Psychological Distance and Intertemporal Choice

Using different perspectives to influence time preferences

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Behavioral Economics

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Abstract

This study investigates the impact of taking a distant perspective (future-self or others'), relative to the present-self on time preferences. Our study uses a dynamic within-subject design consisting of a questionnaire spread over multiple dates, to make it possible to elicit several time preferences. We discuss impatience, stationarity, time invariance and time consistency. Based on construal level theory we expect to find improvements in self-control and rationality when increasing psychological distance. Using non-parametric sign-tests we observe in line with our expectations that stationarity increases when deciding from more distant perspectives. As expected, no change in time invariance is observed. Contrary to our expectations, we do not find strong evidence for the improvements of time consistency (there is some marginal evidence). The results are also supported with a regression analysis. Overall the results indicate that there are some associations between perspective taking and time preferences.

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1. Introduction

Often we make decisions about consumption, savings and investments. When making these decisions we have to deal with intentions, planning and fulfilling needs. These facets lead to difficult decisions as there is mismatch between what people want at one moment in time and do at another moment. You might remember a situation from your own life in which you planned to do something but eventually you did something else. Common frictions in preferences exist between dieting and eating whatever one likes or between going to the gym and watching television. Although people want to invest in the future, it is hard not to give in on tempting offers for a present moment. For illustration, if people have to make the choice for going to the gym, they are more likely to plan going tomorrow, rather than going now. The next day people face the same choice. Whether they go on that later moment depends on their self-control or on a pre-commitment. When facing such a situation one could try to pre-commit, by for example inviting a friend to come along. This creates a barrier not to go, because one does not want to let down a friend. One could also try to look more objectively at the choice situation. This could be done by looking at what one should do in the future or what one should recommend a friend to do. After this, one should decide for themselves. In the "best" situation one acts like the other choices and thereby increased self-control.

Studies on intertemporal choice are not only interested in present choices, but also focus on differences in preferences over a period of time. The interest in time preferences exceed the description of impatient behavior for present situations (Frederick, Loewenstein, & O'donoghue, 2002). Among others Halevy (2015) and Casari and Dragone (2015) studied whether and how choices change over time, by analyzing preferences reversals. Our study investigates associations of self-control, rationality and preference reversals with psychological distance (perspective taking). This study aims to provide insights on how to influence intertemporal behavior.

One of the factors influencing behavior is temporal distance. People are more likely to behave impatient for their "present-self", compared to a future moment, because they put more weight on a possible pain or gain in the present. This is why individuals often want pleasant actions immediately and procrastinate the unpleasant (O'Donoghue & Rabin, 2000). As the present bias describes, current behavior (the present-self) is often more impatient than planned future behavior. Incorporating the "future-self" one can look at a two selves framework including a planner and a doer. But not only time affects time-preference. Studies by Trope and Liberman (2003 and 2010) suggest that many forms of psychological distance have effect on self-control and therefore time preferences. As

described in construal level theory psychological distance changes perception of similar situations. Increased distance creates more abstract views and could affect self-control.

Aforementioned two selves approach becomes even more interesting when taking a third person into account. This third person will be someone else, an outsider. For this outsider one does not feel the consequences of decisions, not in the present nor in the future. There only might be relational costs to the other person, when knowing that one makes the decisions. A study by Pronin, Olivola and Kennedy (2008) found evidence that individuals' decisions for their future selves differ from decisions for their present selves and that these decisions tend to be more comparable to decisions for others. They found a relation between temporal and social distance.

In this research we look at the impact of psychological distance on time preferences. Time preferences we discuss are impatience, stationarity, time invariance and time consistency. To our best knowledge, no study has used perspective taking as factor influencing this elaborated set of time preferences. Psychological distance is manipulated by perspective taking. We discuss the present-self, the future-self and another person's perspective. We state the following research question:

What is the impact of perspective taking (of future-self and on others') on time preferences?

By investigating how people respond to similar choice situation from a present-self, future-self or others' perspective, we learn which perspective brings most rational or consistent choices. This information could be used to nudge people in the "right" direction. If for example using the others' perspective is associated with more consistent preferences, we can use it to guide our present-self's choices. We want to learn whether perspective taking affects intertemporal preferences.

Before we continue some important concepts have to be discussed. Perspective taking refers to the way participants place themselves into different points of view in similar choice situations. Next to the *present-self* perspective, where the respondent makes choices for the "here and now", the future-self and another person's (a friend) perspective will be discussed. For the *future-self* perspective, participants have to imagine to make choices in the future (4 weeks from that moment). For the *others'* perspective, participants have to make choices affecting their friend's outcomes. These perspectives are manipulations of the psychological distance from an event (choice situation).

For time preferences we look at both static and dynamic preferences. This is comparable to earlier work by Halevy (2015). For explaining time preference measures, the pair (x, t) represents a payment of € x at time t. The decision maker's preference (indifference) at time t is given by $\sim_t$. We start with *impatience* as the foundation of all measures. We measure future equivalent of receiving an amount y soon, i.e. $(y, t + \Delta_1) \sim_t (x, t + \Delta_2)$ where $\Delta_1 < \Delta_2$. A higher value of the future equivalent x in (x, t) shows higher impatience. The first time preference measure we discuss is *stationarity*. Time preference is stationary when there is constant discounting, resulting in no static preferences reversals. If one delays the choice into the future, preferences should be the same. Stationarity holds when $(y, t + \Delta_1) \sim_t (x, t + \Delta_2) \Leftrightarrow (y, t' + \Delta_1) \sim_t (x, t' + \Delta_2)$. Secondly, *time invariance* occurs when the present choice now and the present choice at a later moment are the same. Therefore $(y, t + \Delta_1) \sim_t (x, t + \Delta_2) \Leftrightarrow (y, t' + \Delta_1) \sim_{t'} (x, t' + \Delta_2)$ implies that choices are time invariant. At last we look at the *time consistency* of preferences. Choices are consistent when planned and actual behavior are similar. A dynamic preference reversal occurs when there is a difference. We speak of time consistent preferences when $(y, t + \Delta_1) \sim_t (x, t + \Delta_2) \Leftrightarrow (y, t + \Delta_1) \sim_{t'} (x, t + \Delta_2)$.

To elicit all of these preferences, our study uses a dynamic within-subject design consisting of a questionnaire spread over multiple dates. In the first wave 64 individuals participated. The same subjects were reached again in the second wave, which was conducted 4 weeks after the first wave. 54 of the subjects responded in the second wave. To find out how perspective taking influences time preferences we include three different perspectives, present-self, future-self and others' perspective.

We expect that an increase of psychological distance (taking perspective) leads to more self-control and makes preferences more stationary and time consistent. We do not expect deviations in time invariance. In addition, we look at the relationship of risk and ambiguity preferences with perspective taking and time preferences. We expect that risk (and ambiguity) averse respondents tend to be more patient in every perspective. We also expect that more psychological distance increases rationality, and therefore lead to more risk and ambiguity neutral choices.

Our analysis are briefly as follows. We observe in line with the expectations, that psychological distance is positively associated with patience. Our results also suggest a positive relation of psychological distance with stationarity of preferences and no changes in time invariance. We however do not find an increase of time consistent preferences when increasing psychological distance. Additional analysis confirm (at least most of) the main findings. We do however find some

differences between the present and more distant perspective when looking at time consistency. The results indicate that perspective taking at least has some association with time preferences.

The paper is organized as follows. In section 2 we start with a detailed literature review on intertemporal choice and psychological distance. Then we discuss the hypothesis in section 3, followed by the experimental design including the different conditions which might affect time preferences in section 4. In section 5 we explain how we measure the different preferences. Then we report our analysis in section 6 with a brief description of the data and the methodology used. Main results are given in section 7 followed by robustness checks in section 8. We summarize our study in section 9 and discuss the results in section 10.

2. Theoretical framework

2.1 Intertemporal choice

Standard economic theory assumes rationality and predicts that individuals make consistent choices and use constant discounting. In line with those thoughts it should be that what people now believe as the best choice for the future, is still the best choice at that moment in the future. However, experiments and empirical research shows that discount rates are not constant, they tend to decline over time (Frederick, Loewenstein, & O'donoghue, 2002). This decreasing impatience is making people more willing to wait for outcomes further in the future. Thaler (1981) asked his subjects what amount of money they required to make waiting (varying between one month and ten years) just as attractive as getting the money now. He reported that the average discount rate decreases for longer time-horizons. Other studies by Chapman and Elstein (1995) and Chapman (1996) also found evidence that discount rates tend to be larger for shorter delays. These results, suggesting that the size of the delay affects discount rates (and therefore impatience), imply that people have inconsistent preferences.

For example one could prefer €100 in six weeks over €150 in eight weeks, but in six weeks one prefers €100 now over €150 in two weeks. When arriving at a future moment, this (abstract) future becomes the present. The total delay decreases from six to zero weeks, but the difference in delay remains two weeks. This decrease in delay increases the discount rate (impatience) and makes one want to deviate from plans (or preferences) made before. This is a general pattern often found in empirical research. The finding that people tend to put more weight on the present than the future is

also called present bias. This present bias could explain time inconsistent behavior and cannot be captured in constant discounting models. As discussed by Frederick, Loewenstein and O'donoghue (2002), models with a hyperbolic models use declining discount rates and fit the empirical data better than exponential (constant discounting) models.

Intertemporal choice has to cope with many psychological aspects. People often want pleasant actions immediately and procrastinate the unpleasant (O'Donoghue & Rabin, 2000). Another important issue for the understanding of time inconsistency is the individuals' level of awareness that their preferences (are likely to) change over time (O'Donoghue & Rabin, 1999). A completely naïve person believes that future preferences are the same as they are now. A completely sophisticated person is aware of his change in preference and tries to create a commitment device such that at a later moment he takes the action he prefers now. Thaler and Shefrin (1981) describe such actions in their "planner-doer" model. Their model focuses on the strategies employed by the planner to control the behavior of the doers. This is a start of multiple-self models. Multiple-self models assume that there are two agents a myopic one and a farsighted one, who alternately control behavior (Frederick, Loewenstein, & O'donoghue, 2002). This however is quite an unfair battle. The present-self, the "here and now", has all tools in hand, where the future-self has to rely on the present-self's commitment (Goldstein, 2011).

