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Collective intertemporal decisions and heterogeneity in groups *

Daniela Glätzle-Rützler[§], Philipp Lergetporer[#] and Matthias Sutter[$,†]

[§] Department of Public Finance, University of Innsbruck

[#] Center for the Economics of Education, ifo Institute Munich, and CESifo

[$] Max Planck Institute for Research on Collective Goods, University of Cologne, University of Innsbruck and IZA Bonn

Abstract

Many important intertemporal decisions are made by groups rather than individuals. What happens to collective decisions when there is internal conflict about the tradeoff between present and future has not been thoroughly investigated so far. We study experimentally the causal effect of group members' heterogeneous payoffs from waiting on intertemporal choices. We find that three-person groups behave more patiently than individuals. This effect stems from the presence of at least one group member with a high payoff from waiting. We analyze additional treatments, group chat content, and survey data to uncover the mechanism through which heterogeneity in groups increases patience.

Keywords: patience, time preferences, group decisions, payoff heterogeneity, experiment

JEL classification: C91, C92, D03, D90

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† Corresponding author. Max Planck Institute for Research on Collective Goods, Kurt-Schumacher-Strasse 10, 53113 Bonn, Germany. e-mail: Matthias.sutter@coll.mpg.de

1. Introduction

Many important intertemporal decisions are made by groups of decision-makers rather than individuals: Boards of directors decide upon their firms' investment strategies, household members collectively take savings or educational decisions, real estate heirs jointly decide on renovation investments, and teams of officials negotiate international treaties for climate protection. A priori, it is unclear how group members negotiate collective intertemporal decisions because waiting might pay off more for some group members than for others: For instance, a family's collective decision to send the offspring to college might yield different payoffs for the parents than for the child or her siblings; a firm's investment decision might generate different returns for managers than for shareholders[1], and a research team's investment into a publication might have different consequences for co-authors with and without tenure.[2] The presence of heterogeneous payoffs across group members in many situations casts doubt on the validity of the classic approach to model firms and other organizations as a single "representative agent" taking intertemporal decisions. The intra-group tensions which arise from group members' heterogeneous payoffs from waiting raise an important empirical question: How do group members with heterogeneous payoffs for waiting negotiate one collective intertemporal decision? This is exactly the question we address in this paper.

In a laboratory experiment with a total of 753 individual subjects, we study intertemporal decisions of groups and which features drive their choices. As a control, we also compare groups to individuals. The experimental group decision literature so far has largely abstracted from within-group heterogeneity by imposing homogeneous payoffs across group members (see, e.g., Charness and Sutter, 2012, Kugler et al., 2012, and Kocher et al., 2020, for surveys). Since payoffs from waiting often differ across group members in reality, our contribution is to study the *causal* effect of heterogeneity in group members' payoffs from waiting on collective intertemporal decisions. We use a simple choice-list task in which subjects face twenty binary decisions between a fixed immediate payoff and a later payoff that increases monotonically along the list. We implement a novel experimental design that allows us to study behavioral changes between individual- and group decisions (within-subject) across several treatments (between-subject).[3] In a control treatment called *Single*, subjects take intertemporal decisions in isolation. In three main treatments with three-person groups, group members have to

[1] For instance, when managers face incentives for short-term results (e.g., Narayana, 1985).

[2] Even if the nominal payoff for different group members is identical, real payoffs from waiting might vary across individuals if they have different discount rates (see Wang et al., 2016, and Falk et al., 2018, for recent evidence that individual discount rates vary widely across and within countries).

[3] That is, in the group treatments, we measure individual patience of all subjects before eliciting group decisions.

coordinate their choices in all twenty binary decision problems on the list. To facilitate coordination, we implement an anonymous real-time chat. In the first group treatment, all group members are given the same choice list as in treatment *Single*, which allows us to start with a comparison of individual decisions and group decisions with homogeneous payoffs from waiting. From there we induce heterogeneity in the next treatments by assigning group members different choice lists such that some members benefit a lot from waiting, while others have only very small gains when they wait for the future payoff. In the second group treatment, a majority of two group members has high payoffs from waiting, and one member has low payoffs from waiting. A possible increase in patience of the group member with low payoffs from waiting in this group-decision environment might be due to the dominance of the majority. To study the role of majority dominance more closely, a majority in the third group treatment has low payoffs from waiting, and only one group member has high payoffs from waiting. The exogenous variation in individual payoffs from waiting induced by these different choice lists allow us to identify the causal effect of heterogeneous payoffs from waiting on collective intertemporal decisions, and the underlying mechanisms, in a controlled laboratory environment.[4]

Comparing treatment *Single* to the first group treatment with homogeneous payoffs, we find that collective decisions are more patient than individual ones. Our subgroup analysis shows that increased patience in homogeneous groups is entirely driven by groups with at least one very patient member. This finding replicates in two additional control treatments in which homogeneous groups coordinate their choices on choice lists with either only very high or only very low payoffs from waiting. Turning to the causal effect of heterogeneous payoffs from waiting, the second group treatment shows that collective decisions are significantly more patient than average individual ones. This is because the number of patient choices of the group member with a low payoff from waiting converges to the level of the two group members for whom waiting pays off more. Most importantly, we find the same pattern when waiting pays off little for the majority of group members: In the third group treatment, the two group members with relatively low later payoffs increase their number of patient choices to the level of the group member with high payoffs from waiting. Thus, groups follow the heuristic to adopt their most patient member's choice as the group decision, even if the most patient group

[4] Our random assignment of payoffs from waiting to individuals resembles what Schaner (2015) calls "the experimental ideal" of randomly assigning discount factors to individuals.

member is a minority. This implies that the presence of one group member who is prepared to wait (for a high payoff) can be sufficient to increase collective patience in three-person groups.[5]

Our experimental design allows us to investigate different channels through which the group decision process increases collective patience. First, we add two additional treatments to investigate the role of communication within groups more carefully. We find that communication alone (where subjects can chat with others but still make individual choices) does not drive the overall increase in patience in collective decisions. This suggests that the need to negotiate one collective group decision (which affects group members' payoffs in different ways) is a necessary condition for our main results. Second, our content analysis of the chat logs and the post-experimental survey reveals that members with high payoffs from waiting are more likely to prompt other group members to adapt their choices towards more patience, and such prompts are more often accepted.

This paper contributes to several strands of economic research. It adds to the well-developed empirical and experimental literature on group decision making. This literature has shown that groups are more sophisticated, more rational in a standard game-theoretic sense, and more inclined to unethical behavior than individual decision-makers (e.g., Charness and Sutter, 2012; Kocher et al., 2018, 2020). So far, however, this literature has mostly imposed payoff homogeneity within groups. We extend this strand of research by comparing individual- and group decisions with and without within-group payoff heterogeneity in the domain of intertemporal choice.

Our study is also related to the multilateral-bargaining literature, which traditionally investigates how group members with conflicting preferences divide fixed resources among them (e.g., Baron and Ferejohn, 1989; Bolton et al., 2003). While this literature focuses on a different collective decision problem than we do (dividing resources versus taking a collective investment decision), our design resembles different features of the multilateral-bargaining literature. For instance, there are papers that exogenously induce some form of heterogeneity across agents (e.g., by randomly selecting a proposer, or by assigning asymmetric voting power, discount factors, or disagreement values; see Miller et al., 2018, for a discussion), which is similar to our treatments with heterogeneous payoffs from waiting. Furthermore, although most papers focus on simple majority decision rules, some studies investigate bargaining under unanimity rule (e.g., Miller and Vanberg, 2013; Agranov and Tergiman, 2019), which

[5] Comparing patient choices across the different group treatments, we find suggestive evidence that the number of patient choices increases more in groups with heterogeneous payoffs from waiting than in homogeneous groups. This suggests that diversity in groups (with respect to group members' payoffs from waiting) can induce more forward-looking collective decisions.

resembles our collective-decision process. Also, some multilateral-bargaining papers investigate non-constant-sum bargaining situations, which is similar to the collective investment decisions which we study (e.g., Hsu et al., 2008). While our work is related to this strand of research, we are different from it by studying negotiation of collective *intertemporal* decisions with conflicting time preferences among group members.

Our paper is also related to studies on the determinants of patience. This literature has investigated a vast array of potential determinants, such as gender, age, cognitive ability, culture, agricultural history, language, or education (e.g., Carroll et al., 1994; Bettinger and Slonim 2007; Dohmen et al., 2010; Chen, 2013; Galor and Özak, 2016; Alan and Ertac, 2018; Falk et al., 2018; Sutter et al., 2018). We complement this literature by studying heterogeneous group decision environments as determinants of collective patience.

The literature closest to our paper is the small set of papers that investigate intertemporal decision making in groups. Denant-Boemont et al. (2016) compare subjects' individual time preferences to collective decisions in five-person groups. Using a voting mechanism to coordinate group decisions, they find that groups make more patient and more time-consistent choices. Relatedly, Shapiro (2010) compares intertemporal decisions between individuals, pairs, and groups of four and finds that groups, but not pairs, are more patient than individuals. Carlsson et al. (2012) present an artefactual field experiment in which spouses first take individual intertemporal decisions and then decide jointly with the other spouse. They find that the degree of patience in joint decisions reflects a compromise between wives' and husbands' preferences. Focusing on the consequences of heterogeneous time preferences within households, Schaner (2015) documents that couples who are poorly matched on discount factors take more inefficient savings decisions. Adams et al. (2014) explore the sources of time inconsistencies in household choice and find that couples' inconsistencies in intertemporal decisions can be largely explained by heterogeneous discount factors. Beyond replicating the finding that groups tend to be more patient than individuals, the main innovation of our paper is that we exogenously induce heterogeneities in group members' payoffs from waiting. This allows us, for the first time, to show that the established dominance of more patient group members in group decisions can be *causally* attributed to their higher payoffs from waiting, as opposed to other dimensions in which more patient individuals may differ from less patient ones.[6]

[6] Note that our finding that the dominance of patient group members can be causally attributed to their payoffs from waiting is not obvious ex-ante: One could imagine that patient individuals differ in other dimensions than payoffs from waiting, such as cognitive or other non-cognitive skills (Dohmen et al., 2010), which might help them prevail in the group negotiations.

