

Identity, Language and Conflict: An Experiment on Ethno- Linguistic Diversity and Group Discrimination in Two Bilingual Societies

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Keywords

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1. Motivation

The debate on the economic implications of social and cultural diversity is far from new. In this paper we systematically explore the connection between ethno-linguistic diversity and group discrimination in a controlled experiment. While welfare losses associated to the under provision of public goods has been repeatedly documented, in a growing literature we briefly review in this section, the behavioral channels by which this negative interaction happens is not very well known. The list of suspects in the investigation of the detrimental consequences of diversity on economic performance typically includes failure to undertake joint projects, lack of cooperation between groups, or missing the opportunity to exploit complementarities. In the extreme case, armed conflicts may generate huge economic losses due to the destruction of assets or arms investment (Neary, 1997).³

The empirical literature on the work on the political economy of macroeconomic performance has repeatedly shown that ethno-linguistic diversity does harm all types of economies by reducing their growth rates, decreasing both investment and the quality of governments, and limiting the provision of public goods (Banerjee et al., 2005; La Porta et al., 1999; Alesina et al., 2003; Alesina and La Ferrara, 2005; Alesina and Zhuravskaya, 2011; Li, 2010, among others).

In their study of ethnic diversity and local public goods in rural Western Kenya, Miguel and Gugerty (2005) conclude that ethnic diversity is associated with lower primary school funding and worse school facilities. Alesina, Baqir and Easterly (1999) document how spending in productive public goods in US cities is inversely related to their ethnic fragmentation, even after controlling for other socioeconomic and demographic variables.⁴ Interestingly, they also find that voters prefer to reduce expenditures on public goods when shared with other ethnic groups. Using cross section data on 225 countries, Desmet, Ortuño-Ortín and Weber (2009) find that linguistic diversity within a country lowers redistribution.⁵ Khwaja (2009) finds that social fragmentation has similar negative consequences for the upkeep of local public goods in Northern Pakistan. In all these studies ethnic diversity is identified as a possible source of under provision of public goods and inefficiency.

The strong evidence on the negative consequences of diversity on economic performance typically fails to identify at the behavioral level the channels of transmission, from ethnic diversity to under provision. Naturally enough, field evidence has very partial information about individual decisions, and very limited control on the effect of different variables. We believe the use of controlled experiments may help to disentangle between competing behavioral explanations. As a fast growing literature in Psychology and Economics has repeatedly documented, even artificially created groups exhibit different forms of in-group favoritism and out-group discrimination (in the so called *minimal group paradigm*, starting with Tajfel and

³ Armed conflict is an extreme form of inefficiency. Gaibullov and Sandler (2008, 2009), Abadie (2006) and Abadie and Gardeazabal (2003, 2008) have analyzed the economic consequences of terrorism. Here we focus on the cost of non violent social conflict between groups and the mechanisms by which it affects economic relationships, efficiency or social welfare.

⁴ Further evidence is provided by Easterly and Levine (1997). They find a strong negative correlation across countries between indicators of public goods and ethnic diversity (proxied by language).

⁵ Using government transfers and subsidies as a percentage of GDP as a proxy. With an average level of redistribution of 9.5 percent of GDP in their data set, an increase by one standard deviation in the degree of diversity lowers redistribution by approximately one percentage point.

Turner, 1979). In a seminal paper, Chen and Li (2009) carefully document how group identity shape social preferences. Interestingly, group membership alters the expectations about the behavior of in-group and out-group individuals. So, minimal group identity modifies economic behavior through its effect on individual preferences, as out-group discrimination strongly impact the parameters ruling social preferences in the individuals' utility function.⁶

While artificial diversity may generate the lack of cooperation described above, the capacity of the *minimal group paradigm* to capture underlying behavioral forces outside the laboratory has repeatedly being called into question. Even when many behavioral researchers (including the authors of this paper) do not dispute the external validity of lab experiments studying group interaction, several papers in the last years have used a different approach. Rather than creating simulated identities, these papers exploit the existence of naturally occurring groups in different types of settings, to study the link between diversity and efficiency.⁷ Bernhard, Fehr and Fischbacher (2006) use dictator game experiments in two social groups in Papua New Guinea and support the existence of in-group favoritism as exacerbated altruism towards in-group members and more indulgent judgment with in-group norm violators. Tanaka, Camerer and Nguyen (2009) conducted experiments with three different communities in Vietnam (Vietnamese, Chinese and Khmer) finding no in-group favoritism for two of the communities in their interaction with the poor minority, and a strong in-group effect in the poor minority. Goette, Huffman and Meier (2006) study subjects randomly assigned to different platoons during a four week period of officer training in the Swiss Army, and find increased willingness to cooperate with fellow platoon members in a sequence of experiments.

In an inspiring study, Habyarimana et al. (2007) identify four mechanisms that could explain why ethnic diversity generates low provision of public goods. First, different groups may exhibit *different preferences* for public goods, and disagreement on which goods should be provided may lead to it under provision. Second, individuals may attach a positive value to the welfare of in-group members but no value (or a negative value) to the welfare of out-group individuals. If many individuals attach different values to the welfare of different individuals, a *norm* of in-group cooperation (and out-group discrimination) could easily decrease cooperation, and public good provision, in more diverse environments. Third, shared membership in a social network may enable co-ethnics to access *punishment*, and sanction non-cooperators more easily, sustaining cooperation. Finally, a homogeneous environment may improve the accuracy of positive beliefs about the behavior of others, solving a basic coordination problem. For convenience, we will identify these four channels as based on *different preferences*, *norms* on in-group/out-group biases, *punishment* of free riders, and *beliefs* about the behavior of others. Habyarimana et al. (2007) provide solid experimental evidence about the connection between cooperation in homogeneous communities in Uganda and in-group *norms*, supported by expectations that non-contributors will easily face

⁶ See also Charness, Rigotti and Rustichini (2007), Abbink et al. (2010), Eckel and Grossman (2005) and Eckel, Fatas and Wilson (2010).

⁷ The interest in group identity is not new in Economics. Akerlof and Kranton (2000, 2002, 2005) introduced the idea of identity as a variable affecting individuals' economic behaviour. See also Aguiar et al (2010). Social identity is considered multidimensional (see Benabou and Tirole, 2010, for a general model of identity); it may include ethnicity, language, gender, socio-economic level, occupation, etc.

punishment, while they fail to find strong evidence of different *preferences* for different public goods.

In this paper we contribute to the identification of the different channels driving any effect of diversity on public good provision, and group performance. Following Habyarimana et al. (2007), we study diversity when constructed by naturally occurring groups in two bilingual locations in Spain. By keeping the assignment mechanism constant (the self reported mother tongue language), we manipulate the level of diversity and generate a clear cut distance between homogeneous settings, when all participants share the same identity, and speak the same language outside the laboratory, and mixed sessions in which the linguistic identity of the participants is not the same. By running the same experiment in two different locations, we exogenously change the potential implications of naturally occurring identities. Only in one location (the Basque Country), group identities are heavily mediated by a naturally occurring identity conflict; in the other (the Valencia Country) we will convincingly argue that participants have not been exposed to a similar group conflict. We describe the identity conflict and the cultural and social differences between the two locations in detail in the next section.

Participants in the experiment are always assigned to one of two groups, and always make the same allocation decision, and may or may not provide two different public goods. As section 3 below describes, they actually play a repeated and linear nested public goods game. In each of the 20 rounds of the game, they have to distribute their round endowment between a private account, a *local* public good (benefiting their *local* group) and a *global* public good (benefiting both local groups). As the return of both public goods is the same, as they share an identical marginal per capita return, efficiency is fully driven by group size. Being the size of both local groups the same, fully contributing to the global public good is socially efficient, as it is the way to maximize social welfare (and earnings). Interestingly, the nested public good game exhibits an interesting property: a token contributed to the global public good generates as much return to the other members of your local public good as a token contributed to the local public good (because the marginal per capita returns are the same!). In other words, when the allocation is fully *local*, out-group members are automatically, and consciously, *excluded* from the benefits of the contribution. In a sense, we find this experimental design a perfect scenario to test out-group discrimination, without any confounding efficiency effects⁸.

Contrary to Habyarimana et al. (2007), our study heavily relies on computerized networks to obtain enough information about any dynamic behavior effect (e.g. conditional cooperation). We combine natural occurring identities and relatively sophisticated experiments by fortunately exploiting a natural characteristic of Europe: its linguistic diversity, as living in a multilingual environment is more the norm than the exception. Our participants will not be very different to other participants in similar lab experiments in Europe or the US. However, and as discussed above, we will rely on bilingual locations to incorporate into our analysis the effect of natural identities, with or without any pre-existent identity conflict.

⁸ Buchan et al (2009, 2011) were probably the first to study in the field different nested public goods games. In their game, contributing to the global public good game was still maximizing social welfare, but local contributions generated more returns to your own group.

Our experimental protocol does not prime or make salient the ethno-linguistic or any other group identity, neither in the recruitment nor in the experiment itself. Subjects were recruited in a fully bilingual way, closely following the routines used in each laboratory (in Bilbao and Valencia), and they simply chose a language for their participation. Thus, subjects naturally segregated themselves to one linguistic group or another, without any explicit or implicit reference to national identity or diversity. During the neutrally framed experiment, no single reference was ever made to these issues.

As section 4 describes in detail, participants were assigned to one of two rooms, and received information about the language spoken in the other room in a short welcome speech made in one or the two languages, in a very casual way (as we describe in section 3). By running the experimental sessions in two different languages (one in each room, sometimes the same, sometimes different), and letting the subjects choose the language, we were able to elicit their *natural* identity. College students in these two universities are repeatedly asked to choose a language to participate in a myriad of events, and we consciously followed the format of other emails they are used to get, when recruiting them. As subjects were randomly assigned to the different treatments, we focus our attention on the consequences of ethno-linguistic diversity characteristics and not on other features that could be included in social identity (socioeconomic level, gender, etc.)

As in any other lab experiment, we collect enough evidence to study in detail our participants' behavioral patterns, including the strength of conditional cooperation. We also study in details two of the channels described above, by studying (i) the mediating effect of *norms* on (in-group) favoritism and (out-group) discrimination, and (ii) how identity changes the empirical (or positive) *beliefs* about the behavior of others. Both channels are of uttermost importance, and to the best of our knowledge, have never been studied to this extent in this environment. We actually elicit empirical and normative with a second wave of experimental sessions with brand new participants with no experience on the previous study. As *observers* of the first study, they receive full information about the study, and no information about the actual decisions made by the *participants* in the first study. We elicit first-order beliefs (about the decisions made by the participants in the different settings) and second-order beliefs (about the decisions of the other observers when asked to predict the decisions of the participants). By exclusively using the second-order beliefs, we do not only learned about *shared beliefs*, but are able to (i) identify differences in positive beliefs across the different ethno-linguistic groups in the different locations, and (ii) study any normative out-group discrimination. We also use beliefs to run a robustness exercise, and see whether any treatment effects observed in the first wave hold in the second.

