A) and EV(B) list the expected value of the related lottery.

Table C7: MPL Risk List 5

	Option A					Option B				
	p	€	p	€	EV(A)	p	€	p	€	EV(B)
#1	0.5	90	0.5	70	€80	0.5	103	0.5	35	€69
#2	0.5	90	0.5	70	€80	0.5	109	0.5	35	€72
#3	0.5	90	0.5	70	€80	0.5	115	0.5	35	€75
#4	0.5	90	0.5	70	€80	0.5	122	0.5	35	€79
#5	0.5	90	0.5	70	€80	0.5	128	0.5	35	€82
#6	0.5	90	0.5	70	€80	0.5	131	0.5	35	€83
#7	0.5	90	0.5	70	€80	0.5	138	0.5	35	€87
#8	0.5	90	0.5	70	€80	0.5	153	0.5	35	€94
#9	0.5	90	0.5	70	€80	0.5	170	0.5	35	€103
#10	0.5	90	0.5	70	€80	0.5	186	0.5	35	€111

Notes: EV(A) and EV(B) list the expected value of the related lottery.

The decision tasks were presented in lists of binary choices with information about the probabilities and outcomes. Figure C4 shows an example of a risk MPL as presented to participants. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C5 shows the screen with instructions and Figures C6 and C7 show the written instructions (translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

Keuze 3 van 21

	OPTIE A				OPTIE B			
1	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
2	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
3	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
4	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
5	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
6	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
7	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
8	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
9	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4
10	€80		€64	<input type="checkbox"/>	<input type="checkbox"/>	€154		€4

Volgende »

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Figure C4: Example Decision Screen MPL Risk

Instructie deel 1 van 2, onderdeel II

Dit onderdeel bestaat uit vijf keuzesituaties. In elke keuzesituatie kiest u tussen **optie A** en **optie B**. De opties verschillen of in de kans die u maakt op een geldbedrag of in het **geldbedrag** waarop u kans maakt. U krijgt altijd informatie over het geldbedrag en de kans waarmee u dit bedrag kan ontvangen voor zowel optie A als optie B.

Hoe maakt u keuzes?

Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door [hier](#) te klikken.

	OPTIE A				OPTIE B			
1	€68		€50	<input type="checkbox"/>	<input type="checkbox"/>	€102		€10
2	€68		€50	<input type="checkbox"/>	<input type="checkbox"/>	€106		€10
3	€68		€50	<input type="checkbox"/>	<input type="checkbox"/>	€110		€10
4	€68		€50	<input type="checkbox"/>	<input type="checkbox"/>	€114		€10
5	€68		€50	<input type="checkbox"/>	<input type="checkbox"/>	€118		€10

00:00 02:48

Ik bevestig dat ik de instructie goed beluisterd of gelezen heb.

Volgende »

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Figure C5: Instructions Screen MPL Risk

Instructions part [1.2/2]

This part consists of five decision situations. In each decision situation you choose between **option A** and **option B**. The options differ either in the **probability** of earning a sum of money or in the **amount** of money that you can earn with a certain probability. You will always receive information about the amount of money and the chance with which you can receive this amount for both option A and option B.

How do you make choices?

How you make choices is explained using the two examples below.

Decision situation Type 1

The screen shows a decision situation in which you are asked to make a choice between **option A** and **option B** in **each row** (in this example 1 to 5).

	OPTIE A				OPTIE B			
1	€68		€50	<input type="radio"/>	<input type="radio"/>	€102		€10
2	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10
3	€68		€50	<input type="radio"/>	<input type="radio"/>	€110		€10
4	€68		€50	<input type="radio"/>	<input type="radio"/>	€114		€10
5	€68		€50	<input type="radio"/>	<input type="radio"/>	€118		€10

In this example, **Option A is the same in every row**. In this option you will see two amounts, in this example **€68** (the amount with the yellow background) and **€50** (the amount with the blue background). If you choose option A, you will receive one of these amounts with a certain probability. This probability is stated in the middle of the two amounts. In this example, **the probability of receiving €68 is 50%** (i.e. a 5 in 10 chance) and **the probability of receiving €50 is 50%** (i.e. a 5 in 10 chance).

