

# Pre-analysis plan: Intertemporal Universalism

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## 1 Introduction

Many economic and policy decisions involve trade-offs between the well-being of individuals present today and that of individuals living in the future. Enke et al. (2022) introduces the concept of *moral universalism*, defined as the extent to which individuals exhibit the same level of altruism and trust towards strangers as they do to in-group members. Building on this framework of altruism, our study aims to measure *intertemporal universalism*, which refers to the extent to which people exhibit similar levels of altruism towards strangers who live and enjoy material benefits at different moments of time. In this study, we focus on the present and the future (rather than the past). Our experiment is designed to rigorously vary the dates at which subjects participate in the study and receive payments. This work naturally raises new questions about what individuals perceive as a fair way to allocate resources between strangers who are present and paid at different points in time.

## 2 Design

The experiment is made up of three parts. It involves no deception.

**Part 1 - Allocation Decisions.** In this part, we ask subjects to split a fixed amount of money between two strangers for which we exogenously vary the *date of participation* in the experiment

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and the *date of payment*. Precisely, each subject takes the four allocations decisions listed below. At the end of the experiment, we randomly select one of the four decisions and truly implement the allocation decided by the subject. In particular, when the allocation involves strangers who are paid and/or recruited in the future, we effectively recruit and/or pay the individuals as announced.

Between subjects, we will consider at least two future dates, namely in 6 months and in 12 months. If budget allows, we may also consider a 18-months horizon. We list below the allocation decisions for a 6-months time horizon, as an example. Regarding notations, each allocation decision will be described by four letters: two letters for each stranger; for each stranger, the first letter will correspond to the date of his/her participation, and the second letter to the date of his/her payment; *T* will stand for *Today* and *6* for *in 6 months*.

Subjects must decide how to split a fixed amount of money between:

- An individual who participates in the experiment today and is paid today VS another individual who participates in the experiment today and is paid today - This is the *TTTT* allocation.
- An individual who participates in the experiment today and is paid today VS another individual who participates in the experiment today and will be paid in 6 months - This is the *TTT6* allocation.
- An individual who participates in the experiment today and is paid today VS another individual who will participate in the experiment in 6 months and will be paid in 6 months - This is the *TT66* allocation.
- An individual who participates in the experiment today and will be paid in 6 months VS another individual who will participate in the experiment in 6 months and will be paid in 6 months - This is the *T666* allocation.

The four decisions are summarized in Table 1 which also details whether the two strangers involved share the same participation date and payment date.

The *TTTT* allocation decision always comes first. Next, we randomize the order of the three following allocation decisions. As in Enke et al. (2022), these decisions are all taken with a slider

	Strangers <i>participate</i> at the same time	Strangers are paid at the same time
TTTT	✓	✓
TTT6	✓	x
T666	x	✓
TT66	x	x

Table 1: Summary of allocation decisions

that subjects can move from the individual on the right of the screen to the individual on the left of the screen. Whether a given individual appears on the right or on the left is also randomized.

**Part 2 - Understanding Part 1 Decisions.** The purpose of Part 2 is to better understand what determined subjects allocation decisions of Part 1. To do that, we use two types of questions.

First, we use the *Inclusion of the Other in the Self* (IOS) scale (Aron et al., 1992) to measure how close subjects feel to the type of individuals they have allocated money to. Precisely, we ask the following three questions (using again the 6-months horizon as an example):

- Which of the following pictures best describes how close you feel to another individual who participates in the experiment today and is paid today?
- Which of the following pictures best describes how close you feel to another individual who participates in the experiment today and will be paid in 6 months?
- Which of the following pictures best describes how close you feel to another individual who will participates in the experiment in 6 months and will be paid in 6 months?

The set of pictures is given in Figure 1 below.

Second, we ask subjects to briefly explain two of their allocation decisions, namely the ones which kept fixed either the participation date or the payment date of the two strangers. The two questions, presented in random order, are the following. The exact formulation depends on the allocation decisions effectively taken by the subjects in Part 1.

- When you decided how to split money between two individuals participating in our experiment today, you gave more money / less money / the same amount of money [*this depends on the true decision taken by the subject in the TTT6 allocation*] to the individual paid today than to the individual paid in 6 months. Could you tell us why in a few words?

- When you decided how to split money between two individuals paid in 6 months, you gave more money / less money / the same amount of money [*this depends on the true decision taken by the subject in T666*] to the individual participating today than to the individual participating in 6 months. Could you tell us why in a few words?

**Part 3 - Final Questionnaire.** In the last part, subjects answer a sociodemographic questionnaire asking for their gender, age, marital status, whether they have children, income range and educational attainment. We also use four statements to get subjects' general attitude towards the future and future generations.

