External validity of experiments in environmental economics: framing and subject pool effects among students and professionals

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Abstract

Laboratory experiments are increasingly used to study environmental policy questions. Yet, the external validity of these studies has been generally questioned. We contribute to this methodological discussion by investigating the effect of framing and subject pool in laboratory experiments aimed at studying environmental policy questions. We designed an experiment to study incentives for the adoption of more sustainable land management practices using a modified coordination game. In one treatment, the experiment is highly contextualized and characterizes the situation of farmers and cultivation of their land, while the other treatment uses abstract and context-free wording. We conducted the experiment with professional farm apprentice students as well as with generic university students. We find significant differences in behaviour between the two subject pools, while we find no impact of framing. This result stresses the importance of conducting policy-relevant experiments preferably with individuals that relate more to the subject matter. Yet, for the treatments explored in this study, behavioral differences between subject pools concern the amplitude of the results and not their direction.

1. Introduction

The use of laboratory experiments to study issues in environmental policy has grown in prominence within environmental economics. Yet, the external validity or the generalizability of the results from these laboratory studies has been generally questioned (e.g. Harrison & List, 2004; Exadaktylos et al., 2013). The latter is crucial for studies that aim to inform environmental policy. This paper contributes to this methodological discussion by addressing the effect of framing and subject pool on experimental outcomes. It has become standard in experimental economics to use context-free and neutrally framed instructions in order to retain experimental control (Durlauf & Blume, 2009). For example, many scholars use public good games presenting the game in completely abstract terminology and then draw conclusions with respect to environment-related issues (e.g., Barrett & Dannenberg, 2012; Cinyabuguma et al., 2005). Others choose to use context-loaded instructions where contributions are interpreted as climate change mitigation (e.g., Milinski et al., 2006, 2008; Tavoni et al., 2011). While there has been discussion on whether to use heavily contextualized instructions or not, systematic comparisons are rare. We further develop this point in the next section.

Another strand of this literature analyzes the potential bias of using university students in behavioural studies, and focuses on involving instead either "professionals" or randomized non-selected population. While some find that the type of participant strongly determines the nature of the results (e.g. Anderson et al., 2013), others do not find differences between the behaviour of students and non-students and recognize the convenience of using students for laboratory experiments (Fréchette, 2014).

We designed a visualized experiment that is fully contextualized by a specific agricultural problem. It deals with farmers' management decisions on intensively-cultivated organic soils. The problem arising is that the draining of organic soils is necessary for intensive agricultural activities but at the same time leads to the loss of the top soil layer and the related production potential. This soil loss leads to substantial negative environmental externalities, particularly greenhouse gas emissions. The experiment aims to test conservation payments as means to incentivize the adoption of a more sustainable use of these soils. We ran separate sessions of the experiment with farm apprentices and with a sample of generic university students. In addition to the contextualized version, we also developed a context-free (unframed) version of this experiment, which we only conducted with university students. We studied both subject-pool and framing effects with a static and a dynamic experimental design. While the static design simplified the farmers' decision situation considerably, the dynamic design captured more of the actual complexity in the dynamics of soil degradation. We also examined the effect of personal characteristics on behaviour within and among the various experimental setups.

We find no significant effect of the introduction of a specific context in the decision environment on behaviour. The rate of players who adopt sustainable land use is not significantly different in the presence versus absence of framing across the various scenarios tested. However, we find that the type of participant has a significant impact on experimental outcomes. The rate of cooperation and adoption of sustainable land use is on average significantly higher among students than among farm apprentices. Moreover, we find that some players' characteristics significantly influence players' adoption of sustainable land use, such as player's aversion to risk, and that the effect of these characteristics varies across framings and subject pools.

The remainder of the paper is structured as follows. Section 2 reviews the experimental literature on framing and subject-pool effects. Section 3 describes the experimental design and section 4 presents the results. Section 5 discusses the results and draws conclusions.

2. Literature Review

2.1. Subject-pool effects

While most experimental studies make use of the usual sample of university students (see e.g. Danielson & Holm, 2007), there is a growing literature analyzing experimental results from different subject pools, including samples of large representative populations and samples of professionals or specialists. Fréchette (2009) provides a meta-study comparing studies including students and professionals in laboratory environments. Some of these studies highlight significant behavioural differences between the two subject pools and others do not. An initial reason why it may not be possible to generalize the behaviour of students to field behaviour is the possible difference in the distribution of social preferences (e.g. Carpenter & Seki, 2011). A second potential bias to the behavioural generalization is the familiarity of the subject with the experiment, e.g. if players encounter the experiment's social dilemma in their work milieu, but also the absence of elements of the work environment from the experiment (Fréchette, 2009). In the latter case, professionals may either assume the presence of certain features of their work and behave accordingly, or some of their behaviour may only be triggered by specific signals that are not represented in the experiment (Fréchette, 2014). Third, self-selection may cause interpretation issues. Most studies, however, do not find different social inclinations between volunteers and non-volunteers (Falk et al., 2011; Anderson et al., 2013). A few studies involve professionals in games that imitate a particular working environment (e.g. Kagel et al., 2001). Yet, none compares professionals with students in such a contextualized experiment.

In the presence of differences between the behavior of students and professionals, professional's behaviour is observed to be slightly further off equilibrium predictions than that of students. For example, Carpenter and Seki (2010), in a study similar to ours, compare the behaviour of students to resource users, specifically fisherman, in a public goods game. They find that fishermen contribute significantly more than students do. This is also in line with the broader literature on subject-pool effects which shows that representative populations and professionals usually behave more prosocial than students in typical social preference games (e.g. Fehr & List, 2004; Bellemare & Kröger, 2007; Falk et al., 2011; Exadaktylos et al., 2013; Anderson et al., 2013; Belot et al., 2010). Yet, significant differences in behavior between the two populations reveal mainly in experiments invoking other-regarding considerations (Belot et al., 2010). While the literature largely supports the use of students in experiments, involving professionals can provide precious and unique insights (Fréchette, 2009). In particular, there is evidence of a link between potential behavioural differences between different subjects pools and the experimental context or methodology (Belot et al., 2010). Context and methodology can trigger signals that do or do not matter to the decision-making process of a particular type of subject (Belot et al., 2010), which can result in behavioural divergences (Fréchette, 2014). One such methodological aspect is the framing.

2.2. Framing effects

Framing effect corresponds to a shift in the subject's decisions or preferences induced by an alternative way of describing a particular situation or problem (Druckman, 2001; Frisch, 1993). A well-known study is the Asian Disease Problem by Tversky & Kahneman (1981), which illustrates the reversal of preferences when the effects of a medical program were presented in two logically equivalent manners. Other types of framing approaches have been tested in experimental economics, (cf. Levin et al., 1998) such as by varying the formulation of an incentive scheme or giving the frame a specific connotation that affects individuals' social preferences. Most of this literature finds a significant effect of framing on subjects' behaviour (e.g., Tversky & Kahneman, 1981; Hossain & List, 2012; Gächter et al., 2009; Pillutla & Chen, 1999; Elliott et al., 1998; Crisafulli et al., 2008; Rucker et al., 2008). Yet, a few studies find no effect of framing (e.g., Meier, 2006; Rege & Telle, 2004). Most of these experiments use abstract designs and address framing by either playing on the negative/positive connotation of the framing tool, which means that they use a negative or a positive oriented formulation referred to as "valence framing", or by shaping the wording towards a certain type of behaviour, e.g. self-interested vs cooperative, such as in Bernold et al., (2015). Important for this study is the influence of culture. For instance, the introduction of a deliberate rhetorical framing related to the cultural background of participants has been shown to affect behaviour significantly (Cronk, 2007). In this paper, we test the effect of framing induced by the introduction of a specific field context. The study by Cronk & Wasielewski (2008) shares similarities with our study. They show that minimal framing and brief exposure to an unfamiliar social norm can produce strong behavioural effects. An increasing number of authors work on understanding the effect of frame on how subjects view their decision and maximize their utility, and on the creation of norms (e.g., Pillutla & Chen, 1999). A specific experimental context as compared to an abstract experiment may indeed affect internalized social norms of individuals, and/or their interpretation of others' behaviour (Ellingsen et al., 2011). This means that some people may associate a context with a certain kind of behavior (e.g. a primary interest in payoffs in an economic context) (Koneberg et al., 2010).

