Reducing the Detrimental Effect of Identity Voting: An Experiment on Intergroup Coordination in China[1]

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Abstract

A frequently mentioned impediment to intergroup coordination are pre-existing and long-standing divisions between voters along social and ethnic lines. While there are compelling discussions of the effects of identities on voting - focusing on either minimal group identities or naturally occurring identities - scholarly understanding of how to reduce the detrimental effect of identity voting remains limited. In this study, we compare the differential effects of payoff relevant minimal group identities and ethnic identities on intergroup coordination, and explore the effectiveness of repetition and communication on intergroup cooperation. We present findings from a series of experiments conducted in China with Tibetan and Han Chinese, with variations in the degree of identity salience and focality of the choices. We find that the naturally occurring ethnicities are indeed more salient than the minimal group identities. To a large extent, repetition and communication work to reduce the identity effects on voting, even when these effects are strongly reinforced by other identities. We find that conflicting multiple identities appear to be the most difficult to overcome in voter coordination games, but over time, we see that subjects achieve greater coordination through communication.

Keywords: Identities, Communication, Repetition, Other-Regarding Choices, Tibetan, Intergroup Coordination, Lab-in-the-field Experiment
JEL: C9; D6; D7; Z1

1 Introduction

Collective choice institutions often require that voters with diverse preferences coordinate on a common choice in which not all receive their most preferred outcome but together they are able to defeat a less preferred outcome. Gary Cox's seminal work, *Making Votes Count* (1997) emphasizes the importance of coordination in elections through individuals choosing to vote strategically for a secondary choice.[1] For example, consider the following simple election where there are three candidates, A, B, and C, supported by three different groups of voters which we will call voter types a, b, and c. Assume that 30% of the electorate are type a voters; their first preference is candidate A, their second preference is candidate B, and their last preference is candidate C. Similarly, assume that another 30% of the electorate are type b voters; their first preference is candidate B, their second preference is candidate A, and their last preference is candidate C. The remaining 40% of the electorate are type c voters; their first preference is candidate C and they are indifferent between candidates A and B as their second choice. If everyone votes sincerely for their first preference and there are no majority requirements, candidate C will win (voters of type c trivially will always vote for candidate C, since they have no preference between A and B). In order to defeat candidate C, then sufficient numbers of voter types a and b need to coordinate on either A or B such that C is defeated.

Although in this simple example the benefits of coordination appear fairly obvious, as Cox (1997) and Myerson and Weber (1993) note, coordination does not always succeed. One oft-cited and famous example is the 1912 U.S. Presidential election where Wilson defeated Taft and Roosevelt with less than a majority of the vote, even though arguably he was the last choice of the largely Republican supporters of the other two candidates.[2] Essentially, in our simple example voters of types a and b are in a team version of the well-known battle of the sexes game. Failure to coordinate by at least some members of both teams leads to the lowest payoffs for

[1] See also Myerson and Weber (1993). Cox (1997) discusses coordination through strategic entry of parties and candidates as well.

[2] The 1972 New York Senate election is a similar example in which two liberal candidates split support resulting in a win by a conservative candidate with less than a majority support who was easily defeated for reelection.

both types of voters. In the one-shot version of the game, there are two pure-strategy equilibria in which types a and b coordinate, one in which they coordinate on candidate A and the other in which they coordinate on candidate B. However, the payoffs for coordination on candidate A are higher for type a voters than for type b and vice-versa for coordinating on candidate B; payoffs are asymmetric. So there are winners and losers when the two types of voters coordinate and the battle over who will have the higher payoff can impede coordination.

A frequently mentioned impediment to coordination in naturally occurring voting situations are pre-existing and long-standing divisions between voters along social and ethnic lines. A number of scholars contend that voters choose expressively and, as such, can be influenced by appeals to identity and identity cues by candidates and parties during elections (Chandra, 2006; Horowitz, 1985). These identity cues are presumed to prevent voters from finding common ground in political situations when coordination with other ethnic or social groups would be advantageous, particularly when coordination involves asymmetric payoffs and thus there are winners and losers within the coalition of diverse groups. Coordinating may mean that one ethnic group becomes subordinate to another over time, and even at significant costs individuals may be unwilling to be so dominated – unwilling to give up their ethnic identity – resulting in coordination failure.

Yet, as Chandra (2006) points out, identities (even so-called ethnic ones) are not exogenous or unidimensional. Within constraints, individuals can often pick and choose their identities and how much these identities govern their behavior. It is problematic to contend that an identity is an exogenous determinant of how an individual votes in an election if the identity and the salience of the identity are themselves choices of the individual. Chandra (2006) argues that what is relevant is whether an identity arises from *descent-based* attributes or not. Descent-based attributes, she contends, have two main properties – they are visible and they are subject to constrained change. Hence, we might expect that the extent that identity affects voter coordination may be related to the extent that the identity is characterized by attributes that are

descent-based and therefore more difficult for an individual to "choose" to ignore. Furthermore, individuals also have multiple identities that a voter can choose between emphasizing. A voter might choose to follow an identity that helps him or her coordinate with others when such coordination is highly desirable, even at his or her own expense. Indeed, in a noteworthy study of coalitions between ethnic groups in Africa, Posner (2004) finds that Chewas and Tumbukas are allies and appeal to a larger encompassing identity when they are small in number and have strong needs for each other as coalition partners as in Zambia, but in different coalitions and adversarial when both groups are larger and need each other less as in Malawi.