Other studies which discuss time preferences using a dynamic setting like we do, are Halevy (2015) and Casari and Dragone (2015). Halevy (2015) looks for the relation between stationarity, time invariance and time consistency. He argues that any two of these properties imply the third. In short, his results show that choices are approximately stationary and time variant, however mixed (both consistent and inconsistent) results occur for time inconsistency. Because subjects with consistent preferences do not (always) have stationary preferences, he argues that the present bias does not have to be the main source of time inconsistent choices. The study by Casari and Dragone (2015) measures dynamic preferences by linking a preferred plan for task completion with the implementation of this plan over time. They report that about half of their subjects has static, calendar or dynamic choice reversals. They also argue that it is hard to explain these reversals with exponential (constant) or quasi-hyperbolic discounting (present bias). Therefore, intertemporal choices might be driven by more than discounting and temptation. As Casari and Dragone (2015) suggest we could think of risk- and uncertainty preferences and anticipatory feelings which might be associated with intertemporal choices.

2.2 Psychological distance

As mentioned before an important concept for this research is psychological distance. Psychological distance is the subjective distance between an individual and an object, this object could be an event or choice someone has to make. This distance could be influenced by for example temporal and social differences. Parallels between temporal and social distance can be found in construal level theory. Trope and Liberman (2003) discuss a construal level based on changes is temporal distance. The farther away the event is in the future (hence, there is more temporal distance), the higher the construal level will be. Mental representation of similar information is affected by temporal distance. A high level construal is associated with more abstract thinking about an event. On the other hand, an event in the near future has a low level construal, and is associated with more detailed and concrete thinking. Förster, Friedman, and Liberman (2004) find in their experiments a similar link between temporal distance and abstract or concrete thinking. They conducted experiments in which they manipulated the mental representation (and therefore construal level) of choice situations by making the participants imagine their lives a year from now or tomorrow. The results indicate more abstract thinking in the distant time perspective.

When looking from a neurological perspective to the effect of temporal distance, McClure, Laibson, Loewenstein and Cohen (2004) demonstrate that two separate (neural) systems are associated with intertemporal (immediate and later) choices. They found that the prefrontal and parietal regions are associated with all intertemporal choices, where limbic reward areas are only strongly associated with decisions including immediate rewards. Temporal distance does not only affect decisions, it also affects the locations in the brain where decisions are made.

As mentioned before construal level theory can be applied to all kind of forms of psychological distance, including social distance. The present-self can be seen as a reference point and the further an event is removed from that point, in both temporal and social distance, the higher the level of construal will be (Trope & Liberman, 2010). For us construal level theory is interesting because psychological distance also influences self-control. High construal levels are associated with stronger self-control and low levels with weaker self-control. Fujita, Trope, Liberman and Levin-Sagi (2006) found in their experiments support for this aspect of construal level theory. They found that high level construal lead to an increased preference for delayed rewards over immediate rewards. Other important results were the association of high level construal with stronger intentions to exert self-control and less sensitivity for temptations. Next to them, Schmeichel and Vohs (2009) argue that the focus on long-term goals (which is a high level construal) rather than the focus on immediate

gratification leads to more self-control. In the extent of these results, Fujita and Han (2009) argue that the mental construal could be used for promotion of self-control because it can change temptation issues. In their study they used Implicit Association Tests to show that temptations are more easily associate with negativity for higher level construals. Not only self-control but also the consistency of preferences is related to construal level. Any increase in distance or abstract mental representation (higher construal level) is associated with increased evaluative consistency (Ledgerwood, Trope, & Chaiken, 2010). There are also studies arguing the opposite effect. Experiments by Ebert (2005) found that short-term costs, a low level construal, tend to be more influential when making judgements for yourself than for a friend. Therefore, low construal information or actions decrease in importance when making decisions for a more distant person.

Psychological distance does not only affect time preferences, also risk preferences could be subjected to changes in distance. Studies argue that increased psychological distance leads to more rational behavior. Li, Rodhe and Wakker (2015) found that choices move to risk neutrality when deciding for others'. Also Beisswanger, Stone, Hupp and Allgaier (2003) discuss that people tend to make riskier decisions for friends than for themselves. They argue that negative outcomes, which are high level construal, where more likely to be considered important when deciding for themselves.

3. Hypothesis

As discussed in the psychological distance (and construal level theory) literature there is a positive relation between self-control and psychological distance. In line with the earlier discussion Trope, Liberman and Wakslak (2007) found in their experiments that priming participants with abstract words (high level construal) decreased the level of the present bias, relative to concrete words (low level construal). They state that high construal level lead to a more consistent intertemporal choices, compared to low construal level. Next to that Pronin, Olivola and Kennedy (2008) found in one of their experiments that participants showed more temporal discounting (so more impatient behavior) when making a decision for their present self, relative to future-self or other person. Therefore, a psychologically more distant perspective (an increase in construal level) is expected to lead more self-control.

Because more psychological distance is associated with more consistent behavior, we hypothesize that 1a) **Taking perspective of others', relative to not taking perspective, increases stationarity.** For the future-self the future preference is expected to become relatively more patient than for the

present-self. This leads to more patience and a smaller deviation of stationary preferences. We hypothesize that 1b) **Taking perspective of future-self, relative to not taking perspective, increases stationarity.** In line with these hypotheses we expect that less static preference reversals will take place for more distant perspectives compared to present-self. However, if both present and other discount their choices the same way no change in stationarity is expected. Both switching points tend to decrease for the future prospect, leaving the difference between present and future preferences (the level of stationarity) similar for both perspectives.

For time invariance, we do not expect differences between perspectives. The present choice and the choice when the future becomes present are expected to move in the same direction for both perspectives. It is only possible to say something about time invariance for the others' perspective versus the present-self perspective. Because one cannot measure the future-self perspective choices for events happening in the present, we will not discuss the future-self perspective with respect to the time invariance. Taking the others' perspective makes the respondent more patient, compared to present-self, in both direct present and future present. But the difference in the change is not expected to be different between the perspectives. Therefore, we hypothesize that 2) **Taking perspective of others', relative to not taking perspective, does not affect time invariance.**

Our final time preference, time consistency, is about the difference between planned and implemented behavior. Diminishing impatience (present bias) would suggest the existence of dynamic preference reversals. The choice when the future becomes present should be less affected by the present bias, as people become more patient, when taking more psychological distance. Previous studies suggest an increase of time consistent choices and rationality when taking perspective. Related to our study Ledgerwood, Trope and Chaiken (2010) looked at the stability and flexibility of evaluations. They used construal level theory to create different mental representations and found that more abstract thinking (higher construal level) makes it more likely that individuals act in line with their earlier reported values and therefore behave more consistently. Given previous literature we expect a decrease in the difference between planned and implemented behavior at higher construal levels. Therefore, we hypothesize that 3a) **Taking perspective of others', relative to not taking perspective, improves time consistency.** As taking a future-self perspective also increases distance, we hypothesize that 3b) **Taking perspective of future-self, relative to not taking perspective, improves time consistency.** In other words we expect fewer dynamic preference reversals for more distant perspectives.

For a side note, we also discuss the relation of risk and ambiguity preferences with time preferences. Sutter, Kocher and Trautmann (2013) found a significant relation between risk aversion and time preferences. A subject with more risk-averse preferences tempts to be more patient. Therefore, we expect a significant and positive correlation between being risk (and ambiguity) averse and patience. Because Li, Rodhe and Wakker (2015) found improvements of rationality when making decisions for others, we also expect the more rational preferences.

4. The experiment

To find out whether an increased psychological distance changes time preferences, we use a dynamic experiment consisting of two questionnaires which are conducted with four week interval. Each questionnaire consists of three main parts, namely questions to elicit; 1) time preferences, 2) risk and ambiguity preferences and 3) some demographics[1]. The demographic questions include age, gender and measure of the need for money in each part of the study. Participants rated the statement "I could really use the money right now", on a 7-point scale, where 7 "Strongly agree" and 1 "Strongly disagree".

For time preferences questions participants were asked to make choices in similar situations from three different perspectives (present-self, future-self and other) and at two different dates (week 0 and week 4). This setting gives the opportunity to analyze the structure of static and dynamic time preferences of participants in different perspectives. The experimental setup for this research is related to the way Halevy (2015) elicits different time preferences. We use the dynamic setting to elicit preferences for patience, stationarity, time invariance and time consistency. Participants answer the questions from three different perspectives (present-self, future-self and other), this gives us the opportunity to check for possible differences in behavior.

We analyze a hypothetical choice lists with future equivalents[2]. Participants were asked to state a minimum amount of money, for which they choose a delayed (plus one week) payment over an earlier payment of €100. The decision maker's preference at time t is given by $(x, t+1) \succcurlyeq_t (100, t)$, where t is the moment of decision and x the minimum amount of money subjects accept. The

[1] The complete questionnaires for round 1 and 2 can be found in Appendix A.
[2] In economic and psychological literature there is a discussion whether real and hypothetical rewards differ for choice making. This topic is further discussed in section 10 Discussion.

delayed payment lays between €99 and €110. In other words, we ask for a switching point from an earlier €100 payment to a one week delayed payment[3].

The dynamic setting of the experiment makes it possible to look at differences between planned and implemented behavior. In the first part (week 0) preferences for that moment and in four weeks were asked. Four weeks after finishing the first part, participants were contacted to participate in the second part of the study. The participants were informed about the existence of the second (week 4) part of the questionnaire in week 0. Next to that, in week 4 participants were reminded that they already made a choice for week 4 in the first (week 0) part of the study. To avoid that participants tried to look consistent we did not remind them of what they had chosen at the earlier stage.