Our results show that ethno-linguistic diversity is very much context dependent. In the presence of an identity conflict (as in the Basque Country) it significantly harms contribution to the global public good, and earnings. Conditional cooperation completely vanishes in the mixed sessions in the Basque Country, when languages spoken in both rooms are not the same. Intriguingly, an almost symmetric effect (in magnitude, not in statistical significance, as we will explain below) occurs in the Valencia Country. Conditional cooperation is alive and well in the mixed sessions, and global contributions are not below, but above the ones in the homogeneous sessions. The elicitation of shared beliefs as norms clearly shows that the positive effect of

diversity in Valencia operates through optimistic (empirical) beliefs about the behavior of the other group in the mixed sessions. A significant normative discrimination dominates in the Basque Country. Observers do not misrepresent their beliefs about the behavior of the other group, but they do exhibit shared beliefs about the existence of normative out-group discrimination.

The rest of the paper is organized as follows. In Section 2 we briefly provide background information on the field; in Section 3 we explain the Experiment I in detail, while Section 4 presents its results. Section 5 describes Experiment II, and makes sense of the belief elicitation results. Section 6, not surprisingly, concludes.

2. The two bilingual societies

The experiment was run in two bilingual regions in Spain: the Basque Country (BC) and the Valencia Country (VC). In contrast with other multilingual European societies, like Belgium or Switzerland, in both the BC and the VC there is no geographical group segregation (although in rural areas Basque or Catalan is more commonly spoken). The school system is strongly based on the idea of integration; all the students have to study in the two languages and there is contact between students coming from the two ethno-linguistic backgrounds (see Alexander and Christia, 2011).⁹

Table A.1 in the appendix provides data on the percentage of the general population who speak Basque and Spanish in the BC, and Catalan and Spanish in the VC. Basque is not an Indo European language and therefore Catalan and Spanish are much closer than Basque and Spanish.¹⁰ Linguistic diversity has been considered a proxy for the broader notion of ethno-linguistic or cultural diversity since measuring dissimilarity between languages is relatively easy (Desmet et al. 2009).

As explained above, our experimental design does not allow us to study the effect of linguistic diversity on between group cooperation, but it does permit to make an interesting distinction between both locations. National identity is much stronger among the Basques. According to the CIS survey (Center for Sociological Research, 2007), 48.5% of the population in the Basque Country consider themselves Basque but not Spaniards or more Basque than Spaniards, while in the Valencia Country the percentage is a mere 12.8%. Similar surveys run in different years show very similar figures. This non-identification of a large part of the Basque society with the Spanish national identity has been at the origin of the success of the nationalist parties in the Basque Country. In the regional elections of 2011, the Nationalist parties in the Basque Country got more than the 50% of the votes while in the Valencia Country this percentage was less than 15% (see Table A.2 in the Appendix).

On the basis of the perceived cost of cultural heterogeneity, Desmet et al (2011, p. 183-184) conclude that the European regions most likely to secede are the Basque Country and Scotland. Furthermore, the terrorist organization ETA has been claiming the

⁹ Table A.1 in the appendix provides more information on socio-demographic characteristics of the field.

¹⁰ See Desmet et al. (2009, 2011, 2012) for measures of distance between languages.

independence of the Basque Country.¹¹ One of the claims of the political organization of ETA was the establishment of the Basque as the unique national language.¹²

Although the Basque Country and the Valencian Country are both bilingual regions and share many socioeconomic characteristics, the two fields differ in the extent of conflict and the social distance between their ethno-linguistic groups. Thus, they provide an appropriate ground to check the effect of diversity in two very different cases.

3. Experiment I: design and procedures

As described in the introduction, this paper reports on two different waves of experimental sessions. In this section we describe with some details the game played by participants in the first experiment, being the basis for the second round of sessions, as described in section 6. In Experiment I participants face a special linear public good game: a variant of the *nested (local-global) public goods game* used in Buchanan et al. (2009). Participants decide each round how to allocate their round endowment in a Local public account (l_i) and how much they assign to a Global public account (g_i); the rest automatically goes to their Private account.

Each individual i belongs to a group G^i . Each group G^i has its own Local account, while the Global public account gets contributions from both groups G^i and G^{-i} . Thus, while the Local public account is funded by, and benefits, the members of a *local* group G^i , the Global public account is funded by, and benefits, both local groups, so also the members of the other group G^{-i} benefit from the contributions to the Global account made by members of the group G^i .

The following equation represents the individual payoff function in a given period t :

$$\pi_{it} = (e_{it} - l_{it} - g_{it}) + b_l \sum_{k \in G^i} l_{kt} + b_g \sum_{k \in G^i} g_{kt} + b_g \sum_{j \in G^{-i}} g_{jt}$$

where e represents the participant's endowment at the beginning of the period, l_k is the contribution to the Local account and g_k is the contribution to the Global account. The two accounts yield the same marginal per capita return to the participants, b_g .

Assuming rationality and selfish preferences, the theory predicts no contributions to any of the two public accounts (Local or Global); however, cooperation can result in a much more efficient outcome. The only way to maximize the social welfare, using as a proxy the earnings of participants, is to fully contribute to the Global account. The parameters of the game were chosen to simplify the game to our participants. The group size of both *local* groups is 4, the round endowment is 100 ECUs, and both marginal per capita returns are 0.5. In the unique inefficient equilibrium of the stage game, participants make 100 ECUs, while in the fully efficient social welfare

¹¹ Abadie and Gardeazabal (2003, p. 115) report data on the number of killings by ETA “on average, during the 1980's, ETA's activity resulted in 39 deaths per year; this figure was reduced to 16 per year during the 1990's. In the year 2000, ETA killed 23 people.” For procedural reasons, we did not collect any individual level of exposure to conflict.

¹² Corcuera (1979).

maximizing solution, participants fully contribute to the *global* account and make 400 ECUs (if they fully contribute to their *local* account, they make 200).

As explained in the introduction, this game nicely measures willingness to contribute to public goods in two very different ways. By contributing to the *local* public good, participants may choose to cooperate only with members of their same (*local*) group at an efficiency cost. By contributing to the *global* public good, participants cooperate with participants in both their own (*local*) group and in the other. As contributing to the *global* account has the same marginal return than the *local* account, investing in the *local* public good is equivalent to the exclusion of the out-group members from the benefits of cooperation.

Participants in Experiment I were students at the University of the Basque Country (UPV/EHU) and at the University of Valencia (UV). Both are public universities and the socioeconomic level of the students is similar. These universities are bilingual, which implies that the two languages are frequently used in all official communications and students typically choose to take courses or attend events in Basque/Catalan or Spanish. Subjects were electronically recruited through a bilingual e-mail, Spanish/Catalan or Spanish/Basque. These emails are circulated regularly, as official university e-mails, and less official invitations to all types of events are always sent in both languages. Subjects were given the chance to participate in experimental sessions in Basque or Spanish (at UPV/EHU) and Catalan or Spanish (at UV), as they are given the chance of choosing to attend a course or a presentation, in one of the two local languages. Once they chose to participate and selected the language, all the experimental procedures were fully done in that language. Framing was scrupulously neutral when mentioning the language used or chosen by subjects, without any political or identity reference.

Each session was conducted in two adjoining computer rooms (both in the Valencia Country and in the Basque Country). The main experimental manipulation consisted in the selection of languages used in both rooms. While some of the sessions were *homogeneous* (as the same language was spoken in the two rooms, others were *mixed* (the two rooms used different languages). We will use from here these terms (*homogeneous* and *mixed*) to refer to the different treatments run in the different locations.

All participants, in the homogeneous and in the mixed sessions, were requested to come at the same hour and at the same place. A very short welcome announcement was made to all the participants. Local native speakers run the sessions made the short announcement in the unique language of the homogeneous sessions, and in one language and then in the other in the mixed sessions;¹³ then, the participants were directed to the previously assigned computer room. As the welcome speech was used to address the participants in the language originally chosen by them, they were aware of the language spoken by participants in the other computer room. Table 1 below describes our treatments and presents a summary of Experiment I. In four treatments the language used is the same in both computer rooms (*homogenous* sessions) and in two treatments the language is different (*mixed* sessions)

¹³ This is also a standard procedure in these two bilingual universities.

[Table 1 around here]

At the beginning of the experiment, in each computer room participants are randomly matched in groups of four and group composition is held constant throughout the session. Thus, people in the same *local* group always speak the same language. Then, one *local* group from one computer room is randomly matched with another *local* group in the other computer room. We will call *section* to each pair of local groups, one from each room. *Sections* are fully independent from each other, so each section is an independent observation from a statistical point of view.

Note that participants in one *section* may speak the same language, or a different language, depending on the treatment. Subjects were always aware that the members of the other *local* group in their *section* were in the other computer room, and they knew the language spoken there, by the other *local* group. The configuration of groups and sections is shown in Figure 1.¹⁴

[Figure 1 around here]

After the instructions were read aloud and before the experiment started, participants had to answer a quiz to check their understanding of the game. Then participants played 20 rounds of the public goods game. In each round subjects were endowed with 100 ECUs (Experimental Currency Units). After each round subject i was provided with information on her own contributions and payoffs (private, local, global and total), the sum of local contributions of group G^i , the sum of global contributions of group G^i , the sum of global contributions of group G^i , and total contributions to the global account. AS described above, parameters were chosen to reduce the complexity of the game (both marginal per capita return were 0.5 and both local group sizes were 4, for a section size of 8).

After the session, and while assistants were preparing envelopes with individual earnings, participants filled the 30-item Singelis subjective-individualism-collectivism scale test (Singelis, 1994; Singelis et al, 1995). With this test we tried to capture differences in social norms concerning collective action between ethno-linguistic groups. Collectivism is related to the pursuit of group interests so that it could be related to cooperation (Wagner, 1995). These differences are unrelated to the interaction with a different group and could be relevant for their willingness to cooperate either locally or globally. A typical session of Experiment I lasted slightly less than two hours and the average individual payoff was around €15 (around €17 euros in the BC and €12½ in the VC).

4. Experiment I: Results

In this section we start with some descriptive statistics, and then formally test for treatment effects and cooperation dynamics in the different treatments.