A number of experiments have been used to explore the determinants of voter coordination in more than two-candidate elections as in our simple example (see Rietz, 2008 for a review). In the standard approach, voters are randomly assigned minimal payoff relevant identities (i.e. as either a or b voters in the example above) and the effects of institutions such as majority requirements or communication through pre-election polls and campaign ads on the extent of coordination are investigated. These exogenously assigned, but payoff relevant, minimal group identities appear to make voter coordination difficult. Although institutions and communication have some mitigating effects, coordination failures are prevalent.[3]

In this paper, we compare the differential effects of payoff relevant minimal group identities and ethnic identities on intergroup coordination, and explore the effectiveness of repetition and

[3]Morton and Rietz (2007) find that 50% or more majority requirements are most effective institution to facilitate voter coordination as they allow voters to use the institution to ensure coordination with minimal strategic voting on their part. Bassi, Morton and Williams (2011) find that coordination failures are also influenced by the size of incentives and the complexity of the voting situation when one of the choices is arguably more focal (one of the groups involved in coordination is in the majority). They find that providing large financial incentives to ignore these identities appears to be effective in reducing their influence significantly when one of the choices is arguably more focal than the other. As Crawford, Gneezy and Rottenstreich (2008) show, when payoffs are asymmetric as in battle of the sexes coordination games and the voting games studied in these experiments, coordination failures are much more likely than when payoffs are symmetric (that is, in payoff symmetric coordination games there is no disagreement between types a and b in their preferences over the multiple coordination equilibria – in our example the voters preferences between candidates A and B are identical). Crawford et al. (2008) find this inability to coordinate with asymmetric payoffs occurs even when one of the equilibria is arguably more focal than the other as well and facilitates cooperation when payoffs are symmetric. That is, option A is arguably focal since it precedes B in the alphabet. Or, alternatively, labeling one option after a well-known landmark building such as the Sears Tower in Chicago and the other option a lesser known building should make the first choice focal (and does with symmetric payoffs). Yet Crawford et al. (2008) find that focal points are not effective in leading to coordination in these types of games.

communication on intergroup cooperation. We present findings from a series of experiments conducted in China with Tibetan and Han Chinese, with variations in the degree of identity salience and focality of the choices. We find that naturally occurring identities are more likely to provide voters with what we label as *expressive identity utility* which can affect voters' willingness to cooperate. We define expressive identity utility as utility one receives from voting for a candidate with the same identity independent of any instrumental concerns. Thus, we establish that such identities can be potentially more problematic for coalition formation in the naturally occurring environment than those induced in the laboratory by minimal group identities. We find that to a large extent, repetition and communication work to reduce the identity effects in voting, even when these effects are strongly reinforced by other identities. Conflicting multiple identities appear to be the most difficult to overcome in our voter coordination games, but over time, we see that subjects achieve greater coordination through communication.

Our findings contributes to the literature in four ways: First, our study contributes to the empirical studies on the effect of identity on cooperation (Miguel, 2004; Chen and Li, 2009; Cederman, Weidmann and Gleditsch, 2011) by investigating the effects of multiple identities, particularly combining identities that are arguably non-descent based and more easily changeable with descent-based, less changeable identities. We examine the effects on coordination when these additional identities reinforce ethnic identities and when they conflict with ethnic identities. We find that multiple identities, particularly those conflicting with each other, make it significantly more difficult for groups to coordinate. Reinforcing identities appear to increase ethnic identity voting for some voters while conflicting identities appear to increase voter confusion. While most previous experimental studies focus on single identities, our study is one of the few attempts to investigate the effects of multiple identities in a controlled laboratory experiment.

Second, our study contribute to the studies on voter coordination games (Crawford et al., 2008; Bassi et al., 2011) by examining the effects of making one of the choices before the voters

arguably more focal and *other-regarding* in that the choice maximizes aggregate payoffs, minimizes inequity between voters, and maximizes the minimum payoff. Our findings suggest that a strong focal choice may function as a coordination device that will significantly increase intergroup cooperation. Third, we investigate how coordination might or might not evolve through repeated interaction and communication even when individuals are divided on descent-based attributes (and receive expressive identity utility) as compared to minimal group identities. That is, it is well known that communication and repeated interaction can lead to increased coordination with minimal group identities with payoff asymmetries (see Rietz, 2008 on voting games with more than two candidates and Cooper, DeJong, Forsythe and Ross, 1993 on the battle of sexes games which are similar in nature to the voting games we examine); we consider whether the effects of communication and repeated interaction are equally strong in leading to cooperation over time when voters are divided by more than minimal identities. We find that indeed communication and repeated interaction can significantly increase coordination even when individuals are divided by descent-based attributes. We find that over time the differences between coordination with minimal identities and descent-based ones becomes indistinguishable.

Finally, our study also makes empirical contributions to studies on Chinese ethnic minorities' interactions with the majority Han Chinese, which provides scientific foundations for future theoretical and policy studies on intergroup cooperation. Most studies on Chinese ethnic minorities and Tibetans specifically use case studies and state-level aggregate observational data, few individual-level data can be found in the literature.[4] It is potentially due to the challenge of data collection: Ethnicity-related topics are extremely sensitive in most countries; there are serious logistic issues both from the local authorities and individual subjects. Our findings provide meaningful results of how to improve intergroup cooperation, which is useful for both scholars and policymakers.