While some theoretical papers study collective intertemporal decision making with heterogeneous time preferences across group members (e.g., Gollier and Zeckhauser, 2005; Jackson and Yariv, 2015)[7], we are only aware of one empirical paper that also investigates collective intertemporal choices with exogenously induced, heterogeneous payoffs from waiting: Jackson and Yariv (2014) investigate the choices of social planners who take intertemporal decisions on behalf of groups of individuals with randomly assigned discount factors and show that the majority of social planners is present biased. Note that our paper has a different focus: Instead of studying social planners who choose consumption streams for *other* subjects with heterogeneous discount factors, we investigate intertemporal group decisions with heterogeneous payoffs from waiting and therefore are able to examine how heterogeneity in payoffs affects the level of future-oriented choices. Note that our experiments are not designed to test which theoretical model on collective intertemporal decision making describes our data best.

Finally, our paper is related to a longer research tradition in economics that compares risky choices between individuals and groups (e.g., Baker et al., 2008; Masclet et al., 2009; Zhang and Casari, 2012; Harrison et al, 2013). Results from this literature appear somewhat mixed, with some studies finding that groups take less risk than individuals, whereas other studies find null results or the opposite. Interestingly, Zhang and Casari (2012) study conflict in risky group decisions using a coordination mechanism with unanimity rule that is similar to ours and find that extrovert subjects are more likely to dominate the group-decision process. While this strand of literature investigates the role of heterogeneous risk preferences within groups, we are not aware of any study that exogenously varies payoffs from risky decisions as we do in the context of intertemporal decisions.

The remainder of the paper is structured as follows. Section 2 introduces the experimental design and procedure. Section 3 presents our results and Section 4 concludes.

[7] Gollier and Zeckhauser (2005) demonstrate that a representative agent has a decreasing discount rate when all of a group's members have heterogeneous constant discount rates and decreasing absolute risk aversion preferences. Moreover, Jackson and Yariv (2015) show that the aggregation of heterogeneous preferences over consumption streams in a non-dictatorial manner that respects unanimity leads to time inconsistencies or intransitivities.

2. Experimental Design and Procedure

2.1 Elicitation of time preferences

We use a standard choice list task to elicit time preferences (e.g., Coller and Williams, 1999). The choice list comprises twenty binary decisions between receiving 10.10 Euros right after the experimental session and receiving a larger payoff in four weeks. As Figure 1 illustrates, the later payoff increases monotonically along the list by an amount of x. We take the number of patient choices, i.e. the number of times a subject decides to wait for the later payoff, as our measure of time preferences.[8]

To induce different payoffs from waiting, we use three different choice lists which vary in the size of x, the amount by which the later payoff increases along the list. In our standard choice list (which we call "intermediate"), x is set to 0.30 Euros. This means that moving down one line in the choice list increases the later payoff by 0.30 Euros. In choice lists "high" and "low", x is set to 0.50 Euros and 0.10 Euros, respectively (see Figure 2 for a depiction of the choice lists). Depending on the treatment, subjects are assigned to choice lists "intermediate", "high", or "low".

Figure 1 and Figure 2 about here

The experiment consists of two parts, Part A and Part B, and subjects complete one choice list in each part. In Part A, all subjects take the twenty binary decisions individually. Part B uses the same set of 20 decisions, but the decision-making process depends upon the treatments introduced below. At the end of each experimental session, one of the two parts, and one of the twenty choices within that part, is randomly selected for payment. At the beginning of the session, subjects are informed that the experiment consists of two parts and that only one part will be randomly selected for payment. Importantly, they learn the rules of Part B only after choices in Part A have been made (see Appendix B for experimental instructions).

2.2 Treatments

We implement six between-subject treatments (*Single*, *Group*, *HHL*, *LLH, LH,* and

[8] Using the number of patient choices has the advantage that it does not require arbitrary decisions on how to treat multiple switchers, i.e., subjects who switch back and forth along the choice list (see Angerer et al., 2015, for a discussion of different approaches to handle such cases, and for evidence that multiple switching is unrelated to subjects' comprehension). In our sample, the share of multiple switchers is very low at 1 percent. Excluding these subjects from our analysis does not change our qualitative results (results available upon request).

COMM) which differ in the choice lists assigned to subjects. Figure 3 illustrates the experimental design, and the experimental treatments are designed as follows:

Figure 3 about here

Single: In this treatment, all subjects complete the "intermediate" choice list individually in both parts of the experiment. We use this baseline treatment to net out potential effects of taking two consecutive intertemporal decisions when analyzing collective decisions in our three main group treatments.

Group: Here, in Part B subjects are randomly assigned to groups of three members each, and they all get the "intermediate" choice list, meaning that they have homogeneous payoffs from waiting. Part A of this treatment is identical to treatment *Single*, and the choice list used in part B is also identical between both treatments, but in treatment *Group* subjects must coordinate their intertemporal decisions and agree on a joint decision for each of the 20 choices (the procedure for agreement is described in the next subsection 2.3). Comparing the change in the number of patient choices between Part A and Part B across treatments *Single* and *Group* shows whether collective intertemporal decisions are more patient than individual ones.

HHL: In this treatment, at the beginning of Part A, 2/3 of all participants are randomly assigned to choice list "high" and 1/3 to choice list "low". Subjects are aware of this random assignment. In Part B three-person groups are formed randomly such that each group consists of two subjects with choice list "high" (H), and one subject with choice list "low" (L).[9] The choice lists with the precise payoffs and waiting times as well as the assignment to the choice lists ("high" or "low") are (i) common knowledge before the start of Part A, and (ii) kept constant within each subject across both parts (A and B).[10] That is, subjects take their decisions in both parts of the experiment on the same choice list, "high" or "low" (i.e., subjects never switch choice lists). The random assignment of the different choice lists induces an exogenous heterogeneity in individual payoffs from waiting.[11] Comparing the average number of patient

[9] Note that our analysis focuses on *changes* between Part A and Part B across treatments to study how different payoffs from waiting affect the group-decision process. While it is obvious that different choice lists (i.e., "intermediate", "low" and "high") produce different *levels* in average patience, these level effects are taken out in our first-difference regression analysis.

[10] The fact that we impose common knowledge about each group members' choice list enables us to causally attribute any difference in collective intertemporal decisions to the exogenously induced variation in group composition, and thereby abstract from uncertainty surrounding group members' payoff that might exist in everyday-life situations. We consider inducing uncertainty into our experimental setting an interesting avenue for future research (see section 4 for a discussion of this point).

[11] In fact, the number of patient choices is (quantitatively and statistically) significantly higher in choice list "high" than in choice list "low" ($p<0.01$, between subjects t-tests for decisions in Part A for treatments *LLH*, *HHL*,

choices in Part A with the group decision in Part B reveals what types of group members, with respect to their payoffs from waiting, determine group decisions. Note that the majority of group members in this treatment (those two with choice list "high") has relatively high incentives to wait for the larger payoff in the future. Thus, if group decisions are purely driven by majority rule, we should expect that the number of patient decisions should increase from Part A to Part B.

LLH: This treatment is identical to treatment *HHL*, with the exception that waiting pays off little for the majority: two out of three group members are assigned to choice list "low", and only one is assigned to choice list "high". If majority preferences determine group decisions, the number of patient choices should decrease from Part A to Part B in this treatment.

HL and ***COMM***: To investigate the effect of within-group communication on patience, we conducted two additional treatments, *HL* and *COMM*. We decided to run these treatments in two-person groups to maximize power and to test whether our results from the above three-person treatments are robust in a two-person setting. In both treatments, one member of each group is randomly assigned to the "low" choice list, and one is assigned to the "high". Again, subjects complete their choice lists individually in Part A. In Part B of treatment *HL*, group members have to coordinate their choices using the mechanism outlined in section 2.3 below. Part B in treatment *COMM* is identical except for the fact that the necessity to coordinate choices within groups is abolished. That is, subjects can chat with each other for 3 minutes, but they make their decisions in Part B individually and thus do not need to coordinate their decisions on one single choice pattern.

2.3 The group decision-making process

In Part B, subjects are provided an anonymous real-time chat to coordinate group decisions. For each of the twenty binary decision problems, they have to coordinate on whether to choose

HL, and *COMM* respectively). Thus, our calibration successfully induced within-group conflict in group members' preferred number of patient choices. Moreover, we have checked for our heterogeneous group treatments whether the intended ordering of subjects' number of patient choices in Part A holds (i.e. that within groups subjects with the "low" choice list make less patient or at most as patient choices than subjects with the "high" choice list). In fact, 72.97 (64.86) percent of groups in treatment *HHL* (*LLH*) exhibit the intended ordering of the number of patient choices. This is significantly higher than the expected frequency of one third under the assumption of no responsiveness to the given choice list ($p<0.01$, chi-square tests). The same is true for our two-person treatments *HL* and *COMM* (introduced below), in which the number of patient choices of group members with choice list "low" is lower in 75 (79.17) percent of all cases ($p<0.01$, chi-square tests). Furthermore, excluding those groups in which choice list assignment did not produce the intended within-group ordering of patient choices in Part A from the analysis leaves our main findings intact (results available upon request).

the immediate payoff of 10.10 Euros, or the larger payoff in four weeks. In that sense, our group decision process most closely resembles situations in which group members have veto power.[12] The coordination mechanism works as follows:

Round 1: Each group member fills out her choice list and submits this proposal to the group. After all group members have submitted their proposals, they are displayed to the whole group. If the choice patterns on all three (two in two-person groups) choice lists match, Part B is finished. If they don't match, the group continues with round 2. Importantly, each subject's respective payoff is determined by her own choice list. That is, while subjects within a given group coordinate on a single choice pattern (for example, choosing the immediate payoff in rows 1-10 of the choice list, and the delayed payoff in rows 11-20), they receive payoffs according to their individual choice list "high" or "low". Thus, payoffs may differ between individuals within groups.