[Table 2 around here]

¹⁴ For illustrative purposes, Figure 1 represents members of a group sitting next to each other; but of course members of a group and a section were randomly matched. Subjects were aware of this design.

Table 2 shows how the manipulation of diversity affects contributions to the global public good, while has very little effect on local public good provision. In both BC and VC, contributions to the local public good are remarkably similar across the three conditions. In the BC, local contributions range from 18.27 in the Mixed sessions to 20.68 in the homogeneous sessions run in Basque (with slightly smaller local contributions in the homogeneous sessions run in Spanish, 19.46). In the VC, local contributions are close: from 11.94 in the homogeneous sessions run in Catalan, to 12.13 in the mixed sessions and 13.96 in the homogeneous sessions run in Spanish. These differences are never significant running standard non-parametric tests. Interestingly, a similar result applies to contributions to the global public good in the homogeneous sessions run in both locations. Both in the BC and in the VC, global contribution is slightly and insignificantly higher in the homogeneous session run in Spanish (24.65 vs. 21.16 in the BC, and 16.37 vs. 13.42 in the VC).¹⁵

Diversity seems to have a profound effect on contributions to the global public good. In the BC, global contributions in the mixed sessions are clearly below global contributions in the homogeneous sessions: 16.79 vs. 24.65 and 21.16. Interestingly, the effect of diversity is the opposite and of a similar magnitude in the VC: global contribution in the mixed sessions run in the VC is 20.67 vs. 16.37 and 13.42. Ethno-linguistic diversity, as implemented in Experiment I, generates a significant average 27% reduction in global contribution in the BC, and a massive 38% gain in the VC.¹⁶

Figure 2 shows how global contributions evolve over time by diversity levels and location across the 20 rounds of the experiment. While contributions start very close in the VC, and the mixed sessions outperform the homogeneous ones in the VC, in the BC the difference starts from round 1, and follows until the end of the experiment. The decline in contributions is slightly higher in the VC than in the BC, as we will confirm in the econometric analysis below.¹⁷

[Figure 2 here]

Table 3 below confirms the robustness of these treatment effects by estimating three panel data models. The fractional multinomial logit takes into account the interdependence of participants' contributions to the two public goods (the sum of the three dependent variables is equal to 1, so each variable is represented as a fraction of the total endowment). The multinomial model has three dependent variables: the first is the individual contribution to the Global account, the second is the individual contribution to the Local account, and the last dependent variable is the amount kept in

¹⁵ The Mann-Whitney non-parametric test indicates that the distributions of local contributions of Spanish and Catalan participants in homogeneous sessions are not statistically different in the VC. The same is true for global contributions and for the corresponding homogeneous sessions in the BC. We do not find statistical differences using a test of means either.

¹⁶ Note that diversity increases global contribution in the VC in a non-significant way using a conservative Mann-Whitney non-parametric test with one observation per section. Diversity significantly reduces global contributions in the Basque Country ($z = 1.903$, $p\text{-value} = 0.0570$).

¹⁷ Figure A1 in the Appendix shows how language makes a difference in the mixed sessions run in the BC and the VC. Even when culture differences between the different ethno-linguistic groups is not the objective of this paper, it is interesting to note the existence of some remarkable differences: while the Basque speaking participants contribute similarly in the homogeneous and the mixed session, Spanish speaking participants contribute less, and from the very first period, in the mixed sessions, not reacting to the initially higher contributions of the other group.

the private account. We focus our analysis on the Global contributions, to trace any effect of diversity on out-group discrimination.¹⁸

[Table 3 here]

Our explanatory variables are: *Mixed*, a dummy variable taking the value of 1 in mixed sessions; *Location*, a dummy variable taking the value of 1 in the BC; *Language*, a dummy variable taking the value of 1 if the participants speak Catalan or Basque; the interaction terms; *Period*, capturing any trend over time, and the individual scores for *Individualism* and *Collectivism* in the Singelis scale (as explained in the Appendix).

The first results strongly suggest that diversity per se does not significantly reduce contributions to the global public good. The coefficient of *Mixed* is never significantly different from zero; that is, global contributions in the mixed sessions are not lower or higher than in the control (homogeneous). However, the interaction term *Mixed*Location* is negative, and highly significant, showing that mixed sessions with high linguistic or identity distance (as in the BC) global contributions significantly drop. As discussed above, diversity (mixed sessions) has a very different effect in the BC and in the VC. In the BC ethno-linguistic diversity leads to a lower level of cooperation in terms of Global contributions, while in the VC the effect is positive but not significant. *Language* and its interaction terms are never significant, suggesting that the treatment effects are not heavily mediated by linguistically driven culture differences.

Note that we cannot exclude the possibility of some group identity emerging in the homogeneous sessions. In our experimental protocol, participants are always taken to one of two rooms, assigned to a group of four people in the same physical space, different from the other group in their section. Even with a carefully neutral framing, homogeneous sessions may trigger some group effect. As these differences do not seem to be driven by cultural differences across the different linguistic groups, we simply consider the homogeneous sessions as a baseline benchmark.¹⁹ We measure any *additional* group effects in the mixed sessions, as measured by the dummy *Mixed* in Table 3.

Table 4 below analyzes efficiency using earnings as a proxy, with and without controls. We are specifically interested in studying whether the earnings of participants in the different treatments significantly differ, as there are different group externalities, and efficiency gains, to exploit in this game. It could be that any efficiency losses generated by lower contributions to the global public good were compensated by higher contributions to the local public good. The analysis of earnings is also interesting because it tells a story about performance, as discussed in the introduction. If diversity harms (or benefits) economic performance, we could align the result with the idea that homogeneous (or well integrated) societies are more efficient because ethno-linguistic diversity harms (favors) cooperation. Given our experimental method,

¹⁸ We do understand that some of the models presented in Table 3 could easily go to the Appendix. We do prefer to leave them in the main text because they convincingly show that results are independent of the estimation method.

¹⁹ Note that in the homogeneous sessions contributions are larger in the BC than in the VC, as the positive and significant coefficient of *Location* suggests. We do not focus on this difference in the paper, as general culture differences are not our goal, even when we control for them.

we can also learn whether both groups benefit from cooperation, which one benefits more, or whether the result depends on the existence of identity conflict.

[Table 4 here]

From Tables 2 and 3, it is not difficult to see that participants in the Basque Country did contribute more to both public goods. The variable *Location* (BC) is highly significant for *Earnings* in the panel data regression shown in Table 4, suggesting that participants in the BC get significantly higher payoffs than in the VC. However, the efficiency losses in the mixed sessions in the BC are large and significant, as the coefficient of the interaction term *Mixed*Location* suggests. As the comparison of both coefficients in both models makes clear, any efficiency gains obtained in the homogeneous sessions in the BC (relative to homogeneous sessions in the VC) are wiped out by diversity (and, presumably, the identity conflict).²⁰

As efficiency may be related to the importance of collective vs. individual action in each culture, we control in the second model for any differences between ethno-linguistic groups in collectivism and individualism (see Appendix for a detailed description). As the second model clearly shows, by adding as controls the Singelis measures of collectivism and individualism the results do not change, and these two variables as controls turn out not to be significant (neither for contributions nor earnings).

To make sense of the results described above, and shed some light on the main behavioral factors driving these treatment differences, we investigate the dynamics of conditional global contribution. We use a linear regression model, where our main dependent variable is the subject's global contribution in period t . Our explanatory variables are: *Period*, to capture the possible trend in contributions; $Contribution_{i,t-1}$, the individual global contribution in the previous period; $Contribution_{g,t-1}$, the out-group average global contribution in the previous period; and $Contribution_{-i,t-1}$, the average global contribution in the previous period of the members of the group excluding i . Figure 3 visually represents the linear link between individual global contribution and the previous contribution of the other group to the global public good ($Contribution_{i,t-1}$ and $Contribution_{-i,t-1}$, respectively), while Table 5 presents the regression results.

[Figure 3 here]

[Table 5 here]

Not surprisingly, Figure 3 and Table 5 are extremely consistent with each other and, interestingly, show a dramatic difference in conditional cooperation patterns. As expected, there is inertia in global contributions, so that $Contribution_{i,t-1}$ is highly significant in all treatments. This inertia does not apply to the lagged global contribution of the in-group ($Contribution_{-i,t-1}$ is never significant), suggesting that global contributions are mainly driven by the behavior of the out-group more, than by the in-group. Conditional cooperation is confirmed by the positive slopes of the fitted

²⁰ In the homogenous sessions in the BC participants obtained almost 20% higher payoffs than in the VC.

lines in Figure 3 and the positive and significant coefficients of $Contribution_{g,t-1}$ in Table 3 with only one remarkable exception: mixed sessions in the BC.

While the conditional cooperation dynamics in the homogeneous session in the BC and the VC is remarkably similar in Figure 3, diversity again plays very different roles in the BC and the VC. The dotted line corresponding to mixed sessions in the VC has a larger slope in the VC, and it is remarkably flat in the BC, suggesting that participants in the BC do not react to the contribution of the out-group to the global public good. Table 3 confirms this visual presentation of the data, as the mixed session in the BC is the only one with a coefficient not significantly different from 0 for $Contribution_{-i,t-1}$. Remarkably, in the mixed sessions in the BC, participants do not react to the lagged global contribution of the out-group, but does not react to the lagged global contribution of their in-group, and global contribution does not decline (another exception to the general rule, as *Period* is significant and negative in all the other cases). A sharp contrast with the large and significant coefficient of $Contribution_{-i,t-1}$ in the VC (the largest of all four estimations), in line with previous results.

We believe this result strongly indicates the existence of strong norms to discriminate the out-group in the BC. Strong behavioral norms about how to interact with out-group members could explain why participants do not react to the observed out-group behavior, and why decisions do not change over time. In the next section we explore whether there is a fixed convention that dictates behavior and which does not react to the out-group behavior.

5. Experiment II: Empirical and normative (shared) beliefs

Our interpretation of Experiment I is straightforward: ethno-linguistic diversity may harm or benefit provision of (global) public goods. The results obtained in the first experiment are clearly consistent with a significant and detrimental effect of diversity on contributions and efficiency in the BC, and a positive and statistically weak effect in the VC. Both results deserve a deeper analysis. The effect of diversity in a location with a strong identity conflict is roughly consistent with the literature on in-group favoritism, and out-group discrimination, mentioned in the introduction. However, the positive (and statistically weak) result of diversity in the VC is certainly more intriguing. The analysis of conditional cooperation patterns developed in the previous section suggests that the main behavioral factor in the mixed sessions in the BC could be linked to the existence of strong social norms. It could be that diversity triggers different social norms in the VC.