The remainder of this paper proceeds as follows. In Section 2, we report our basic experimen-

[4] Morton, Ou and Qin (2018) investigate the effects of religion on charitable contribution of Chinese Muslims who are in a minority to Han Chinese who are in a majority, which is comparable to this study.

tal voting game and our experimental design. In Section 3, we present the experimental results of the primary treatments. In Sections 4, we report the results of repetition and communication and consider the communication transcripts. Section 5 concludes.

2 Research Design

In this section, we first present the basic voting game in our experiment, then we discuss treatments and the experimental design. Our main research inquires focus on the comparison of identity effects on coordination between minimal group identities and naturally occurring and descent-based identities, and whether communication and repetition can reduce the identity effects. We investigate the effect of communication and repetition in reducing identity voting and improving intergroup coordination by comparing the effects of a single identity with multiple identities. We also explore our discussion of the identity effects and the influence of communication and repetition in a scenario with a strong focal choice - a possible coordination device - by studying the effects of having an other-regarding choice.

The project entailed Tibetans' interactions with Han Chinese. Our study targeted the Tibetans inhabited in Sichuan, one of the highest concentrations of Chinese Tibetans in China. Tibetan Chinese are treated as members of an ethnic minority group since they are less than 1% of the China's population, while Han Chinese comprise about 92%.[5] Tibetans clearly face competition from Han Chinese, both politically and economically. The cultural and religious differences between Han Chinese and Tibetans also cause conflicts. For various historical reasons, the relationship between the two ethnic groups has been sensitive. All of these differences between the two ethnic groups promote distinct identities and establish the difficulty of intergroup cooperation.

Two hundred and eight student subjects participated in our study. We used student subjects because they are relatively homogenous in their income and education, which allows for us to

[5]The data is based on the sixth nationwide population census (http://www.stats.gov.cn/tjsj/pcsj/rkpc/dlcrkpcsj/201207/t20120718_72812.html) initiated in 2010.

control for the differences on socio-economic factors that may exist among non-student subjects. Importantly, previous studies show that student subjects are not different from non-student subjects in their decisions in simple experiments such as our study (Exadaktylos, Espín and Brañas-Garza, 2013; Belot, Duch and Miller, 2015; Fréchette, 2016). The experiment was conducted at a public university in Chengdu, China. The university has a significant population of native Tibetan students as well as a large number of Han Chinese students.[6] Although there is generally little conflict between the two ethnic groups in the university, there have been protests by Tibetan students during times of tension in Tibet. However, compared to the general population, the animosity that the Han Chinese students have towards Tibetan students is less even when they have protests. Nevertheless, the ethnic distinctions between the two groups are noticeable, involve visible descent-based attributes, are difficult to change (differences in skin color and facial characteristics), and openly acknowledged by the students. Thus, we can think of the ethnic identities as largely immutable and predetermined for the purpose of the experiment.

2.1 Basic Voting Game in the Experiment

In our experiments we used the following basic voter coordination game as illustrated in Table 1 below. Let $i = \{a, b\}$ represent a voter's type. There are two voters of each type.[7] Subjects vote for either Candidate A or Candidate B (abstention is not allowed).[8] Let $j = \{A, B\}$ represent a candidate. The payoffs received for a voter of type i if candidate j is elected, u_{ij}, in

[6] Exact figures of the Tibetan and Han population in the university are not easily obtained, but most estimates are that Han Chinese students are 35% and Tibetan students are about 10% of the student population. Other minority groups make up the remaining population of students.

[7] Two voters of each type is the minimal requirement for a team version of the voter coordination game. A larger size of voters of each type may affect voters' decision-making (see Rietz, 2008 for a review). For example, Feddersen, Gailmard and Sandroni (2009) find that when the probability of being pivotal in voting declines, people are more prosocial in their voting choices. Our choice of two voters of each type reduced the number of subjects required for the study and thus increased the number of observations for a given subject pool. We faced significant logistic constraints when we recruited subjects. Tibetans are members of an ethnic minority and thus a small number of students at the local university were eligible to be subjects. Furthermore, we were only able to recruit and manage a somewhat small subject pool when we conducted the experiment given the sensitivity of using Tibetan subjects in an experiment in China.

[8] To have a clean comparison of treatments and understand the influence of identities, we wished to elicit sincere voting choices in our voter coordination games. When abstention is allowed, voters have an out between identity voting and voting strategically. It allows voters to coordinate by not actively voting against their identities. Investigating the extent that voters might use such a strategy is an interesting question for future research.

Table 1: Basic Payoff Matrix with Minimal Identities

	Election Outcome			Number
Voter Type	A	B	Tie	of Voters
a	100	70	0	2
b	70	100	0	2

experimental points, are given by Table 1 (we explain how points were translated into subject payments subsequently when we elaborate on our experimental design). Hence, $u_{aA} = u_{bB} = 100$ and $u_{aB} = u_{bA} = 70$. In the event of a tie election, the cost of failing to coordinate is stark, each voter receives 0. Notice that the minimal identities of a and b are payoff relevant in that voters benefit through higher payoffs if the candidate who shares their assigned identity is elected. But these payoffs are purely instrumental benefits, that is, the voters do not receive any payoff simply because they choose to vote for the candidate who shares their identity independent of the outcome of the election.