3. Methodology

3.1. Experimental design

Our experimental design captures the three key components of the decision situation of farmers on organic soils (see Ferré et al. 2017a and 2017b for further details on the framed version of the experiment). First, sustainable use of organic soils is considerably less profitable than current management practice that relies on heavy drainage of these soils. Second, the adoption of sustainable land use requires farmers to cooperate among each other. Several farmers depend on a joint drainage system. Therefore, rewetting the soils, which is necessary for the more sustainable land use, requires unanimous agreement. Third, organic soils spatially differ in their profiles. Some farmers have high quality soils beneath the peat layer and others have poor quality underlying soils. Considering that the peat disappears under intensive land use (due to drainage), farmers are therefore heterogeneous in their soil production potential in the intensive land use, and differ in their opportunity costs of adopting the sustainable land use.

In the experiment, players are placed in groups of two. Each group consists of a High-production-potential player (H) and a Low-production-potential player (L). In the experiment, players were referred to as Blue farmer and Yellow farmer. Each player needs to decide between intensive and sustainable use of the soil. The decision procedure, repeated in each round of the baseline and the treatment phase is as follows: each group member first votes in favor or against rewetting the soils (*stage-1 decision*). This is because rewetting is a necessary step to the establishment of sustainable land use. If at least one player of the group rejects rewetting, both players automatically pursue intensive cultivation and their respective payoffs (π^H and π^L) are as in Figure 1. If both players vote for rewetting, the drainage is stopped and intensive use of the soils is no longer possible. Each member needs then to decide between adopting the sustainable land use (profit R) and reverting to the intensive land use by installing a personal drainage system at cost C (*stage-2 decision*). If soils are rewetted, players' possible payoffs are as in Figure 2.

Players need to cooperate to adopt the sustainable land use. Because of asymmetric opportunity costs, they may, however, differ in their incentives to do so, which may trigger negotiation. Thus, before proceeding to the vote, each player can make a binding side-payment offer to his/her group member, which is executed if and only if the player to whom the offer was made adopts the sustainable land use. Side payments made by player i (i=L, H) to the other player are denoted as S^i and are included in the payoffs in Fig. 2.

In the treatment phase, we test one of three conservation payment schemes to foster the adoption of sustainable land use:

- A differentiated agglomeration payment (DA) which mirrors the opportunity costs of players for adopting sustainable land use. Following the definition of Drechsler et al. (2007), the agglomeration payment is only allocated to the players if both group members adopt the sustainable land use.
- A uniform agglomeration payment (UA) which is also conditional on both players adopting sustainable land use, but pays an equal amount to players. We test two versions of this payment: one is aligned on H player's opportunity cost and one is set as an average across both players' opportunity costs.
- A uniform individual payment (UI) which is set as an average across players' opportunity costs but is only conditional on the individual player's land use, regardless of the other player's land use choice.

The three payment treatments are also represented in the payoff matrix in Fig. 2. We refer to Ferré et al., (2017a,b) for an overview of behavioural predictions associated to the treatments explored in this paper.

		Player H
		Intensive land use
Player L	Intensive land use	π^L $\boldsymbol{\pi}^{\mathbf{H}}$

Figure 1: Players' payoffs if soils are not rewetted.

Note: Payoffs of the H farmer are indicated in bold print

		Player H	
		Sustainable land use	Intensive land use
Player L	Sustainable land use	$R + UI + AP^L - S^L + S^H$ $\mathbf{R + UI + AP^H + S^L - S^H}$	$R + UI + S^H$ $\boldsymbol{\pi}^{\mathbf{H}} \mathbf{- C - S^H}$
	Intensive land use	$\pi^L - C - S^L$ $\mathbf{R + UI + S^L}$	$\pi^L - C$ $\boldsymbol{\pi}^{\mathbf{H}} \mathbf{- C}$

Figure 2: Players' payoffs if soils are rewetted, including side payments.

Note: In the treatment phase: UI = uniform individual payment, AP^i = agglomeration payment to player i. The agglomeration payment is either uniform (UA) or differentiated according to players' opportunity costs (DA^i). S^i: side payment made by player i to his/her group member. Payoffs of the H player are indicated in bold print.

In addition, we conducted this experiment in a "static" and "dynamic" setting. This enabled to further test the validity of our results. In a "static" setting, in line with most economic experiments, the decision procedure is strictly repeated over all rounds (i.e. repeated one-shot decision-making). The "dynamic" setting captures the dynamics of the management problem; it depicts the effect of land use on soil. This includes that H's farm profit is constant over time while L's farm profit declines across rounds used for intensive land use (due to of his/her underlying soil layer not being suitable for intensive land use).[1] The dynamic setting is described in detail in Ferré et al. 2017b (see also footnote 1).

Finally, the experiment also included an experimental elicitation of social preferences, which was conducted at the outset of the main decision procedure and a short exit survey. Figure 3 summarizes the timeline of the overall experiment.

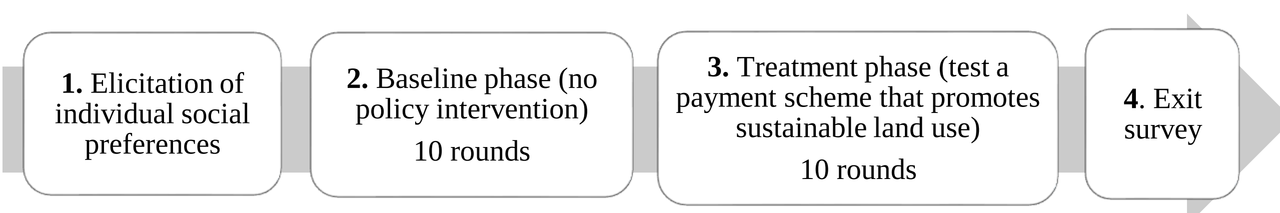

Figure 3: Organization of the experiment

[1] The experiment is calibrated as follows. In the static setting, players' payoffs in intensive land use are invariant across rounds: $\pi^L = 2500$, $\pi^H = 4500$; R = 250, C = 220, $DA^L = 2300$ and $DA^H = 4300$; UI = UA = 3300 (i.e. (2300+4300)/2). In the dynamic setting, H's profit is constant ($\pi^H = 800$); L's profit is negatively affected by intensive land use: it declines and falls to 0 as from the 6th round in intensive land use. With $\pi^L_{n,t}$ defined as the payoff in intensive land use at time t given a number n of previous rounds used in intensive land use (n={0,...,9}): $\pi^L_{n,t} = 800$ if n = 0, 1, 2; $\pi^L_{3,t} = 550$; $\pi^L_{4,t} = 160$; and $\pi^L_{n,t} = 0$ if n = 6, …, 10; R = 40, C = 25; UA = 770.