We explore the role of social norms in a second experiment run in the same locations with different subjects. Third-party beliefs elicitation avoids some problems identified in the literature when behavior and beliefs come from the same participants.²¹ We were also interested in avoiding any potential hedging problem.²² Being specific, we adopted

²¹ One of the problems is that the beliefs elicitation previous to the experiment may change participants' behavior, although the literature is not clear about the direction of the effect. For instance, Croson (2000) found in a public good experiment that eliciting beliefs leads participants to decrease their contribution, while Gaechter and Renner (2010) found the opposite.

²² When participants are paid for their actions and their beliefs, risk averse subjects may want to hedge with their stated beliefs against bad outcomes of their decisions in the game (see Blanco et al., 2010).

a quite agnostic and cautious approach to norms. Our objective was to elicit norms at two different levels (empirical and normative) using shared 2nd order beliefs as a proxy, as the description of the protocol used will hopefully make clear.

The experimental procedures in Experiment II followed closely the ones used in Experiment I. The experiment was run months after the first one, in 7 additional sessions with 140 new participants. A typical session in Experiment II lasted less than one hour and the average payoff was 12.65 euros in the BC and 13.29 euros in the VC. Participants were recruited through the same bilingual e-mail used in experiment I, and they were asked to choose a session run in one of the two languages (Spanish or Basque/Catalan). The subjects who participated in Experiment II did not participate in Experiment I. Once subjects arrived to the laboratory, they received the same instructions than in Experiment I, and had to complete a very similar quiz to make sure they understood the game. The main difference is that this time they did not actually play the game presented in Section 3 of the paper, but rather had to guess the decisions made by participants in Experiment I.

They were asked to guess four different types of decisions. For the sake of simplicity, we will call subjects in Experiment I *participants*, and subjects in Experiment II *observers*. In each location (the BC and the VC), and once they understood the game played by *participants* in Experiment I, *observers* were asked first to predict average contributions to the local and global public good in the different conditions described in Table 2: homogeneous sessions run in Spanish, homogeneous sessions run in Basque/Catalan, and the decisions made in the mixed sessions by Spanish speaking participants and Basque or Catalan speaking participants (depending on their location).²³ This first set of decisions was incentivized. The reward was proportional to the deviation between the guess and the true value (see Instructions in the Appendix, observers were also paid a show-up fee of €5).

Once this first set of decisions was made, they were asked to answer a non-incentivized set of questions with a strong normative component. *Observers* were asked to reveal what they believe *participants* should have done in each of the cases described above (in the two homogeneous sessions run in each location, plus in the mixed sessions for each of the languages spoken), again with respect to contributions to the local and global public good. As this second set of questions was related to subjects' normative beliefs, their answers were not incentivized.

Note that while the first set of questions made in Experiment II refers to the observers' beliefs on the actual behavior of participants in Experiment I, the second refers to their normative, highly subjective judgment. Even when we do assign a very high informative value to these two sets of questions, we do not believe they say much about the existence of very different social norms because, as mentioned above, we use a very particular definition of norms: shared beliefs, in each location, at two different levels (empirical and normative).

How did we learn about the shared beliefs of subjects in the two locations? By adding two additional sets of questions to Experiment II, and by not using at all the outcome

²³ Note that in Experiment II *observers* were never asked to make a prediction about the decisions made in the other location. In the BC, *observers* were asked about decisions in the BC, and in the VC, *observers* were asked exclusively about decisions made in the VC.

of the questions described so far in this section (other than the indirect role described below). In the third and fourth set of questions, *observers* were asked to predict the decisions of other *observers* in their session in the first two sets of questions. Now, these two sets of decisions were incentivized using the protocol mentioned above and described in the appendix.

By asking *observers* about the decisions made by other *observers* (on both the actual decisions of participants in Experiment I, and on their individual normative evaluation), we do get a highly informative set of individual perceptions of *shared beliefs*, at two different levels (*empirical* and *normative*). We gain an understanding of shared beliefs in each location, and for each treatment run in Experiment I. We do believe Experiment II allows us to genuinely learn about how norms explain the results obtained in Experiment I, as the rest of this section will hopefully show. Table 6 below presents a summary of the Experimental design used in Experiment II.

[Table 6 here]

Experiment II was designed to elicit both empirical (or positive) and normative shared beliefs on contributions in each experimental condition. In the rest of this section we focus on second order (empirical and normative) beliefs on contributions to the global public good, as a proxy for conventions. Because we are interested in the effect of diversity, we start by identifying shared beliefs when individuals are making decisions exclusively with individuals from their in-group (as in the homogeneous sessions). In Table 7 below we refer to this natural reference point as the *norm* (for each location and language). Then, we compare this reference point with the (empirical and normative) shared beliefs when individuals are making decisions with individuals from their out-group (as in the mixed sessions).

Interestingly, Experiment II allows us to see whether any particular group of subjects (exhibits a different *norm* at one particular level (empirical or normative), and whether this change applies to them or the others. It could be that Basque participants follow a different *empirical norm* (as captured by their 2nd order beliefs) when making contributions in a homogeneous session than when in a mixed session. But, it could also be that their norm does not change, and they still believe that the other group (Spanish participants) will do something different. A similar logic applies to the normative level.

[Table 7 here]

Table 7 serves multiple purposes. The first one is to at least partially reproduce, with different participants, at a very different time, the treatment differences observed in Experiment I. While diversity had a negative effect on efficiency in Experiment I in the BC, it did help global cooperation in the VC. In Experiment II there is a significant difference between 2nd order empirical beliefs on global contribution in mixed sessions relative to the homogeneous sessions in the VC (37.12 versus 30.53). Observers in the VC share an empirical belief about participants in Experiment I contributing more in mixed sessions, consistent with the results of Experiment I. Interestingly, this difference is far from significant in the BC (slightly smaller in mixed sessions, 35.13, than in homogeneous ones, 36.18), even when the only significant effect of diversity was found in the BC.

One simple way of reading these comparisons is to say that while empirical 2nd order beliefs in Experiment II in the VC are consistent with the results obtained in Experiment I, in the BC empirical beliefs fail to see the dark reality about the detrimental effect of diversity on global contribution. What is the driving force of this negative effect, then? Our answer will be that Experiment II documents the existence of normative discrimination of the out-group in the BC, as we explain now.

Table 7 is extremely informative about how diversity shapes norms in different ways in the two locations. As described above, in the VC the positive (and weak) effect of diversity on global contributions is driven by overoptimistic beliefs about the decisions of others. In a sense, we see a self-fulfilling prophecy in the VC: because there are optimistic beliefs about the behavior of the out-group, global contribution goes up. Note that in the VC both Spanish and Catalan speaking *observers* believe the others will contribute significantly above their own norm (41.3 versus 30.57 for Spanish, 38.57 versus 30.47 for Catalans, and both differences are strongly significant). Maybe because of that, or maybe for a different reason, observers in the VC also believe they will contribute more in the mixed sessions (34.30 vs. 30.57, and 34.30 versus 30.47, even when only the former difference is significant).

In the BC, the pernicious effect of diversity has little to do with empirical 2nd order beliefs. As noted, they actually fail to predict the consequences of diversity. However, an inspection of how diversity shapes normative discrimination clearly shows that those normative beliefs do change, particularly among the Basque participants. If any, Spanish-speaking participants show a positive and insignificant change in their normative beliefs (both for their in-group, 43.42 versus 40.29, nor for their out-group, 45.16 versus 40.29). That is, at a normative level, they believe they should cooperate more in the mixed sessions, even when the difference is not significant.

Basque-speaking subjects change the norm in the different direction: from a normative 2nd order belief of 40.27 when interacting with other Basque-speaking subjects, to 35.50 when interacting with the out-group. Moreover, they normatively refuse the cooperation of the Spanish-speaking subjects, as they believe the out-group should cooperate even less (30.27, significant at the 5% level, using a Wilcoxon signed rank test, as in the other comparisons).

Figure 5 and 6 represents graphically the results of Experiment II, at the empirical and normative level, and follow closely the results presented in Table 7. The distribution of 2nd order beliefs is plotted using kernel densities, in each condition, adding the median of the corresponding norm, to help the reader identifying the shifts. Figure 5 represents well how the empirical norm positively reacts to diversity in the VC, as the distribution of both Spanish-speaking and Catalan-speaking subjects shifts to the right. In the BC, the shift disappears, and we observe a very marginally significant (and detrimental) shift to the left among Basque-speaking subjects (significant at 10.14%) for the out-group. They do believe the out-group, Spanish-speaking subjects, will contribute below their own norm.

[Figure 5 here]

Figure 6 shows no significant shift in normative beliefs in the VC, and the shift to the left in the BC among Basque-speaking subjects described in Table 6: for both their own group and the other group, the distribution of normative 2nd order beliefs shifts to the left, consistent with a shared belief on the appropriateness of contributing less when mixed (even when the difference is only significant in the out-group case).

[Figure 6 here]

6. Concluding Remarks

Indexes of ethnic fractionalization (ELF²⁴) are often included as regressors in empirical work on macroeconomic performance and growth.²⁵ Fearon (2003) argues that not only the number of ethnic groups matters, but that the social distance between the different groups does as well. Montalvo and Reynal-Querol (2010) propose an index of polarization as a better measure of social conflict and show that the incidence of civil wars is more related to polarization than fractionalization (ELF), and Gardeazabal (2011) documents the relationship between linguistic polarization and armed conflict in the Basque Country.

This paper uses a different research method to study the impact of ethno-linguistic diversity on macroeconomic performance through its impact on cooperation. One of the reasons to study cooperation in human behavior is that it affects the efficiency of economic relationships. Due to incomplete contracts, the efficiency of organizations tends to depend on the cooperative behavior of agents, when a third party cannot easily enforce cooperation. Cooperation leads to outcomes that cannot be sustained by selfish behavior and incentive mechanisms. In this paper we study the effect of ethno-linguistic differences and identity conflict between social groups on the level of cooperation when these groups interact with each other.

By running controlled experiments in two bilingual locations in Spain, we carefully keep under control a plethora of variables to study how randomly assigned participants react to a precise manipulation of ethno-linguistic diversity. As our experiment is run in two bilingual locations with a very different level of identity conflict, we conjecture that this very different political and social environment could mediate the effect of diversity on economic performance. The experimental results of Experiment I clearly confirm that diversity does not necessarily diminish the provision of global public goods. While provision, and efficiency, is significantly reduced in the Basque Country, it goes up, even when not significantly, in Valencia.