The questions to elicit risk and ambiguity aversion are not of main importance for the hypotheses, nonetheless they can give us some extra insight in the effect of psychological distance on decision making. For risk and ambiguity aversion there is a choice between a gamble and a fixed amount of money. Participants were asked to choose the minimum fixed amount they wanted to avoid the gamble. The gamble is based on a paper by Sutter, Kocher and Trautmann (2013) using an Ellsberg (1961) two color choice task. The switching point is the sure outcome someone wants for a risky (or ambiguous) gamble. For the risk aversion gamble the probabilities are known, for the ambiguity probabilities are unknown. These questions are asked for present and others' perspective in both parts of the study.

Experimental conditions

In this subsection, we discuss the relation in the questionnaires between the time-preference questions and perspectives. As mentioned before, we differentiate between three perspectives; present-self, future-self and others' perspective. In the *present-self* perspective, the participant is asked to choose between the two options at this moment ("now") for the time preference (see figure 1). For the present-self perspective we observe; $x1p$ [4], the switching point in and for this moment (week 0); $x20p$, the choice for the future (week 4); and $x24p$, the choice in the future (week 4). In the *future-self* perspective the participant is asked to imagine him/herself in the future (see figure 2). We observe only $x20f$, the switching point for the future (week 4). We do not observe other measures because one cannot measure the future-self perspective choices for events happening in

[3] We only use gain situations (positive stakes) and no loss treatment. This is because the focus of the study is on the perspective taking. We are aware that in a loss situation perspective might have a different impact.
[4] Throughout the paper we refer to the different perspectives, present, other and future, by adding a letter (respectively p, o and f) at the end of the variable or measure names.

the present. In the *others'* perspective the participant is asked to make choices where the outcome is for a good friend (see figure 3). We observe; $x1o$, the choice in and for this moment (week 0); $x20o$; the choice for the future (week 4); and $x24o$, the choice in the future (week 4).

Figure 1: *Present-self* perspective time preference questions

Week 0: x1p: Imagine you choose between getting € 100 now and getting € … next week. What is the minimum € … for you to accept the offer for next week? (99-110) x20p: Imagine you choose between getting € 100 in 4 weeks and getting € … in 5 weeks. What is the minimum € … for you to accept the offer in 5 weeks? (99-110) Week 4: x24p: Imagine you choose between getting € 100 now and getting € … next week. What is the minimum € … for you to accept the offer for next week? (99-110)

Figure 2: *Future-self* perspective time preference questions

Week 0: x20f: Think about yourself in 4 weeks choosing between getting € 100 at that moment and getting € … a week later. What is the minimum € … for you to accept the offer for a week later? (99-110)

Figure 3: *Others'* perspective time preference questions

Week 0: x1o: Imagine you have to make a decision for a friend. He can either get € 100 now or € … next week. What is the minimum € … for you to accept the offer for next week? (99-110) x20o: Imagine you have to make a decision for a friend. He can either get € 100 in 4 weeks or € … in 5 weeks. What is the minimum € … for you to accept the offer in 5 weeks? (99-110) Week 4: x24o: Imagine you have to make a decision for a friend. He can either get € 100 now or € … next week. What is the minimum € … for you to accept the offer for next week? (99-110)

5. Measures

Before we discuss the effect of perspective taking on time-preference, we have to discuss how we measure these preferences. For impatience, a higher switching point implies more impatient preferences. For example, if $x1p$ is larger than $x1o$, then the present choice in the present-self perspective is more impatient than in the others' perspective. For stationarity we start with using the measure $nonstat$, which captures the level of non-stationarity by calculating $x1 - x20$ for each perspective. If $nonstat > 0$ there is a present bias and if $nonstat < 0$ there is a future bias. Stationarity holds when $nonstat = 0$, i.e. $x1 = x20$. Preferences are time invariant when there is no difference between $x1$ and $x24$, variance measure $var = 0$. Time consistent preferences occur when there is no observed inconsistent behavior, which implies that $incons = 0$ and $x20 = x24$.

To calculate the difference between the perspectives we use absolute values of non-stationarity ($abs\_nonstat$), variance (abs_var) and inconsistency (abs_incons) for each perspective. The bigger these absolute values are the less choices are stationary, invariant or consistent. For example, if $abs\_inconsp > abs\_inconso$ then there seems to be more inconsistent preferences for the present compared to the others' perspective, which indicates that consistency improves in a more distant perspective. To test robustness of the relationships between perspective taking and time preferences we use a different indifference interval [-1, 1] for the absolute measures. We also create binary variables to capture whether respondents' preferences are stationary ($dstat$), invariant ($dinvar$) or consistent ($dcons$). We use two definitions, one where switching points have to be exactly the same and one based on the indifference interval [-1, 1].

For risk and ambiguity preferences we elicit a certainty equivalent for risky gambles (cer) and a certainty equivalent for ambiguous gambles (cea). These are used to calculate risk and ambiguity aversion. These measures are taken from the different perspectives and at different moments in time (week 0 and week 4). The calculations for risk and ambiguity aversion are based on Sutter, Kocher and Trautmann (2013). Risk preference is given by $r = 1 - cer \,/\, \pi$ (where π is the price in the gamble, $\pi = 10$). Values of are ranged from 0 to 1. $r < 0.5$ indicates a risk loving preferences, $r = 0.5$ indicates risk neutrality and $r > 0.5$ shows a risk averse preferences. Hence, an increase in the certainty equivalent leads to lower r and therefore increases risk aversion. We create a binary variable capturing whether someone is risk averse at a moment in time (dra). The level of ambiguity aversion is captured in $a = cer - cea$. The higher the value the more ambiguity averse someone is, 0 indicates ambiguity natural preferences. We again create a binary variable from every perspective and time capturing ambiguity aversion if $a > 0$ (daa).

6. Data

6.1 Data description

In total 64 people participated in the first part of the study. In the second part, 54 of these participants responded. We use all available data for the analysis of the different time preferences. About thirty percent of the respondent was female and the average age was around 28 years old. There are three participants that have at least once a negative time preference, such that he/she prefers lower payoff later over higher payoff now[5]. In both waves respondents are on average "neutral" in their needs for money (about 3.6 on scale of 7). This measure for the need of money is however never significantly or consistently related to the level of impatience.

6.2 Analysis

We analyze the data gathered with the dynamic experiment in several steps. First we use a sign-test to find out whether non-stationarity, variance or inconsistency of preferences are present within each perspective. Then we check whether there is a difference in the absolute measures between the perspectives. We do not look at discount rates as we do not observe utility but only monetary switching points. We check whether one of the perspectives shows more non-stationarity, variance or inconsistency than one of the other perspectives. If we cannot reject the null hypothesis of the test, we conclude that there is no evidence for a difference between the two perspectives. We use nonparametric sign-tests because it smooths the differences between negative and positive deviations. Parametric student t-tests work with mean of the sample and are significantly affected by outliers, nonparametric tests work with the median and are less affected by outliers.

To get a better image about the relations between the different time preferences between and within the perspectives we generate binary variables. For each perspective these binary variables capture whether someone has stationary, time invariant or time consistent preferences. We again use nonparametric sign-tests to find possible relations. We also test for correlation between the different perspectives and measures.

[5] The analysis is based on all available survey data. Removing partial results or negative time preferences does not significantly change in the results.

As mentioned before we also look at risk and ambiguity preferences on the side. For these measures we also generate binary variables capturing whether someone is risk or ambiguity averse. We use similar nonparametric test as with time preference analysis.

In addition to these nonparametric analysis we use two different regression models to test our hypothesis. We start with a regression model which uses the absolute difference from stationary, invariant and consistent preferences as dependent variables. After that we analyze a logistic regression with the binary variables capturing stationary, invariant and consistent preferences as dependent variables. In both models dummies for others' and future perspective are the independent variables of interest. An advantage of regressions is that we can include additional control variables, next to the variables of interest. We add two sets of controls. One including demographics; age, gender and need for money, and the other including risk and ambiguity preferences; dummies capturing risk and ambiguity aversion and interactions of these with the different perspectives.

7. Results

We first discuss impatience within each perspective followed by the differences of impatience between perspectives. After that, we discuss the differences and relations in stationarity, time invariance and time consistency across the different perspectives.

Table 1 gives an overview of preferences for each perspective. In this table we can observe the mean of the monetary choices from the respondents divided by the different perspectives. Higher values of x indicate a more impatient preferences. For example in the number 104.2656 ($x1p$) is the average switching point for the present-self perspective with an early payment of €100. This means that the average respondent prefers an amount of at least €104.27 next week over €100 this week.

Table 1: overview time preferences

variable	mean	H_0	p-value sign-test H_a: ≠(</> one-sided)
Present perspective			
x1p	104.2656	x1p=x20p	*0.0059 (0.0030)*
x20p	105.6563	x1p=x24p	*0.5572 (0.2786)*
x24p	104.9815	x20p=x24p	*0.2649 (0.1325)*

Other perspective			
x1o	104.5469	x1o=x20o	*0.6291 (0.3145)*
x20o	104.8281	x1o=x24o	*0.4583 (0.2291)*
x24o	104.1667	x20o=x24o	*0.2649 (0.1325)*
Future perspective			
.	.	x1p=x20f	*0.1516 (0.0758)*
x20f	104.9219	.	.
.	.	x20f=x24p	*1.0000 (0.5000)*

**Note: between (…) one sided test, seen from largest switching point*

7.1 Impatience

We start with the differences in impatience between perspectives to answer the question whether an increase in psychological distance decreases impatience. The present choice ($x1$) for the present-self and others' perspective does not differ significantly ($x1p - x1o < 0,\ p = 0.500$)[6]. The future switching point ($x20$) for the others' perspective tends to be smaller than for the present perspective ($x20p - x20o > 0,\ p = 0.068$). Also the switching point in week 4 ($x24$) is smaller from the others' perspective ($x24p - x24o > 0,\ p = 0.026$). When using a future perspective the switching point is significantly lower ($x20p - x20f > 0,\ p = 0.038$) and therefore decrease impatience. These results indicate that (at least in some cases) taking a more distant perspective makes respondents behave more patiently.