3.2. Framed and unframed experiment

The basic experimental setting as described in 3.1 refers to the framed (contextualized) version of the experiment. The unframed (context-free) experiment differs from the framed version as follows. First, while the visual background of the framed experiment depicts the agricultural landscape in the Swiss region concerned by the problem of cultivated organic soils and thus even visually reflects the impact of players' decisions on their land, the background of the unframed experiment is unspecific (see Appendix A1 for screen shots). Second, the wording of the unframed experiment includes no reference to agricultural terms nor farming management decisions. Instead of referring to farmers, participants are simply referred to as players; land use options are referred to as activities.

3.3. Subject pools and organization

We conducted the framed experiment with both professionals and a generic sample of university students (from the Swiss Federal Institute of Technology (ETHZ) and University of Zurich). Professionals in our case are farm apprentices from Swiss agricultural schools, who have a strong background in agriculture and most of whom intend to become farmers. Some of these already work on a farm, most often of their parents. In addition, we conducted the unframed experiment with a sample of university students only. Table 1 presents the treatments tested for the purposes of this paper across frames and subject pools.

Table 1: Experimental set up

	Framed experiment		**Unframed experiment**
	Apprentices	*Students*	*Students*
Dynamic setting	Baseline (78)	Baseline (80)	Baseline (76)
	UA (88)	UA (80)	UA (76)
Static setting	Baseline (58)	Baseline (222)	Baseline (78)
	UI (30)	UI (74)	-
	DA (28)	DA (74)	-
	-	UA (74)	UA (78)

Note: number of participants in brackets. UI = uniform individual payment, UA = uniform agglomeration payment, DA= agglomeration payment differentiated according to players' opportunity costs.

4. Results

We derive our results based on two main questions: 1) How is performance of our treatments affected by subject pool and by the experimental framing? And 2) how do the individual characteristics of players affect their decisions depending on subject pool and across framings? For the first question, we examine different performance criteria including environmental effectiveness, cost effectiveness, and effect on income inequalities. We first analyze how the behaviour of farm apprentices compares to that of university students and then investigate how the framing affects players' behaviour. In addition to analyzing absolute performance, we also examine whether the subject pool and the type of experimental framing, here the level contextualization, affect the ranking of the payment designs in terms of performance. Henceforth, we refer to the intensive land use as "*Activity 1*" and to the sustainable land use as "*Activity 2*". We also term the adoption of sustainable land use as "cooperation". Below, reported average values correspond to the average of the means of the given variable over all rounds.

4.1. Impacts of subject pool

4.1.1. On environmental effectiveness

In this study, a higher rate of cooperation means a higher level of the environmental outcome being provided, specifically a larger amount of peat being preserved. We examine cooperation across subject pools. Figure 4 illustrates cooperation across rounds graphically. We find that cooperation rates (i.e., percentage of players who adopt Activity 2) of students and apprentices in the baseline treatment are very much similar until round 5, but start diverging from round 6 onwards. In fact, the average percentage over all rounds of players who adopt Activity 2 is significantly higher among students (40.3%, std. 5.4) than among apprentices (23.6%, std. 3.2) (proportion test, p-value = 0.02). We further examine this effect with a panel regression on cooperation (Table 2, Model 1). We find that H-player types are less likely to adopt Activity 2 than L types, and the effect of the subject pool is significantly stronger for H than for L types.

In the treatment phase with a uniform agglomeration payment (UA) to incentivize cooperation, we find that the mean percentage of players who cooperate is again significantly higher among students than among farm apprentices (97.3% (std. 3.2) and 65% (std. 3.0) respectively; proportion test, p-value = 0.00). We confirm this subject-pool effect in UA with a panel regression on cooperation (see Table 2, Model 2). L players and students are both significantly more likely to cooperate than H players and farm apprentices; the effect of subject pool is also significantly stronger on L than on H players. First, L players' profits from Activity 1 decrease as L conducts Activity 1. L players therefore have an increasing incentive to adopt Activity 2 along the experiment. Second, one possible explanation is that the behaviour of students is more strongly driven by payoffs than that of farm apprentices. Thus, students aim at cooperating and maximizing their payoffs from the payment incentive earlier on in the experiment as compared to farm apprentices.

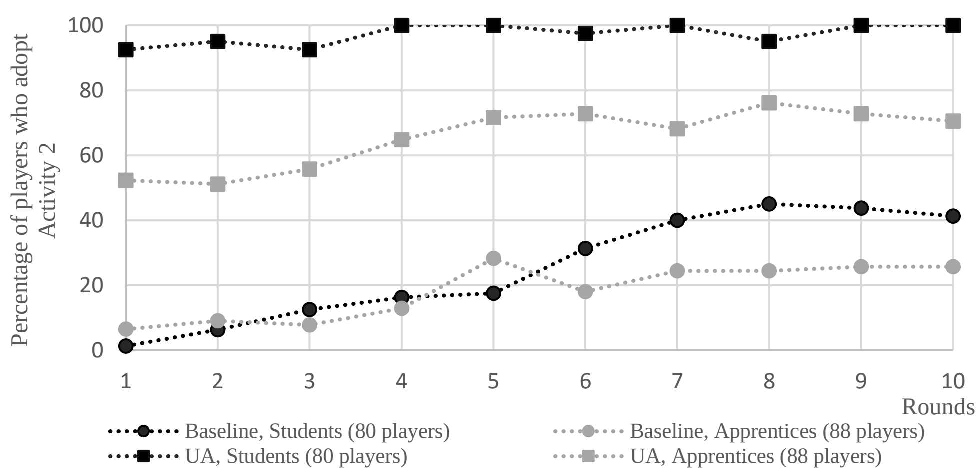

Figure 4: Cooperation rates across subject pools in baseline and UA (framed design, dynamic setting)

We now investigate the impact of the subject pool with the static setting. In the baseline scenario, on average 5.7% of the apprentices and 3.5% of the students adopt Activity 2 in all rounds. This cooperation rate is not significantly different (proportion test, p value = 0.44). Yet, we find a weak effect of subject pool on cooperation. (Table 2, Model 3). Apprentices appear to be more likely to adopt Activity 2 than students in the baseline scenario. In both payment treatments (UI and DA), we find no significant effect of subject pool on the adoption of Activity 2; see Table 2, Models 4 and 5.[2] The average percentage of players who cooperate among students versus farm apprentices is equal to 42.8% (std. 6.1) vs. 36.3% (std. 7.3) in UI (proportion test, p-value = 0.51) and 50.8% (std. 6.3) vs. 49.3% (std. 14.5) in DA. An analysis of each decision stage separately led to the same findings. We find that in UI, H players are less likely to cooperate that L players. Under such average uniform payment treatment and in the absence of sufficient side payments from L, H players have indeed no incentive to adopt Activity 2

Table 2: Random effect logistic panel regression on player's cooperation

	(1) Baseline dynamic	(2) UA dynamic	(3) Baseline static	(4) UI static	(5) DA static
Round	1.440***	1.163**	1.144*	1.035	0.856**
	(0.0959)	(0.0769)	(0.0764)	(0.0610)	(0.0542)
Subject pool (0=apprentices,	0.657	479.0***	0.291*	3.830	3.323
1=students)	(0.432)	(574.0)	(0.178)	(4.230)	(4.942)
H player	0.243***	0.650**	0.627	0.0944***	1.415
	(0.0135)	(0.0238)	(0.00510)	(0.0316)	(0.0555)
H player*Subject pool	10.10***	0.650**	1.334	1.694	1.420
	(5.365)	(0.137)	(0.859)	(1.392)	(0.454)
Constant	0.0208***	2.262	0.0223***	0.149	0.333
	(0.0164)	(1.962)	(0.0210)	(0.219)	(0.794)
Observations	1,580	1,680	2,800	1,040	1,020
Groups	158	168	280	104	102

Note: Odds ratios are reported: *** p<0.01, ** p<0.05, * p<0.1 Robust standard errors clustered at group level in parentheses. Models 3 and 5 weakly fit the data: general p-values of the models respectively equal to 0.09 and 0.06. All regressions include a dummy variable referring to the group membership of the player (not reported).