We consciously avoid any over interpretation of this finding. From this study we cannot elaborate general policy lessons about the direct effect of conflict on provision of global public goods, when more than one ethno-linguistic group is interacting. As we did not collect any individual measure of exposure to conflict, we cannot even use the different individual experiences of conflict to gain a deeper understanding about how conflict operates at the individual level (as Bellows and Miguel (2009) do, in an exemplar study on individual conflict exposure and victimization). However, by using controlled experiments, we do generate clean and solid results about how diversity

²⁴ As the Herfindahl concentration index.

²⁵ Easterly and Levine (1997), La Porta et al (1999), among others.

operates at the group level, for the bad or the good, in two particularly interesting environments.

Using their mother tongue language, we assign our participants to different treatments and groups within each treatment. In a sense, and even when we use a computerized network of computers, as in many other lab experiments, we take the lab to the field by using naturally occurring groups, and identities, in our study. By running two waves of experiments, we are also able to, first, qualitatively replicate some findings of Experiment I in Experiment II (the positive effect of diversity without identity conflict), and, second, construct a credible proxy for shared beliefs at the empirical and normative levels. We do believe this is a particularly powerful and novel contribution of this study. Our analysis of social norms provides an insightful description of how diversity may blur normative beliefs, particularly among those seeing themselves as not integrated in a broader political project (e.g. Basque-speaking participants in the BC), generating strong and significant out-group *normative* discrimination in Experiment II. This normative out-group discrimination is consistent with the significant efficiency losses observed in the mixed sessions of Experiment I.

We also learn some positive lessons from the other location. When integration is not an issue, and identity conflict is at most weak, diversity may generate a self-fulfilling *empirical* prophecy: both Spanish-speaking and Catalan-speaking participants exhibit overoptimistic beliefs about the contributions of the out-group under diversity, and do contribute more to the global public good.²⁶ Moreover, no normative out-group discrimination is observed. It would be too easy to extrapolate from our results that more integration will always mitigate or reverse the pernicious consequences of ethno-linguistic diversity on macroeconomic performance. We will not dare to go that far. But we convincingly show in this study that diversity does not always have to destroy cooperation between groups, and that working to reduce identity conflict may help to reduce any under provision of global public goods.

²⁶ We do not want to interpret these over-optimistic beliefs. We thank Gary Charness to link them with a subtle form of out-group discrimination, as overoptimistic beliefs in standard linear public goods games with a unique an inefficient equilibrium could be explained by low expectations about the cognitive abilities of the other group, and their failure to identify the Nash equilibrium of the game. They would also be consistent with the kind of out-group favoritism described in Tanaka et al (2014). We cannot tell which interpretation is correct with our experimental data.

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Tables and figures

Table 1. Experimental design

Sessions	Language	Location	Subjects	Sections/Groups	Observations
Homogeneous	Spanish	Valencia Country	48	6/12	960
	Spanish	Basque Country	56	7/14	1120
	Catalan	Valencia Country	48	6/12	960
	Basque	Basque Country	56	7/14	1120
Mixed	Spanish/Catalan	Valencia Country	48	6/12	960
	Spanish/Basque	Basque Country	56	7/14	1120
Total	6	2	312	39/78	6240

Figure 1. Experimental sections and groups

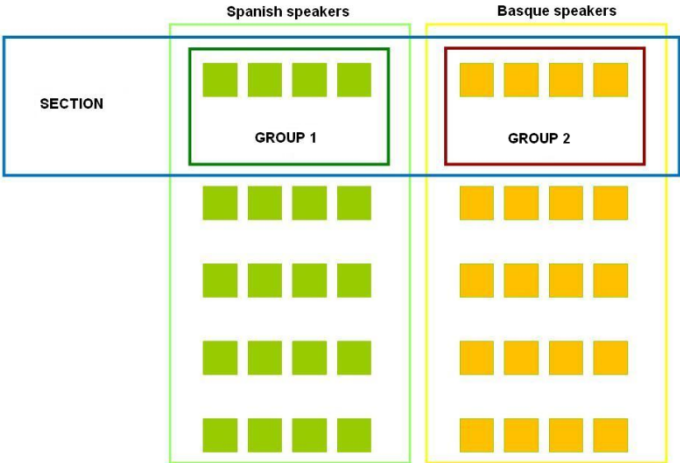


Table 2. Local and global contributions by location and language

	Homogeneous		Mixed	
	Spanish	Catalan/Basque	All Spanish	Cat/Bas
Global contribution				
Valencia Country	16,37 (22.51)	13,42 (20.85)	20.67 21.15 (28.01)	20.19 (28.91)
Basque Country	24,65 (24.49)	21,16 (27.29)	16.79 15.72 (20.66)	17.86 (22.61)
Local contribution				
Valencia Country	13,96 (19.48)	11,94 (21.93)	12.13 11.86 (20.44)	12.39 (20.85)
Basque Country	19,46 (21.19)	20,68 (28.23)	18.27 15.52 (21.31)	20.99 (24.04)

Figure 2. Global contribution by location and treatment

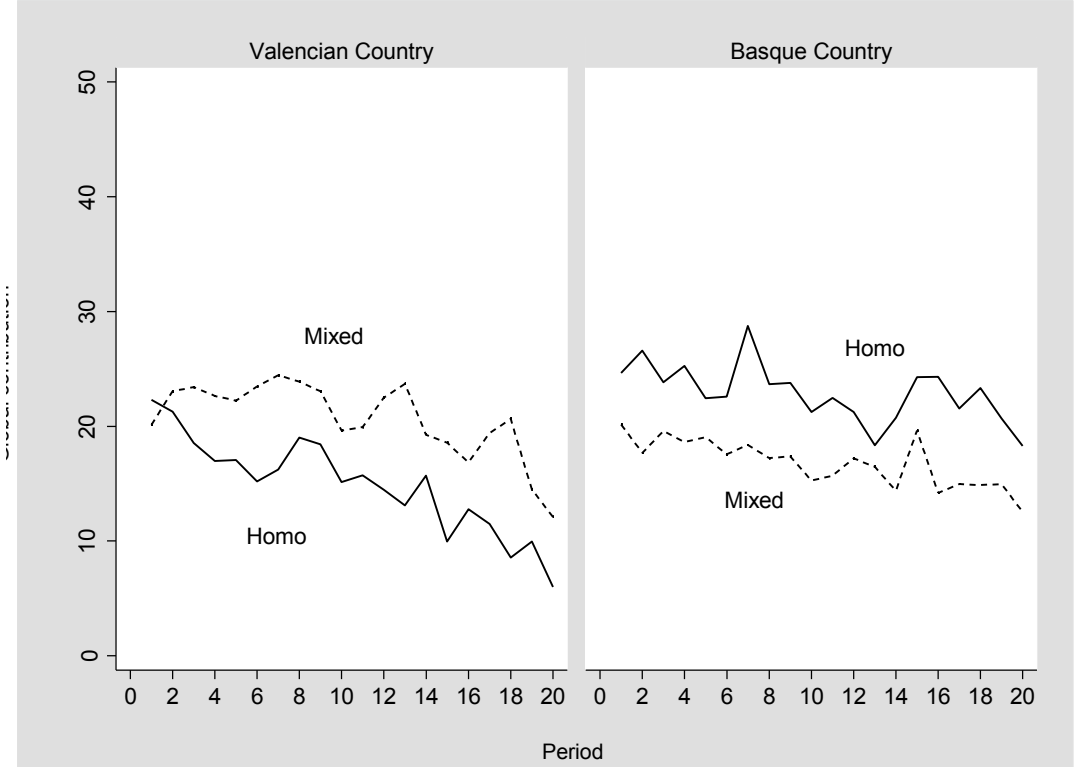


Table 3. Global Contribution

Global Contribution	OLS	Tobit	Fractional multinomial model
Mixed	5.084 (5.237)	6.321 (5.602)	0.054 (0.052)
Location	8.493** (3.497)	14.824*** (4.393)	0.082** (0.033)
Language	-2.664 (2.676)	-5.575 (4.617)	-0.032 (0.032)
Mixed*Location	-14.207** (6.379)	-19.732** (7.656)	-0.118*** (0.043)
Mixed*Language	1.663 (4.285)	3.564 (7.903)	0.022 (0.045)
Location*Language	-0.530 (4.375)	-2.323 (6.217)	0.004 (0.044)
Mixed*Location*Language	3.773 (6.954)	8.963 (10.794)	0.033 (0.078)
Period	-0.399*** (0.069)	-0.674*** (0.064)	-0.004*** (0.001)
Control variables	YES	YES	YES
Observation	6240	6240	6240

Standard errors in parentheses. Cluster at the section level. Tobit analysis is left-censored.

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Diversity and efficiency

Earnings	(1)	(2)
Mixed	10.342 (15.504)	11.443 (15.247)
Location	30.348** (11.996)	31.146*** (11.756)
Language	-10.855 (9.660)	-9.774 (9.478)
Mixed*Location	-36.782* (19.480)	-38.672** (19.378)
Mixed*Language	12.332 (10.669)	11.338 (10.620)
Location*Language	1.595 (15.649)	1.297 (15.296)
Mixed*Location*Language	0.254 (16.499)	1.555 (16.326)
Period	-1.805*** (0.193)	-1.805*** (0.193)
Constant	182.007*** (8.863)	161.381*** (21.464)
Controls	NO	YES
Observations	6240	6240

Earnings are in ECUs. Standard errors in parentheses. Cluster at the section level.