Round 2: Group members see the proposals of the previous (unsuccessful) round and have one minute to discuss how to coordinate their decisions in an anonymous free-form chat. We deliberately imposed a relatively unstructured group-decision process (e.g., with respect to the order of moves of the different group members) in order to resemble real-world group-decision processes as closely as possible.[13] To preserve group members' anonymity, we use chat names "Person A", "Person B", and "Person C" (in three-person groups) throughout all rounds of Part B.[14] Each group member sees all messages sent in the chat and can decide to leave the chat at any time. If one group member leaves the chat, the two remaining group members (in three-person groups) can keep on chatting until the time elapses or until they leave the chat. After the chat, each group member can privately update her proposal before submitting it again. If the choice patterns on all lists match, coordination is achieved. If not, the group continues with the next round.

Round > 2: The subsequent rounds are identical to round 2. The coordination mechanism

[12] While the extent to which different decision rules (e.g., unanimity, majority, or dictatorial decisions) are used to take collective decisions likely varies across specific applications, note that many such situations entail veto rights for group members.

[13] See, e.g., Tremewan and Vanberg (2016) for a discussion of structured versus unstructured multilateral bargaining experiments.

[14] The minimum number of subjects per session was 18, so that identification of other group members was practically impossible. In the chat protocols, we did not find a single case in which a person successfully revealed her identity. Thus, we can exclude the possibility that post-experimental side payments affect our results. Interestingly, there was one case in which one group member tried to influence group decisions by offering such side payments, but the other group members did not accept the offer.

continues until coordination is achieved.[15] After successful coordination, there is one final chat round.[16]

Our experimental design permits three within-person comparisons: First, comparing the number of patient choices between Part A and the final round of Part B ("*Part B final*", henceforth) gives the gross effect of taking intertemporal decisions in groups rather than individually. This gross effect can be decomposed into two parts: the effect of the collective decision environment without communication (comparing Part A to the first round of Part B ("*Part B first*", henceforth)), and the effect of communication in the collective decision environment (comparing *Part B first* to *Part B final*).[17] In the results section, we present these three comparisons separately to scrutinize the channels through which the coordination mechanism affects intertemporal choices.

2.4 Experimental procedure

The experiment was conducted between October 2016 and April 2017 at the Innsbruck-Econ-Lab. All sessions were computerized using z-Tree (Fischbacher, 2007). We used the software hroot (Bock et al., 2014) to recruit 555 university students for participation in our main experiments.[18] We had 18-24 subjects per session, depending on turnout. Table 1 shows the distribution of subjects across treatments. Each session lasted approximately 45 minutes, and average earnings per subject were 15 Euros, including 2 Euros for answering the post-experimental questionnaire.

Upon arrival, each subject was randomly assigned to one of the 24 workstations in the

[15] We did not set a fixed endpoint of the coordination mechanism because (i) the decision of where to set the endpoint is arbitrary, and (ii) this would change the strategic nature of the coordination mechanism. For instance, subjects could threaten (the) other group member(s) with deliberate miscoordination in the final round, especially if negotiation-breakdown values vary across group members (e.g., Miller et al., 2018). In that sense, our coordination mechanism is similar to the classic bargaining model by Rubinstein (1982), and its extension to more than two players by Baron and Ferejohn (1989). Note that no group in our experiment needed more than 5 rounds to reach an unanimous agreement.

[16] This final chat round was implemented to exclude the possibility that subjects deliberately miscoordinate in round 1 only to have the opportunity to chat with the other group members. Note that bargaining situations outside the laboratory usually entail the possibility of post-bargaining communication. Since the anticipation of post-experimental communication has been shown to influence strategic behavior (e.g., Xiao and Houser, 2005), we consider this final chat round a natural and important design feature. The final chat round was announced at the beginning of Part B.

[17] Of course, it might well be that a subject's proposals in *Part B first* is strategic in a sense that it is influenced by the prospect of chatting with the other group member(s) in the subsequent rounds (for instance, subjects might strategically submit extreme proposals in *Part B first* to improve their bargaining position in later rounds). Therefore, one should be cautious not to interpret the differences between Part A and *Part B first* respectively the one between *Part B first* and *Part B final* as isolated effects, but rather as two interdependent parts of the gross effect.

[18] We recruited 198 additional subjects for our robustness treatments (see section 3.1).

computer lab and the instructions of Part A were read aloud. Then, subjects had time to read the instructions and ask questions in private. After Part A was completed, we distributed the instructions of Part B, read them aloud, and answered questions privately.

After all decisions were made, and before subjects were informed what binary decision was randomly selected for payment, they completed a post-experimental questionnaire. Apart from standard background characteristics, we elicited subjects' self-assessed economic preferences (risk tolerance, patience, impulsiveness, and altruism) using experimentally validated survey questions from Falk et al. (2016). To scrutinize the (group) decision-making process, we also elicited subjects' explanations for how they reached their decisions and their perceived difficulty to reach a decision in Part A and Part B.

If a subject chose to receive 10.10 Euro today in the payoff-relevant binary decision, she received her payment in a sealed envelope at the end of the session. If instead, a subject chose the delayed payment in the relevant decision problem, subjects were free to either opt for a bank transfer or collect the payment at the department office.[19]

Table 1 about here

3. Results

3.1 Individuals versus groups with homogeneous and heterogeneous payoffs

We start this section by comparing individual choices to decisions made by groups with homogeneous payoffs for all group members. Table 2 presents mean patience levels by treatments. Columns 1, 2, and 3 display the average number of patient choices in Part A, *Part B first*, and *Part B final*, respectively, and columns 4-6 display the changes across parts as

[19] The recruitment email for the experiment informed potential participants about the possibility of later payments. In case the subjects opted for a bank transfer we covered bank transfer charges to assure that subjects would be paid exactly the amount they earned in the experiment. The department's secretary who conducted the delayed in-person payments was blind to the content of the experiment. To preclude the possibility that social image concerns influence decisions (e.g., Bursztyn and Jensen, 2017), each subject received a sealed envelope at the end of the experiment. Depending on whether a subject received the immediate or the delayed payment, the envelope either contained 10.10 Euro in cash, or a voucher for the later payment. Subjects were informed about this procedure before decisions were made. In the post-experimental questionnaire, we asked subjects whether they were confident to actually receive the money in four weeks if the later payment would turn out to be payoff-relevant. 97 percent of respondents answered this question affirmatively. This share was independent of subjects' treatments or choice lists, and dropping subjects who were not confident to receive the later payment from the analysis does not change our qualitative results (results available upon request).

indicated in the column headers.[20] Decisions in treatment *Single* are statistically indistinguishable between Part A (15.30 patient choices) and Part B (15.35 patient choices) showing that there is no repetition effect of making the same decisions twice.[21] In treatment *Group*, the number of patient choices increases from 15.72 in the individual decisions of Part A to 16.76 in the collective decisions of Part B. This increase of 1.04 patient choices is marginally significant (see column 6), and replicates earlier findings in the literature (e.g., Shapiro, 2010; Denant-Boemont et al., 2016).

Table 2 about here

Consistently, regressing the difference in the number of patient decisions between *Part B final* and Part A on treatment indicators (omitted reference category: *Single*) reveals a marginally insignificant effect of treatment *Group* (p=0.101, see column 1) that turns marginally significant once we control for respondents' background characteristics (p=0.062, see column 2).

Table 3 about here

Before turning to groups with exogenously imposed heterogeneity in payoffs from waiting, we briefly look into endogenously emerging differences across groups in treatment *Group* with its homogeneous payoffs. Interestingly, among *patient groups* (defined by the number of patient choices in Part A)[22], the collective decisions are significantly more patient than individual ones (18.5 versus 16.69; see Table 2), whereas this is not the case in *impatient groups*. Intriguingly, these results carry over to two additional control treatments with homogeneous groups *LLL* and *HHH*. In these control treatments with a total of 198 new subjects (run in fall 2020), all group

[20] Since Part B of treatments *Single* and *COMM* are individual decisions, *Part B first* is identical to *Part B final* in these treatments. In our non-parametric analysis we only use one observation per group. This is the most conservative approach to account for interdependence of choices within groups.

[21] Note that the implicit monthly discount rate of our subjects is relatively high; for instance 14.75/10.10-1 = 46.04 percent for those who switch from the immediate to the delayed payoff between rows 15 and 16 on the intermediate choice list. This is in line with the literature that has documented relatively high discount rates when eliciting patience using multiple price lists (e.g., Frederick et al., 2002; Andreoni and Sprenger, 2012a).

[22] We categorized groups as *patient* (*impatient*) if the number of patient choices of the most patient group member in Part A is above (below) the median across groups. According to this definition, 26 of the 37 groups are patient because they have at least one member who chose the later payoff in all twenty binary decisions of Part A. Reassurinly, our results are robust to alternative categorizations of *patient* and *impatient* groups. Furthermore, excluding those 8 groups which already reached an agreement in *Part B first* from the analysis does not change our qualitative results (details available upon request).

members were assigned to either the "low" or the "high" choice list.[23] Within these additional treatments, the overall increase in patience from Part A to *Part B final* is again entirely driven by *patient groups* (see Appendix Table A1).

While these findings provide robust evidence that group composition with respect to groupmembers' individual level of patience is related to collective intertemporal decisions, the subgroup analysis of *patient* and *impatient* groups is descriptive in the sense that the increase in patience between Part A and Part B among patient groups cannot be causally attributed to group members' payoffs from waiting.[24] Therefore, we now turn to the causal impact of exogenously induced heterogeneous payoffs from waiting on collective intertemporal decisions in treatments *HHL* and *LLH*.

Focusing first on the treatment *HHL*, in which we assigned two group members to choice list "high" and one group member to choice list "low", Table 2 shows that collective decisions are significantly more patient (16.54) than average individual ones (14.59; $p<0.05$). Distinguishing subjects by their choice lists' payoffs from waiting, the overall increase in patience is entirely driven by subjects with the "low" choice list who increase their number of patient choices by 6.41 to match the other two group members' choices. The latter, in turn, do not change their choices between Part A and *Part B final*. While one might have expected that the three group members negotiate a compromise between the number of patient choices of subjects with "low" and "high" choice lists, the latter seem to dominate the group decision process. Thus, the descriptive finding in treatment *Group* that the presence of group members with high payoffs from waiting increases patience in groups can be replicated when payoffs from waiting are exogenously assigned and heterogeneous. Treatment *HHL* does not tell, however, whether this dominance stems from group members deciding based on majority rule, or whether they follow the heuristic to adapt to the most patient group members' choices as the group decision.