In this example, **Option B is different in each row**. In this option you will see two amounts in each row, in this example **€102 or more** (the amount with the yellow background) and **€10** (the amount with the blue background). If you choose option B, you will receive one of these amounts with a certain probability. This probability is stated in the middle of the two amounts. In this example, **the probability of receiving €102 or more is 50%** (i.e. a 5 in 10 chance) and **the probability of receiving €10 is 50%** (i.e. a 5 in 10 chance).

You make your choices by clicking on one of the radio buttons. **Note: you must make a choice in each row.**

On the next page are instructions for the example of Decision Situation Type 2.

Figure C6: Written Instructions MPL Risk Page 1 (Translated from Dutch)

Decision situation Type 2

The screen shows a decision situation in which you are asked to make a choice between **option A** and **option B** in **each row** (in this example 1 to 5).

	OPTIE A					OPTIE B		
1	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10
2	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10
3	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10
4	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10
5	€68		€50	<input type="radio"/>	<input type="radio"/>	€106		€10

Option A is different in each row. In this option you will see two amounts, in this example **€68** (the amount with the yellow background) and **€50** (the amount with the blue background). If you choose option A, you will receive one of these amounts with a certain probability. This probability is stated in the middle of the two amounts and differs per row. For example, in row 1, the top row, **the probability of receiving €68 is 10%** (i.e. a 1 in 10 chance) and **the probability of receiving €50 is 90%** (i.e. a 9 in 10 chance). For example, in row 5, the bottom row, **the probability of receiving €68 is 50%** (i.e. a 5 in 10 chance) and **the probability of receiving €50 is 50%** (i.e. a 5 in 10 chance).

Option B is different in each row. In this option you see two different amounts than in option A, in this example **€106** (the amount with the yellow background) and **€10** (the amount with the blue background). If you choose option B, you will receive one of these amounts with a certain probability. This probability is stated in the middle of the two amounts and differs per row. The probability of receiving the amount with the yellow or blue background are the same in option A as in option B in each row. For example, in row 1, the top row, **the probability of receiving €106 is 10%** (i.e. a chance of 1 in 10) and **the probability of receiving €10 is 90%** (i.e. a 9 in 10 chance). For example, in row 5, the bottom row, **the probability of receiving €106 is 50%** (i.e. a 5 in 10 chance) and **the probability of receiving €10 is 50%** (i.e. a 5 in 10 chance).

You make your choices by clicking on one of the radio buttons. **Note: you must make a choice in each row.**

Figure C7: Written Instructions MPL Risk Page 2 (Translated from Dutch)

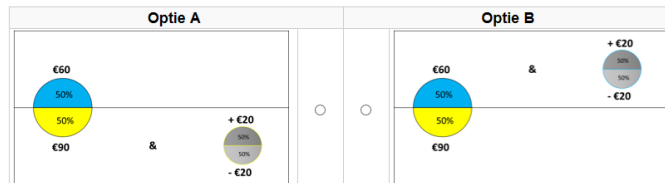
Multiple Price List Prudence. Table C8 shows the parameters used for the MPLs to elicit prudence.

Table C8: MPL-Prudence

	Option A				Option B			
	p	€	p	€	p	€	p	€
#1	0.5	€90 + [0.5*€20;0.5*-€20]	0.5	€60	0.5	€90	0.5	€60 + [0.5*€20;0.5*-€20]
#2	0.5	€90 + [0.5*€10;0.5*-€10]	0.5	€60	0.5	€90	0.5	€60 + [0.5*€10;0.5*-€10]
#3	0.5	€90 + [0.5*€40;0.5*-€40]	0.5	€60	0.5	€90	0.5	€60 + [0.5*€40;0.5*-€40]
#4	0.5	€135 + [0.5*€30;0.5*-€30]	0.5	€90	0.5	€135	0.5	€90 + [0.5*€30;0.5*-€30]
#5	0.5	€65 + [0.5*€20;0.5*-€20]	0.5	€35	0.5	€65	0.5	€35 + [0.5*€20;0.5*-€20]

The decision tasks were presented one by one with information about the probabilities and outcomes. Figure C8 shows an example of a prudence MPL as presented to participants. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C9 shows the screen with instructions and Figure C10 shows the written instructions (translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

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Figure C8: Example Decision Screen MPL Prudence

Instructie deel 1 van 2, onderdeel IV
 Dit onderdeel bestaat uit vijf keuzesituaties. In elke keuzesituatie kiest u tussen **optie A** en **optie B**. In beide opties is er een gelijke kans op twee mogelijke uitkomsten: een hoger bedrag en een lager bedrag. Het is aan u de keuze of u een **bijkomende kans** toevoegt aan het hogere of aan het lagere bedrag.