Another finding, in line with Pronin, Olivola and Kennedy (2008), suggests that choices for the future and choice for others' are alike. We observe that the slightly higher average switching point of the future-self perspective is not significantly larger than from the others' perspective ($x20f - x20o > 0,\ p = 0.500$).

For a final remark on impatience we look at the correlations between the switching points (measures of impatience). We observe significant and positive correlations between and within the different perspectives (see Appendix B table 2). This indicates strong and positive relations between impatience at different moments in time and at different perspectives. In general we observe that the correlation between present and future-self perspective is much bigger than present and others'

[6] Throughout the paper we refer to statistical tests by including this (H_a, p-value H_0). This ($x1p - x1o < 0,\ p = 0.500$) shows that we use a one-sided test and that the corresponding p-value for rejecting H_0 is 0.500 . In this case we tests H_0: median of x1p-x1o=0 versus H_a: median of x1p-x1o<0.

perspectives. This indicates stronger associations between present and future compared to present and others'.

7.2 Stationarity

In general the choice for the future seems to be higher than the present choice ($x1 < x20$) (see table 1). This suggests increasing impatience (future bias) and contradicts the present bias, which suggests decreasing impatience. Using the nonparametric sign test we observe that the difference is statistically significant for the present-self ($x1p - x20p < 0,\ p = 0.003$). Therefore, it seems that respondents make significantly more impatient choices for the future relative to the present from the present-self perspective, implying nonstationary preferences. In the others' perspective the future is not significantly more impatient than the present ($x1o - x20o < 0,\ p = 0.315$). This indicates that the average respondent in the others' perspectives has stationary preferences. In the future perspective the switching point for week 4 again is higher but only marginally ($x1p - x20f < 0,\ p = 0.076$). Therefore, there is some evidence for nonstationary behavior in the future perspective. These findings may be seen as evidence that taking a more distant (particularly others') perspective increases the likelihood of making stationary choices.

Table 3: absolute time preference measures

Stationarity			
	present	**other**	**future**
abs_nonstat (|x1-x20|)	2.359375	1.25	1.96875
p-value		*0.022*	*0.151*
Time invariance			
	present	**other**	**future**
abs_var (|x1-x24|)	2.296296	2.555556	.
p-value		*0.360*	
Time consistency			
	present	**other**	**future**
abs_incons (|x20-x24|)	2.203704	2.518519	2.425926
p-value		*0.4278*	*0.6047*

**Note: p-value one-sided sign-test of absolute measure compared to present-self*

To test whether perspective taking decreases deviations from stationary behavior we use the absolute difference between the switching points in week 0 for present and future choice ($abs\_nonstat$). Table 3 shows the absolute deviations from stationary preferences. On first sight these are in line with expectations because deviations are lower for the more distant perspectives. When using more formal tests, the absolute non-stationarity seems to be significantly higher for the present-self compared to the others' perspective ($abs\_nonstatp - abs\_nonstato > 0$, $p = 0.022$). There is no evidence that the absolute non-stationarity of the present-self is significantly different from the future-self ($abs\_nonstatf - abs\_nonstato > 0$, $p = 0.151$). Because the overall (positive and negative) deviations from stationary behavior are different between the others' and the present-self perspective, perspective taking seems to be related to stationarity. Moreover, results suggest that *one could increase stationarity by making choices from others' perspective, relative to present-self perspective*. No such relation is found when using future framing. These results are partially in line with the first set of hypotheses, hypothesis 1a is confirmed, but no evidence is found for 1b.

Table 4: present and future bias

	Present biased			**Future biased**		
	present	**other**	**future**	**present**	**other**	**future**
# subjects	6 (9%)	7 (11%)	8 (13%)	21 (33%)	10 (16%)	16 (25%)
p-value		*0.5000*	*0.3633*		*0.0037*	*0.0313*

**Note: p-value based on one-sided sign-test of # subjects compared to present-self*

Now we examine the present and future bias to get more detail on the differences in non-stationarity between the perspectives. We use binary variables capturing whether someone is present or future biased (respectively dpb and dfb). The present bias exists when someone is more impatient for the present compared to the future ($x1 > x20$). For the future bias this is the other way around ($x1 < x20$). As shown in table 4, only few respondents are present biased and there is no significant difference between the perspectives. The decrease in nonstationary preferences for the others' perspective seems to come from a decrease in the proportion of future biased respondents ($dfbp - dfbo > 0,\ p = 0.004$). The future-self perspective also has a significantly smaller proportion of subjects who are future biased ($dfbp - dfbf > 0,\ p = 0.031$). Thus, preferences for the present-self are more affected by increasing impatience than the more distant perspectives.

The correlation between the different perspective's non-stationarity measures are significant (see Appendix B table 5a and 5b). The correlation between the present and others' perspective is less

than half the correlation between present- and future-self. This indicates a stronger impact of taking a perspective outside yourself, relative to a future-self.

7.3 Time invariance

For the relation between time invariance and perspective taking we only look at the present-self relative to the others' perspective. Although respondents are on average more impatient for a delayed payment in week 4 than week 0 (see table 1), there is no significant difference within the present-self perspective ($x1p - x24p < 0$, $p = 0.279$). For the others' perspective $x24$ is lower than $x1$, but again there is no statistically significant difference ($x1o - x24o > 0$, $p = 0.229$). For the both present and others' perspective there is no significant time variant behavior.

Although the absolute difference from time invariant preferences is higher for the more distant perspective (see table 3), we do not observe a significant difference between the perspectives ($abs\_varp - abs\_varo < 0$, $p = 0.360$). These results suggest that *taking others' perspectives does not change time invariance, relative to present-self perspective.* This is in line with hypothesis 2. In other words respondents have the same preferences when making a choice for a present situation, whether it is now or at a future moment. The correlation (see Appendix B table 5a and 5b) between the variance in each perspective is positive and significant ($corr = 0.396$, $p = 0.003$), for the absolute variance there is no significant correlation ($corr = 0.187$, $p = 0.175$).

7.4 Time consistency

Now we will take a look at the last time-preference measure, time consistency. On average, the smallest absolute time inconsistent preferences are found in the present-self condition (see table 3). However, from none of the perspectives the "planned" preference ($x20$) differs significantly from the preference in the moment in the future ($x24$) (see table 1). Next to future-self ($x20f - x24p > 0$, $p = 0.500$) and others'($x20o - x24o > 0$, $p = 0.1325$), the present-self perspective also does not show statistically significant inconsistent preferences ($x20p - x24p > 0$, $p = 0.1325$).

We do not observe significant differences in the variable abs_incons between the present and more distant perspectives. The absolute inconsistency does not differ between present and other ($abs\_inconsp - abs\_inconso > 0$, $p = 0.4278$) or present and future ($abs\_inconsp - abs\_inconsf > 0$, $p = 0.6047$). The results suggest that *there is no difference in time consistency of*

the preferences between the perspectives. This is not in line with hypothesis 3a and 3b, which suggested an increase of consistency for more distant perspectives. The correlation between inconsistency among perspectives is significant and positive (see Appendix B table 5a and 5b). It is remarkeble that the correlation of present and other is less than half of present and future. Indicating a weaker relation of present-self with others' than with future-self perspective.

7.5 Risk and ambiguity preferences

We end the main analysis with a short discussion on the relation of risk and ambiguity aversion with first time preferences and then perspective taking. We do not observe any robust relation between risk or ambiguity aversion and self-control. Ambiguity aversion is only marginally related to impatience in the present-self perspective ($corr = 0.2378,\ p = 0.0585$). The correlation between ambiguity aversion and other perspectives or periods is not significant, moreover the sign of the correlation coefficient differs. Against our expectations, results shows that being risk averse is significantly and negatively correlated to the future switching point for the present-self ($corr = -0.261,\ p = 0.037$), others' ($corr = -0.275,\ p = 0.028$) and future-self perspectives ($corr = -0.343,\ p = 0.006$). Hence, being risk averse is associated with decreased impatience for a future prospect. This is counter intuitive, because if one does not want to take risk of waiting, one is expected to be more impatient. Risk and ambiguity aversion are never significantly related to stationarity, variance or inconsistency.

We find some significant differences in risk and ambiguity aversion between the perspectives. In the first survey round, we do not observe differences in the proportion of risk averse respondents in present and others' perspective. In the second round however, there is a marginal difference, suggesting there are more risk averse respondents in the others' perspective relative to the present-self ($dra24p - dra24o < 0,\ p = 0.0898$). This indicates that making a decision for a friend is associated with taking fewer risks. This finding is contrary to the theory arguing that more distant perspectives lead to more rational behavior, which suggests risk neutrality in this case. The difference between the two survey rounds might suggest inconsistent risk aversion preferences, nonetheless there is a strong positive and significant correlation between risk aversion within and between perspectives (see Appendix B table 6). For ambiguity aversion we do not find significant differences between perspectives and there is significant correlation between and within the perspectives (see table 7).

8. Robustness

In this part we test whether previous results hold when using different models and different definitions for the time preferences. We first discuss the relationship between the time preferences and the perspectives when we use a wider indifference interval. Then we use an analysis of binary variables capturing whether preferences are stationary, invariant or consistent. At last we use two regression models to test whether previous results are also robust not using nonparametric tests.