In summary, in the dynamic setting, environmental effectiveness differs significantly by sample population in the framed experiment. The effect is less pronounced in the static setting. Regardless of subject pool, all payment design options rank the same in environmental effectiveness.

4.1.2. On the use of side payments and cost effectiveness

We analyze the effect of subject pool on side payments between group members (see Appendix A2 for an overview of offered and executed side payments). For this, we examine net side-payment offers from player H to player L (i.e., $S^H - S^L$). A positive net H offer refers to the fact that the level of the offer made by H was larger than the one made by L, and a negative net H offer means that the offer made by L was larger than the one made by H. We first examine the experiment conducted in a dynamic setting. In the baseline scenario, we find no significant effect of the subject pool on side-payments offers. In the UA treatment, we find a significant effect of subject pool on side payments. The mean net H side-payment offer is significantly higher among students than among apprentices: it is equal to -250 and -40, respectively (t-test, p-value = 0.00). However, considering all rounds, 47.5% of the apprentice groups make a side payment offer (either positive or negative net H offer) as compared to 10.2% of the student groups, which is significantly different (proportion test, p-value=0.00). Note that in this treatment, H types may have an incentive to bargain given

2 In UI, the mean percentage of players who adopt Activity 2 is 42.8% (std. 6.1) with students and 36.3% (std. 7.3) with apprentices (proportion test, p-value = 0.51); in DA, it is 50.8% std. 6.3 with students and 49.3% std. 14.5 with apprentices.

that L's profit decreases in the event of no cooperation. The analysis of the communication content between group members confirms that the proportion of H players who condition their cooperation on a side payment and therefore delay group cooperation is significantly higher among apprentices than among students.

Next, we analyze the experiments conducted in a static setting. We find no significant effect of the subject pool on the side payments in these treatments.

Next we analyze cost-effectiveness, defined as the total amount of soil units preserved per money unit spent on conservation payments. The distinction in the use of bargaining power between subject pools in the UA-dynamic treatment is also reflected in the cost effectiveness of the payment scheme. We find that cost-effectiveness of the UA payment is higher among students than among apprentices (see Table 3). For the static setting, cost effectiveness does not largely differ between subject pools in both treatments (see Table 3). We also observe that the ranking with regard to cost-effectiveness of the two payment schemes examined in the static setting does not vary with the type of subject: UI appears as more cost effective than DA for both subject pools.

Table 3: Impact of the subject pool on cost-effectiveness (framed design)

			Peat preserved as % of the total	Payment made as % of the total payment possible	Cost-effectiveness	N
Apprentices	*Dynamic*	UA	45.2	59.5	2,027.5	88
	Static	UI	36	36.3	3,330.5	30
		DA	49.3	44.3	2,965.22	28
Students	*Dynamic*	UA	93.75	97.5	1,601.6	80
	Static	UI	42.7	42.8	3,310.4	74
		DA	50.7	45.4	2,956.8	74

4.1.3. On income inequality

Using the Gini coefficient, we analyze the effect of our treatments on income inequality between players and compare these effects across subject pools (see Table 4). The Gini coefficient varies from 0 (perfect equality between payoffs) to 1 (perfect inequality). We calculate the Gini coefficient for each round based on players' payoffs and then report the average Gini coefficient across all rounds. For each treatment considered, the coefficient differs significantly between subject pools (t-test, 95% confidence level). This is due to the low variation of the variable across the rounds (cf. standard deviation). The highest difference is observed for UA in the dynamic setting: the coefficient is equal to 0.14 with farm apprentices and 0.27 with students. This is consistent with our previous finding: side-payment offers are higher among students than among farm apprentices, hence a higher redistribution of payoffs and a higher level of inequality in incomes among players. However, as for the measure of cost effectiveness, we find that the subject pool does not affect the ranking of policy options with regard to their impacts on income inequalities (see UI and DA treatments - static, Table 4).

Table 4: Test of subject pool effect on inequalities (framed design)

			Gini coefficient (std.)	N
Apprentices	*Dynamic*	Baseline	0.34 (0.21)	78
		UA	0.14 (0.02)	88
	Static	Baseline	0.18 (0.02)	58
		UI	0.13 (0.02)	30
		DA	0.18 (0.03)	28
Students	*Dynamic*	Baseline	0.27 (0.16)	80
		UA	0.03 (0.01)	80
	Static	Baseline	0.16 (0.01)	222
		UI	0.11 (0.00)	74
		DA	0.17 (0.02)	74

In summary, and along the three examined performance criteria, the type of subject affects the performance of the payment treatments in their magnitude. However, the effect is less pronounced in the static setting than in the dynamic setting. Moreover, we find that, for the treatments tested in this study, subject pool does not affect the ranking of policy options in their performance. This means that conducting experiments with regular university students still seems to enable identifying most and least performant policy schemes.

4.2. Impacts of framing

4.2.1. On environmental effectiveness

Again, we examine the effect of framing on cooperation among the sample of university students. For this, we compare the percentage of players who cooperate across the two framings, for both the baseline and treatment phases (see Figures 5a and 5b for visual illustration). We also conduct a panel regression on cooperation across all treatments accounting for the framing effect (Table 5). We find no significant difference in decisions of university students, regardless of whether the experiment is played framed or unframed, and in either setting (static or dynamic).Thus, there appears to be no significant effect of framing on decisions of students for these experiments.