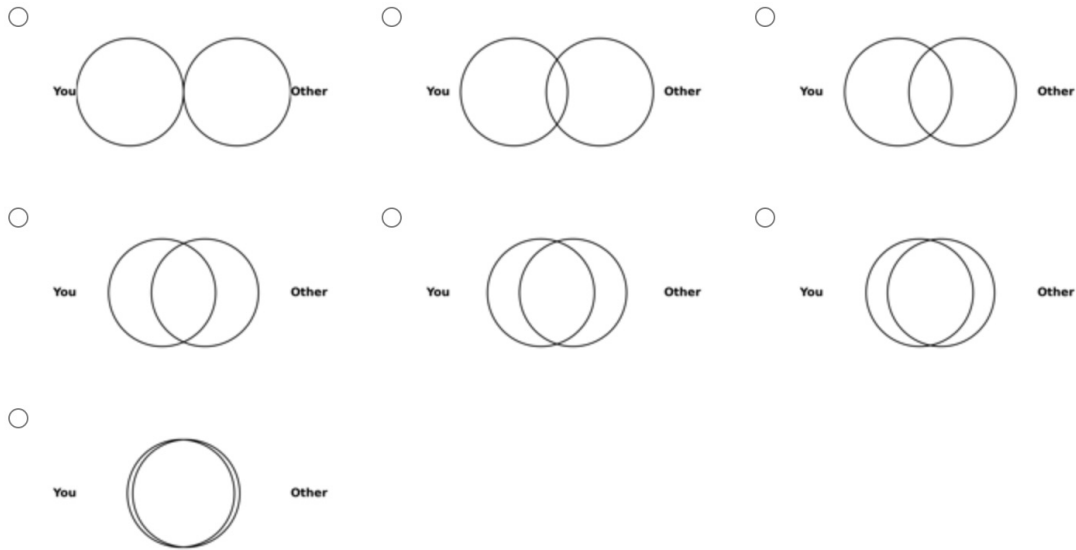


Figure 1: IOS

### 3 Main Hypotheses

The main hypothesis is that the time at which strangers participate in the experiment and the time at which they are paid impact the allocation decisions. More specifically, we make three hypotheses:

*Hypothesis 1: Conditional on the strangers being paid at the same date, subjects allocate more money to the strangers who participate in the experiment in the present than to the strangers who participate in the future.*

The idea behind this hypothesis is that subjects have a higher level of altruism towards strangers who participate in the experiment on the same day as they do than towards strangers who participate at a later date. One possible reason is that subjects feel socially closer to strangers who participate today, as they themselves do.

*Hypothesis 2: Conditional on the strangers participating in the experiment at the same date, subjects allocate more money to the strangers who are paid in the present than to the strangers who are paid in the future.*

The idea behind this hypothesis is that subjects value a stranger's payment more when it is done in the present than in the future.

*Hypothesis 3: Subjects allocate more money to the strangers who are paid and participate in the experiment in the present than to strangers who are paid and participate in the future.*

This hypothesis results from combining the effects of Hypothesis 1 and 2.

For each hypothesis, we additionally expect that the allocations will be more unequal for more distant future dates.

**A note on fairness.** It is important to note that subjects may have concerns about fairness when they allocate money between two strangers. Subjects could hold different views of what is a fair allocation when money is allocated to different people over time. One possibility is that subjects consider that a fair allocation is an equal split, independent of when the two strangers are paid (for example, because they consider that being paid in the present or in the future is random in the first place). Another possibility is that subjects consider fair an allocation which gives the same amount of money to the two strangers from the point of view of the present. If money is discounted over time, subjects should allocate more money to strangers who are paid later than to strangers who are paid today. Considering the latter view of intertemporal fairness, Hypothesis 2 would go in the opposite direction.

## 4 Data and Analysis

**Data.** Our dataset consists of the following main variables.

1. For each of the four allocation decisions, the amounts allocated to each stranger. For instance, in allocation  $TTT6$ , we will denote  $TTT6_{TT}$  the amount allocated to the stranger participating and paid today and  $TTT6_{T6}$  the amount allocated to the stranger participating today but paid in 6 months.
2. For each of the four allocation decisions, the stranger who was allocated more money.
3. For each of the four allocation decisions, a dummy variable that states whether the *time of payment* is the same or different for the two strangers involved, and a dummy variable that states whether the *time of participation* is the same or different for the two strangers involved (see Table 1).
4. For each subject, the order in which the allocation decisions appear.