8.1 Indifference Intervals

In this part we will check whether the results hold when we use a different definition of stationarity, invariance and consistency. We create a wider indifference interval [-1, 1] instead of only [0]. This implies that if $nonstat = -1$ preferences are seen as stationary, in previous analysis this implied non-stationarity. This interval is defendable by the fact that a deviation of 1 from indifference is so small (negligible) that it actually captures indifference and therefore similar preferences. Next to that it could be that a difference of one is caused by a minor mistake. Therefore, we now base preference reversals only on people with a strong(er) preference. In general the findings on stationarity, time invariance and time consistency using [-1, 1] are almost similar to the main analysis (see table 8). There are two major changes in the results[7].

Table 8: overview time preferences using interval [-1, 1]

variable	mean	H_0	p-value sign-test H_a: ≠(</> one-sided)
Present perspective			
x1p	104.2656	x1p=x20p	*0.0146 (0.0073)*
x20p	105.6563	x1p=x24p	*0.8238 (0.4119)*
x24p	104.9815	x20p=x24p	*0.1516 (0.0758)*
Other perspective			
x1o	104.5469	x1o=x20o	*0.6291 (0.3145)*
x20o	104.8281	x1o=x24o	*0.7011 (0.3506)*
x24o	104.1667	x20o=x24o	*0.2295 (0.1148)*

[7] We use the same notation as in the main analysis when reporting results including the interval [-1, 1]. This makes it easier to compare the results.

Future perspective			
.	.	x1p=x20f	*0.2863 (0.1431)*
x20f	104.9219	.	.
.	.	x20f=x24p	*0.8388 (0.4194)*

**Note: between (…) one sided test, seen from largest switching point*

First, the wider indifference interval affects stationarity for the future perspective. We do not find any significant evidence for nonstationary preferences ($x1p - x20f < 0$, $p = 0.1431$) in the future perspective. In the main analysis the future perspective showed nonstationary preferences at a marginally significant level. Now there is some evidence that non-stationarity also disappears when taking the future perspective. This result, however, is not as strong compared to taking the others' perspective. As shown in table 9, the absolute difference form stationarity is not significantly different for present and future perspective ($abs\_nonstatp - abs\_nonstatf > 0, p = 0.151$).

Table 9: absolute time preference measure including interval [-1, 1]

Stationarity [-1, 1]			
	present	**other**	**future**
abs_nonstat (|x1-x20|)	2.328125	1.25	1.9375
p-value		*0.032*	*0.1509*

Time invariance [-1, 1]			
	present	**other**	**future**
abs_var (|x1-x24|)	2.185185	2.518519	.
p-value		*0.221*	

Time consistency [-1, 1]			
	present	**other**	**future**
abs_incons (|x20-x24|)	2.111111	2.444444	2.296296
p-value		*0.5*	*0.6047*

**Note: p-value one-sided sign-test of absolute measure compared to present-self*

The second change in results is that the difference between the switching points for the time inconsistency measure at the present-self perspective is marginally significant ($x20p - x24p > 0$, $p = 0.0758$). This indicates that there is some evidence that in the present-self perspective the

respondents shows time inconsistent preferences. For the others' and future perspectives no significant deviation from time consistent preferences is found. Although there is no significant difference in absolute values of inconsistency between the perspectives (see table 9), taking a psychologically more distant perspective seems to improve consistency of preferences.

8.2 Classifications

We now use a binary variable to capture whether a choice is stationary, time invariant or time consistent ($dstat$, $dinvar$, $dcons$)[8]. Using the binary variables, we observe a higher proportion of respondents with stationary preferences for the others' relative to present perspective in table 10. These differences are statistically significant ($dstatp - dstato < 0, p = 0.0106$). Even though more respondents behave stationary in the others' relative to present perspective, there is a strong and positive relation between the preferences in each perspective ($corr = 0.4891, p = 0.000$)[9]. Using a chi-square test we reject the null-hypothesis that $dstatp$ and $dsatato$ are independent ($p = 0.000$). The proportion of stationary preferences in present and future perspective do not significantly differ ($dstatp - dstatf < 0, p = 0.2539$). This classification into binary variables gives the same results for stationarity as the main analysis does. Again findings are in line with hypothesis 1a, but no evidence is found for hypothesis 1b.

Table 10: Numbers and percentages of preferences

	Stationary [0]			**Stationary [-1, 1]**		
	present	**other**	**future**	**present**	**other**	**future**
# subjects	37 (58%)	47 (73%)	40 (63%)	39 (61%)	47 (73%)	42 (66%)
p-value		*0.0106*	*0.2539*		*0.0384*	*0.2744*

	Invariant [0]			**Invariant [-1, 1]**		
	present	**other**	**future**	**present**	**other**	**future**
# subjects	28 (52%)	25 (46%)	.	34 (63%)	27 (50%)	.
p-value		*0.3318*			*0.0835*	

[8] The analysis reported here is based on binary variables without the indifference interval [-1, 1]. Results with this indifference interval [-1, 1] are very similar, unless mentioned differently in the analysis.
[9] For correlations between the binary time preference variables without interval [0] and with interval [-1, 1] see Appendix B table 11 and 12, respectively.

	Consistent [0]			Consistent [-1, 1]		
	present	**other**	**future**	**present**	**other**	**future**
# subjects	25 (46%)	25 (46%)	23 (43%)	30 (56%)	29 (54%)	30 (56%)
p-value		*0.5927*	*0.3633*		*0.5000*	*0.6230*

**Note: p-value based on one-sided sign-test of # subjects compared to present-self*

Results for the time invariance measures slightly differ from the main analysis (see table 10). Now there seems to be a marginal difference between the proportion of invariant respondents for the present and other perspective when using the [-1, 1] interval ($dinvarp - dinvaro > 0,\ p = 0.0835$), without interval there is no significant difference ($p = 0.3318$). There is marginal evidence that more respondents are time invariant in the present-self relative to the others' perspective. This is in contradiction with the main results and hypothesis 2 in which no effect of perspective taking is expected. We have mixed results when looking at the correlation between invariance in both perspectives. Without interval there is only a marginally significant relation ($corr = 0.2257$, $p = 0.100$), with interval the relation becomes significant ($corr = 0.3068,\ p = 0.0240$). Using a Pearson chi-square test we reject the null-hypothesis of independence with ($p = 0.024$) and without only marginally ($p = 0.097$). This suggests a relation between the invariance of preferences for present and other perspectives.

For time consistency there are no statistically significant differences between the proportion of consistent respondents between the present and more distant perspectives ($dconsp - dconso > 0$, $p = 0.5927$ and $dconsp - dconsf > 0,\ p = 0.3633$) (see table 10). These results indicate that there is no significant impact of perspective taking on the consistency of preferences. This is not in line with hypothesis 3a and 3b which expects an increase of consistent behavior when taking a more distant perspective. Next to that, there is a positive and significant correlation between consistency in present and others' perspective ($corr = 0.3297,\ p = 0.015$). However, when looking at the relations, using the [-1, 1] interval, between these consistency measures we find something else. These results suggest that there is no statistically significant relationship between being consistent in present and other perspective ($corr = 0.2159,\ p = 0.1169$). Also using a Pearson chi-square test there are mixed results with and without the interval. There seems to be a significant relationship without the interval ($p = 0.015$). Including the interval we do not observe a significant relation ($p = 0.113$). These results indicate that there is at least some association between consistency and perspective taking.

8.3 Regression analysis

As an extension of previous nonparametric tests we now analyze two different regression models. One capturing the association of the others' and future perspective, relative to present, with the absolute difference from stationary, invariant and consistent preferences as dependent variables. The other, a logistic regression, capturing the relation of the more distant perspectives, relative to the present, with having stationary, invariant and consistent preferences[10]. We add demographics and risk and ambiguity preferences.

Table 12: Regressions absolute time preference measures

	(1)	(2)	(3)
	abs_nonstat	abs_var	abs_incons
other	**-1.89579**	**0.4105004**	**-0.0786211**
	0.021	*0.687*	*0.928*
future	**-0.5536557**	**.**	**0.1733521**
	0.488	*.*	*0.838*
constant	1.455439	2.919612	3.626259
	0.171	*0.067*	*0.003*
Controls (demographics)	Yes	Yes	Yes
Controls (risk and ambiguity)	Yes	Yes	Yes
Observations	192	108	162

A significantly negative coefficient for other (β_1) or future (β_2) indicates a negative association between the independent and dependent variable, relative to the reference category. Table 12 shows the regression estimates for others' and future perspective relative to the present-self perspective.

The results show a significant and negative coefficient for the dummy variable other (column 1)[11]. This indicates that the absolute deviation from stationary preferences decreases in the others' perspective relative to the present-self perspective. We observe a significant decrease of absolute non-stationarity by 1.896 when taking the others' perspective, relative to taking a present-self

[10] The analysis reported here is based on dummy variables without the indifference interval [-1, 1]. Results with this indifference interval [-1, 1] are very similar.

[11] Only the variables of interest in the most elaborated models are presented in the main text. The other (extended) models can be found in Appendix B table 13.

perspective ($\beta_1 = -1.896$, $p = 0.021$). The relation between future and non-stationarity is negative, but not statistically significant ($\beta_2 = -0.554$, $p = 0.488$). These results are in line with our previous findings that one decreases non-stationarity (and increases stationarity) in the others perspective, but not in the future perspective. Results confirm hypothesis 1a and no evidence is found for hypothesis 1b. For absolute variance (column 2) we do not observe a significant difference for the others' relative to the present-self perspective. This is in line with hypothesis 2 and previous nonparametric findings. For time inconsistency we do not observe a significant relation. The model (column 3) shows an insignificant relation between more distant perspectives and absolute inconsistency. These results indicate, in line with previous nonparametric analysis, that there are no associations between perspective taking and inconsistency of behavior. We therefore reject hypothesis 3.