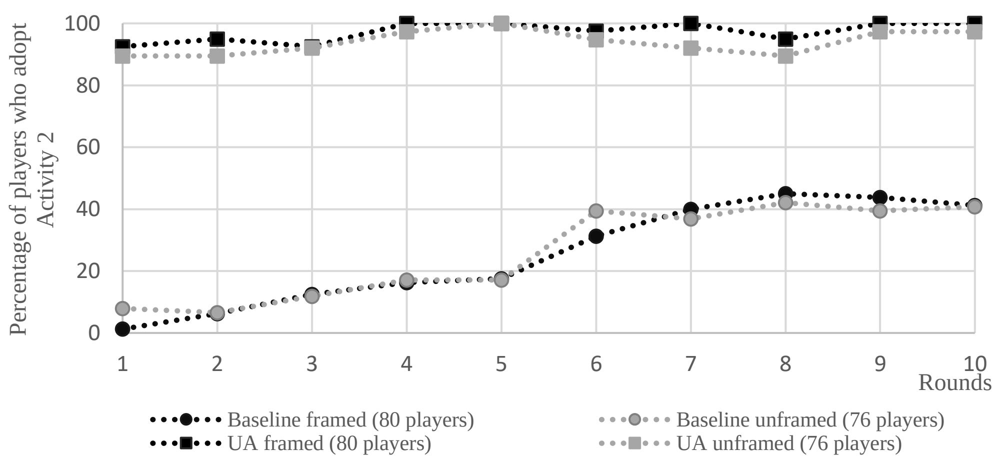

Figure 5a

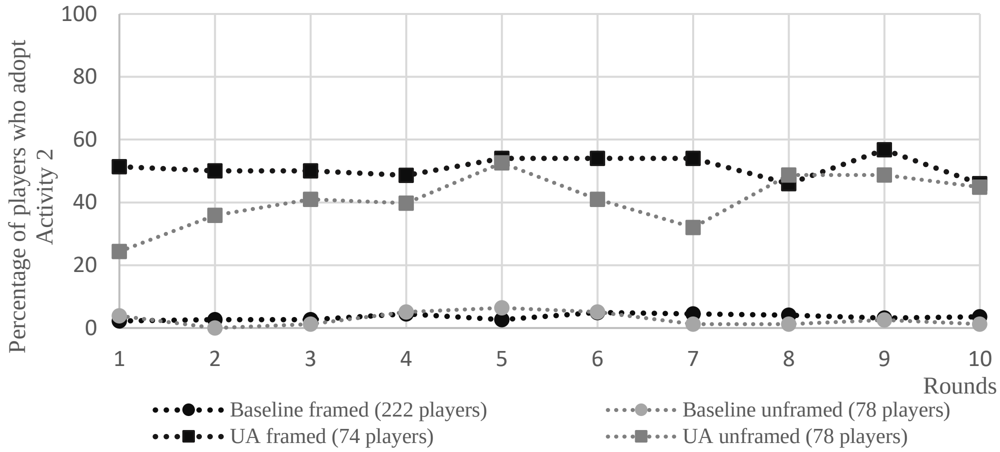

Figure 5b

Figure 5: Proportion of players who cooperate in the baseline and in treatment UA across framings, in the dynamic setting (Fig. 5a) and in the static setting (Fig. 5b)

Table 5: Random effect logistic panel regression on player's cooperation among students

	(1) Baseline dynamic	(2) UA Dynamic	(3) Baseline static	(4) UA static
Round	1.521***	1.40**	1.034	1.076
	(0.101)	(0.235)	(0.0733)	(0.0647)
Framing (0=unframed,	0.342	1.21	0.926	0.196
1=framed)	(0.247)	(3.163)	(0.731)	(0.261)
H player	0.0433***	1.0	0.620	1.026
	(0.0185)		(0.404)	(0.0894)
H player*framing	2.378	1.0	1.398	1.181
	(1.487)	(0.00002)	(0.975)	(0.156)
Constant	0.0300***	635.9	0.0102***	7.130
	(0.0208)	(2371)	(0.0118)	(11.94)
Observations	1,560	1,404	3,000	1,520
Groups	156	156	300	152

Note: We report odds ratios: *** p<0.01, ** p<0.05, * p<0.1 Robust standard errors in parentheses. In UA dynamic (Model 2), the variation of the response variable is very low: nearly all players cooperate: on average 97.3% std. 3.2 in the framed and 93.9% std. 3.9 in the unframed design.

4.2.2. On the use of side payments and cost effectiveness

In both dynamic and static settings, and across all treatments, we find no significant effect of framing on side-payments offers. As a consequence, cost effectiveness of the payment treatment is not affected by the framing either (Table 6).

Table 6: Impact of the framing on cost-effectiveness (students)

			Peat preserved as % of the total	Payment made as % of the total payment possible	Cost-effectiveness	N
Framed	*Dynamic*	UA	93.75	97.5	1,601.6	80
	Static	UA	51.2	49.7	3,204.2	74
Unframed	*Dynamic*	UA	87.9	93.9	1,646.05	76
	Static	UA	41.3	39.5	3,156.5	78

4.2.3. On inequalities in incomes

Comparing the Gini coefficients for all treatments we again do not observe a noteworthy effect of the framing on inequalities in incomes between players (see Table 7).

Table 7: Test of framing effect on inequalities (students)

			Gini coefficient (std.)	N
Framed	*Dynamic*	Baseline	0.27 (0.16)	80
		UA	0.03 (0.01)	80
	Static	Baseline	0.16 (0.01)	222
		UA	0.14 (0.01)	74
Unframed	*Dynamic*	Baseline	0.31 (0.18)	76
		UA	0.02 (0.01)	76
	Static	Baseline	0.15 (0.01)	78
		UA	0.14 (0.01)	78

In summary, along the three examined performance criteria, the experimental framing does not affect the performance of the payment treatments explored in this study with a sample of university students. Given that each experimental setup for the analysis of framing effect includes only one payment treatment, we cannot formulate conclusions with respect to the effect of framing on the performance ranking of policy options.

4.3. Effect of individual players' characteristics across framings and subject pools

4.3.1. Distribution of social preferences across subject pools

The SVO slider measure that we conducted at the outset of the experiment uses the test proposed by Murphy et al. (2011) and provides us with an individual measure of social preferences. This test enables to elicit the extent to which the player places importance on his/her own income in relation to the outcome of other players. An angle is defined for each player (ranging between -16.26° and 61.39°) and characterizes his/her level of prosociality. The higher the individual's SVO angle, the stronger his/her social preferences. The average SVO angle is not significantly different between the two subject pools: it is equal to 24.8 (std. 14.8) in farm apprentices and to 24.2 (std. 13.2) in university students (t-test, p-value = 0.64). Yet, the distribution of individual measured SVO, illustrated in Figure 6, varies between students and apprentices: apprentices tend to exhibit higher SVO angles, while the students show a similar peak at higher SVO angels, and an additional second peak at lower angles. The SVO angle also allows categorizing players in distinct types. The most common types are proself (i.e. selfish types) and prosocial (i.e. altruistic types). In line with our observed distributions, we find that the percentage of players characterized as individualistic is significantly higher among students than among apprentices (45.7% versus 34.3%, respectively; proportion test, p-value = 0.013).

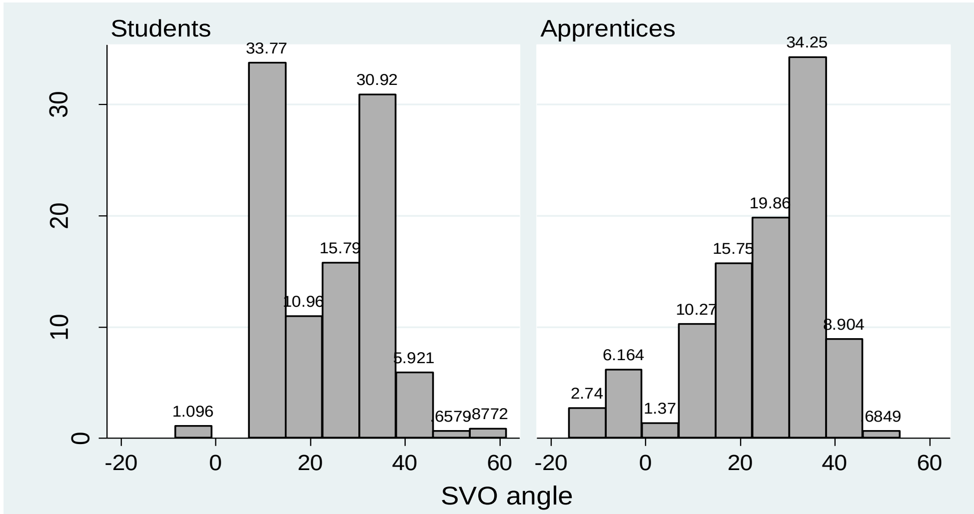

Figure 6: Distribution of the SVO angle among students (456) and apprentices (146)

4.3.2. Impact of individual characteristics on players' decision in link with framing and subject pool

We are interested in the influence of social preferences and other characteristics on players' behaviour in link with the framing and the subject pool. Besides the SVO angle we include further important characteristics which we elicited in our exit survey: environmental preferences (index ranging from 0% to 100%, higher score indicated stronger concern for environmental issues); risk preferences (score ranging from 0 to 10, higher score indicates greater willingness to take risks); time preferences (score ranging from 0 to 10, higher score indicates more patience); reputation (score ranging from 0 to 10, higher score indicates more concern for others' opinions). Appendix A3 presents a summary of all collected characteristics.