Hoe maakt u keuzes?
 Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door **hier** te klikken.

The video player shows the same decision screen as in Figure C8. The video progress bar is at 00:00, and the total duration is 01:27. There are play, volume, and full screen icons at the bottom right of the player.

Ik bevestig dat ik de instructie goed beluisterd of gelezen heb.

Volgende >

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Figure C9: Instructions Screen MPL Prudence

Instructions part [1.4/2]

This part consists of five decision situations. In each decision situation you choose between **option A** and **option B**. In both options there is an equal chance of two possible outcomes: a higher and a lower amount. In addition, in both options there is an **additional** equal chance that one of the amounts will be higher or lower. In option A, this additional chance is added to the higher amount. In option B, this additional chance is added to the lower amount.

How do you make choices?

How you make choices is explained using the example below. The example shows a decision situation in which you are asked to choose between option A and option B.

In both option A and option B you have an equal chance of receiving a higher or lower amount, in this example €50 or €100.

In both option A and option B there is an **additional** equal chance that one outcome will be higher or lower, in this example €25 higher or €25 lower. The difference is that option A has the **additional** chance added to the higher amount, while option B has the **additional** chance added to the lower amount.

You can make your choice by clicking on one of the radio buttons.

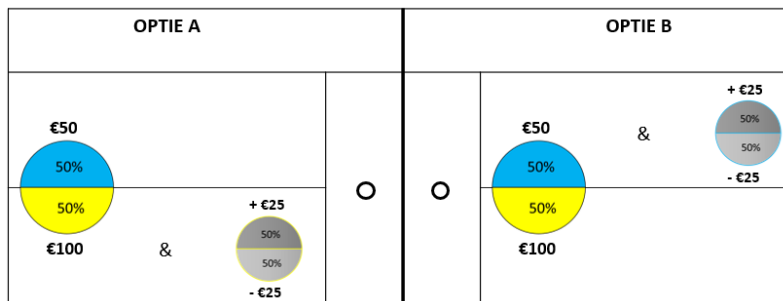


Figure C10: Written Instructions MPL Prudence (Translated from Dutch)

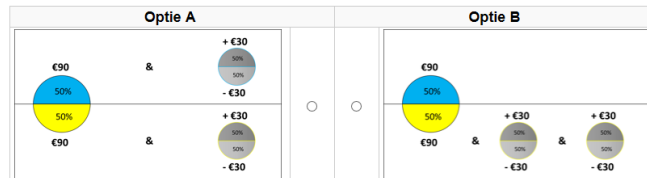
Multiple Price List Temperance. Table C9 shows the parameters used for the MPLs to elicit temperance.

Table C9: MPL-Temperance

	Option A			Option B				
	p	€	p	€	p	€	p	€
#1	0.5	€90 + [0.5*€30;0.5*-€30]	0.5	€90 + [0.5*€30;0.5*-€30]	0.5	€90	0.5	€90 + [0.5*€30;0.5*-€30] + [0.5*€30;0.5*-€30]
#2	0.5	€90 + [0.5*€30;0.5*-€30]	0.5	€90 [0.5*€10;0.5*-€10]	0.5	€90	0.5	€90 + [0.5*€30;0.5*-€30] + [0.5*€10;0.5*-€10]
#3	0.5	€90 + [0.5*€30;0.5*-€30]	0.5	€90 [0.5*€50;0.5*-€50]	0.5	€90	0.5	€90 + [0.5*€30;0.5*-€30] + [0.5*€50;0.5*-€50]
#4	0.5	€30 + [0.5*€10;0.5*-€10]	0.5	€30 [0.5*€10;0.5*-€10]	0.5	€30	0.5	€30 + [0.5*€10;0.5*-€10] + [0.5*€10;0.5*-€10]
#5	0.5	€70 + [0.5*€30;0.5*-€30]	0.5	€70 [0.5*€30;0.5*-€30]	0.5	€70	0.5	€70 + [0.5*€30;0.5*-€30] + [0.5*€30;0.5*-€30]

The decision tasks were presented one by one with information about the probabilities and outcomes. Figure C11 shows an example of a prudence MPL as presented to participants. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C12 shows the screen with instructions and Figure C13 shows the written instructions (translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