Treatment *LLH* resolves this ambiguity by assigning only one group member to choice list "high", and two group members to choice list "low". Intriguingly, the pattern observed in treatment *LLH* confirms the main results of treatment *HHL*: The collective decision environment significantly increases the number of patient choices from 13.33 in Part A to 16.54 in *Part B final* ($p<0.05$). Again, this increase in patience is entirely driven by the group members with choice list "low" who adapt their decisions to the number of patient choices preferred by

[23] We thank the anonymous associate editor for suggesting these additional control treatments.

[24] For instance, very patient group members might also differ in other, potentially unobserved, dimensions (e.g., negotiation skills or cognitive skills) which might explain their influence on the group decision.

the single subject with choice list "high". The latter again does not change her choices significantly across Part A and Part B. This result shows that, even if a majority of group members favors a lower number of patient choices, the group adapts to its most patient member's choices in the group decision process. Columns 1 and 2 of Table 3 show that the coefficients on *Group* are smaller than those on treatment indicators *HHL* and *LLH*, which suggests that the group decision environment increases forward-looking behavior more when groups are diverse with respect to its members' payoffs from waiting. Note, however, that the difference is only significant between treatments *Group* and *LLH* (see Wald-tests beneath the table). This finding is also supported by our additional treatments *LLL* and *HHH*: Columns 3 and 4 of Appendix Table A2 show that the shift in patience by group members with the "low" choice list is significantly larger in heterogeneous groups *HHL* and *LLH* compared to the homogeneous group *LLL*.[25]

Interestingly, column 4 of Table 3 reveals a marginally significant and positive association between altruism and the change in patient choices between Part A and *Part B final* for group members with choice list "low". Thus, it might be that the adaptation decisions of these subjects are driven by their altruistic inclination. For future research, it would be interesting to study how subjects' social-preference types relate to decisions to adapt choices in collective intertemporal choice contexts.[26]

In sum, we find that group decisions are more patient than individual decisions. The overall effect is generally the sum of two components: an increase in the number of patient choices between Part A and *Part B first*, and an even stronger increase between *Part B first* and *Part B final*. Most importantly, to our knowledge, this is the first causal evidence that groups use the number of patient choices of their most patient group member as a heuristic to negotiate group

[25] Consistently, the average number of patient choices in *Part B final* is highest in treatment HHH, followed by the heterogeneous treatments *HHL* and *LLH*, and lowest in treatment LLL (see Table 2 and Appendix Table A1). These descriptive comparisons need to be interpreted with some caution, since treatments *HHH* and *LLL* were conducted in fall 2020, i.e., three to four years after treatments *HHL* and *LLH*, and in the middle of the global Covid-19 pandemic.

[26] From a theoretical viewpoint, subjects with a "low" choice list should be more likely to adapt their choices to the number of patient choices of subjects with choice list "high" if they have some form of altruistic inclination; e.g., if they are *efficiency loving* agents (Engelmann and Strobel, 2004), have *perfect substitutes* preferences (Andreoni and Miller, 2002), or have *social welfare* preferences (Charness and Rabin, 2002; Fisman et al., 2007). See, e.g., Montero (2008) and Hsu et al. (2008) for discussions on how altruism can affect decisions in different bargaining environments.

decisions. This finding is particularly intriguing since it also holds in groups with a minority of only one member having a high payoff from waiting.[27]

3.2 The role of communication

Previous research has shown that within-group communication can be a driving factor for differences in choices between individuals and groups (e.g., Kocher et al., 2018). To investigate whether the observed patience shift in groups is driven by within-group communication, we conducted the treatments *HL* and *COMM*.

Table 2 displays again the non-parametric comparison of mean patience levels and Table 4 presents regressions. Focusing on treatment *HL*, the results show that the dynamic of the three-person-group results above is also prevalent among two-person groups: The player with choice list "low" increases her number of patient choices from Part A to Part B to match the preferences of the player with the "high" choice list. The latter does not change choices between Part A and Part B. This dynamic is not borne out in treatment *COMM,* where subjects can communicate with each other in Part B as in the other group treatments but where coordination of group choices is not enforced: While average decisions with communication in Part B are slightly more patient than average decisions without communication in Part A (15.23 versus 14.73, p=0.051), the adaptation process of the "low" choice list player towards her more patient counterpart is largely missing. Thus, communication alone does not account for increased patience in groups. Put differently, the necessity to negotiate a collective group decision that affects each group members' payoff seems to be key for inducing the increase in collective patience.

Table 4 about here

[27] We also looked at whether heterogeneity in group members' payoffs increases the difficulty to reach a decision, compared to homogeneous groups. We measured difficulty by the number of rounds needed to reach an unanimous agreement and by answers to survey questions on the difficulty of the group decision making process. We did not find any significant difference between homogeneous and heterogeneous groups. Detailed results are available upon request.

3.3 The mechanisms behind group decisions: Insights from chat logs and a post-experimental survey

The chat conversations of Part B enable an in-depth analysis of the group decision processes. We focus on our three-person group treatments as this will reveal the mechanism why choices in treatments *HHL* and *LLH* are so similar, despite that these treatments are so different with respect to whether a majority or minority profits much more from waiting. To code the chat content, the authors read through parts of chat logs independently to identify relevant statements. These statements were then reconciled to establish the coding list displayed in Table 5. We differentiate between group-specific categories, which describe how the group as a whole reached a decision (see Panel 1), and individual-specific categories, which depict statements of the individual group members (see Panel 2). Two undergraduate research assistants (who were blind to the treatments) were trained to do the coding. Both research assistants had to read the entire chat independently and code whether each of the different categories of Table 5 applies to the respective chat history (by assigning a value of one), or not (by assigning a value of zero). Our procedure to code chat content is a standard approach in the laboratory experimental literature (see, e.g., Cooper and Kagel, 2005; Balafoutas et al., 2014). The cross-coder correlation over all categories is 0.70 and highly significant ($p<0.01$; Cohen's kappa: 0.69, $p<0.01$), and we averaged the entries of both coders to create a single variable for each category.[28]

Column 1 of Table 5 depicts the relative frequency of the different categories in the chat content. The most common group-specific category in Panel 1 is the majority decision (G1): In 43 percent of all groups, two members have the same preferences, and the third group member adapts. 22 percent of all group decision-making processes are characterized by some form of compromise, in which, after some negotiation, group members agree on a final group decision which is in between their initial proposals (G2). Unanimity decisions, where all group members agree on the same proposal within the first chat round, prevail in 19 percent of all groups (G4), while only 8 percent of all group decisions are determined by a single group member who dominates the group by acting as a blocking minority (G3). Turning to individual-specific categories in Panel 2, we find that 51 percent of all individuals signal willingness to adapt their decisions to the other group members (I2). 20 percent request other group members to make a

[28] Our cross-coder correlation is comparable in magnitude to previous studies: For instance, the correlation is 0.61 in Balafoutas et al. (2014), and 0.39 in Cooper and Kagel (2005). An alternative approach to aggregate individual codings to a single variable is to assign a value of one if at least one of the two coders considers that a certain category applies. Applying this alternative coding scheme does not change our qualitative results (results available upon request).

more patient decision (I4), and 33 percent accept this request (I5).[29] Other categories, such as proposals to be more impatient, or requests to adapt, are less prevalent.

Table 5 about here

These findings from the chat-content analysis are corroborated by data from our post-experimental survey.[30] The survey item of interest is an open-ended question which asked respondents to explain how they reached a decision in Part B of the experiment. We followed the same coding procedure as above and used the same group-specific and individual-specific categories. The same two research assistants coded the answers. Cross-coder correlation is 0.73 ($p<0.01$; Cohen's kappa: 0.73, $p<0.01$), and the correlation between the corresponding chat- and survey-based categories is 0.41 ($p<0.01$). We averaged both coders' entries to derive a single variable for each category. Column 2 of Table 5 depicts the relative importance of the different categories. While there are some differences in the chat-based categorization in column 1, the overall patterns are fairly similar. As in the chat-content analysis, the two most important group-specific categories are majority decision (36 percent) and compromise (36 percent), and the most important individual-specific categories are willingness to adapt (58 percent), request for patience (5 percent), and acceptance of requests for patience (8 percent).

Next, we analyze how these characteristics of the decision-making process relate to group members' randomly assigned payoffs from waiting. Starting with group-specific categories, Appendix Table A3 regresses each category on group-treatment identifiers (omitted reference category: *Group*) and a set of covariates. The dependent variables in odd-numbered columns are categories based on chat-content data, those in even-numbered columns are based on post-experimental survey data. Results suggest that the prevalence of majority decisions decreases in groups with heterogeneous payoffs from waiting (see coefficients in columns 1 and 2), though these effects only reach statistical significance for treatment LLH in the survey data. The other coefficients of the table are relatively small and statistically insignificant.

[29] The share of those who accept demands for patience is higher than the share of those who demand patience, because our coding of the former is based on the assumption that subjects who demand patience also accept such demands.

[30] One concern with using post-experimental surveys to explain choices in earlier stages of the experiment is that the survey data is retrospective, and therefore potentially susceptible to biased memory about what happened in the experiment (see Cooper and Kagel, 2005). Relatedly, the practice to use survey responses as dependent variables has been criticized because measurement error in survey answers might be correlated with the explanatory variables of interest, which, in turn, might bias estimates (see Bertrand and Mullainathan, 2001). While we find it unlikely that reporting errors – such as recall bias or survey demand effects – are correlated with subjects' randomly assigned treatment status, the results in this section should be interpreted with some caution and viewed as complementary evidence on the inner working of the group decision process.