Table 14: Logistic regressions binary time preference variables

	(1)	(2)	(3)
	dstat	dinvar	dcons
other	**1.165056**	**-0.2536943**	**-0.1147869**
	0.065	*0.697*	*0.848*
future	**0.2407295**	**.**	**-0.1609622**
	0.671	*.*	*0.754*
constant	1.736.532	0.4233018	-1.260818
	0.028	*0.683*	*0.132*
Controls (demographics)	Yes	Yes	Yes
Controls (risk and ambiguity)	Yes	Yes	Yes
Observations	192	108	162

Table 14 shows the results of a logistic regression with the answer $dstat = 1$, $dinvar = 1$ and $dcons = 1$ as dependent variable, dummy variables other and future are the independent variables of interest[12]. As before we include demographic, risk and ambiguity variables. The logistic regressions analyze whether it becomes more likely that subjects show stationary (column 1), invariant (column 2) and consistent (column 3) preferences when making decisions from psychologically more distant

[12] Only the variables of interest in the most elaborated models are presented in the main text. The other (extended) logit models can be found in Appendix B table 15.

perspectives. A significantly positive coefficient for other ($\beta_1 > 0$) would indicate that the likelihood that subjects become stationary (invariant or consistent) is higher when making a decision from others' perspective relative to present-self's perspective. We will not interpret the magnitude of the coefficients, only the sign.

For stationarity we observe a marginally significant positive coefficient ($\beta_1 = 1.165,\ p = 0.065$). Therefore, taking others' perspective (marginally) increases the likelihood of being stationary compared to present-self. There is no significant difference for future ($\beta_2 = 0.241,\ p = 0.671$) relative to present. For the likelihood of being invariant there is no significant improvement when deciding for others' ($\beta_1 = -0.253,\ p = 0.697$) relative to present-self. Also for consistency no significant improvement in the others' ($\beta_1 = -0.113,\ p = 0.848$) or future ($\beta_2 = -0.161,\ p = 0.754$) relative to present-self perspective occurs. These results are in line with previous nonparametric findings.

Risk and ambiguity preferences

For a side note, we are interested in the relationship between the time preferences and risk and ambiguity attitudes. As we observe in the extended regression models (see Appendix B table 13 and 15), there are no significant relations between the time preferences and risk or ambiguity attitudes. There are some marginally significant coefficients in both regression models.

In the models with the absolute time preferences as dependent variables (see Appendix B table 13, column 9), there is a marginally significant negative coefficient for being ambiguity averse in the first questionnaire round ($daa1$). This indicates that absolute inconsistency is negatively related to being ambiguity averse in the present-self perspective. In the logistic models (see Appendix B table 15, column 9), however, there is a marginally significant negative association between being time consistent and being risk averse at $t = 0$ ($dra1$). Hence, it is less likely to be time consistent when being risk averse in the present-self perspective. The two model specifications give different results for risk and ambiguity aversion. Because of this, we conclude that these findings (for risk and ambiguity) are not robust to different model specifications.

There also exists a marginally significant interaction in both models with time invariance as dependent variable (see Appendix B table 13 and 15, column 6). Both models suggest a relation between having invariant preferences and the interaction term capturing others' perspective and ambiguity aversion ($other * daa1$). In other words one could say that variance is related to the

others' perspective when one is ambiguity averse. As this part gives inconsistent results and is not part of the main study objective, other studies should further investigate the relationship between time preferences and risk and ambiguity attitudes.

9. Conclusion

We started with the idea that an increase in psychological (both temporal and social) distance is likely to affect self-control. Moreover we expected that intertemporal preferences became more aligned when looking at the situation from a more distant perspective. These expectations were based on construal level theory which suggests behavioral changes when taking more distant (abstract) views in the same situation. In this study we tried to find out whether taking a more distant perspective, future-self or others', relative to present-self would affect time preferences? We expected an increase in stationarity and time consistency when taking a more distant view. We did not expect any differences in time invariance of preferences between perspectives.

We used a dynamic experiment consisting of two questionnaires at different dates (week 0 and week 4) to elicit the different time preferences. In the within subject design, all participants answered the time preference question from three different perspective, present-self, future-self and others'.

Our results show that subjects become more patient when taking distant perspectives. Taking a more distant perspective is also positively associated with stationarity of preferences. No significant relation between psychological distance and time variant preferences is found. We expected to find significant differences in the level and proportion of time inconsistent behavior across the perspectives, but we do not. However, when looking at a broader indifference interval, we do observe marginal evidence for inconsistent behavior of the present-self, but still not significantly more than for more distant perspectives. Also interesting is that the future-self perspective has a much stronger correlation (about twice the size) with the present-self than the others' perspective does. Although most relations are positive and significant it seems that taking the others' perspective has a stronger association with changing time preferences. In summary our main results suggest that increasing psychological distance in a monetary choice task increase patience and stationarity, but is not significantly related to invariance or consistency of preferences.

10. Discussion

First of all, we learn that psychological distance has some effect on intertemporal time preferences. Taking a more distant perspective increase stationarity by decreasing the likelihood of being future biased. There is also some marginal evidence that one could increase the consistency of preferences. We now know that perspective taking is associated with changes in behavior. Secondly, the findings can be used to make people behave more rational. By letting people think about what they want for more distant selves or others' before making a choice for their present selves, individuals might anchor to more stationary or consistent ideas. Faro and Rottenstreich (2006) used such an idea and suggest that making predictions of what others would do before choosing for yourself could improve the quality of one's choices. Their study was however based on risk preferences, therefore we could learn from additional studies on perspective taking and anchoring in combination with time preferences.

Relation to previous research

As discussed before (in section 2.1) Halevy (2015) used similar questions to elicit time preferences. When comparing our results for the present-self with previous findings reported by Halevy (2015), we find some inconsistencies. Where we found significant nonstationary preferences, Halevy found only marginal evidence for nonstationary preferences. Next to that we do not observe any evidence for time variant behavior, where he found significant difference between $x1$ and $x24$. He also found marginally significant evidence for time inconsistency of preferences in his analysis, for us this was the case only when looking at a larger indifference interval. An important difference between our studies in eliciting monetary preferences is the use of incentives. We do not use real incentives for the respondents, where Halevy uses a lottery between choices in week 0 and week 4. In economic experiments it is common to use incentives, however some studies found no differences. A study by Madden, Begotka, Raiff and Kastern (2003) looked at discounting rates and found that the reward type did not affect their findings. Other studies looked at a more general impact of hypothetical versus real choices, and argue that hypothetical rewards give a correct image of real choices (Kühberger, Schulte-Mecklenbeck, & Perner, 2002). Also studies by Grether and Plott (1979) and Grether (1980) found no difference between playing for real or hypothetical money. Nonetheless the differences in our findings compared to Halevy's study, could be related to the use of incentives, but we cannot be sure about this. Another factor changing was the setting where the experiment took place in. While our study was conducted online, Halevy's study was a lab experiment. This in-class setting made Halevy more in control over his respondents. This consequently makes his subjects less

vulnerable to influential factors outside the experimental setting. Next to that, the increased number of questions because of additional perspectives and risk and ambiguity questions might affect the results.

As discussed in the literature review, many studies found evidence for the existence of present bias, which suggests decreasing impatience. Our results however showed that on average respondents, in the present-self perspective, are more impatient for the future than the present. These subjects show increasing impatience. This finding of future bias has not been reported as often as present bias. Nonetheless Loewenstein (1987) already found some evidence for the existence of future bias and referred to it as reverse time inconsistency. More recently Takeuchi (2011) and Sayman and Öncüler (2009) also observed that subjects exhibit reversed time inconsistent behavior when the delay between future options is short (up to a week) and the options are close to the present. In our study the delay is exactly one week and the options are only four weeks from the present. Hence, there are some studies in line with our findings, however most suggest different preferences.

Limitations

One of the limitations was the randomization process of the time, risk and ambiguity preferences. This was done within separate blocks. This however might lead to people anchoring to previously stated questions and perspectives affecting following questions. This could therefore lead to biased results. Nonetheless we still found some differences between the perspectives. This might give rise to the idea that the "real" effect of perspective taking might even be stronger.

Another potential improvement are the complexity of preference eliciting choice tasks. Although it is now possible to see and analyze the different levels of the time preferences, the high amount of options could be too complicated leading to answers not showing actual preferences. An easier choice task, only choose between two options for example 100 now or 110 later instead of 100 now or 99 up to 110 later, could improve the understanding of the choice task.

Because of the nature of the data it is only possible to talk about associations between perspectives and time preferences rather than causal relations. Even though we observe no (consistent) relations between time preferences and risk taking behavior or demand for liquidity when using correlations and regression analysis, there are still other factors we cannot control for because we do not observe them. Because of the study's online setting we cannot control the environment the questionnaires took place in.

Future research

As discussed in the theoretical framework (section 2.2), other manipulations of psychological distance could also affect the representation of information. In our study we only looked at the relationship between perspective taking and hypothetical monetary preferences. There are plenty other manipulations of construal level which in turn could affect decision making. To increase the control over our intertemporal preferences and choices, we (research in general) should find out which manipulations of psychological distance have the strongest effect on intertemporal preferences. For example one could look at the effect of framing in gains versus losses. Because losses are associated with lower construal levels, one could expect similar changes as discussed in our study. It could, therefore, be interesting to look at how (strong) other manipulations of psychological distance affect monetary time preferences.

In addition to our study on hypothetical monetary preferences, there could be several interesting other preferences which might be affected by psychological distance. Preferences for other goods (durable and nondurable) and opinions also change over time. Therefore, it could be interesting to look at how changes in context affect these preferences or opinions. For example one could study, in line with our setting, how the effect of temporal and social distance might affect the stability of opinions, which are (very) subjectable to changes.

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Appendix A

Questionnaire Part 1 (week 0)

Thank you for participating in the study!

In this questionnaire you will make some decisions in hypothetical choice situations taking place now and in the future. This questionnaire will be the first part of the study, and it will take about 8 minutes of your time. In 4 weeks, you will be contacted again to participate in the second part of the study. Then you have an opportunity to rethink some of the choices you made in the first part. The second part will take about 4 minutes to complete. Your participation in the second part will be appreciated as it will complete my study.