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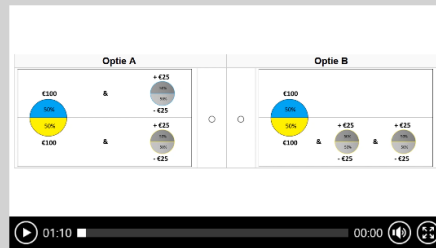
Figure C11: Example Decision Screen MPL Temperance

Instructie deel 1 van 2, onderdeel V

Dit onderdeel bestaat uit vijf keuzesituaties. In elke keuzesituatie kiest u tussen optie A en optie B. In beide opties is er een gelijke kans op twee mogelijke uitkomsten. Het is aan u de keuze op welke manier u twee bijkomende kansen toevoegt.

Hoe maakt u keuzes?

Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door hier te klikken.



Ik bevestig dat ik de instructie goed beluisterd of gelezen heb.

Volgende »

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Figure C12: Instructions Screen MPL Temperance

Instructions part [1.5/2]

This part consists of five decision situations. In each decision situation you choose between **option A** and **option B**. In both options there is an equal chance of two possible outcomes. In addition, there is **twice** an **additional** equal chance that an outcome will be higher or lower. In option A, these additional probabilities are split. In option B, these additional chances are added to the same amount.

How do you make choices?

How you make choices is explained using the example below. The example shows a decision situation in which you are asked to make a choice between option A and option B.

In both option A and option B you have an equal chance of winning an amount, in this example €100.

In both option A and option B there is **twice** an **additional** equal chance that one outcome will be higher or lower, in this example €25 higher or €25 lower. The difference is that with option A the **additional** odds are split, while with option B the **additional** odds are added to the same amount.

You can make your choice by clicking on one of the radio buttons.

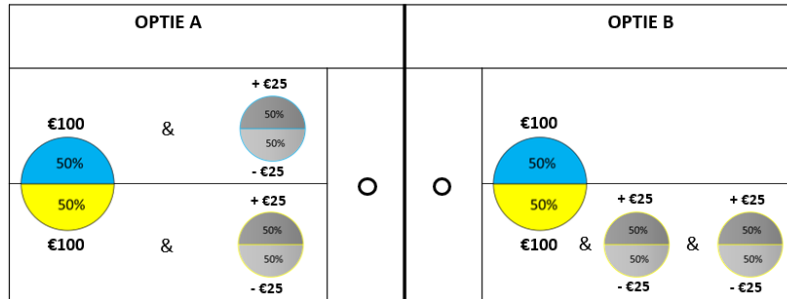


Figure C13: Written Instructions MPL Temperance (Translated from Dutch)

Multiple Price List Ambiguity. Table C10 shows the parameters used for the MPLs to elicit ambiguity aversion.

Table C10: MPL-Ambiguity

	Option A Urn A composition (balls)	Indifference	Option B Urn B composition (balls)
#1	10 red ; 0 blue	0.5*option A ; 0.5*option B	Unknown
#2	9 red ; 1 blue	0.5*option A ; 0.5*option B	Unknown
#3	8 red ; 2 blue	0.5*option A ; 0.5*option B	Unknown
#4	7 red ; 3 blue	0.5*option A ; 0.5*option B	Unknown
#5	6 red ; 4 blue	0.5*option A ; 0.5*option B	Unknown
#6	5 red ; 5 blue	0.5*option A ; 0.5*option B	Unknown
#7	4 red ; 6 blue	0.5*option A ; 0.5*option B	Unknown
#8	3 red ; 7 blue	0.5*option A ; 0.5*option B	Unknown
#9	2 red ; 8 blue	0.5*option A ; 0.5*option B	Unknown
#10	1 red ; 9 blue	0.5*option A ; 0.5*option B	Unknown
#11	0 red ; 10 blue	0.5*option A ; 0.5*option B	Unknown

Notes: Participants received this MPL twice. In the first list, they were informed that the winning color was red and in the second list, they were informed that the winning color was blue. Participants were also informed that the proportion of red and blue balls in the ambiguous urn stayed the same within each and between both MPLs.