Appendix Table A4 presents regressions of the individual-specific categories from chat data on dummies which indicate subjects' treatment (*HHL* or *LLH*) and choice list ("high" or "low"). Subjects who are randomly assigned to choice list "low" in treatment *HHL* are significantly more willing to adapt their choices, and significantly less likely to request others to adapt to their own choice than subjects in the reference treatment *Group*. Comparing subjects with a "high" choice list in treatment *HHL* versus treatment *LLH* reveals that the latter exhibit less willingness to adapt (see Wald-tests beneath the table). The reason for this finding might be that adaptation of group members with a "high" choice list in treatment *HHL* includes the case of adapting to another group member with a "high" choice list, whereas adaptation in treatment *LLH* implies adapting to the decisions of group members with a "low" choice list. Comparing subjects with "high" versus "low" choice lists within treatments, the former are more likely to request other group members to adapt. Re-running the analysis on survey-based categories in Appendix Table A5 confirms the effect that subjects who are randomly assigned to choice list "low" in treatment *HHL* are significantly more willing to adapt their choices.

In sum, the analysis of chat content provides valuable insights into the effects of group heterogeneity on the decision-making process within groups. Most importantly, low payoffs from waiting decrease requests towards other group members to adapt, whereas high payoffs for waiting increase it.

4. Conclusion

In this paper, we document that group members' (heterogeneous) payoffs from waiting are a key determinant of intertemporal collective decisions. In a lab experiment with 753 individual subjects, we find that the presence of at least one very patient group member is associated with more patient decisions of three-person groups. By randomly assigning individuals' payoffs from waiting, we establish a causal effect of group members' payoffs from waiting on collective patience. Intriguingly, this increased patience in groups is not only prevalent when a group's majority profits a lot from waiting, but also when only the minority does. Thus, adapting to the most patient group members' choices as the group decision seems an important heuristic to determine intertemporal group decisions. Scrutinizing group chat content and post-experimental survey responses, we uncover different channels through which the group decision process increases collective patience. In additional control treatments, we show that (i) our main result that group members with higher payoffs from waiting dominate group

decisions replicates in two-person groups and that (ii) this effect cannot be merely attributed to within-group communication.

Our paper has important implications for our understanding of intertemporal group decisions and policy. Most of the experimental literature thus far focused on situations in which group members with homogeneous payoffs from waiting take a collective intertemporal decision (e.g., Denant-Boemont, 2016; Shapiro, 2010). Adding the feature of randomly assigned payoff heterogeneities to the group decision context, we can show that the previously documented dominance of more patient group members in group decisions can be causally attributed to their higher payoffs from waiting (as opposed to other observable or unobservable characteristics of patient group members). From a management perspective, this implies that setting group compositions with respect to its members' payoffs accordingly can have profound influences on the outcome of the group decision process.

It is worth stressing that we imposed common knowledge about each group members' payoffs from waiting in the group-decision making process. This design comes with both advantages but also some potential costs. On the one hand, imposing perfect knowledge facilitates causally attributing any difference in collective intertemporal decisions to the exogenously induced variation in group composition with respect to group members' payoffs from waiting, thereby abstracting from any confounds that might stem from uncertainty about group members' payoffs. On the other hand, the extent to which the assumption of perfect knowledge about the within-group payoff structures applies is certainly debatable, and it might be more realistic in some situations to assume imperfect knowledge. For instance, while the assumption about perfect knowledge about group members' payoffs from waiting seems realistic in situations where group members know each other very well (e.g., when household members collectively decide upon whether or not to send an offspring to college), the assumption might be somewhat unrealistic in situations where group members face complex constraints and incentives (e.g., when negotiating international treaties, negotiators may not be fully aware of all the national and international constraints that other negotiators face). While studying the role of uncertainty is beyond the scope of the present paper, we view extending our setting towards allowing for uncertainty about group members' payoffs from waiting as a very interesting avenue for future research.

Another extension of our study would be to assess the robustness of our findings by using alternative methods to elicit intertemporal preferences. As we briefly discuss in section 3, a common feature of time-preference elicitation using multiple price lists as we do is that they produce relatively high discount rates. It would be interesting to investigate whether our results

replicate when using alternative intertemporal choice tasks that tend to produce lower interest-rate estimates (e.g., the Convex Time Budget method by Andreoni and Sprenger, 2012b). Relatedly, it would be interesting to study the effects of collective intertemporal decisions (in heterogeneous groups) on present bias.

Finally, it would be worthwhile for future research to assess the effects of different decision rules on collective intertemporal decisions in heterogeneous groups. Our unanimous group decision-making process resembles those situations where single group members have veto power. Prominent cases in point are the decision-making processes of nations with veto power in the United Nations Security Council, the Council of the European Union deciding unanimously on sensitive issues, or many U.S. companies requiring unanimous decision-making in their certificates of incorporation (e.g. Agranov and Tergiman, 2019). Of course, many of the decisions made by these bodies entail an intertemporal component. Despite the practical importance of unanimous decision rules, it would be very interesting to assess the extent to which our results replicate when using other decision rules, such as majority rule, instead.

5. References

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Figures and Tables

Figure 1: Choice list task to elicit time preferences

[1]	10.10 Euros today	O	**or**	O	10.10 + 1*x* Euros in 4 weeks
[2]	10.10 Euros today	O	**or**	O	10.10 + 2*x* Euros in 4 weeks
		… etc.			
[19]	10.10 Euros today	O	**or**	O	10.10 + 19*x* Euros in 4 weeks
[20]	10.10 Euros today	O	**or**	O	10.10 + 20*x* Euros in 4 weeks

Figure 2: Choice lists "intermediate", "high", and "low"

						Choice list			
						"interm."	"high"	"low"	
[1]	receive 10.10 Euros today	O	**or**	O	receive	10.40	10.60	10.20	Euros in 4 weeks
[2]	receive 10.10 Euros today	O	**or**	O	receive	10.70	11.10	10.30	Euros in 4 weeks
	… etc.								
[19]	receive 10.10 Euros today	O	**or**	O	receive	15.80	19.60	12.00	Euros in 4 weeks
[20]	receive 10.10 Euros today	O	**or**	O	receive	16.10	20.10	12.10	Euros in 4 weeks

Figure 3: Experimental design

TREATMENTS	PART A	PART B
Single Choice list: "intermediate"	Individual decision	Individual decision
Group Choice list: "intermediate"	Individual decision	Group decision
HHL Choice lists: "high" (2/3), "low" (1/3)	Individual decision	Group decision
LLH Choice lists: "high" (1/3), "low" (2/3)	Individual decision	Group decision
HL Choice lists: "high" (1/2), "low" (1/2)	Individual decision	Group decision
COMM Choice lists: "high" (1/2), "low" (2/2)	Individual decision	Individual decision

Notes. Subjects were randomly assigned (i) to one of the treatments (*Single*, *Group*, *HHL*, *LLH, HL or COMM*), and (ii) to one choice list used within the respective treatment ("high", "low", or "intermediate") in a between-subject design. Subjects participated in both parts (Part A and Part B). A subject's choice list was held constant across both parts.

Table 1: Number of participants by treatments

Treatment	Number of individuals	Number of groups
Single	46	46
Group	111	37
HHL	111	37
LLH	111	37
HL	128	64
COMM	48	24
SUM	**555**	**245**

Notes: One group constitutes one independent observation in the group treatments

Table 2: Patience level by treatments

	Mean number of patient choices			Difference		
Treatment	Part A (1)	Part B first (2)	Part B final (3)	B first - A (4)	B final – B first (5)	B final - A (6)
Single	15.30		15.35			0.04
Group	15.72	15.93	16.76	0.21	0.83	1.04*
Subgroups:[#]						
Patient groups	16.69	16.95	18.50	0.26**	1.55**	1.81***
Impatient groups	13.42	13.52	12.64	0.09	-0.88	-0.79
HHL	14.59	14.95	16.54	0.37	1.59***	1.95***
Subgroups:						
HHL "low" list [§]	10.14	11.51	16.54	1.38**	5.03***	6.41***
HHL "high" list [§]	16.81	16.68	16.54	-0.14	-0.14	-0.27
LLH	13.33	14.11	16.54	0.77***	2.43***	3.21***
Subgroups:						
LLH "low" list [§]	11.42	12.39	16.54	0.97**	4.15***	5.12***
LLH "high" list [§]	17.16	17.54	16.54	0.38	-1.00	-0.62
HL	13.89	14.47	15.77	.58**	1.30***	1.88***
Subgroups:						
HL "low" list [§]	11.14	12.27	15.77	1.13**	3.5***	4.63***
HL "high" list [§]	16.64	16.67	15.77	.03	-.91*	-.88
COMM	14.73		15.23			.5*
Subgroups:						
COMM "low" list [§]	12		12.46			.46
COMM "high" list [§]	17.46		18			.54

Notes. The table shows the average number of patient choices. ***, **, * denote significance at the 1%, 5%, 10% level, respectively (calculated from matched t-tests using group means).

[#] We categorize groups in Part B as *patient* (*impatient*) if their maximum number of patient choices of the most patient group member in Part A is above (below) the median across groups. According to this definition, 26 of the 37 groups are patient because they have at least one member who chose the later payoff in all twenty binary decisions of Part A.

[§] The respective row shows the decisions of subjects with the low, respectively high, choice list (see Figure 2).