There are no "right" or "wrong" answers for any of the questions. All questions are hypothetical and no real monetary rewards are attached. For the reliability of our study, please try to answer all the questions truthfully according to your honest preference.

Haiko Wensveen

1. Gender

2. Age

3. Birthday (for example, 24-03-1993)

Present-self perspective
In the coming 4 questions you will be asked about your preferences at this moment.

1. Imagine you choose between getting € 100 now and getting € … next week. What is the minimum € … for you to accept the offer for next week?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

2. Imagine you choose between getting € 100 in 4 weeks and getting € … in 5 weeks. What is the minimum € … for you to accept the offer in 5 weeks?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

3. Imagine you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?

   If you choose playing the gamble, you will draw one ball from box A. This box has in total 20 balls, 10 white and 10 red. If you draw a white ball you get € 10, otherwise you will get nothing.

   If you choose getting the sure amount of money, you will get € … without playing the gamble.

   What is the minimum sure € … you prefer over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

4. Imagine you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?

   If you choose playing the gamble, you will draw one ball from box B. This box has in total 20 balls, the balls are green or yellow. You do not know the distribution of green and yellow balls. This means the balls can be all green, all yellow, or any other composition of green and yellow. If you draw a yellow ball you get € 10, otherwise you will get nothing.

If you choose getting the sure amount of money, you will get € … without playing the gamble.

What is the minimum sure € … you prefer over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

Future-self perspective

In the coming 3 question you will be asked about your preferences for a future moment.

1. Think about yourself in 4 weeks choosing between getting € 100 at that moment and getting € … a week later. What is the minimum € … for you to accept the offer for a week later?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

2. Imagine that in 4 weeks from now you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?
   If you choose playing the gamble in 4 weeks you will draw one ball from box A. This box has in total 20 balls, 10 white and 10 red. If you draw a white ball you get € 10, otherwise you will get nothing.

   If you choose getting the sure amount of money in 4 weeks, you will get € … without playing the gamble.

   What is the minimum sure € … you prefer over playing the gamble in 4 weeks?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

3. Imagine that in 4 weeks from now you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?

   If you choose playing the gamble in 4 weeks you will draw one ball from box B. This box has in total 20 balls, the balls are green or yellow. You do not know the distribution of green and yellow balls. This means the balls can be all green, all yellow, or any other composition of green and yellow. If you draw a yellow ball you get € 10, otherwise you will get nothing.

   If you choose getting the sure amount of money in 4 weeks, you will get € … without playing the gamble.

   What is the minimum sure € … you prefer over playing the gamble in 4 weeks?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

Others' perspective

In the coming 4 questions you will be asked about your preferences when you have to make a decision for a good friend. Your friend knows you make the decisions for him/her.

1. Imagine you have to make a decision for a friend. He can either get € 100 now or € … next week. What is the minimum € … for you to accept the offer for next week?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

2. Imagine you have to make a decision for a friend. He can either get € 100 in 4 weeks or € … in 5 weeks. What is the minimum € … for you to accept the offer in 5 weeks?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

3. Imagine you have to make a decision for a friend. You can either play a gamble or get a sure amount of money for him. What would you do in the following situation?

   If you participate in the gamble on behalf of him, you have to draw one ball from box A. This box has in total 20 balls, 10 white and 10 red. If you draw a white ball your friend will get € 10, otherwise he/she will get nothing.

   If you choose the sure amount of money, your friend will get € …, without playing the gamble.

   What is the minimum sure € … you prefer for your friend over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

4. Imagine you have to make a decision for a friend. He can either play a gamble or get a sure amount of money. What would you do in the following situation?

   If you participate in the gamble on behalf of him, you have to draw one ball from box B. This box has in total 20 balls, the balls are green or yellow. You do not know the distribution of green and yellow balls. This means the balls can be all green, all yellow, or any other composition of green and yellow. If you draw a yellow ball your friend will get € 10, otherwise he/she will get nothing.

   If you choose the sure amount of money, your friend will get € …, without playing the gamble.

   What is the minimum sure € … you prefer for your friend over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

Statement
How much do you agree with the following statement?

"If the choices were about real money, I could really use the money right now"

	1	2	3	4	5	6	7	
Strongly disagree				Neutral				Strongly Agree

Contact information
As mentioned in the beginning of the survey, to finish the study I need to reach you with a second survey. The contact information will only be used to contact you for a second survey. This information won't be used in the study.

In which way do you prefer to be reached in 4 weeks?
Please enter your Facebook name, E-mail address or other way to sent you the second questionnaire

Thank you for participating in the first part of the study!
I hope that in 4 weeks you have a few minutes to also answer the second part of the study.

Questionnaire Part 2 (week 4)

Thank you for participating in the second part of the study!

The survey takes about 4 minutes.

As in the first questionnaire, there is not right of wrong answer. All choices are hypothetical, and therefore, there are no real monetary rewards attached. For the reliability of our study, please try to answer every question truthfully according to your honest preferences.

Haiko Wensveen

1. Gender
2. Age
3. Birthday (for example 24-03-1993)

Present-self perspective
In the coming 4 questions you will be asked about your preferences at this moment.

1. As you may remember a few weeks ago, you were asked to make decisions between getting €100 in 4 weeks or some other amount of money in 5 weeks. 4 weeks have passed since you made your decision. In this question, you have an opportunity to rethink about that decision, and change it if you like.

Imagine you choose between getting € 100 now and getting € … next week. What is the minimum € … for you to accept the offer for next week?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

2. Imagine you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?

   If you choose playing the gamble, you will draw one ball from box A. This box has in total 20 balls, 10 white and 10 red. If you draw a white ball you get € 10, otherwise you will get nothing.

   If you choose getting the sure amount of money, you will get € … without playing the gamble.

   What is the minimum sure € … you prefer over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

3. Imagine you choose between playing a gamble and getting a sure amount of money. What would you do in the following situation?
   If you choose playing the gamble, you will draw one ball from box B. This box has in total 20 balls, the balls are green or yellow. You do not know the distribution of green and yellow balls. This means the balls can be all green, all yellow, or any other composition of green and yellow. If you draw a yellow ball you get € 10, otherwise you will get nothing.

   If you choose getting the sure amount of money, you will get € … without playing the gamble.

   What is the minimum sure € … you prefer over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

Others' perspective

In the coming 3 questions you will be asked about your preferences when you have to make a decision for a good friend. Your friend knows you make the decisions for him/her.

1. As you may remember a few weeks ago, you were asked to make decisions for a friend between getting € 100 in 4 weeks or some other amount of money in 5 weeks. 4 weeks have passed since you made your decision. In this question, you have an opportunity to rethink about that decision, and change it if you like.

   Imagine you have to make a decision for a friend. He can either get € 100 now or € … next week. What is the minimum € … for you to accept the offer for next week?

€ 99	€ 100	€ 101	€ 102	€ 103	€ 104	€ 105	€ 106	€ 107	€ 108	€ 109	€ 110

2. Imagine you have to make a decision for a friend. He can either play a gamble or get a sure amount of money. What would you do in the following situation?

   If you participate in the gamble on behalf of him, you have to draw one ball from box A. This box has in total 20 balls, 10 white and 10 red. If you draw a white ball your friend will get € 10, otherwise he/she will get nothing.

   If you choose the sure amount of money, your friend will get € …, without playing the gamble.

   What is the minimum sure € … you prefer for your friend over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

3. Imagine you have to make a decision for a friend. He can either play a gamble or get a sure amount of money. What would you do in the following situation?

   If you participate in the gamble on behalf of him, you have to draw one ball from box B. This box has in total 20 balls, the balls are green or yellow. You do not know the distribution of green and yellow balls. This means the balls can be all green, all yellow, or any other composition of green and yellow. If you draw a yellow ball your friend will get € 10, otherwise he/she will get nothing.

   If you choose the sure amount of money, your friend will get € …, without playing the gamble.

   What is the minimum sure € … you prefer for your friend over playing the gamble?

€ 0,5	€ 1,0	€ 1,5	€ 2,0	€ 2,5	€ 3,0	€ 3,5	€ 4,0	€ 4,5	€ 5,0	€ 5,5	€ 6,0	€ 6,5	€ 7,0	€ 7,5	€ 8,0	€ 8,5	€ 9,0	€ 9,5	€ 10

Statement

How much do you agree with the following statement?

"If the choices were about real money, I could really use the money right now"

	1	2	3	4	5	6	7	
Strongly disagree				Neutral				Strongly Agree

Thank you for participating in the second part of the study!