*** p<0.01, ** p<0.05, * p<0.1

Figure 3. Conditional cooperation

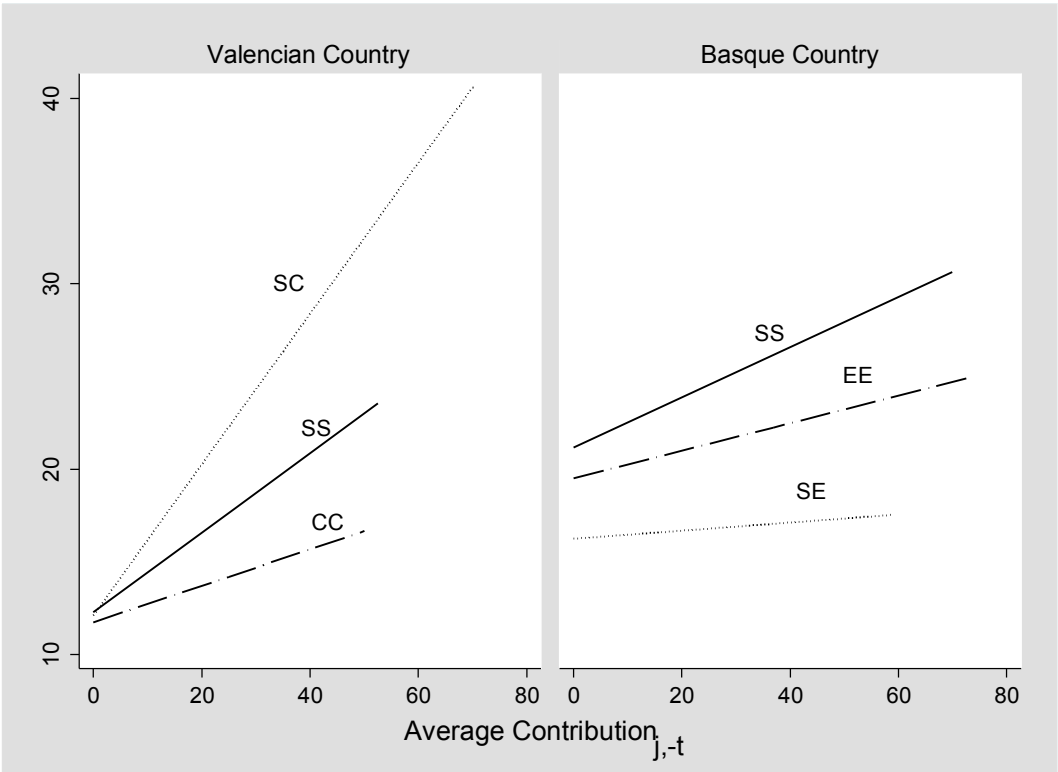


Table 5. Conditional Cooperation

Global Contribution	BC Homo	BC Mixed	VC Homo	VC Mixed
Contribution _{i,t-1}	0.447*** (0.047)	0.469*** (0.060)	0.457*** (0.074)	0.521*** (0.101)
Contribution _{i,t-1}	0.033 (0.063)	0.039 (0.058)	0.038 (0.049)	0.003 (0.091)
Contribution _{g,t-1}	0.089* (0.052)	0.049 (0.055)	0.105** (0.044)	0.248*** (0.078)
Period	-0.140** (0.064)	-0.129 0.121	-0.267*** (0.066)	-0.230** (0.117)
Constant	11.201*** (2.072)	8.546*** (3.069)	8.226*** (2.054)	6.938*** (2.775)
Observations	2128	1064	1824	912

Contributions are in ECUs. Standard errors in parentheses. Cluster at the section level.

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Experiment II

	Empirical	Normative
Spanish and Catalan <i>observers</i>	Decisions made by <i>participants</i> (1 st order empirical beliefs)	Individual normative judgment (1 st order normative beliefs)
	Decisions made by <i>observers</i> (2 nd order empirical beliefs)	Decisions made by <i>observers</i> (2 nd order normative beliefs)
Spanish and Basque <i>observers</i>	Decisions made by <i>participants</i> (1 st order empirical beliefs)	Individual normative judgment (1 st order normative beliefs)
	Decisions made by <i>observers</i> (2 nd order empirical beliefs)	Decisions made by <i>observers</i> (2 nd order normative beliefs)

In each cell, *observers* were always asked about contributions to the local and global public good of participants choosing to participate using their own language (Spanish Catalan or Basque) or the other language, in both homogeneous and mixed sessions.

Table 7. Second order beliefs

		Empirical			Normative		
		Norm	Own mixed	Other mixed	Norm	Own mixed	Other mixed
Valencia country	All	30.52 (18.94)	37.12*** (17.91)		42.56 (28.19)	45.04 (25.43)	
	Spanish	30.57 (17.14)	34.3 (20.07)	41.3** (25.28)	44.67 (27.27)	41.37 (29.93)	48.77 (29.93)
	Catalan	30.47 (20.82)	34.3** (19.17)	38.57*** (20.58)	40.45 (29.27)	42.00 (25.28)	48.00* (25.71)
	Obs	80	80	80	80	80	80
Basque country	All	36.18 (19.90)	35.13 (21.38)		40.28 (27.83)	40.11 (29.56)	
	Spanish	37.37 (18.88)	36.97 (21.72)	38.47 (23.01)	40.29 (27.85)	43.42 (30.78)	45.16 (31.68)
	Basque	34.13 (21.85)	34.09 (20.55)	27.22 ∅ (22.21)	40.27 (28.44)	35.50 (31.41)	30.27** (30.52)
	Obs.	60	60	60	60	60	60

***, **, * Significant differences with respect to the Norm, using a Wilcoxon signed-rank test
 ∅ p-value<.1014

Figure 5. Second order empirical beliefs

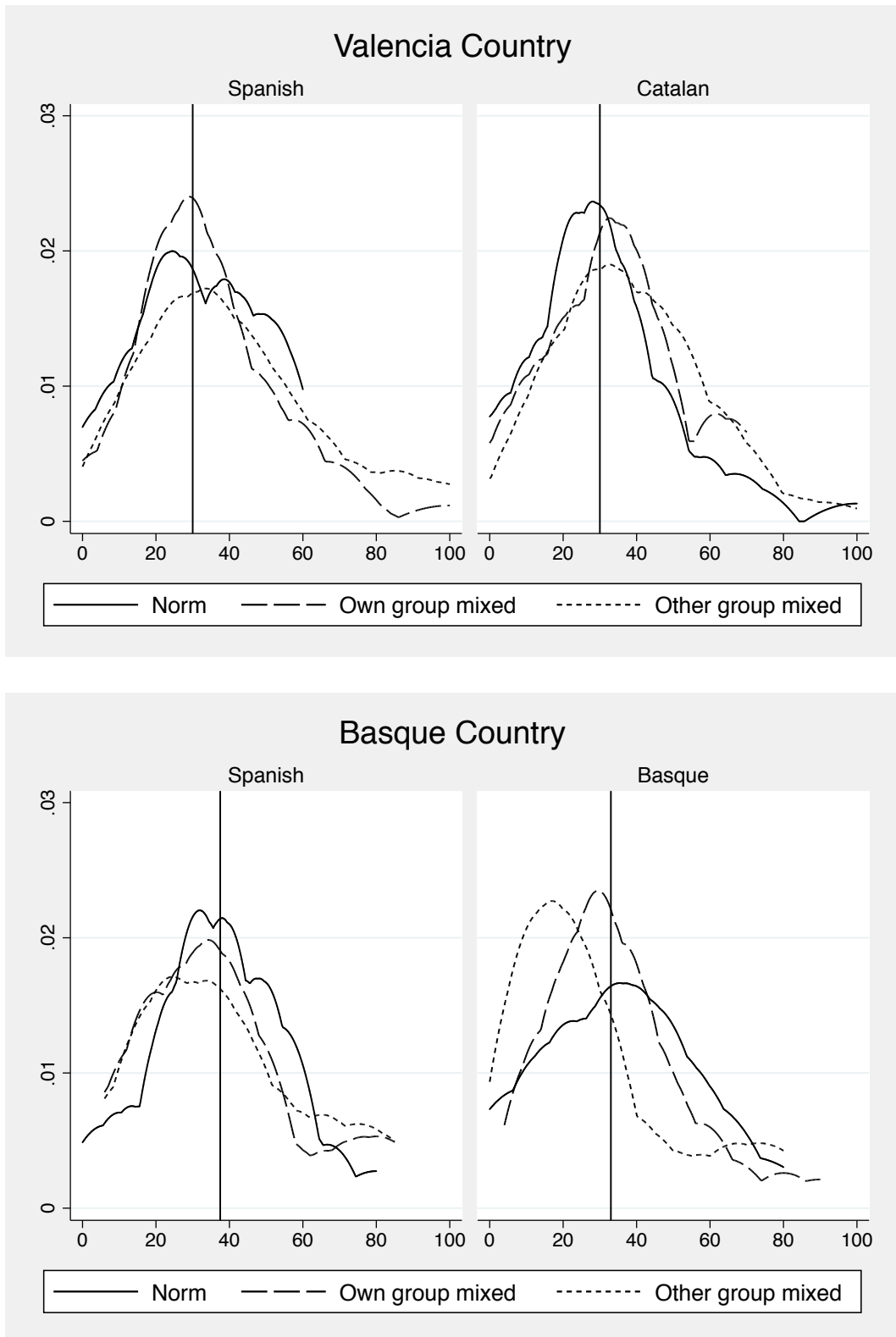
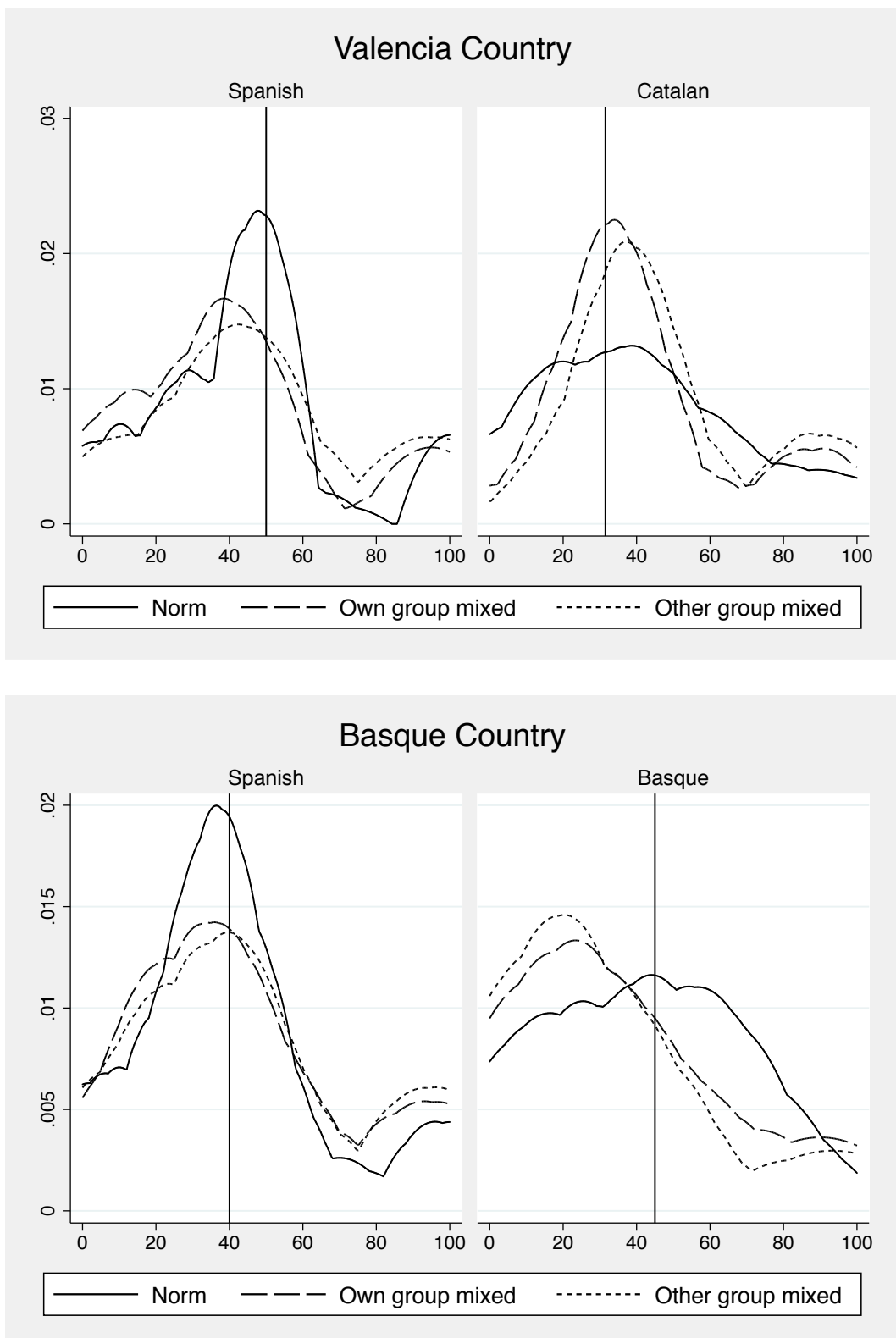