Table 3: OLS Regressions of the change in patience between Part B final and Part A in treatments *Single*, *Group*, *HHL*, and *LLH*

Dependent variable:	Change in patience between Part B final and Part A					
Subsample:	All	All	"low" [§]	"low" [§]	"high" [§]	"high" [§]
	(1)	(2)	(3)	(4)	(5)	(6)
Group	0.993	1.112*				
	(0.602)	*(0.591)*				
HHL[$]	1.911***	1.814***	6.362***	6.231***	-0.314	-0.412
	(0.513)	*(0.569)*	*(1.251)*	*(1.183)*	*(0.478)*	*(0.546)*
LLH	3.164***	3.269***	5.078***	5.550***	-0.665	-0.726
	(0.632)	*(0.633)*	*(0.798)*	*(0.826)*	*(0.697)*	*(0.725)*
Female = 1		-1.447**		-2.142**		0.111
		(0.599)		*(1.024)*		*(0.585)*
Age in years		-0.0641		0.0356		-0.114
		(0.0961)		*(0.173)*		*(0.118)*
Risk tolerance		-0.202		-0.668***		-0.092
		(0.184)		*(0.206)*		*(0.167)*
Patience		-0.0717		0.410**		-0.0750
		(0.145)		*(0.182)*		*(0.110)*
Impulsiveness		0.137		0.537**		0.0320
		(0.170)		*(0.209)*		*(0.184)*
Altruism		0.159		0.367*		-0.138
		(0.155)		*(0.195)*		*(0.128)*
Constant	0.044	1.939	0.044	-3.388	0.044	4.346
	(0.076)	*(2.660)*	*(0.076)*	*(4.639)*	*(0.076)*	*(3.168)*
Observations	379	378	157	156	157	156
R-squared	0.032	0.050	0.153	0.255	0.005	0.031
Wald-tests						
H_0: No treatment difference between …						
… Group & HHL (β_{Group}-β_{HHL}=0)	-0.919	-0.702				
… Group & LLH (β_{Group}-β_{LLH}=0)	-2.171**	-2.156**				
… HHL and LLH (β_{HHL}-β_{LLH}=0)	-1.252	-1.454*	1.284	0.681	0.351	0.314

Notes. Risk tolerance, impulsiveness, patience, and altruism were measured on a Likert scale from 0 to 10. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.

[$] The reference category is *Single*.

[§] The respective column shows the decisions of subjects with the low, respectively high, choice list (see Figure 2).

Table 4: OLS Regressions of the change in patience between Part B final and Part A in treatments *Single*, *HL,* and *COMM*

Dependent variable:	Change in patience between Part B final and Part A					
Subsample:	All	All	"low" [§]	"low" [§]	"high" [§]	"high" [§]
	(1)	(2)	(3)	(4)	(5)	(6)
HL[$]	1.832***	1.987***	4.582***	4.750***	-0.918	-0.792
	(0.444)	*(0.469)*	*(0.851)*	*(0.863)*	*(0.563)*	*(0.593)*
COMM	0.457*	0.405	0.415	0.316	0.498	0.453
	(0.251)	*(0.349)*	*(0.494)*	*(0.655)*	*(0.356)*	*(0.485)*
Female = 1		-0.0774		-0.779		0.457
		(0.800)		*(0.898)*		*(0.655)*
Age in years		-0.0535		-0.149		0.0813
		(0.0945)		*(0.132)*		*(0.0971)*
Risk tolerance		0.00727		-0.0898		0.187
		(0.201)		*(0.260)*		*(0.143)*
Patience		0.0606		-0.223		0.148
		(0.151)		*(0.192)*		*(0.101)*
Impulsiveness		0.216		0.287		-0.0675
		(0.209)		*(0.257)*		*(0.140)*
Altruism		-0.313		-0.339		-0.139
		(0.191)		*(0.253)*		*(0.124)*
Constant	0.0435	2.042	0.0435	6.428	0.0435	-2.613
	(0.076)	*(3.247)*	*(0.076)*	*(4.460)*	*(0.076)*	*(2.601)*
Observations	222	219	134	132	134	132
R-squared	0.026	0.050	0.180	0.238	0.032	0.068

Notes. Risk tolerance, impulsiveness, patience, and altruism were measured on a Likert scale from 0 to 10. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.

[$] The reference category is *Single*.

[§] The respective column shows the decisions of subjects with the low, respectively high, choice list (see Figure 2).

Table 5: Categories for coding chat content and post-experimental survey answers

Category	Description	Chat content		Survey content	
		Relative frequency (1)	Cohen's kappa [§] (2)	Relative frequency (3)	Cohen's kappa (4)
Panel 1: Group-specific categories					
G1	Majority: Two members have the same preferences; the third member adapts.	0.43	0.73	0.36	0.82
G2	Compromise: After negotiating, individuals agree on a solution in between their initial choices.	0.22	0.71	0.36	0.71
G3	Minority: The decision is made by a single individual, based on his lack of compliance or indifference of other group members.	0.08	0.28	0.16	0.54
G4	Unanimity: Within the first chat round, all individuals agree on or submit the same proposal.	0.19	0.59	0.12	0.79
Panel 2: Individual-specific categories					
I1	Indifference: The individual either refuses to participate in the discussion or expresses that he does not care.	0.10	0.87	0.02	0.61
I2	Willingness to adapt: The individual with differing preferences decides to adapt either voluntarily or on request.	0.51	0.74	0.58	0.75
I3	Demand to adapt: The individual explicitly prompts others to adapt their differing decision.	0.08	0.68	0.00	0.00
I4	Demand for patience: The individual explicitly prompts others to make a more patient decision.	0.20	0.65	0.05	0.11
I5	Acceptance of patience: The individual accepts and implements the demand for patience.	0.33	0.52	0.08	0.06
I6	Demand for impatience: The individual explicitly prompts others to make a more impatient decision.	0.08	0.71	0.01	0.24
I7	Acceptance of impatience: An individual accepts and implements the demand for impatience.	0.14	0.59	0.02	0.15

[§] We calculated Cohen's kappa (see Cohen, 1960) for each of the categories. The kappa values of most categories lie above 0.6 and thus reveal a substantial strength of agreement between the two coders (see Landis and Koch, 1977). Kappa values between 0.41 and 0.6 reveal a moderate strength of agreement. Categories that do not reach a moderate strength of agreement (i.e. the chat content measure for minority decisions as well as the survey content measures for categories I3-I7) and the analysis thereof (in Table A2 and A4) should be interpreted with caution. Note, however, that the relative frequency of occurrence of these categories is anyway relatively low.

Online Appendix

Appendix A: Supplementary tables

Table A1: Patience level in treatments *LLL* and *HHH*

	Mean number of patient choices			Difference		
Treatment	Part A (1)	Part B first (2)	Part B final (3)	B first - A (4)	B final – B first (5)	B final - A (6)
LLL	13.91	13.64	15.73	-0.27	2.09***	1.82**
Subgroups:[#]						
Patient groups	15.21	14.78	17.37	-0.43	2.59***	2.16***
Impatient groups	8.06	8.50	8.33	0.44	-0.17	0.28
HHH	17.42	17.51	18.55	0.08	1.04***	1.12***
Subgroups:[+]						
Patient groups	18.20	18.30	19.30	0.10	1.00***	1.10***
Impatient groups	13.94	13.94	15.17	0.00	1.22*	1.22

Notes. The table shows the average number of patient choices. ***, **, * denote significance at the 1%, 5%, 10% level, respectively (calculated from matched t-tests using group means).

[#] We categorize groups in Part B as *patient* (*impatient*) if their maximum number of patient choices of the most patient group member in Part A is above (below) the median across groups. According to this definition, 27 of the 33 groups are patient because they have at least one member who chose the later payoff in all twenty binary decisions of Part A.

[+] We categorize groups in Part B as *patient* (*impatient*) if their maximum number of patient choices of the most patient group member in Part A is above (below) the median across groups. According to this definition, 27 of the 33 groups are patient because they have at least one member who chose the later payoff in all twenty binary decisions of Part A.

Table A2: OLS Regressions of the change in patience between Part B final and Part A in each of the treatments

Dependent variable:	Change in patience between Part B final and Part A					
Subsample:	All	All	"low" [§]	"low" [§]	"high" [§]	"high" [§]
	(1)	(2)	(3)	(4)	(5)	(6)
Group	0.993	1.171**				
	(0.602)	(0.592)				
HHL [$]	1.911***	1.865***	6.362***	6.302***	-0.314	-0.319
	(0.513)	(0.555)	(1.250)	(1.199)	(0.477)	(0.526)
LLH	3.164***	3.276***	5.078***	5.471***	-0.665	-0.705
	(0.632)	(0.629)	(0.796)	(0.788)	(0.696)	(0.703)
HHH	1.078***	1.275***			1.078***	1.137***
	(0.272)	(0.333)			(0.273)	(0.317)
LLL	1.775***	1.987***	1.775***	2.050**		
	(0.663)	(0.713)	(0.665)	(0.792)		
Female = 1		-1.084**		-1.538		-0.0938
		(0.514)		(0.970)		(0.439)
Age in years		-0.010		0.0670		-0.0468
		(0.079)		(0.143)		(0.0886)
Risk tolerance		-0.173		-0.449**		-0.0671
		(0.132)		(0.178)		(0.128)
Patience		-0.131		0.0930		-0.0747
		(0.105)		(0.148)		(0.0822)
Impulsiveness		0.113		0.261		0.104
		(0.124)		(0.174)		(0.135)
Altruism		0.089		0.309		-0.126
		(0.126)		(0.203)		(0.102)
Constant	0.043	1.230	0.0435	-2.243	0.0435	2.278
	(0.076)	(2.128)	(0.0757)	(3.903)	(0.0757)	(2.252)
Observations	577	576	256	255	256	255
R-squared	0.024	0.038	0.112	0.147	0.042	0.059
Wald-tests						
H_0: No treatment difference between …						
… Group & HHL (β_{Group}-β_{HHL}=0)	-0.918	-0.694				
… Group & LLH (β_{Group}-β_{LLH}=0)	-2.171**	-2.105**				
… HHL and LLH (β_{HHL}-β_{LLH}=0)	-1.253	-1.411*	1.284	0.831	0.351	0.386
… HHL and HHH (β_{HHL}-β_{HHH}=0)	0.833	0.59			-1.392**	-1.456**
… LLH and HHH (β_{LLH}-β_{HHH}=0)	2.086***	2.001***			-1.743**	-1.842**
… HHL and LLL (β_{HHL}-β_{LLL}=0)	0.136	-0,122	4.587***	4.252***		
… LLH and LLL (β_{LLH}-β_{LLL}=0)	1.389	1.289	3.303***	3.421***		

Notes. Risk tolerance, impulsiveness, patience, and altruism were measured on a Likert scale from 0 to 10. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.