Appendix B

Table 2: correlation between switching points

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	x1p	x1o	x20p	x20o	x20f	x24p	x24o
x1p	1						
x1o	**0.4398**	1					
	0.0003						
x20p	0.4843	0.3577	1				
	0.0001	0.0037					
x20o	0.2811	0.7759	**0.4356**	1			
	0.0245	0.0000	**0.0003**				
x20f	0.5611	0.4469	**0.7472**	0.5145	1		
	0.0000	0.0002	**0.0000**	0.0000			
x24p	0.4658	0.4061	0.5548	0.3930	0.4342	1	
	0.0004	0.0023	0.0000	0.0033	0.0010		
x24o	0.2038	0.3912	0.3953	0.4812	0.2935	**0.6556**	1
	0.1393	0.0034	0.0031	0.0002	0.0313	**0.0000**	

Note: **bold → between perspectives, underlined → within perspectives*

Table 5a: correlation between time preference measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	nonstatp	nonstato	nonstatf	varp	varo	inconsp	inconso	inconsf
nonstatp	1							
nonstato	**0.3500**	1						
	0.0046							
nonstatf	**0.7503**	0.3757	1					
	0.0000	0.0022						
varp	0.6258	0.2462	0.5058	1				
	0.0000	0.0728	0.0001					
varo	0.1988	0.3831	0.0728	**0.3960**	1			
	0.1496	0.0042	0.6009	**0.0030**				
inconsp	-0.4815	-0.1534	-0.3547	0.3823	0.2094	1		
	0.0002	0.2683	0.0085	0.0043	0.1285			
inconso	-0.0593	-0.3317	-0.1983	0.2264	0.7444	**0.3248**	1	
	0.6699	0.0143	0.1505	0.0996	0.0000	**0.0166**		
inconsf	-0.1553	-0.1323	-0.4982	0.4959	0.3247	**0.7413**	0.4273	1
	0.2621	0.3403	0.0001	0.0001	0.0166	**0.0000**	0.0013	

Note: **bold → between perspectives, underlined → within perspectives*

Table 5b: correlation between absolute time preference measures

	(1) abs_nonstatp	(2) abs_nonstato	(3) abs_nonstatf	(4) abs_varp	(5) abs_varo	(6) abs_inconsp	(7) abs_inconso	(8) abs_inconsf
abs_nonstatp	1							
abs_nonstato	**0.4436**	1						
	0.0002							
abs_nonstatf	**0.6849**	0.3738	1					
	0.0000	0.0023						
abs_varp	0.4733	0.1617	0.2852	1				
	0.0003	0.2428	0.0366					
abs_varo	-0.0832	0.1298	0.1267	**0.1872**	1			
	0.5499	0.3497	0.3614	**0.1753**				
abs_inconsp	0.3957	0.3801	0.2166	0.2184	0.1467	1		
	0.0031	0.0046	0.1157	0.1126	0.2899			
abs_inconso	-0.0717	0.1954	0.0684	0.0445	-0.6340	**0.3080**	1	
	0.6066	0.1568	0.6233	0.7492	0.0000	**0.0235**		
abs_inconsf	0.2412	0.3465	0.4271	0.2826	0.3078	**0.6803**	0.3811	1
	0.0789	0.0103	0.0013	0.0384	0.0236	**0.0000**	0.0045	

Note: **bold → between perspectives, underlined → within perspectives*

Table 6: correlation between risk aversion binary variables

	(1) dra1p	(2) dra1o	(3) dra24p	(4) dra24o
dra1p	1			
dra1o	**0.6667**	1		
	0.0000			
dra24p	0.4494	0.3430	1	
	0.0007	0.0111		
dra24o	0.3538	0.6308	**0.5558**	1
	0.0087	0.0000	**0.0000**	

Note: **bold → between perspectives, underlined → within perspectives*

Table 7: correlation between ambiguity aversion binary variables

	(1) daa1p	(2) daa1o	(3) daa24p	(4) daa24o
daa1p	1			
daa1o	**0.7225**	1		
	0.0000			
daa24p	0.2965	0.2946	1	
	0.0295	0.0306		
daa24o	0.2622	0.3269	**0.5941**	1
	0.0555	0.0159	**0.0000**	

Note: **bold → between perspectives, underlined → within perspectives*

Table 11: correlation between time preference binary variables [0]

	(1) dstatp	(2) dstato	(3) dstatf	(4) dinvarp	(5) dinvaro	(6) dconsp	(7) dconso	(8) dconsf
dstatp	1							
dstato	**0.4891**	1						
	0.0000							
dstatf	**0.7107**	0.4841	1					
	0.0000	0.0001						
dinvarp	0.2946	0.1052	0.1444	1				
	0.0306	0.4489	0.2977					
dinvaro	0.1917	0.1958	0.2740	**0.2257**	1			
	0.1649	0.1559	0.0450	**0.1007**				
dconsp	0.4152	0.1958	0.1989	0.4487	0.2552	1		
	0.0018	0.1559	0.1494	0.0007	0.0626			
dconso	0.1917	0.1958	0.1238	0.1514	0.6276	**0.3297**	1	
	0.1649	0.1559	0.3725	0.2744	0.0000	**0.0149**		
dconsf	0.2740	0.2309	0.3633	0.4553	0.2517	**0.7024**	0.3269	1
	0.0450	0.0930	0.0069	0.0005	0.0663	**0.0000**	0.0159	

Note: **bold → between perspectives, underlined → within perspectives*

Table 12: correlation between time preference binary variables [-1, 1]

	(1) dstatp1	(2) dstato1	(3) dstatf1	(4) dinvarp1	(5) dinvaro1	(6) dconsp1	(7) dconso1	(8) dconsf1
dstatp1	1							
dstato1	**0.4611**	1						
	0.0001							
dstatf1	**0.6342**	0.3841	1					
	0.0000	0.0017						
dinvarp1	0.3173	0.1742	0.2226	1				
	0.0194	0.2078	0.1057					

dinvaro1	0.0745	0.2433	0.1508	**0.3068**		1			
	0.5922	0.0762	0.2765	**0.0240**					
dconsp1	0.4750	0.3174	0.2444	0.3173	0.1491		1		
	0.0003	0.0194	0.0749	0.0194	0.2820				
dconso1	-0.0083	0.1295	-0.0140	0.0570	0.5571	**0.2159**		1	
	0.9525	0.3505	0.9200	0.6824	0.0000	**0.1169**			
dconsf1	0.3250	0.3174	0.3961	0.3173	0.0745	**0.6250**	0.1412		1
	0.0165	0.0194	0.0030	0.0194	0.5922	**0.0000**	0.3085		

Note: **bold → between perspectives, underlined → within perspectives*

Table 13: Regression absolute time preference measures (extended)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	abs_nonstat	abs_nonstat	abs_nonstat	abs_var	abs_var	abs_var	abs_incons	abs_incons	abs_incosn
other	**-1.109375**	**-1.109375**	**-1.89579**	**0.259259**	**0.259259**	**0.4105004**	**0.3148148**	**0.3148148**	**-0.0786211**
	0.039	0.034	0.021	0.677	0.682	0.687	0.587	0.583	0.928
future	**-0.390625**	**-0.390625**	**-0.5536557**	**.**	**.**	**.**	**0.2222222**	**0.2222222**	**0.1733521**
	0.465	0.453	0.488	.	.	.	0.701	0.698	0.838
Female		.7562406	.7704824		-.2531436	-.3746709		.2792288	.2484045
		0.108	0.105		0.722	0.601		0.595	0.637
Age		.0027608	.0014056		-.0072502	-.0047979		-.029866	-.0296676
		0.903	0.951		0.825	0.886		0.217	0.221
Need_money1		.3687973	.3493463		.0376952	-.0310123		.3515158	. 3457114
		0.003	0.005		0.868	0.893		0.037	0.044
Need_money24					-.0047846	.021274		-.3318949	-.3289158
					0.983	0.926		0.050	0.055
Dra1			.1584404			-1.155743			.3916093
			0.853			0.311			0.669
Daa1			-1.21124			-.5124522			-1.54051
			0.105			0.591			0.061
Dra24						1.468414			
						0.287			
Daa24						-.0823483			
						0.933			
Other*dra1			-.0420153			.4090045			-1.383958
			0.972			0.813			0.283
Other*daa1			1.528036			2.557119			1.556955
			0.148			0.059			0.178
Other*dra24						-3.051208			
						0.109			

Other*daa24						-1.785911			
						0.198			
Future*dra1			-.791835						-1.128107
			0.504						0.378
Future*daa1			.6893481						.6886424
			0.513						0.552
constant	2.359375	0.7501866	1.455439	2.296296	2.463796	2.919612	2.203704	2.951905	3.626259
	0.000	0.420	0.171	0.000	0.090	0.067	0.000	0.008	0.003
Controls (demographics)	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Controls (risk and ambiguity)	No	No	Yes	No	No	Yes	No	No	Yes
Observations	192	192	192	108	108	108	162	162	162

Table 15: Logistic regressions binary time preference variables (extended)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	dstat	dstat	dstat	dinvar	dinvar	dinvar	dcons	dcons	dcons
other	**0.7018532**	**0.7426793**	**1.165056**	**-0.222528**	**-0.2252553**	**-0.2536943**	**3.39e-16**	**-1.56e-17**	**-0.1147869**
	0.065	0.058	0.065	0.564	0.561	0.697	1.000	1.000	0.848
future	**0.1957446**	**0.2079237**	**0.2407295**	**.**	**.**	**.**	**-0.150073**	**-0.1551241**	**-0.1609622**
	0.588	0.577	0.671	.	.	.	0.699	0.694	0.754
Female		-.3535759	-.3460531		-.0354047	.0145171		-.1130218	-.1159136
		0.299	0.317		0.936	0.975		0.755	0.754
Age		-.012046	-.0129066		.0039611	-.0086256		.0346753	.035032
		0.476	0.452		0.846	0.696		0.038	0.041
Need_money1		-.2678965	-.2829165		.1478397	.1394137		-.0458952	-.0730042
		0.003	0.002		0.301	0.363		0.691	0.535
Need_money24					-.1378197	-.1490622		.1363521	.1587935
					0.332	0.328		0.238	0.180
Dra1			-.9417925			.2254674			-1.298789
			0.126			0.761			0.060
Daa1			.588066			.2225926			.3291025
			0.275			0.716			0.571
Dra24						-1.240547			
						0.178			
Daa24						-.0055794			
						0.993			

Other*dra1			.9168167			.2724299			1.230704
			0.322			0.811			0.186
Other*daa1			-1.282267			-1.777201			-.4179054
			0.110			0.052			0.604
Other*dra24						1.627848			
						0.202			
Other*daa24						.9894193			
						0.290			
Future*dra1			.8138467						.9978896
			0.338						0.285
Future*daa1			-.451722						-.5091109
			0.553						0.532
constant	0.315081	1.719.095	1.736.532	0.074108	0.2593496	.4233018	-0.14842	-1.43907	-1.260818
	0.213	0.014	0.028	0.786	0.769	0.683	0.587	0.057	0.132
Controls (demographics)	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Controls (risk and ambiguity)	No	No	Yes	No	No	Yes	No	No	Yes
Observations	192	192	192	108	108	108	162	162	162