Figure 6. Second order normative beliefs



Appendix

Table A.1 Characteristics of the field		
Socio-demographic variables	Basque Country	Valencian Country
Geographical segregation	No	No
School segregation	No	No
Annual expenditure per person (euros), 2011	13,774	10,140
GDP per capita 2011	31,288	20,583
Index of social capital 2004	700 ¹	820 ²
Population (2012)	2,108,700	4,993,000
% Foreign population 2012	7.17	17.61
% Population (25 to 64 year old) with a college degree	45.0	29.5

Language (knowledge and use)		
Understands (Basque/Catalan)	55.5	94.7
Fluent (Basque/Catalan)	35.7	55.7
Uses mainly Spanish	64.7	60.5
Uses mainly Basque/Catalan	14.0	21.7
Which language was spoken at home when you were a child?		
Basque/Catalan	18.2	28.8
Spanish	68.7	60.8
Both	7.8	9.5

National identity		
Feel strongly identified with their country (Basque, Valencian) (9-10/10)	49.5	47.0
Feel strongly identified with Spain (9-10/10)	16.2	58.2
Prefer a state where the regions have the right to become independent	26.3	4.2
Although my official documents are Spanish, I do not consider myself Spanish (agree or strongly agree)	31.2	5.5
I feel only Spanish	5.3	12.3
I feel only Basque/Catalan	20.8	1.8
I feel more Spanish than Basque/Catalan	8.0	17.7
I feel more Basque/Catalan than Spanish	27.7	11.0
I feel equally Spanish than Basque/Catalan	32.2	55.0

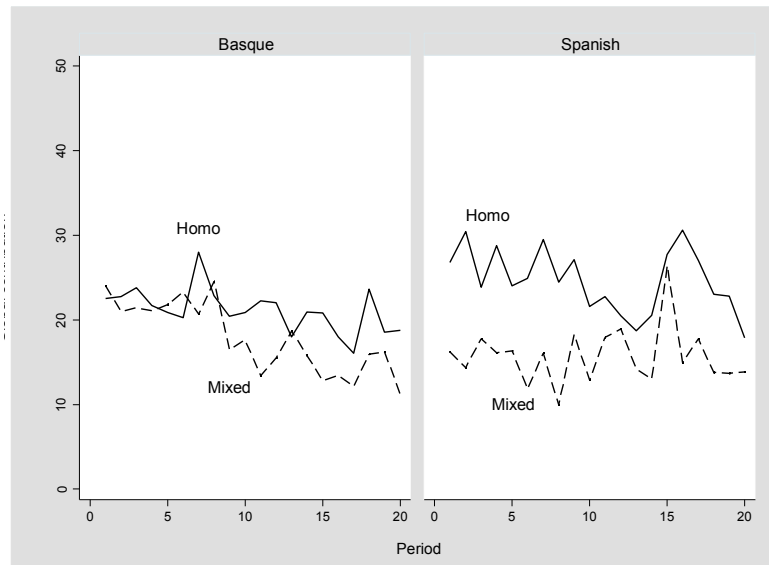
Source: CIS (Center for Sociological Research) 2007. National Identity in Spain, report 2667, INE and FBBVA (2007); ¹: fourth quartile; ²: second-third quartile.

Table A.2 Nationalism	
Regional elections 2011 Basque Country	Regional elections 2011 Valencian Country
EAJ-PNV (30.05%)	PP (48.53%)
Bildu-EA (25.45%)	PSOE (27.5%)
PSE-EE (16.34%)	C.Compromis (7.03%)
PP (13.53%)	EUPV (5.79%)
EB-B (3.19%)	UPyD (2.44%)
ARALAR (2.96%)	Verds (1.28)
Total Nationalist: 58.46%	Total Nationalist: 12.82%

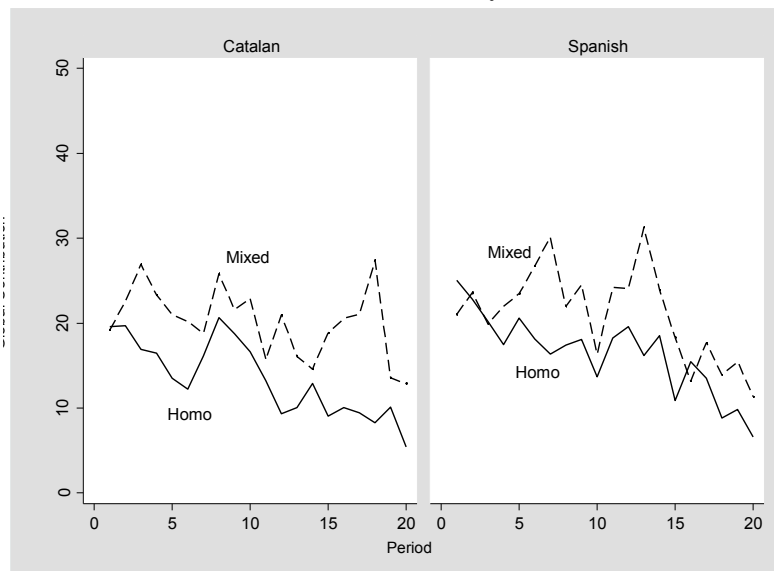
Source: Ministerio del Interior (2011).

Figure A1. Average global contribution by language and treatment

Basque Country



Valencia Country



Measures of collectivism, individualism (Singelis, 1994)

Concerning the Singelis subjective-individualism-collectivism scale test, the distribution of scores for *individualism* was not the same for all linguistic groups (Spanish vs. Basque in the Basque Country $z=2.274$, $p=0.0230$; Spanish vs. Catalan in the Valencian Country $z=1.402$, $p=0.1610$). However, we do not find significant differences for *collectivism* (Spanish vs. Basque $z=-1.584$, $p=0.1131$; Spanish vs. Catalan $z=-1.587$, $p=0.1124$).

Individualism: Spaniards in the BC are not different from Spaniards in the VC ($z=0.607$, $p=0.5440$; $t=0.3156$, $p=0.7528$). Pooling the data from all the Spanish speaking subjects we perform the test Spaniards vs. Catalans ($z=1.484$, $p=0.1377$; $t=1.2997$, $p=0.1950$) and Spaniards vs. Basques ($z=2.627$, $p=0.0086$; $t=2.2044$, $p=0.0285$). Thus, Spaniards scored higher in individualism than Basques but Spaniards and Catalans are similar in this construct.

Collectivism: Spaniards in the BC are not different from Spaniards in the VC ($z=-0.302$, $p=0.7623$; $t=-0.2639$, $p=0.7922$). Pooling the data from all the Spanish speaking subjects we perform the test Spaniards vs. Catalans ($z=-1.706$, $p=0.0881$; $t=-1.5710$, $p(\text{one-tail})=0.1176$, $p(\text{two-tails})=0.0588$) and Spaniards vs. Basques ($z=-1.941$, $p=0.0523$; $t=-1.8761$, $p=0.0619$). Thus, Spaniards scored lower in collectivism than Basques and Catalans.

Supporting Online Material for

Identity, Language and Conflict

An Experiment on Ethno-Linguistic Diversity and Group Discrimination in Two Bilingual Societies

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This PDF file includes:

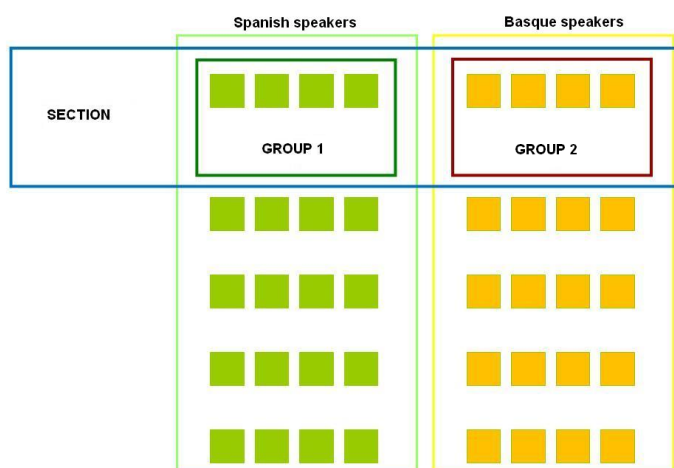
- I. Instructions for Part I of the experiment
- II. Pre-experimental questionnaire.
- III. Post-experimental questionnaire: Singelis test
- IV. Instructions for Part II of the experiment

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I. EXPERIMENTAL INSTRUCTIONS FOR PART I

The aim of the experiment is to study how individuals make decisions in some environments. Instructions are easy to follow and you can make some money if you follow them carefully. Money will be privately paid at the end of the experiment. Should you have any questions please raise your hand and an assistant will come to you. Any communication between you and other participants is strictly forbidden. If you do not follow this rule, you will be excluded from the experiment.

1. Only for taking part in this experiment you will receive 2000 ECUs (experimental currency units) that will be exchanged for Euros at the end of the experiment.
2. This experiment will be conducted in the two official languages of the UPV/EHU. Given that the participants choose the session language (Spanish or Basque), the participants in this session are divided in two laboratories. In each laboratory only one language will be spoken. In today experiment, the participants in this laboratory have chosen to do the experiment in Spanish while the participants in the other laboratory have chosen to do it in Basque.
3. The experiment consists of 20 rounds. In each round you are a member of a section of 8 participants. Each section of 8 participants is composed of two groups of 4 participants. You belong to one group of 4 participants. One group of 4 participants is composed of participants from this laboratory and the other group is composed of participants from the other laboratory. Both groups are connected by the net.
4. The composition of each group and each section is randomly determined at the beginning of the experiment and does not change along the experiment. You will never know the identities of the other group and section members. The following figure represents the distribution of participants in groups and sections in the two laboratories.