[$] The reference category is *Single*.

[§] The respective column shows the decisions of subjects with the low, respectively high, choice list (see Figure 2).

Table A3: OLS Regressions of chat and survey content in Part B (group-specific categories)

	Majority (G1)		Compromise (G2)		Minority (G3)		Unanimity (G4)	
Source:	Chat	Survey	Chat	Survey	Chat	Survey	Chat	Survey
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HHL[$]	-0.125	-0.142	0.135	0.095	0.014	0.007	-0.048	0.040
	(0.108)	*(0.109)*	*(0.090)*	*(0.105)*	*(0.054)*	*(0.069)*	*(0.073)*	*(0.073)*
LLH	-0.150	-0.220**	0.034	0.035	0.028	0.134*	0.089	0.037
	(0.105)	*(0.105)*	*(0.086)*	*(0.099)*	*(0.051)*	*(0.076)*	*(0.086)*	*(0.067)*
Covariates	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.320	0.471*	0.161	0.370	0.110	-0.009	0.286	0.150
	(0.260)	*(0.248)*	*(0.192)*	*(0.262)*	*(0.131)*	*(0.178)*	*(0.223)*	*(0.172)*
Observations	333	333	333	333	333	333	333	333
R-squared	0.046	0.058	0.024	0.042	0.006	0.045	0.049	0.035
Wald-tests:								
H_0: No treatment effect between …								
… *HHL* and *LLH* (β_{HHL} - β_{LLH}=0)	0.025	0.078	0.101	0.06	-0.014	-0.127	-0.137*	0.003

Notes. Covariates: Female, age in years, risk tolerance, patience, impulsiveness, and altruism. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.

[$] The reference category is *Group*.

Table A4: OLS Regressions of chat content in Part B (individual-specific categories)

Dependent variable:	Indifference (I1)	Willingness to adapt (I2)	Demand to adapt (I3)	Demand for patience (I4)	Acceptance of patience (I5)	Demand for impatience (I6)	Acceptance of impatience (I7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HHL "high"[$]	-0.001	0.120	0.024	-0.011	-0.058	0.008	0.058
	(0.065)	*(0.086)*	*(0.046)*	*(0.064)*	*(0.081)*	*(0.044)*	*(0.070)*
HHL "low"	0.025	0.237***	-0.090***	-0.015	-0.000	0.018	0.066
	(0.065)	*(0.090)*	*(0.027)*	*(0.071)*	*(0.084)*	*(0.058)*	*(0.080)*
LLH "high"	-0.046	-0.081	0.052	0.027	-0.029	-0.057	-0.041
	(0.057)	*(0.089)*	*(0.057)*	*(0.073)*	*(0.088)*	*(0.040)*	*(0.060)*
LLH "low"	-0.009	0.026	-0.019	-0.021	0.006	-0.014	-0.035
	(0.060)	*(0.084)*	*(0.035)*	*(0.061)*	*(0.090)*	*(0.039)*	*(0.056)*
Covariates	YES	YES	YES	YES	YES	YES	YES
Constant	0.180	0.248	0.117	0.493**	0.628**	0.164	0.236
	(0.182)	*(0.276)*	*(0.125)*	*(0.247)*	*(0.243)*	*(0.156)*	*(0.183)*
Observations	333	333	333	333	333	333	333
R-squared	0.042	0.048	0.035	0.031	0.052	0.063	0.037
Wald-tests:							
H_0: No treatment effect between …							
… *HHL* "high" and *LLH* "high" ($\beta_{HHL\ \text{"high"}} - \beta_{LLH\ \text{"high"}}=0$)	0.045	0.201**	-0.028	-0.038	-0.029	0.065	0.099
… *HHL* "low" and *LLH* "low" ($\beta_{HHL\ \text{"low"}} - \beta_{LLH\ \text{"low"}}=0$)	0.034	0.211**	-0.071***	0.006	-0.006	0.032	0.101
H_0: No list effect for …							
… *HHL* ($\beta_{HHL\ \text{"high"}} - \beta_{HHL\ \text{"low"}}=0$)	-0.026	-0.117	0.114***	0.004	-0.058	-0.01	-0.008
… *LLH* ($\beta_{LLH\ \text{"high"}} - \beta_{LLH\ \text{"low"}}=0$)	-0.037	-0.107	0.071*	0.048	-0.035	-0.043	-0.006

Notes. Covariates: Female, age in years, risk tolerance, patience, impulsiveness, and altruism. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.
[$] The reference category is *Group*.

Table A5: OLS Regressions of survey content in Part B (individual-specific categories)

Dependent variable:	Indifference (I1)	Willingness to adapt (I2)	Demand to adapt (I3)	Demand for patience (I4)	Acceptance of patience (I5)	Demand for impatience (I6)	Acceptance of impatience (I7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HHL "high"[$]	-0.019	0.013	0.003	0.038	0.030	-0.003	-0.003
	(0.012)	*(0.092)*	*(0.009)*	*(0.032)*	*(0.042)*	*(0.009)*	*(0.020)*
HHL "low"	-0.008	0.180**	-0.003	-0.002	0.031	0.017	0.023
	(0.017)	*(0.088)*	*(0.004)*	*(0.038)*	*(0.048)*	*(0.028)*	*(0.033)*
LLH "high"	-0.008	-0.028	-0.003	0.012	0.017	0.001	-0.005
	(0.018)	*(0.094)*	*(0.005)*	*(0.030)*	*(0.040)*	*(0.015)*	*(0.019)*
LLH "low"	0.023	0.096	-0.002	0.018	0.033	0.002	-0.003
	(0.024)	*(0.084)*	*(0.004)*	*(0.022)*	*(0.037)*	*(0.011)*	*(0.015)*
Covariates	YES	YES	YES	YES	YES	YES	YES
Constant	-0.018	0.517**	0.016	0.085	0.076	0.019	0.030
	(0.061)	*(0.248)*	*(0.025)*	*(0.089)*	*(0.100)*	*(0.028)*	*(0.059)*
Observations	333	333	333	333	333	333	333
R-squared	0.024	0.039	0.036	0.034	0.045	0.012	0.017
Wald-tests:							
H_0: No treatment effect between …							
… *HHL* "high" and *LLH* "high" ($\beta_{HHL\text{ "high"}} - \beta_{LLH\text{ "high"}}=0$)	-0.011	0.041	0.006	0.026	0.013	-0.004	0.002
… *HHL* "low" and *LLH* "low" ($\beta_{HHL\text{ "low"}} - \beta_{LLH\text{ "low"}}=0$)	-0.031	0.084	-0.001	-0.02	-0.002	0.015	0.026
H_0: No list effect for …							
… *HHL* ($\beta_{HHL\text{ "high"}} - \beta_{HHL\text{ "low"}}=0$)	-0.011	-0.167**	0.006	0.04	-0.001	-0.02	-0.026
… *LLH* ($\beta_{LLH\text{ "high"}} - \beta_{LLH\text{ "low"}}=0$)	-0.031	-0.124	-0.001	-0.006	-0.016	-0.001	-0.002

Notes. Covariates: Female, age in years, risk tolerance, patience, impulsiveness, and altruism. ***, **, * denote significance at the 1%, 5%, 10% level, robust standard errors in parentheses. Clustered on group level.
[$] The reference category is *Group*.

Appendix B: Experimental instructions (translated from German)

Treatment *Single*

Welcome to the experiment and thank you for participating. From now on please do not talk to the other participants.

In this experiment, we investigate decision making. You can make money by participating. Soon I am going to explain the task. But first, please pay attention to some organizational matters. We ask you to turn off your mobile phone. Please understand that activities not related to the experiment, like surfing the Internet, playing computer games, or reading literature, will result in you being excluded from the experiment. In this case, you will not receive any payoff. If you have any questions (before or during the experiment) please raise your hand. I am going to answer your question in person, but please do not ask any questions in public. All your data and your decisions will be treated anonymously and do not allow conclusions to be made about your person.

The experiment consists of two parts: Part A and Part B. Both parts contain different decision-making situations. In the end, we ask you to fill out an additional questionnaire. Now I am going to explain Part A of the experiment to you. Afterward, you can make your decisions concerning Part A. Subsequently, I am going to explain part B of the experiment and you can make your decisions concerning Part B. Please note that only one part will be paid off. At the end of the experiment, either Part A or Part B will be randomly selected as your payoff-relevant part.

PART A

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part A consists of 20 decision-making situations (20 lines) listed below. In each situation (in each line) you must choose one out of two options: 10,10€ paid out **today** or a higher payoff you will **receive in four weeks**. For information about the available amount please consider the following list.

[*Display screenshot of choice list "intermediate"*]

Example of a decision-making situation in this list (line 1): Do you prefer to receive 10,10€ **today** or 10,40€ **in four weeks**? In every decision-making situation, you must choose one option. Altogether, you will make 20 decisions, but only one of them will be paid out. At the end of the experiment, the computer will randomly determine which line will actually be paid

out if Part A becomes payout relevant. After you have made all 20 decisions, please confirm your entry by pressing the button ”DONE”.

Important information regarding your payoff:

If you have chosen the four-week-option in the line which is finally paid out, the money will be transferred to your bank account in four weeks. Alternatively, you may collect the money at Mr. Richard Krenndorfer's office at the "Institut für Finanzwissenschaft" (SOWI, 4th floor, room: w4.36, Mon-Fri 13.00-14.00). If you have chosen the today-option in the line which is finally paid out, you will receive the money at the end of the experiment. To make sure no other participant learns about your decision, each of you is given a sealed envelope. If you receive the money today, the envelope contains 10,10€. If you have chosen the four-week-option, the envelope contains the confirmation that you will receive the money by bank transfer or that you can collect it at the office in four weeks.

PART B

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part B is identical to Part A. You will receive the same list consisting of 20 decision-making situations, where you have to choose one option each. After all participants have completed their list, Part B is finished. The payoff-relevant part (Part A or Part B) and the payoff-relevant line will be randomly selected. Subsequently, please fill out the questionnaire. At the end of the experiment, you will receive detailed information about the amount paid out to you and when this will take place.