We conduct a random-effect logistic panel regression on players' cooperation (i.e. adoption of Activity 2), and test for effects of interaction between players' personal characteristics and framing vs. subject-pool on players' decisions. Regressions tables are provided in Appendix A4. The main findings are as follows. We find in UA-dynamic that reputation is a predictor for player's adoption of Activity 2, and has a stronger effect for apprentices than for students. Because of their difference in cultural background, apprentices may be more sensitive to reputation than regular students. Next, we find that the effects of environmental consideration, willingness to take risks, and social preferences are each significantly stronger for students than for apprentices in this very same treatment. One possible explanation may be the familiarity of the player with the context offered in this experiment. Apprentices who are familiar with the farming context and consider it their professional future activity may be less influenced by environmental or social preferences. For this reason, for instance, a high level of care for the environment may induce a relatively higher level of cooperation in students than in apprentices. Interestingly, the intensity of the effect of risk depending on the subject pool varies between UA-dynamic and DA-static. In UA and in line with the previous result, the effect of risk on players' cooperation is stronger among students than among apprentices. In UA, students are more likely to cooperate than farm apprentices. Risk aversion linked to the agglomeration-payment type may be a stronger limiting factor to cooperation among students than among apprentices. In DA, it is the other way around: the effect of risk on players' cooperation is stronger among farm apprentices than among students. One potential explanation may relate to prosocial preferences. Farm apprentices may pay higher attention to income equalities than university students. Given that successful cooperation facilitates payoff redistribution, farm apprentices may thus be more sensitive to the risk of unsuccessful cooperation than university students. In UI, the type of subject does not interact significantly with any players' characteristics in a way that affects players' decisions.

Next, we analyzed the interaction effects between framing and the characteristics of players. In UA-dynamic, we find that the willingness to take risk and the consideration for the environment appear as significantly stronger predictors of cooperation in the framed than in the unframed design. The introduction of a resource management problem (with a farming context) may induce non-economic considerations in the decision-making process (e.g. linked to the environment), which then makes the player more sensitive to risk and to environmental preferences. In the static setting baseline scenario we find that risk takers are less likely to cooperate, and the effect of willingness to take risk is also stronger in the framed than in the unframed design. One possible explanation is that in the framed design, the player may not only account for the impact of his/her decision on payoffs but also the impact of the decision on the soils or the environment, which induces different types of risk considerations. Moreover, we find that patient players are more likely to cooperate and this effect is significantly stronger in an unframed than in a framed design.

5. Discussion and conclusion

Our comparative analysis reveals that, along the tested criteria, the type of subject taking part in economic experiments may significantly impact behaviour of players, while the experimental framing does not appear to have a significant effect on the decisions of players. This is true in the absence and in the presence of a policy promoting a specific activity. Environmental effectiveness and payoff redistribution, and hence cost effectiveness and impact on income inequalities, differ between apprentices and students. Yet, the subject-pool effect is mainly present with the dynamic experimental setting that closely captures the resource management problem. The weaker impact of the subject pool on decisions in the static setting may be explained as follows. The static setting is an abstraction of the actual farming situation and may therefore be perceived by farm apprentices as less connected to the actual agricultural decision situation and therefore may induce a higher level of rational payoff-maximizing decisions. By contrast, the dynamic setting gives a more real depiction of agricultural management decision and the actual soil degradation dynamics. First, this may trigger questioning among farm apprentices (and not among students) with regard to farming identity, such as “shall I maximize my soil potential by producing vegetables until I am no longer able to or shall I benefit from the payment incentive and stop producing?” Second, the dynamic setting may trigger more emotional responses. For instance, observing soils degrade over time triggers more concerns about the L player).

A potential explanation to the difference in behaviour between the two populations is the representation of social preferences, which differs between university and agricultural students; this is in line with the literature. Furthermore, we find that the impacts of several players' characteristics on their decision vary significantly across subject pools and across framing designs. This includes willingness to take risks, social preferences, environmental consideration, and caring about personal reputation. This paper thus highlights the importance of identifying the personal characteristics of subjects that could potentially be affected by the choice of an experimental setup, as this could be a bias factor in the estimation of behaviour.

In conclusion, subject pool affects the size of policy impacts but tends to not affect the ranking of policy options along the performance criteria. As policy recommendations are based usually on the ranking and general direction of effect and not on its exact magnitude, the type of subject used in the experiment may not matter so much. However, this result needs to be nuanced with the type of treatment investigated. In this paper, we only explored the effect of payment schemes for which there is a collective gain from adopting the sustainable land use. Group members have therefore an incentive to negotiate and cooperate. Another type of treatment could more severely influence the nature of the outcomes across subject pools. This is especially important when the experimental study intends to draw environmental policy implications from the results. Furthermore, the type of subject does affect the magnitude of policy impacts and policy costs, which can make predictions difficult.

Two further limitations of our study need to be highlighted. First, there is a need to analyze a larger range of payment treatments in order to conclude on the impact of both subject pool and framing on policy ranking. In this study, this analysis was only possible under the static setting and considering the effect of subject pool. We could not compare the impact on ranking of different policy options in the dynamic setting. Yet, the impact of subject pool seems to be more pronounced for the dynamic setting, which was depicting the actual decision situation more closely. It is thus possible that subject pool may also affect the ranking of policy options in that setting. Second, our analysis of framing effects focused only on university students. Further research is needed on the impact of framing among a professional population: How would the framing affect the behavior of farm apprentices? Would farm apprentices be more sensitive to the framing than university students?

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APPENDIX

A1. Background visualization

Below are screen shots of the interfaces of the players in the framed versus the unframed experiment.

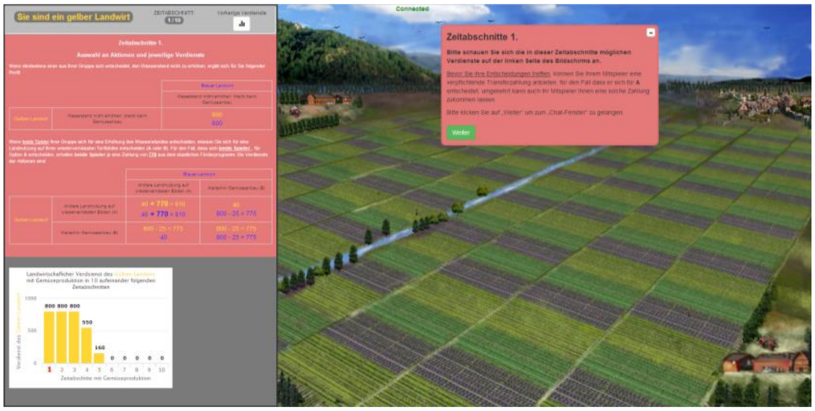

Figure 7: Visual background of the framed experiment. It represents two vegetable farming systems (i.e. group members) separated by a joint drainage canal