Our voting game captures the essence of strategic voting and coordination. It is also a team version of the battle of the sexes game. Unless three of the four voters can coordinate on either A or B, all will receive 0. However, because of the asymmetry in payoffs, type a voters benefit more from coordination on A while type b voters benefit more from coordination on B.

2.2 Single Identities

Our primary experimental comparison studies cooperative behavior in the voter coordination game with only minimal identities (being assigned exogenously to the payoff relevant identities of types a and b) to naturally occurring identities in which individuals are likely to receive expressive identity utility.

In the *Baseline Treatment*, we used minimal group identities as is typical in such voting experiments. Subjects were randomly assigned to either type a or type b in which there were 2 voters of each type using the payoff matrix in Table 1 above. The candidates were always listed with candidate A first. Subjects voted for either Candidate A or Candidate B (abstention was not allowed). There were no restrictions on how much time subjects could take to cast their

votes. We conducted three sessions with 12 subjects each for a total of 36 subjects. In each session, subjects were anonymously divided into 3 committees of 4 voters. Subjects were also in two separate rooms, 6 Han subjects in one room with 6 Tibetans in the other (we divided the subjects by rooms and ethnicity in order to make the experimental environment as similar as possible with the ethnic identity treatment described below). Subjects did not know which of the other subjects in their room were in their groups. Subjects were seated such that their choices were private and they could not observe the choices of other subjects.

In the *Ethnic Treatment* we used the same voting game and experimental design with the exception that the candidates were given Han and Tibetan names, *Li Hanmin* (李翰民) and *Zhaxi Duoji* (扎西多吉), respectively.[9] The subjects were paid according to the same matrix as in Table 1 with the exception that now candidate A was labeled Li Hanmin and candidate B was labeled Zhaxi Duoji. Again, the order in which the candidates were presented in the payoff matrix (first Li Hanmin, second Zhaxi Duoji) was kept constant throughout the experiment and there was no restriction as to how much time subjects could take to cast their votes. As with the Baseline Treatment, we conducted three sessions with 12 subjects each for a total of 36 subjects in this treatment. Again, in each session half of the subjects were Tibetan and half were Han Chinese. Subjects were matched into groups of 4, with 2 Tibetans and 2 Han in each group. Han Chinese sat in one room, while the Tibetan students sat in a different room. Tibetan subjects were assigned to receive higher instrumental payoffs if Zhaxi Duoji was elected (type b's) and Han Chinese were assigned to receive higher instrumental payoffs if Li Hanmin was elected (type a's). The Instructions for the Ethnic Treatment are presented in the Supplemental Online Appendix A2.

[9]Li Hanmin is a representative Han Chinese male's name. Zhaxi Duoji is a representative Tibetan male's name. In terms of their pronunciations, these names clearly show the ethnic identities. When we have controlled for the quality of the candidates (by setting up the payoff matrix of the coordination game), what matters is whether one wishes to vote for a co-ethnic candidate and whether two groups will be able to coordinate to avoid an outcome that they both dislike. The identity priming methodology we used in the experiment is typical in behavioral political economy studies. For example, Kam and Zechmeister (2013) find strong empirical evidence showing that name recognition can affect candidate support. Similar findings can also be found in Panagopoulos and Green (2008).

2.3 Multiple Identities

Identities are not always exogenous or unidimensional. Individuals often have multiple identities simultaneously, and within constraints, they can often pick and choose their identities and how much these identities govern their behavior. To investigate the influence of multiple identities, we conducted the experiment with two additional treatments in which we added naturally occurring identities that do not meet the criteria for ethnic identities in Chandra (2006)'s work, discussed above, and therefore are arguably more malleable. Specifically, in these additional treatments our subjects also differed in another identity, that is, half were Liberal Arts majors (i.e. Arts and Humanities, Chinese, media, etc.) and half were Science majors (i.e. Chemistry, Biology, Physics). Such identities are a matter of choice and, while they certainly might also reflect innate abilities and perhaps long-standing preferences, they are arguably more flexible and less long-standing than ethnic identities. Thus, they may not have the same salience in affecting coordination as ethnic identities.

The *Ethnic Reinforcing Treatment*, hereafter Reinforcing Treatment, was similar to the Ethnic Treatment with the addition that the Han students were all Liberal Arts majors and Li Hanmin was also described as a Liberal Arts Major. Similarly, all the Tibetan students were Science majors and Zhaxi Duoji was described as a Science major as well. As above, the order in which the candidates were presented was Han, then Tibetan and kept constant throughout the experiment.

The *Ethnic Conflicting Treatment*, hereafter Conflicting Treatment, was also similar to the Ethnic treatment with the addition that the Han students were all Liberal Arts majors and Li Hanmin was described as a Science Major. Similarly, all the Tibetan students were Science majors and Zhaxi Duoji was described as a Liberal Arts major. As above, the order in which the candidates were presented was Han, then Tibetan and kept constant throughout the experiment.