The decision tasks were presented in a list of binary choices with information about the urn composition. Figure C14 shows an example of an ambiguity MPL as presented to participants. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C15 shows the screen with instructions and Figure C16 shows the written instructions (translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

Vraag 1 van 2

In onderstaande keuzesituatie is in elke rij **rood** de winnende kleur. Er wordt willekeurig een bal getrokken uit de vaas die u gekozen heeft. Als de getrokken bal **rood** is, ontvangt u €80. Als de getrokken bal **blauw** is, ontvangt u €0.

Vaas A		Geen voorkeur		Vaas B
				Onbekend hoeveel van de 10 ballen rood en hoeveel blauw zijn
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	




Volgende »

Figure C14: Example Decision Screen MPL Ambiguity



Instructie deel 2 van 4
In deel 2 van het onderzoek krijgt u twee keuzesituaties te zien. In elke keuzesituatie is er telkens één winnende kleur: rood of blauw. U kiest steeds tussen twee vazen, vaas A en vaas B, ieder gevuld met 10 ballen. De ballen hebben de kleur rood of blauw. Uit de door u gekozen vaas wordt willekeurig 1 bal getrokken. In het geval dat de getrokken bal de winnende kleur heeft, ontvangt u 80 euro. Als de getrokken bal niet de winnende kleur heeft, ontvangt u 0 euro.

Hoe maakt u keuzes?
Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door [hier](#) te klikken.

Vaas A 	Geen voorkeur 	Vaas B Onbekend hoeveel van de 10 ballen rood en hoeveel blauw zijn 
--	---	--

ik bevestig dat ik de instructie goed beluisterd of gelezen heb.




[Volgende »](#)

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Figure C15: Instructions Screen MPL Ambiguity

Instructions Part [2/4]

In part 2 of the study, you will be presented with two decision situations. In each decision situation there is always one winning color: **red** or **blue**. You always choose between two urns, **urn A** and **urn B**, each filled with 10 balls. The balls have the color **red** or **blue**. 1 ball is randomly drawn from the urn you have chosen. In case the drawn ball has the winning color, you receive 80 euros. If the drawn ball is not the winning color, you receive 0 euros.

Vaas A	Geen Voorkeur 	Vaas B Onbekend hoeveel van de 10 ballen rood en hoeveel blauw zijn
 ○	○	○ 

Urn A is transparent: in each choice you can see **exactly** how many of the 10 balls are red and how many are blue. In this example, there are 5 red and 5 blue balls in urn A.

Urn B is opaque: you **do not** know how many of the 10 balls are red and how many are blue. A computer determines the ratio of red and blue balls in urn B once by chance. This could be 10 red balls, 10 blue balls, or anything in between.

The decision situations differ in the number of red and blue balls in urn A. **The content of urn B remains the same for all choices.**

The number of balls of a certain color in a urn determines the probability of choosing this color by a random draw. In this example, there are 5 red and 5 blue balls in the urn. Thus, in a random draw, the probability of getting a red ball is 5 in 10 (i.e. 50%). The chance of getting a blue ball is also 5 in 10 (i.e. 50%).

Your choices

In the choices you are going to make you will be asked to choose between urn A and urn B. You also have the option to choose the option “No Preference”. If you choose “No Preference” then the computer will determine by chance (50-50% chance) which urn is chosen.

Figure C16: Written Instructions MPL Ambiguity (Translated from Dutch)

C.2 Time Preferences, Procrastination, and Self-Control

Survey Questions. Table C11 shows the wording of the survey questions to elicit time preferences, procrastination, and self-control.

Table C11: Survey Questions Time Preferences, Procrastination, and Self-Control

Time Preference	0 “completely unwilling” – 10 “completely willing”
Near Future	How willing are you to give up something that is beneficial for you today in order to benefit more from that in the near future?
Far Future	How willing are you to give up something that is beneficial for you today in order to benefit more from that in the far future?
Procrastination	0 “does not describe me at all” – 10 “describes me perfectly”
	I have a tendency to delay tasks even though I know it would be better to do them right away.
Self-Control	1 “not at all” – 5 “very much” ($\alpha = .80$)
Question 1	I am good at resisting temptation.
Question 2	I have a hard time breaking bad habits. (R)
Question 3	I am lazy. (R)
Question 4	I say inappropriate things. (R)
Question 5	I do certain things that are bad for me, if they are fun. (R)
Question 6	I refuse things that are bad for me.
Question 7	I wish I had more self-discipline. (R)
Question 8	People would say that I have iron self-discipline.
Question 9	Pleasure and fun sometimes keep me from getting work done. (R)
Question 10	I have trouble concentrating. (R)
Question 11	I am able to work efficiently towards long-term goals.
Question 12	Sometimes I can’t stop myself from doing something, even if I know it is wrong. (R)
Question 13	I often act without thinking through all the alternatives. (R)

Notes: Questions were asked in Dutch. R indicates that the scale is reversed. α refers to Cronbach’s alpha (Cronbach, 1951), which provides an indication of scale reliability. Sources: Time, Procrastination (Falk et al., 2022), Self-Control (Tangney et al., 2004).