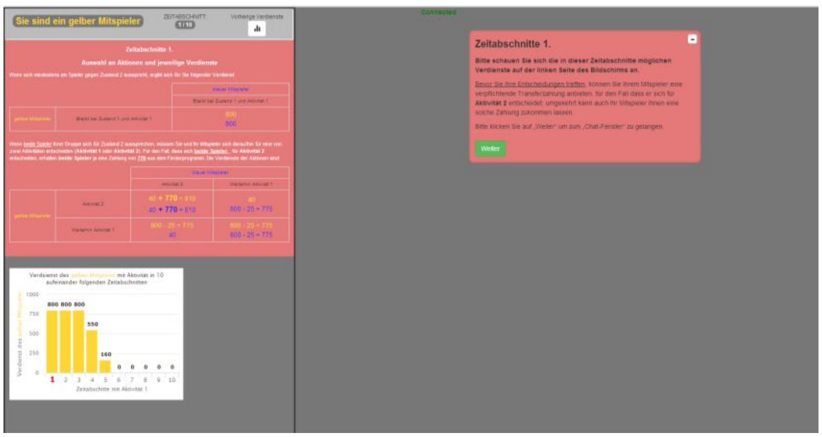

Figure 8: Visual background of the unframed experiment: context-free

A2. Side payments

Table 8: Analysis of side payments in the experimental setups

Experimental Set up			Mean net H side-payment offer		Mean % of groups who make an offer	
			Among all groups	Among groups who cooperate	Among all groups	Among groups who cooperate
Apprentices framed	*Dynamic*	Baseline	R4 to R10: 173.7 (55.0)	-	25	-
		UA	-40 (23)	-71.3	47.5	23
	Static	Baseline	-	-	78	-
		UI	-	-188.4 (198.4)	85	15
		DA	136.1 (152.9)	129.2 (105.0)	78.6	37
Students framed	*Dynamic*	Baseline	R4 to R10: 171.3 (63.9)	-	40	-
		UA	-250 (328)	-250 (328)	10.2	10.2
	Static	Baseline	77.8 (74.0)	-	65	-
		UA	-427 (108.4)	-337.9 (126.7)	77	41
		UI	-182.8 (33.7)	-184.0 (284.4)	76	18
		DA	110.5 (64.2)	139.1 (81.7)	74	35
Students unframed	*Dynamic*	Baseline	TP4 to R10: 203.6 (25.9)	-	37	-
		UA	-147.0 (46.1)	-147.0 (46.1)	10.5	10.5
	Static	Baseline	-	-	59	-
		UA	-307.2 (104.2)	-477.59 (116.7)	80	36.4

Note: R = round. "-": the mean is not significantly different from 0 at 90% conf. level (t-test). Groups cooperate = both members adopt Activity 2.

A3. Characteristics of players

Table 9: Characteristics of players in student (S) versus apprentice (A)

Characteristics of players	*Dynamic setting*			*Static setting*		
	UA S	UA A	UI S	UI A	DA S	DA A
Age	21.3 (2.3)	20.3 (4.1)	22.3 (3.1)	22.3 (2.3)	22.1 (3.0)	21.6 (1.6)
Feedback instructions; (0=very clear, 3= very difficult)	0.8 (0.6)	1.2 (0.8)	0.5 (0.5)	0.9 (0.7)	0.5 (0.6)	0.9 (0.7)
Level of knowledge about degradation of peat soils in CH; (0 = great deal, 3 = nothing)	2.2 (0.9)	1.15 (0.7)	2.3 (0.8)	1.3 (0.9)	2.3 (0.9)	1.2 (0.8)
Opinion of peat soil degradation among players who have knowledge about it; (1= not a problem at all, 4= a very serious problem)	1.9 (0.5)	2.1 (0.7)	1.5 (0.6)	2.0 (0.6)	1.5 (0.6)	2.1 (0.8)
Index of Altruism	46.1 (11.4)	47.9 (11.8)	47.6 (10.5)	44.0 (8.7)	46.9 (11.8)	46.9 (10.4)
Index of Care for the environment	62.6 (13.2)	57.6 (15.5)	64.0 (14.1)	68.8 (13.8)	63.1 (11.8)	62.0 (10.1)
Financial risks; (0 =avoid, 10 =willing to take financial risks)	3.4 (2.3)	4.6 (2.4)	3.4 (2.6)	3.4 (2.4)	3.2 (2.2)	4.1 (2.4)
Risks; (0 = avoid, 10=willing to take risks)	4.9 (2.3)	6.4 (2.2)	4.6 (2.4)	5.8 (2.1)	4.6 (2.3)	5.3 (2.4)
Time preference measure (money amount) (outliers excluded)	597 (472)	860 (961)	857.8 (917.5)	723 (730)	853 (964)	504 (287)
Impatience; (0 = very impatient, 10 = very patient)	5.7 (2.3)	5.0 (2.5)	5.4 (2.5)	4.9 (2.6)	5.8 (2.3)	5.5 (2.7)
Care for reputation; (1= care a lot, 4 = don't care at all)	1.5 (0.7)	1.2 (0.7)	1.5 (0.7)	1.7 (0.7)	1.5 (0.7)	1.4 (0.6)
% players who prefer individual as compared to collective participation in environmental scheme	16.25%	40.2%	27.0%	33.3%	24.3%	39.3%
Opinion of cooperative approaches in agricultural management; (0=more successful than other approaches, 3=not at all)	0.6 (0.7)	1.0 (0.6)	1.06 (0.7)	0.9 (0.6)	1.0 (0.8)	1.1 (0.7)
Gender (% females)	58.8	20.7	63.5	53.3	54.0	57.1
SVO angle	22.3 (13.4)	25.1 (15.7)	24.6 (13.3)	25.0 (12.0)	24.4 (12.6)	24.1 (15.1)

Note: Within apprentices, in UA-dynamic, 69% of the players have a farm at home and 98% plan to become farmers. In UI-static, 60% have a farm at home and 75% want to become farmers, and in DA-static, 57% have a farm at home and 75% want to become farmers.

Table 10: Comparative analysis of the characteristics of student players according to framing type

Characteristics of players	*Dynamic setting*		*Static setting*	
	UA Unframed	UA framed	UA Unframed	UA framed
Previous participation experiment	57.9	47.5	47.4	ND
Number experiments participated in	2.02 (1.9)	2.1 (2.4)	2.0 (1.9)	ND
Age	22.1 (3.8)	21.3 (2.3)	21.6 (3.5)	21.9 (3.5)
Feedback instructions (0=very clear, 3= very difficult)	0.84 (0.85)	0.8 (0.6)	0.6 (0.6)	0.5 (0.6)
Level of knowledge about degradation of peat soils in CH; (0 = great deal, 3 = nothing)	2.4 (0.7)	2.2 (0.9)	2.6 (0.6)	2.5 (0.7)
Opinion of peat soil degradation among the players who have knowledge of the issue; (1= not a problem at all, 4= a very serious problem)	1.8 (0.5)	1.9 (0.5)	1.8 (0.7)	1.7 (0.6)
Index of Altruism (in %)	46.5 (9.9)	46.1 (11.4)	46.5 (11.0)	48.3 (11.3)
Index of Care for the environment (in %)	62.7 (13.3)	62.6 (13.2)	61.7 (12.4)	62.8 (11.7)
Financial risks; (0 =avoid, 10 =willing to take financial risks)	3.3 (2.2)	3.4 (2.3)	3.3 (2.0)	3.5 (2.6)
Risks; (0 = avoid, 10=willing to take risks)	4.7 (2.2)	4.9 (2.3)	4.8 (2.1)	5.0 (2.3)
Measure of time preference (money amount) (outliers excluded)	706.5 (694.3)	597 (472)	858 (938)	714 (707)
Impatience; (0 = very impatient, 10 = very patient)	5.8 (2.2)	5.7 (2.3)	5.8 (2.5)	5.8 (2.6)
Care for reputation; (1= care a lot, 4 = don't care at all)	1.3 (0.7)	1.5 (0.7)	1.6 (0.7)	1.4 (0.8)
Environmental scheme preferences: % of players who prefer individual participation as compared to collective participation	10.5	16.25	15.4	17.8
Opinion of cooperative approaches in Agricultural management (0=more successful than other approach, 3=not at all)	0.8 (0.6)	0.6 (0.7)	0.8 (0.5)	0.8 (0.7)
Gender (% females)	48.7	58.8	60.3	46.0
SVO angle	22.4 (13.3)	22.3 (13.4)	24.3 (13.7)	22.2 (12.7)