Table 2: Voting Game with Other-regarding Choice

	Election Outcome			Number
Voter Type	A	B	Tie	of Voters
a	100	90	0	2
b	60	100	0	2

2.4 Focal Effects and Other-Regarding Choice

Are focal points effective in leading to cooperative behavior? How does a focal choice affect intergroup coordination? What is the joint effect of focal points and identities? In order to explore identity effects more fully, we introduce a variation in our basic voting game that has a possibly stronger focal effect, which we label *Other-Regarding Treatment*. As in the Baseline Treatment, subjects were randomly assigned to either type a or type b in which there were 2 voters of each type. In each period they voted for either candidate A or candidate B (abstention was not allowed). The payoffs received in experimental points are given by Table 2 below. Again, the order in which the candidates were presented in the payoff matrix (first A, second B) was kept constant throughout the experiment and there was no restriction as to how much time subjects could take to cast their votes. Note that now candidate B is arguably the *other-regarding choice* in that total aggregate payoffs are higher if B is selected, B maximizes the smallest payoff, and the difference in payoffs between voters is minimized if B is selected.

As in the basic voting game, when we assume no expressive identity utility, there are multiple coordination equilibria – equilibria in which voters coordinate on voting for A, either all four voters or three of the four, and equilibria in which voters coordinate on voting for B, again either all four voters or three of the four. There is also a symmetric mixed strategy equilibrium and correlated equilibria. Our expectation is that the coordination equilibrium in which all four, or less likely three, voters choose B will be focal in this other-regarding coordination game. For comparison, we conducted a sixth treatment, *Ethnic Other-Regarding Treatment*, in which we used the same procedures and experimental design as in the Ethnic Treatment but with the payoff matrix in the Other-Regarding Treatment. Therefore, the Tibetan candidate became the

other-regarding choice.

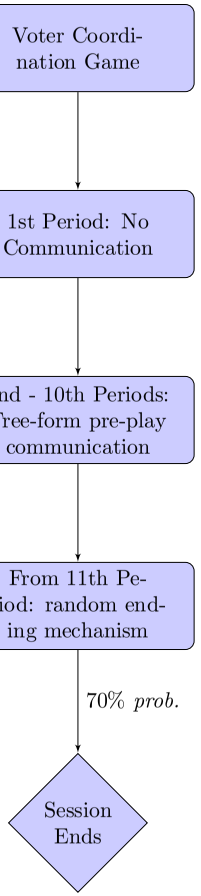
2.5 Communication and Repetition

In every session, subjects played the game initially for one period without communication. They then played for 9 more periods with free-form pre-play communication. The committees were standing committees or fixed matchings, to facilitate coordination over time. After the 10th period, we used a random ending rule, with a 30% probability that there would be a new round, and 70% probability that there would be no new round. We implemented a 120-second time limit for the free-form pre-play communication between rounds to facilitate the implementation of the experiment. Subjects could not choose who to communicate with; all messages were sent to all subjects of the four-person voting group. However, for privacy considerations, messages in the chat were not linked to the subjects' IDs and their types. Our experimental design thus allows us to investigate whether repetition and communication reduce identity voting, and whether the influence of repetition and communication has similar effect on minimal group identities and natural identities. Table 3 summarizes the treatments and procedures.

The experiment was conducted using an improvised lab-in-the-field methodology with laptop computers connected via a wireless network in two standard classrooms. The experiment was programmed in z-tree (Fischbacher, 2007). Subjects received 5 Chinese RMB for showing up for the experiment and one third of each experimental point earned in the selected rounds was converted to 1 RMB. Subjects were paid for 50% of the first round's earning plus 50% of one other randomly selected round's earning. On average, one session lasted for 90 minutes, and average earnings were about 45 RMB. In each session, 50% of subjects are Han Chinese and 50% of them are Tibetan. Han Chinese sat in one room, while the Tibetan students sat in a different room. The subjects were anonymously divided into committees of 4 voters, and there are always 2 Han Chinese and 2 Tibetan voters in each committee.

Table 3: Summary of Treatments

Treatment	Voting Payoff Matrix	Identity	Subjects	Procedure
Baseline		**minimal group identities**: voter type a, b and candidate type A, B	3 sessions, 9 committees, 36 subjects	
Ethnic		**ethnic identities**: Han Chinese name for candidate A and Tibetan name for candidate B.	3 sessions, 9 committees, 36 subjects	
Reinforcing	Election Outcome: Voter Type a: A 100, B 70, Tie 0; Voter Type b: A 70, B 100, Tie 0	**ethnic identities plus reinforcing identities**: Han Chinese name and Liberal Arts majors for candidate A when all Han Chinese voters are Liberal Arts majors. Tibetan name and Science majors for candidate B when all Tibetan voters are Science majors.	3 sessions, 9 committees, 36 subjects	
Conflicting		**ethnic identities plus conflicting identities**: Han Chinese name and Science majors for candidate A when all Han Chinese voters are Liberal Arts majors. Tibetan name and Liberal Arts majors for candidate B when all Tibetan voters are Science majors.	3 sessions, 9 committees, 36 subjects	
Other-regarding	Election Outcome: Voter Type a: A 100, B 90, Tie 0; Voter Type b: A 60, B 100, Tie 0	**minimal group identities**: voter type a, b and candidate type A, B	3 sessions, 8 committees, 32 subjects	
Ethnic Other-regarding		**ethnic identities**: Han Chinese name for candidate A and Tibetan name for candidate B.	3 sessions, 8 committees, 32 subjects	



3 Results: Identity Voting and Intergroup Coordination

In this section, we report the extent that voters are able to coordinate without repetition or communication by investigating voting choices in the first period. In the first period of the experiment subjects were not allowed to communicate and had no prior experience with the voting game. We focus on the treatment effect on identity voting, and we examine the identity effects across treatments. In the empirical analysis, we use every subject's voting choice as an independent observation since we only have one observation for each subject in the first period.