Convex Time Budget. See Section C.1.

Multiple Price List Time Preferences. Tables C12 and C13 show the parameters used for the MPLs used to elicit time preferences.

The decision tasks were presented in a list of binary choices with information about the delay period and outcomes. Figure C17 shows an example of a time MPL as presented to participants. Before making decisions, participants received video instructions as well as the option to download written instructions in PDF format. Participants were required to watch the entire video or download the written instructions before being able to continue to the decision tasks. Figure C18 shows the screen with instructions and Figure C19 shows the written instructions

Table C12: MPL-Time List 1

	Option A		Option B	
	€	Delay Period	€	Delay Period
#1	75	8 weeks	75	16 weeks
#2	75	8 weeks	76	16 weeks
#3	75	8 weeks	77	16 weeks
#4	75	8 weeks	79	16 weeks
#5	75	8 weeks	81	16 weeks
#6	75	8 weeks	84	16 weeks
#7	75	8 weeks	87	16 weeks
#8	75	8 weeks	91	16 weeks
#9	75	8 weeks	95	16 weeks

Table C13: MPL-Time List 2

	Option A		Option B	
	€	Delay Period	€	Delay Period
#1	75	8 weeks	75	24 weeks
#2	75	8 weeks	76	24 weeks
#3	75	8 weeks	77	24 weeks
#4	75	8 weeks	79	24 weeks
#5	75	8 weeks	81	24 weeks
#6	75	8 weeks	84	24 weeks
#7	75	8 weeks	87	24 weeks
#8	75	8 weeks	91	24 weeks
#9	75	8 weeks	95	24 weeks

(translated to English). The video narrated roughly the same text as the written instructions while highlighting the relevant parts of the decision screen.

Keuze 1 van 21

	Optie A		Optie B
1	€75 over 8 weken	<input type="checkbox"/>	€75 over 16 weken
2	€75 over 8 weken	<input type="checkbox"/>	€76 over 16 weken
3	€75 over 8 weken	<input type="checkbox"/>	€77 over 16 weken
4	€75 over 8 weken	<input type="checkbox"/>	€79 over 16 weken
5	€75 over 8 weken	<input type="checkbox"/>	€81 over 16 weken
6	€75 over 8 weken	<input type="checkbox"/>	€84 over 16 weken
7	€75 over 8 weken	<input type="checkbox"/>	€87 over 16 weken
8	€75 over 8 weken	<input type="checkbox"/>	€91 over 16 weken
9	€75 over 8 weken	<input type="checkbox"/>	€95 over 16 weken

Volgende »

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Figure C17: Example Decision Screen tMPL, Version 1

Instructie deel 1 van 2, onderdeel I

Dit onderdeel bestaat uit twee keuzesituaties. In elke keuzesituatie kiest u tussen **optie A** en **optie B**. De opties verschillen in het **geldbedrag** dat u krijgt en het **tijdstip** waarop het geldbedrag wordt uitbetaald.

Hoe maakt u keuzes?

Hoe u keuzes maakt, wordt uitgelegd in de video hieronder. U kunt de instructie ook lezen door [hier](#) te klikken.

	Optie A		Optie B
1	€50 over 5 weken	<input type="radio"/>	€50 over 10 weken
2	€50 over 5 weken	<input type="radio"/>	€51 over 10 weken
3	€50 over 5 weken	<input type="radio"/>	€52 over 10 weken
4	€50 over 5 weken	<input type="radio"/>	€53 over 10 weken
5	€50 over 5 weken	<input type="radio"/>	€54 over 10 weken
6	€50 over 5 weken	<input type="radio"/>	€55 over 10 weken
7	€50 over 5 weken	<input type="radio"/>	€56 over 10 weken
8	€50 over 5 weken	<input type="radio"/>	€57 over 10 weken
9	€50 over 5 weken	<input type="radio"/>	€58 over 10 weken

Ik bevestig dat ik de instructie goed beluisterd of gelezen heb.