Treatment *Group*

Welcome to the experiment and thank you for participating. From now on please do not talk to the other participants.

In this experiment, we investigate decision making. You can make money by participating. Soon I am going to explain the task. But first, please pay attention to some organizational matters. We ask you to turn off your mobile phone. Please understand that activities not related to the experiment, like surfing the Internet, playing computer games, or reading literature, will result in you being excluded from the experiment. In this case, you will not receive any payoff. If you have any questions (before or during the experiment) please raise your hand. I am going to answer your question in person, but please do not ask any questions in public. All your data and your decisions will be treated anonymously and do not allow conclusions to be made about your person.

The experiment consists of two parts: Part A and Part B. Both parts contain different decision-making situations. In the end, we ask you to fill out an additional questionnaire. Now I am going to explain Part A of the experiment to you. Afterward, you can make your decisions concerning Part A. Subsequently, I am going to explain Part B of the experiment and you can make your decisions concerning Part B. Please note that only one part will be paid off. At the end of the experiment, either Part A or Part B will be randomly selected as your payoff-relevant part.

PART A

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part A consists of 20 decision-making situations (20 lines) listed below. In each situation (in each line) you must choose one out of two options: 10,10€ paid out **today** or a higher payoff you will **receive in four weeks**. For information about the available amount please consider the following list.

[*Display screenshot of choice list "intermediate"*]

Example of a decision-making situation in this list (line 1): Do you prefer to receive 10,10€ **today** or 10,40€ **in four weeks**? In every decision-making situation, you must choose one option. Altogether, you will make 20 decisions, but only one of them will be paid out. At the end of the experiment, the computer will randomly determine which line will actually be paid out if Part A becomes payout relevant.

After you have made all 20 decisions, please confirm your entry by pressing the button "DONE".

Important information regarding your payoff:

If you have chosen the four-week-option in the line which is finally paid out, the money will be transferred to your bank account in four weeks. Alternatively, you may collect the money at Mr. Richard Krenndorfer's office at the "Institut für Finanzwissenschaft" (SOWI, 4th floor, room: w4.36, Mon-Fri 13.00-14.00). If you have chosen the today-option in the line which is finally paid out, you will receive the money at the end of the experiment. To make sure no other participant learns about your decision, each of you is given a sealed envelope. If you receive the money today, the envelope contains 10,10€. If you have chosen the four-week-option, the envelope contains the confirmation that you will receive the money by bank transfer or that you can collect it at the office in four weeks.

PART B

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part B is identical to Part A, i.e. you will receive the same list consisting of 20 decision-making situations, except that you have to make your decision together with two partners sitting in this room. Teams of three (person A, person B, and person C) will be matched randomly. Each person keeps his or her list from Part A. The groups must coordinate their decisions in Part B, so that all lists are filled out identically, i.e. in each line all three persons have to choose the same option (today or in four weeks). Part B only terminates if all team members have chosen the same options.

You can communicate with your partners via your computer. Therefore, all your decisions are made anonymously. To distinguish between the three members' decisions, the persons are indicated with the name "person A", "person B" or "person C". These names will remain the same during the whole time of the experiment. You can communicate with your partners by using their name. The decision-making process runs in 1 to X rounds. In the first round, you and your partners will choose individually how to fill out each line of your own list (at the left part of your display). As soon as you have completed your list, please press the button "DONE". As soon as your partners have completed and confirmed their lists as well, they will be displayed to you (in the middle and the right part of your display). Your partners can see your decision too. It is important that your partners' decisions are displayed to all group members at the same time. It looks like this:

[*Display screenshot of group decision screen*]

If you and your partners have made the same choices from the beginning, Part B is finished. Everything stays the same as in Part A. Please note that the line randomly implemented is paid out separately for each of you, i.e. each person receives the amount indicated on his or her list.

If you and your partners have made different choices in the first round, you must coordinate your decisions in the second round. Before filling out your list, you have the opportunity to communicate with your partners via chat. The three persons can be distinguished by using their names, “person A”, “person B” or “person C”. You have three minutes to chat with your partners. After these three minutes (or as soon as you finish the chat), you should revise each line of your list. Please confirm your entry by pressing the button “DONE”. As soon as your partners have completed and confirmed their lists as well, they will be displayed to you again.

If you and your partners now have made the same choices, Part B is finished. If you and your partners have made different choices, you must coordinate your decisions in another round. Again, you can chat with your partners before filling out the list. This procedure will continue until you have reached an agreement. Only then, Part B is finished. After finishing Part B, you may again chat with your partners regardless of when you have reached an agreement. The payoff-relevant part (Part A or Part B) and the payoff-relevant line will be randomly selected. Subsequently, please fill out the questionnaire. At the end of the experiment, you will receive detailed information about the amount paid out to you and when this will take place.

Treatment *HHL*

Welcome to the experiment and thank you for participating. From now on please do not talk to the other participants.

In this experiment, we investigate decision making. You can make money by participating. Soon I am going to explain the task. But first, please pay attention to some organizational matters. We ask you to turn off your mobile phone. Please understand that activities not related to the experiment, like surfing the Internet, playing computer games, or reading literature, will result in you being excluded from the experiment. In this case, you will not receive any payoff. If you have any questions (before or during the experiment) please raise your hand. I am going to answer your question in person, but please do not ask any questions in public. All your data and your decisions will be treated anonymously and do not allow conclusions to be made about your person.

The experiment consists of two parts: Part A and Part B. Both parts contain different decision-making situations. In the end, we ask you to fill out an additional questionnaire. Now I am going to explain Part A of the experiment to you. Afterward, you can make your decisions concerning Part A. Subsequently, I am going to explain Part B of the experiment and you can make your decisions concerning Part B. Please note that only one part will be paid off. At the end of the experiment, either Part A or Part will be drawn by lot as your payoff-relevant part.

PART A

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part A consists of 20 decision-making situations (20 lines) listed below. In each situation (in each line) you must choose one out of two options: 10,10€ paid out **today** or a higher payoff you will **receive in four weeks**. There are 2 different lists, list 1 and list 2. One third of the participants will be randomly selected for list one, the other two-thirds will receive list 2. The two lists differ regarding the amount paid out in four weeks.

List 1 looks like this:

[*Display screenshot of choice list "low"*]

List 2 looks like this:

[*Display screenshot of choice list "high"*]

Example of a decision-making situation in list 1 (line 1): Do you prefer to receive 10,10€ **today** or 10,20€ **in four weeks**? Example of a decision-making situation in list 2 (line 1): Do

you prefer to receive 10,10€ **today** or 10,60€ **in four weeks**? In every decision-making situation, you must choose one option. Altogether, you will make 20 decisions, but only one of them will be paid out. At the end of the experiment, the computer will randomly determine which line will actually be paid out if Part A becomes payout relevant. After you have made all 20 decisions, please confirm your entry by pressing the button "DONE".

Important information regarding your payoff:

If you have chosen the four-week-option in the line which is finally paid out, the money will be transferred to your bank account in four weeks. Alternatively, you may collect the money at Mr. Richard Krenndorfer's office at the "Institut für Finanzwissenschaft" (SOWI, 4th floor, room: w4.36, Mon-Fri 13.00-14.00). If you have chosen the today-option in the line which is finally paid out, you will receive the money at the end of the experiment. To make sure no other participant learns about your decision, each of you is given a sealed envelope. If you receive the money today, the envelope contains 10,10€. If you have chosen the four-week-option, the envelope contains the confirmation that you will receive the money by bank transfer or that you can collect it at the office in four weeks.

PART B

Please remember that this part will only be paid out if it is randomly selected as payoff-relevant. Part B is identical to Part A, i.e. you will receive the same list consisting of 20 decision-making situations, except that you have to make your decision together with two partners sitting in this room. Teams of three (person A, person B, and person C) will be matched randomly.

The teams consist of one person (person A) who, in Part A, had list 1 and two persons (person B and person C) who, in Part A, had list 2. Each person keeps his or her list of Part A, i.e. if you had list 1 in Part A, you will still have list 1 in Part B. The groups must coordinate their decisions in Part B, so that all lists are filled out identically, i.e. in each line, all three persons have to choose the same option (today or in four weeks). Part B only terminates if all team members have chosen the same options.

You can communicate with your partners via your computer. Therefore, all your decisions are made anonymously. To distinguish between the three members' decisions, the persons are indicated with the name "person A", "person B" or "person C". These names will remain the same during the whole time of the experiment. You can communicate with your partners by using their name. The decision-making process runs in 1 to X rounds. In the first round, you and your partners will choose individually how to fill out each line of your own list (at the left

part of your display). As soon as you have completed your list, please press the button "DONE". As soon as your partners have completed and confirmed their lists as well, they will be displayed to you (in the middle and at the right part of your display). Your partners can see your decision too. It is important that your partners' decisions are displayed to all group members at the same time.

Example: If you have received list 1 and your partners have received list 2, it looks like this:

[*Display screenshot of group decision screen*]

If you and your partners have made the same choices from the beginning, part B is finished. Everything stays the same as in Part A. Please note that the line randomly implemented is paid out separately for each of you, i.e. each person receives the amount indicated on his or her list.

If you and your partners have made different choices in the first round, you must coordinate your decisions in the second round. Before filling out your list, you have the opportunity to communicate with your partners via chat. The three persons can be distinguished by using their names, "person A", "person B" or "person C". You have three minutes to chat with your partners. After these three minutes (or as soon as you finish the chat), you should revise each line of your list. Please confirm your entry by pressing the button "DONE". As soon as your partners have completed and confirmed their lists as well, they will be displayed to you again.

If you and your partners now have made the same choices, part B is finished. If you and your partners have made different choices, you must coordinate your decisions in another round. Again, you can chat with your partners before filling out the list. This procedure will continue until you have reached an agreement. The payoff-relevant part (Part A or Part B) and the payoff-relevant line will be randomly selected. Subsequently, please fill out the questionnaire. At the end of the experiment, you will receive detailed information about the amount paid out to you and when this will take place.

Treatment *LLH:*

Identical to treatment HHL, except that the choice lists varied.