As discussed in previous sections, we expect that the extent that identity affects voter coordination is related to the extent that the identity is characterized by attributes that are descent-based and therefore more difficult for an individual to ignore. The naturally ethnic identities are mostly immutable and predetermined, and thus, we expect they are more salient and have a stronger effect on identity voting than the minimal group identities. Figure 1 reports the percentage of identity voting across treatments.

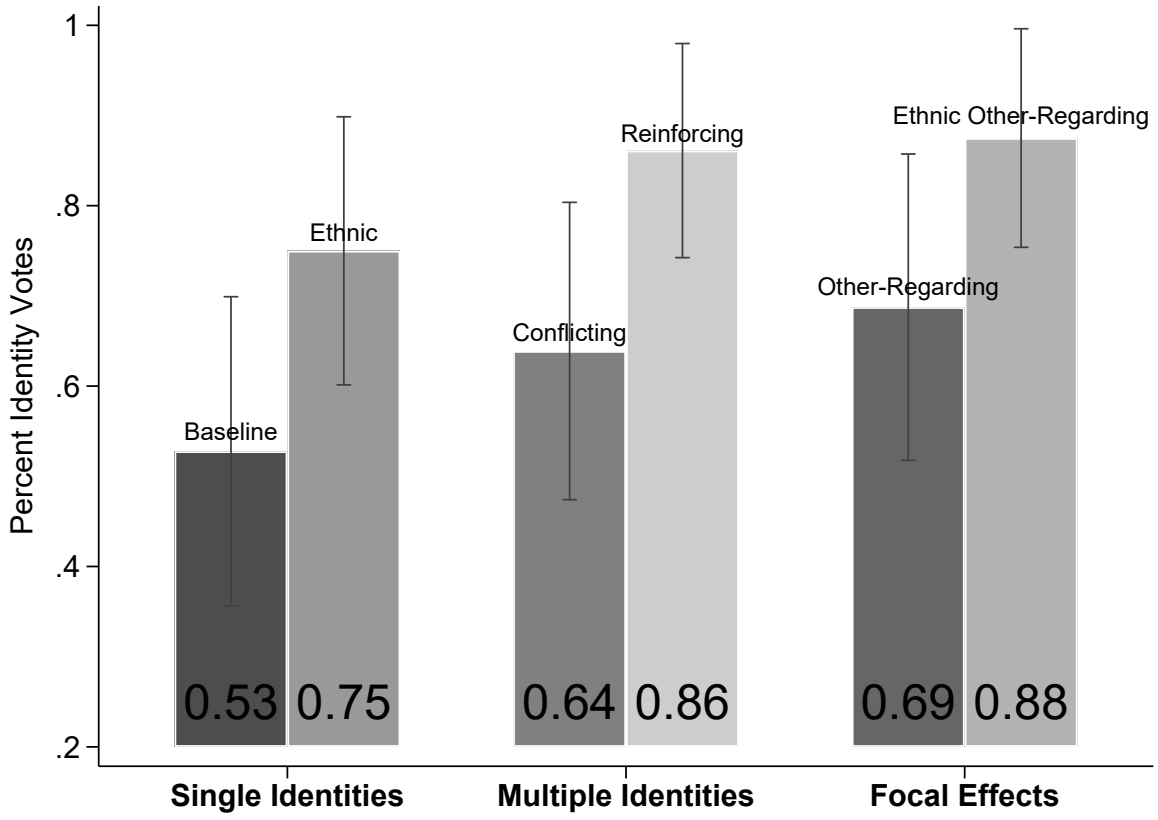


Figure 1: Percent Identity Votes without Repetition or Communication

When we compare the Baseline Treatment to the Ethnic Treatment, we find that our naturally occurring ethnic identities are more salient to our voters. We find greater identity voting between the two treatments in period 1. In the Ethnic Treatment, subjects voted their identities 75% of the time, which is significantly greater than the Baseline Treatment in which subjects voted their identities 53% of the time ($P = 0.049, N = 72$).[10] When we examine group outcomes, we find that in the Baseline Treatment 5 out of the 9 groups manage to coordinate on A, with all voters choosing A in 2 of these groups; one group coordinates on voting for B, with all voters choosing B, and only 3 groups do not manage coordination on either A or B, resulting in tie elections. In the Ethnic Treatment, Tibetan voters are significantly more likely

[10]Unless otherwise specified, we conducted the nonparametric chi-square test to compare whether the proportions of identity voting in the two treatments are significantly different.

to vote for their co-ethnic (78%) in the Ethnic Treatment than comparable type b voters whose first preference is also listed second are willing to vote for candidate B (39%) in the Baseline Treatment ($P = 0.018, N = 36$). We find that Han voters are also more likely to vote for their co-ethnic (72%) in the Ethnic Treatment than type a voters are willing to vote for candidate A (67%) in the Baseline Treatment, although these proportions are not significantly different.

We observe greater ethnic voting and less apparent coordination on the first listed candidate in the Ethnic Treatment, however, there is actually little difference in the amount of overall coordination between the Baseline and Ethnic Treatments in period 1. Voters manage to coordinate a greater percentage of the time in the Ethnic Treatment than in the Baseline Treatment (78% or 7 out of 9 groups in the Ethnic Treatment versus 67% or 6 out of 9 groups in the Baseline Treatment), although the difference is insignificant.