Volgende »

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Figure C18: Instructions Screen tMPL

Instructions part [1.1/2]

This part consists of two decision situations. In each decision situation you choose between **option A** and **option B**. The options **differ** in the **amount of money** you receive and the **time** when the amount of money is paid out.

How do you make choices?

How you make choices is explained using the example below. The example shows a choice situation in which you are asked to make **9 choices** between option A and option B.

Option A is the same in every row. If you choose option A in this example, you will receive **€50**. This amount will be paid in **5 weeks**.

Option B differs in each row. If you choose option B in this example, you will receive **€50 or more**. This amount will be paid in **10 weeks**.

You make your choices by clicking on one of the radio buttons. **Note: you must make a choice in each row.**

	Optie A		Optie B	
1	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€50 over 10 weken
2	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€51 over 10 weken
3	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€52 over 10 weken
4	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€53 over 10 weken
5	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€54 over 10 weken
6	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€55 over 10 weken
7	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€56 over 10 weken
8	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€57 over 10 weken
9	€50 over 5 weken	<input type="radio"/>	<input type="radio"/>	€58 over 10 weken

Figure C19: Written Instructions tMPL

C.3 Solidarity Preferences and Altruism

Survey Question. Table C14 shows the wording of the survey question to elicit altruism.

Table C14: Survey Question Altruism

Altruism	0 “completely unwilling” – 10 “completely willing”
How willing are you to give to good causes without expecting anything in return?	

Notes: Questions were asked in Dutch. Sources: Altruism (Falk et al., 2022)

Solidarity Game. For the solidarity game, participants only received written instructions. Figure C20 shows the screen with instructions and Figure C21 shows the decision screen as presented to participants.




Instructie deel 3 van 4
 In dit deel wordt u **gekoppeld aan een anonieme medeburger** (genoemd 'ander') die ook deelneemt aan het onderzoek. U zult de identiteit van de ander nooit te weten komen en de ander zal nooit uw identiteit te weten komen.

Er zijn **vier mogelijke situaties**.
 De kans dat elke situatie zich daadwerkelijk voordoet, uw taak en de taak van de ander in elke situatie wordt hier beschreven. U kunt dit ook terug zien in de onderstaande tabel.

Situatie 1: U en de ander ontvangen elk €80. U en de ander **hoeven niets te doen**.
 De kans dat deze situatie optreedt, is **5 op 10 (d.w.z. 50%)**.

Situatie 2: U en de ander ontvangen elk €0. U en de ander **hoeven niets te doen**.
 De kans dat deze situatie optreedt, is **1 op 10 (d.w.z. 10%)**.

Situatie 3: U ontvangt €0 en de ander ontvangt €80. De ander kan beslissen om de €80 met u te delen. Dit kan op elke wijze die de ander wenst.
 De kans dat deze situatie optreedt, is **2 op 10 (d.w.z. 20%)**.

Situatie 4: U ontvangt €80 en de ander ontvangt €0. U kunt beslissen om uw €80 met de ander te delen. Dit kan op elke wijze die u wenst.
 De kans dat deze situatie optreedt, is **2 op 10 (d.w.z. 20%)**.

Situatie	U ontvangt	De andere ontvangt	Uw taak	Taak van de ander
1	80 euro	80 euro	U hoeft niets te doen	De ander hoeft niets te doen
2	0 euro	0 euro	U hoeft niets te doen	De ander hoeft niets te doen
3	0 euro	80 euro	U hoeft niets te doen	Beslissen hoe 80 euro met u te delen
4	80 euro	0 euro	Beslissen hoe u uw 80 euro met de ander deelt	De ander hoeft niets te doen

Ik bevestig dat ik de instructie goed gelezen heb.

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Figure C20: Instructions Screen Solidarity Game

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Uw beslissing

Stel dat situatie 4 zich voordoet. In dat geval ontvangt u €80 en de ander €0.

De ander kan van een vergelijkbare of een andere leeftijd zijn dan u. U weet niet hoe oud de ander is. We vragen u daarom om in onderstaande gevallen voor drie leeftijdscategorieën aan te geven **hoeveel u de ander geeft** in de situatie waar u €80 ontvangt en de ander €0.