A4. Panel regression analyses

Table 11: Panel regression on player's cooperation including player characteristics and their interaction with subject-pool effects

(framed design) VARIABLES	(1) Baseline Dynamic	(2) UA Dynamic	(3) Baseline Static	(4) UI Static	(5) DA Static
Round	**1.463*** **	**1.156** **	1.144*	1.036	**0.854** **
	(0.0987)	(0.0763)	(0.0822)	(0.0618)	(0.0550)
H-farmer type	**0.0352** **	0.173	0.0174*	**0.000592** **	0.141
	(0.0509)	(0.511)	(0.0363)	(0.00179)	(0.574)
Subject pool (0=apprentices, 1=students)	0.867	0.135	0.147	5.874	0.885
	(1.211)	(0.516)	(0.325)	(19.53)	(4.544)
Environment	0.979	1.021	0.999	0.975	0.942
	(0.0142)	(0.0241)	(0.0240)	(0.0431)	(0.0537)
Risks	0.962	0.832	**0.790** **	0.757	1.238
	(0.0996)	(0.143)	(0.0787)	(0.165)	(0.286)
Patience	1.005	1.037	0.885	0.910	0.792
	(0.0816)	(0.120)	(0.0868)	(0.222)	(0.227)
Reputation	1.038	**2.903** **	0.385***	1.071	0.221*
	(0.311)	(1.439)	(0.135)	(0.683)	(0.183)
SVO angle	1.010	0.970	1.025	0.988	0.954
	(0.0205)	(0.0241)	(0.0242)	(0.0365)	(0.0429)
Environment*H	1.018	1.021	1.045*	1.069*	0.970
	(0.0181)	(0.0340)	(0.0265)	(0.0424)	(0.0515)
Risks*H	0.860	1.349	1.070	1.083	0.917
	(0.115)	(0.322)	(0.103)	(0.203)	(0.242)
Patience*H	1.002	1.133	0.944	1.042	1.355
	(0.112)	(0.214)	(0.0996)	(0.209)	(0.419)
Reputation*H	0.957	0.225**	1.148	0.508	2.419
	(0.320)	(0.157)	(0.447)	(0.335)	(1.927)
SVO angle*H	0.970	1.033	1.017	1.040	1.040
	(0.0224)	(0.0342)	(0.0204)	(0.0429)	(0.0605)
Environment*Subject pool	1.008	**1.087** **	0.977	0.976	1.076
	(0.0168)	(0.0447)	(0.0237)	(0.0433)	(0.0697)
Risks*Subject pool	0.983	**1.763*** **	**1.279** **	1.198	**0.548** **
	(0.101)	(0.380)	(0.149)	(0.245)	(0.150)
Patience*Subject pool	1.050	0.837	1.147	1.035	0.623*
	(0.102)	(0.194)	(0.128)	(0.220)	(0.167)
Reputation*Subject pool	1.103	**0.206** **	1.746	0.851	1.886
	(0.386)	(0.140)	(0.655)	(0.577)	(1.299)
SVO angle*Subject pool	1.008	**1.065***	0.990	1.001	1.045
	(0.0229)	(0.0384)	(0.0244)	(0.0395)	(0.0439)
Subject pool *H player	12.70***	0.505	0.628	0.598	1.655
	(8.034)	(0.342)	(0.307)	(0.605)	(1.220)
Constant	0.0902	1.300	0.295	11.50	1,957
	(0.166)	(3.704)	(0.666)	(42.81)	(11,037)
Observations	1,560	1,670	2,780	1,020	1,010
Number of B	156	167	278	102	101

Note: Reported odds ratios are: *** p<0.01, ** p<0.05, * p<0.1 Robust standard errors clustered at group level in parentheses.

Table 12: Panel regression on player's cooperation including players' characteristics and their interactions with framing effect

(students) VARIABLES	(1) Baseline Dynamic	(2) UA Dynamic	(3) Baseline Static	(4) UA Static
Round	**1.519*****	**1.380***	1.034	1.076
	(0.102)	(0.234)	(0.0731)	(0.0648)
H player	0.0591	0.0342	0.0420	**4.07e-05*****
	(0.135)	(0.166)	(0.0966)	(0.000139)
Framing (0=unframed, 1=framed)	1.602	**3.14e-07****	0.962	1.840
	(3.384)	(2.08e-06)	(2.236)	(7.175)
Environment	0.991	0.976	0.935***	0.971
	(0.0173)	(0.0350)	(0.0236)	(0.0280)
Risks	0.936	0.797	**0.718***	0.638**
	(0.108)	(0.200)	(0.122)	(0.130)
Patience	1.091	0.889	**1.826*****	0.920
	(0.100)	(0.291)	(0.383)	(0.141)
Reputation	0.846	0.328	0.983	0.908
	(0.334)	(0.345)	(0.789)	(0.543)
SVO angle	1.019	0.949	0.995	1.041
	(0.0166)	(0.0499)	(0.0238)	(0.0281)
Environment*H	0.999	1.077	1.037	1.129***
	(0.0221)	(0.0654)	(0.0311)	(0.0483)
Risks*H	0.601***	0.781	1.058	1.771**
	(0.110)	(0.310)	(0.131)	(0.420)
Patience*H	1.123	0.749	0.863	0.950
	(0.162)	(0.294)	(0.109)	(0.156)
Reputation*H	2.162	1.990	1.232	0.353
	(1.036)	(2.627)	(0.576)	(0.274)
SVO angle*H	0.979	1.032	1.018	1.055
	(0.0336)	(0.0724)	(0.0229)	(0.0461)
Environment*Framing	1.001	**1.159****	1.047	0.971
	(0.0192)	(0.0695)	(0.0327)	(0.0417)
Risks* Framing	1.054	**2.675*****	**1.406****	1.066
	(0.143)	(0.776)	(0.241)	(0.247)
Patience* Framing	0.959	1.184	**0.580****	1.044
	(0.0984)	(0.448)	(0.124)	(0.197)
Reputation* Framing	1.101	0.429	0.642	1.901
	(0.449)	(0.514)	(0.499)	(1.390)
SVO angle* Framing	0.987	1.071	1.021	0.972
	(0.0183)	(0.0631)	(0.0260)	(0.0325)
Framing *H player	1.385	1.594	2.211	1.549
	(0.799)	(1.600)	(1.684)	(0.722)
Constant	0.0302	746,050**	0.0589	87.09
	(0.0774)	(4.526e+06)	(0.130)	(265.1)
Observations	1,550	1,395	2,990	1,510
Number of B	155	155	299	151

Note: Odds ratios are reported: *** p<0.01, ** p<0.05, * p<0.1 Robust standard errors clustered at group level in parentheses.