**Analysis.** We will test the hypotheses described in Section 3 as follows:

H1 (Effect of *participation date*): To examine the validity of Hypothesis 1, we will analyze decisions in the  $T666$  allocation. In particular, we will check if:

- On average, the allocation given to T6 is larger than the allocation given to 66, using Wilcoxon matched-pairs signed-rank tests. (Alternatively, we can use t-tests to evaluate whether the difference between the two amounts is different from 0.)
- It is more frequent to see subjects give more to T6 than to 66, using proportion tests.

We will also check whether  $TTT6_{TT} > TT66_{TT}$ . Said differently, we will compare the amount allocated to TT *across* the allocation decisions which keep constant the time of payment but vary the time of participation.

H2 (Effect of *payment date*): To examine the validity of Hypothesis 2, we will analyze decisions in the  $TTT6$  allocation. In particular, we will check if:

- On average, the allocation given to TT is larger than the allocation given to T6, using Wilcoxon matched-pairs signed-rank tests. (Alternatively, we can use t-tests to evaluate whether the difference between the two amounts is different from 0.)
- It is more frequent to see subjects give more to TT than to T6, using proportion tests.

We will also check whether  $TTTT_{TT} > TTT6_{TT}$ . Said differently, we will compare the amount allocated to TT *across* the allocation decisions which keep constant the time of participation but vary the time of payment.

H3 (Joint effect): To examine the validity of Hypothesis 3, we will analyze decisions in the  $TT66$  allocation. In particular, we will check if:

- On average, the allocation given to TT is larger than the allocation given to 66, using Wilcoxon matched-pairs signed-rank tests. (Alternatively, we can use t-tests to evaluate whether the difference between the two amounts is different from 0.)
- It is more frequent to see subjects give more to TT than to 66, using proportion tests.

We will also check whether  $TTTT_{TT} > TT66_{TT}$ . Said differently, we will compare the amount allocated to TT *across* the allocation decisions for which both the time of participation and the time of payment vary.

We will repeat the analysis for the 12-months horizon.

In addition to statistical tests, we will use OLS regression analysis to estimate the effect of the dummy variables indicating whether strangers share or do not share participation and payment dates on the amounts given to the TT stranger.

We are also likely to do some further exploratory analyses to better understand what determined individuals' allocation decisions. For example, to examine whether social distance affects these decisions, we will use OLS regression analysis that includes the three responses from the IOS questionnaire (see Section 2, Part 2). To explore whether the impact of the timing of participation and payment on allocation decisions differs across age, gender, etc., we may also include demographic variables and answers to the final questionnaire.

Additionally, we may carry out a semantic analysis of the responses to the two open-ended questions, where participants were asked to briefly explain their allocation choices. The goal is to identify whether thematic clusters emerge, with participants providing similar explanations or justifications for their decisions.

**Sample Size.** We have run a pilot study with 80 subjects, 53 of them splitting money equally in TTTT.<sup>1</sup> To estimate the sample size necessary to uncover the hypothesized effects, we build on the decisions of these 53 subjects. By construction, the average amount given in  $TTTT_{TT}$  is 1.5 (SD=0, N=53). The average amount given in  $TTT6_{TT}$  and  $TTT12_{TT}$  was 1.58 (SD=0.51, N=53). When comparing with  $TTTT_{TT}$ , this gives an effect size of 0.156. Assuming a type-I error rate of 0.05 and a power level of 0.8, the required sample size to detect the effect size of the *payment date* is 321 individuals.

The average amount given in  $TT66_{TT}$  and  $TT1212_{TT}$  was 1.73 (SD=0.54, N=53). When comparing with the average amount given in  $TTT6_{TT}$  and  $TTT12_{TT}$ , this gives an effect size of 0.202. Assuming a type-I error rate of 0.05 and a power level of 0.8, the required sample size to detect the effect size of the *participation date* is 195 individuals.

Overall, the highest number of subjects required is thus 321. To be on the conservative side, we round this number to 400 subjects for each of the time horizons we will consider.

**Additional Comments.** In the analysis, we plan to have a particular focus on individuals who split money equally in the first allocation decision ( $TTTT$ ).

In a second study (which we will pre-register separately if we run it), we plan to consider the same four allocation decisions with longer time horizons such as 5 years and 10 years. In this case, we will consider hypothetical allocation decisions. Again, this study will involve no deception, so subjects will be made aware that decisions are hypothetical.

## References

- Aron, A., Aron, E. N., and Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of personality and social psychology*, 63(4):596.
- Enke, B., Rodriguez-Padilla, R., and Zimmermann, F. (2022). Moral universalism: Measurement and economic relevance. *Management Science*, 68(5):3590–3603.

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<sup>1</sup>This pilot had been pre-registered on AsPredicted #204395.