Als de ander tussen 16 en 34 jaar oud is, geef ik de ander € (€0 t/m €80, alleen hele euro's)

Als de ander tussen 35 en 54 jaar oud is, geef ik de ander € (€0 t/m €80, alleen hele euro's)

Als de ander 55 jaar of ouder is, geef ik de ander € (€0 t/m €80, alleen hele euro's)

Volgende >>

Figure C21: Decision Screen Solidarity Game

C.4 Trust and Reciprocity

Survey Questions. Table C15 shows the wording of the survey questions to elicit trust and reciprocity.

Table C15: Survey Questions Trust and Reciprocity

Generalized Trust	0 “You cannot be careful enough” or 1 “Most people can be trusted”
	In general, do you think that most people can be trusted or do you think that one cannot be too careful when dealing with people?
Institutional Trust	1 “no trust at all” – 4 “a lot of trust”
	Could you please indicate for each of the following institutions how much trust you have in it? How much trust do you have in:
Public	... justice system ... police ... the Lower House of Parliament ... science
Private	... banks ... large corporations
Pension	... pension funds ... current pension system ... future pension system [incl. option “don’t know”]
Positive Reciprocity	0 “completely unwilling” – 10 “completely willing”
	When someone does me a favor, I am willing to return it
Negative Reciprocity	0 “does not describe me at all” – 10 “describes me perfectly”
	If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so

Notes: Questions were asked in Dutch. Sources: Trust (Statistics Netherlands, 2012), Reciprocity (Falk et al., 2022).

C.5 Optimism and Overconfidence

Survey Questions. Table C16 shows the wording of the survey questions to elicit optimism and overconfidence.

Table C16: Survey Questions Optimism and Overconfidence

Optimism	0 “not optimistic [pessimistic] at all” – 10 “very optimistic [pessimistic]”
Question 1	Optimists are people who look to the future with confidence and who mostly expect good things to happen. How would you describe yourself? How optimistic are you in general?
Question 2	Pessimists are people who are full of doubt when they look to the future and who mostly expect bad things to happen. How would you describe yourself? How pessimistic are you in general?
Overconfidence	0 “0 questions correct” – 5 “5 questions correct”
	In questions 1-5 you have provided answers to questions about financial literacy. How many of the five questions do you think you answered correctly?

Notes: Questions were asked in Dutch. Sources: Optimism (Kemper et al., 2017).

C.6 Cognitive Reflection, Financial Literacy, and Financial Management

Survey Questions. Table C17 shows the wording of the survey questions to elicit cognitive reflection, financial literacy, and financial management.

Table C17: Survey Questions Cognitive Reflection, Financial Literacy, and Financial Management

Cognitive Reflection	Open answer
Question 1	A bat and a ball cost €110 in total. The bat costs €100 more than the ball. How much does the ball cost? [correct = 5]
Question 2	If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? [correct = 5]
Question 3	3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the lake, how long would it take the patch to cover half the lake? [correct = 47]
Financial Literacy	Multiple choice
Question 1	Suppose you had €100 in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow? [more than €102 ; exactly €102; less than €102; do not know; prefer not to say]
Question 2	Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account? [more; exactly the same; less ; do not know; prefer not to say]
Question 3	Do you think the following statement is true or false? “Buying a single company stock usually provides a safer return than a stock mutual fund.” [true; false ; do not know; prefer not to say]
Question 4	Do you think the following statement is true or false? “A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest over the life of the loan will be less.” [true ; false; do not know; prefer not to say]
Question 5	If interest rates rise, what will typically happen to bond prices? [they will rise; they will fall ; they will stay the same; there is no relationship; do not know; prefer not to say]
Financial Management	1 “completely disagree” – 5 “completely agree” ($\alpha = .61$)
Question 1	I manage my daily financial affairs in a very organized way.
Question 2	I am very impulsive and I am tempted to buy things even when in fact I do not have the money for it. (R)
Question 3	I never pay my bills too late.
Question 4	I rather pay items on credit than waiting until I have saved the money. (R)

Notes: Questions were asked in Dutch. R indicates that the scale is reversed. α refers to Cronbach’s alpha (Cronbach, 1951), which provides an indication of scale reliability. Sources: Cognitive Reflection (Frederick, 2005), Financial Literacy (Lusardi and Mitchell, 2014), Financial Management (Antonides et al., 2011).