It is critical to stress that the candidates benefitting from the coordination are clearly different in the two treatments. That is, in period 1 in the Baseline Treatment candidate A wins 56% of the time (5 out of 9) and candidate B wins only 11% of the time (1 out of 9), which is significantly different (two-sided proportion test, $P = 0.045, N = 18$). However, even though Zhaxi Duoji is listed second, in the Ethnic Treatment Li Hanmin wins 33% of the time (3 out of 9) and Zhaxi Duoji wins 44% of the time (4 out of 9), which is not statistically distinguishable. The results suggest, given Tibetan voters are significantly more likely to vote for their co-ethnic in the Ethnic Treatment, the Tibetan candidate clearly benefits from the coordination.

The greater identity voting in the Ethnic Treatment is also reflected in the fact that none of the groups in the Ethnic Treatment succeeded in full coordination on the same outcome, at the most one candidate received 3 votes. However, in the Baseline Treatment 33% of groups managed full coordination. Hence, full cooperation is a bit more likely under the Baseline Treatment than the Ethnic Treatment ($P = 0.058, N = 18$). This result fits with our theoretical prediction (detailed in Appendix A1) that full coordination equilibria do not exist when voters receive expressive identity utility and that such expressive identity utility is more likely to exist

in the Ethnic Treatment than in the Baseline Treatment.

The comparisons between the Baseline Treatment and the Ethnic Treatment focus on one dimension of identities. We now turn to our experimental investigation of the effects of multiple identities on voting choices. We expect that without repetition and communication that reinforcing identities should increase the salience of expressive ethnic identity utility and lead to more ethnic voting and less coordination, while conflicting identities should have the opposite effect.

We indeed find that, as expected, ethnic identity voting is higher in the Reinforcing Treatment (86%) and lower in the Conflicting Treatment (64%); recall that in the Ethnic Treatment identity voting is 75%. The difference between the Reinforcing and Conflicting Treatments is significant ($P = 0.029, N = 72$), although the comparison of each with the Ethnic Treatment, arguably the more appropriate baseline, is not significant.[11] When we disaggregate by subject type, we find that the difference between the Reinforcing and Conflicting Treatments is greater for Tibetan voters than for Han. In the Reinforcing Treatment Tibetans vote their ethnic identities 89% of the time while they do so 61% of the time in the Conflicting Treatment ($P = 0.054, N = 36$), the percentages are 83% and 67% for Han ($P = 0.248, N = 36$). However, as with the overall results, the percentages disaggregated are not significantly different from the percentages of ethnic voting by ethnicity in the Ethnic Treatment. Hence, we find weak evidence suggesting that the multiple identities increase the salience of the ethnic identities when reinforcing and decrease the salience when conflicting.

However, despite the weak evidence for differences in ethnic identity voting between these treatments and the Ethnic Treatment, we find that coordination failures are much more likely with multiple identities than without, even when Conflicting. In the Reinforcing Treatment only 4 out of the 9 groups manage to coordinate, a success rate of 44% and in the Conflicting Treatment only 1 out of the 9 groups manages to coordinate, a success rate of 11%. Compared

[11] For the comparison of the Reinforcing and Ethnic Treatments, Pearson $\chi^2 = 1.419$, $P = 0.234$, and for the comparison of the Conflicting and Ethnic Treatments, Pearson $\chi^2 = 1.047$, $P = 0.306$.

to a success rate of 78% (7 out of 9) in the Ethnic Treatment, the difference is not significant between the Reinforcing Treatment and the Ethnic Treatment ($P = 0.147, N = 18$), but there is a significant difference between the Conflicting Treatment and the Ethnic Treatment ($P = 0.004, N = 18$). These results suggest that, although we expected the Conflicting Treatment to mitigate the effects of identity voting and lead to less coordination, by adding in the confusion of conflicting identities, the treatment has the opposite effect, leading to much more difficulty in coordinating without repetition and communication.

In our simple voting game the two candidates only differ in the asymmetry in terms of winners and losers. In other ways there is little to distinguish them. In terms of aggregate payoffs both candidates provide equal total payoffs, 340 experimental points. The inequity between winners and losers is identical and both provide the same minimum payoffs to voters. Thus, if voters care about aggregate payoffs, equity between voters, or maximizing the minimum payoffs, the choices are identical. Previous research has demonstrated that voters might be willing to engage in other-regarding or prosocial voting for a candidate that is not their first choice when one of the choices differs on these dimensions (Feddersen et al., 2009).

In our baseline voting game we have limited the degree that one candidate may be focal to the candidate first listed. We indeed find that identity voting is significantly less than predicted by the mixed strategy equilibrium in the Baseline Treatment, which appears to reflect coordination on candidate A, which is arguably focal given that A comes first in the alphabet.[12] Previous work has found similar such coordination on the first listed candidate (Rietz, 2008). We now examine identity voting in the scenario in which there is a possibly stronger focal effect and investigate whether a focal choice functions as a coordination device.