5. In each round every participant gets an initial endowment of 100 ECUs (Experimental Currency Units). You must only decide how much of this amount you want to assign to the Group Account and how much you want to assign to the Section Account. The remainder will automatically be assigned to an Individual Account.
6. Your payoff from the Individual Account (IA) equals your assignment to the Individual Account and does not depend on the decisions of others.
7. The payoff from the Group Account (GA) and the Section Account (SA) depend on the amount of ECUs you have assigned to those accounts as well as the

amount assigned by the members of your group and your section to the Group Account and Section Account in the following way:

- a. The sum of all assignments of your Group to the Group Account (GA) will multiplied by two and equally divided among the 4 members of the Group, independently of your assignment to that Account.
- b. The sum of all assignments of your Section to the Section Account (SA) will be multiplied by four and equally divided among the 8 members of the Section, independently of your assignment to that Account.

8. In summary, your earnings in one round will be determined as follows:

$$\text{Individual earnings} = \text{Payoff IA} + \frac{\text{Payoff GA}}{4} + \frac{\text{Payoff SA}}{8}$$

100 ECU – my allocation to the GA and SA *2 x GA of my group* *4 x SA of my section*

9. A simple way to understand how your earnings in each round have been calculated is the following:

Your earnings in a round are the sum of:

- a. The ECUs you decided not to allocate neither to the Group account nor to the Section Account (the amount of ECUs that goes to the Individual Account (IA)).
- b. 50% of the total amount assigned by the 4 members of your group to the Group Account **(2/4)**.
- c. 50% of the total amount assigned by the 8 members of your section to the Section Account **(4/8)**.

10. An example will allow you to better understand how your decisions will be converted into earnings at the end of the experiment. By simplicity, let's focus on one of the groups of one section of 8 participants. We will call this group, Group 1 (the other 4 members of the Section belong to Group 2, located in the other laboratory).

Suppose that the members of Group 1 make the following **allocations**:

	<i>GA of Group 1</i>	<i>SA</i>	<i>IA</i>
i. Participant A	100	0	0
ii. Participant B	0	100	0
iii. Participant C	0	0	100
iv. Participant D	40	20	40

The members of Group 1 have allocated a total of 140ECUs to the GA (100+0+0+40) and 120 ECUs to the SA (0+100+0+20). Suppose that the participants from Group 2 have allocated a total of 40 ECUs to the SA. Then earnings for members of Group 1 are calculated as follows:

	<i>Earning GA</i>	<i>Earning SA</i>	<i>Earning IA</i>	<i>Total earnings</i>
i. Participant A	70	80	0	150
ii. Participant B	70	80	0	150
iii. Participant C	70	80	100	250

11. Note that the earning that each participant gets from the Group Account is the same (independently of how much you allocate to that Account) and members of Group 2 also get 80 ECUs from the Section Account although they have allocated in total less than Group 1 to that Account. Thus, all the members of each group (and each section) will get always half of the total allocation made to the GA and SA, independently of how much they have assigned to the Accounts. Remember that you are not able to assign to these two Accounts more than 100 ECUs by round.
12. After each round you will get information about individual allocations of the members of your group to the GA and to the SA, as well as the allocations of the members of the other group to the SA. You will also get information about your earnings in each round (earnings from GA, SA and IA). The information of the allocation and earnings from the past rounds will appear on your computer screen. The following table shows the information that Participant A in the above example would observe:

	My allocations			My Group		The other Group	Section	Earnings			
Round	IA	GA	SA	GA	SA	SA	SA	IA	GA	SA	Total
1	0	100	0	140	120	40	160	0	70	80	150

13. At the end of the experiment, the sum of your individual earnings over the 20 rounds will be privately paid to you at the exchange rate of 400 ECUs=1€.

14. II. PRE-EXPERIMENTAL QUESTIONNAIRE

Questionnaire

Choose the correct answer and fill out the gaps. When you finish, raise your hand and an assistant will check the answers. The assistant will inform you whether your answers are correct or not. If you have made any mistake the assistant will give back the questionnaire and you will have to fill it again. You cannot ask any question to the assistant about the correct answers. Any communication between you and other participants is forbidden. If you do not follow this rule, you will be excluded from the experiment.

The following example shows the decisions from participants of one group (Group 1) in a Section and in one period. It also includes basic information about the decisions of the participants of the other group (Group 2) in the same Section. Please, fill out the gaps.

	Private Account (IA)	GA Group 1	SA Section
Participant 1	50	50	0
Participant 2	0	0	100
Participant 3	70	30	0
Participant 4	100	0	0
Total allocations of my group:	

Total allocation of my group to the GA of Group 1: ___ 80 ___

Total allocation of my group to the GA of the Section: ___ 100 ___

Suppose that Group 2 allocates 80 ECUs to the SA.

Thus, the sum of the allocations of both groups to the SA is: ___ 180 ___

The earnings that each participant in Group 1 gets from the GA of Group 1 is half of the value of all the allocations to that account: ___ 40 ___

The earnings that each participant in Group 1 gets from the SA is half of the value of all the allocations to that account: ___ 90 ___

The following table shows the earnings of the members of Group 1. Please, fill out the gaps.

	IA	GA G1	SA	Total Earnings
Participant 1	50	40	90	180
Participant 2	0			130
Participant 3	70			200
Participant 4	100			230

III. POST-EXPERIMENTAL QUESTIONNAIRE: SINGELIS TEST

INSTRUCTIONS

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement write the number that best matches your agreement or disagreement. Please respond to every statement. Thank you.

1=STRONGLY DISAGREE	4=DON'T AGREE OR	5=AGREE SOMEWHAT
2=DISAGREE	DISAGREE	6=AGREE
3=SOMEWHAT DISAGREE		7=STRONGLY AGREE

- ___ 1. I enjoy being unique and different from others in many respects.
- ___ 2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am.
- ___ 3. Even when I strongly disagree with group members, I avoid an argument.
- ___ 4. I have respect for the authority figures with whom I interact.
- ___ 5. I do my own thing, regardless of what others think.
- ___ 6. I respect people who are modest about themselves.
- ___ 7. I feel it is important for me to act as an independent person.
- ___ 8. I will sacrifice my self-interest for the benefit of the group I am in.
- ___ 9. I'd rather say "No" directly, than risk being misunderstood.
- ___ 10. Having a lively imagination is important to me.
- ___ 11. I should take into consideration my parents' advice when making education/career plans.
- ___ 12. I feel my fate is intertwined with the fate of those around me.
- ___ 13. I prefer to be direct and forthright when dealing with people I've just met.
- ___ 14. I feel good when I cooperate with others.
- ___ 15. I am comfortable with being singled out for praise or rewards.
- ___ 16. If my brother or sister fails, I feel responsible.
- ___ 17. I often have the feeling that my relationships with others are more important than my own accomplishments.
- ___ 18. Speaking up during a class (or a meeting) is not a problem for me.
- ___ 19. I would offer my seat in a bus to my professor (or my boss).
- ___ 20. I act the same way no matter who I am with.
- ___ 21. My happiness depends on the happiness of those around me.
- ___ 22. I value being in good health above everything.
- ___ 23. I will stay in a group if they need me, even when I am not happy with the group.
- ___ 24. I try to do what is best for me, regardless of how that might affect others.
- ___ 25. Being able to take care of myself is a primary concern for me.
- ___ 26. It is important to me to respect decisions made by the group.
- ___ 27. My personal identity, independent of others, is very important to me.

- ____ 28. It is important for me to maintain harmony within my group.
- ____ 29. I act the same way at home that I do at school (or work).
- ____ 30. I usually go along with what others want to do, even when I would rather do something different.

To score the scale, add each subject's scores (1 to 7) for the independent items and divide by 15 to give the mean score of the items. Then, do the same for the interdependent items. ***Each subject receives two scores***: one for the strength of the independent self and one for the interdependent self.

Independent items: 1, 2, 5, 7, 9, 10, 13, 15, 18, 20, 22, 24, 25, 27, and 29.

Interdependent items: 3, 4, 6, 8, 11, 12, 14, 16, 17, 19, 21, 23, 26, 28, and 30.

INSTRUCTIONS FOR PART II IF THE EXPERIMENT

The aim of the experiment is to study how individuals make decisions in some environments. Instructions are easy to follow and you can make some money if you follow them carefully. Money will be privately paid at the end of the experiment. Should you have any questions please raise your hand and an assistant will come to you. Any communication between you and other participants is strictly forbidden. If you do not follow this rule, you will be excluded from the experiment.

1. This experiment will be conducted in the two official languages of the UPV/EHU. In today's experiment, the participants in this laboratory have chosen to do the experiment in Spanish. Only for taking part in this experiment you will receive 3 Euros.
2. The experiment consists of 6 periods. In each period you will be an **observer**. As an **observer** you will make **predictions** about the decisions made by participants of an experiment that was conducted in this laboratory. You will get information about the day in which the experiment took place, the number of participants and the language chosen by the participants in that experiment as well as any other relevant information.
3. We will call the people that participated in that experiment **participants**. All **participants' decisions** were numeric and they were between 0 and 100 ECU (experimental currency unit). To understand the **decisions** made by the **participants** we will provide you with the full instructions of that experiment. Once you have read and understood the instructions you will make two types of predictions:
 - a. Predictions about the **decisions** made by the **participants**.
 - b. Predictions about the **predictions** made by the rest of **observers** in this room (excluding yourself).
4. The earnings that you will get at the end of this experiment will depend on how accurate your **predictions** have been. We will ask you about the average of the **decisions** and the **predictions**. Your earnings will depend on the difference between your **predictions** and those averages.
 - a. If the difference is equal o below 1 ECU, you will get 5 Euros.
 - b. If the difference is equal o below 5 ECU, you will get 3 Euros.
 - c. If the difference is equal o below 10 ECU, you will get 1 Euro.
 - d. If the difference is above 10 ECU, you will not receive anything.
5. At the end of the experiment the computer will randomly choose one period to be paid. Given that in each period you will made several predictions you can get some money. Some of your decisions will not be paid and you will be informed of that in the instructions that will appear in your computer screen. At the end of the experiment you will get information about the period chosen to be paid, your decisions in that period, the accuracy of your predictions and your final earnings.