We find that having a choice that is arguably other-regarding facilitates coordination strongly, and other-regarding choices are more focal than those first listed and groups find it more easy

[12]We derive the equilibria of the basic voting game in Appendix A1. The mixed strategy equilibrium predicted identity voting of 69% probability, we observe subjects voting their identities only 53% of the time, which is significantly different for a two-sided binomial test at 5 percent level of significance. When we break the results down by subject type, we find that both voter types a and b are more likely to vote for A, the first listed candidate, than to vote for B; type a voters vote for A 67% of the time, while type b voters vote for A 55% of the time.

to do so. However, naturally occurring ethnic identities can make coordination on an other-regarding choice difficult. Specifically, in the Other-Regarding Treatment, there are two possible focal points. One is candidate A who is listed first, the other is candidate B who is an other-regarding choice. We find that in the Other-Regarding Treatment, voters appear strongly attracted to candidate B as a focal choice, with 63% choosing candidate B, which is significantly more than the 37% voting for candidate A (two-sided proportion test, $P = 0.046, N = 64$).[13] We find little difference in the percentage of groups who coordinate in the Other-Regarding Treatment (63% or 5 out of 8 groups) as compared to the Baseline Treatment (67% or 6 out of 9 groups). However, we find that the majority of groups who coordinated in the Other-Regarding Treatment coordinated on B (4 out of 5), while the majority of groups who coordinated in the Baseline did so for A (5 out of 6). Hence, we find strong evidence that the Other-Regarding choice is focal and more so than being listed as the first candidate.

Given that having an other-regarding choice as an option leads to extremely easy coordination among voters, what happens when we introduce naturally occurring ethnic identities? Will such identities mitigate the advantage reaped by the other-regarding choice? We find less voting overall for the Tibetan candidate in the Ethnic Other-Regarding Treatment than in the Other-Regarding Treatment (50% compared to 63%), but the difference is not significant. We also compare voting for the Tibetan candidate in the Ethnic Treatment to the Ethnic Other-Regarding Treatment, and the difference is statistically undistinguishable. However, we do find strong ethnic identity effects. As reported in Figure 1, we find that in the initial period, without repetition or communication, voters engaged in significantly more ($P = 0.043, N = 64$) identity voting in the Ethnic Other-Regarding Treatment (88%) than in the Other-Regarding Treatment (69%).[14] The result is a serious inability to coordinate in the first period in the Ethnic Other-

[13] We also compare the vote share for candidate B in the Other-Regarding Treatment (63%) to the vote share for candidate B in the Baseline Treatment (36%), which is not significantly different ($P = 0.030, N = 68$).

[14] When we disaggregate the data, we find that Han Chinese vote significantly less for the Tibetan candidate in the Ethnic Other-Regarding Treatment than type a voters chose the B candidate in the Other-Regarding Treatment (13% as compared to 44%, $P = 0.049, N = 32$), while we find no significant difference between Tibetan voters and type b voters (88% to 81% voting for the Tibetan and B candidates, respectively). Han subjects vote more for the Han candidate in the Ethnic Other-Regarding Treatment (88%) than in the Ethnic

Regarding Treatment, only 2 out of the 8 groups coordinate (in both cases the coordination occurred with a minimal winning coalition, in one group for the Tibetan candidate and the other for the Chinese) as compared to 5 out of the 8 groups in the Other-Regarding Treatment, although the difference is not significant at conventional levels.

4 Effects of Repetition and Communication

Can communication and repetition reduce coordination failure? Especially, can the identity effects found in the first period be reduced to the same extent? To address these questions, we examine the percentage of intergroup coordination across treatments and consider the communication transcripts. In the statistical analysis, we average voting choices and group coordination rates for periods 2-10.[15] Because the averages are numbers between 0 and 1 rather than dichotomous results, we conduct Wilcoxon-Mann-Whitney tests to investigate the difference of means of identity voting and group coordination. Figure 2 reports the group level coordination rate over time by treatment.

Between the Baseline Treatment and the Ethnic Treatment, we find that overall with communication and repetition the degree of identity voting is not significantly different between the two treatments (55% of voters choose their identity in the Baseline Treatment and 55% in the Ethnic Treatment). When we examine group outcomes, we find further support that communication and repetition reduces identity voting and leads to similar behavior in the Baseline and Ethnic Treatments. We find that in the Baseline Treatment groups manage to coordinate 91% of the time and in the Ethnic Treatment 94% of the time, which are not significantly different. The results suggest that repetition and communication are as effective in reducing non-cooperation with our naturally occurring identities as it is with minimal identities. It is important to note

Treatment (72%), although the difference is not statistically significant.

[15]The hypothesis is that repetition and communication leads gradually to coordination over time. Since some groups chose for more periods than others (because of the random ending rule used in our experiment), then arguably some groups might look like they coordinated more when it is just that they have more later periods in the average computation than the other groups. Each session lasted for at least 10 periods. Hence, we focus on the averages of periods 2-10.

that our results do not suggest that the voters do not receive expressive identity utility in the Ethnic Treatment. Our results from period 1 suggests that such utility exists and is significant. What our analysis shows is that communication and repetition are effective in reducing the negative influence such identities can have on cooperation.

When we turn to the effects of repetition and communication on voter coordination in the Reinforcing and Conflicting Treatments, unlike our results comparing the Baseline and Ethnic Treatments, we find that when we compare the Reinforcing and Ethnic Treatments, ethnic identity voting is significantly higher in the Reinforcing Treatment with repetition and communication (62% compared to 55%, Mann-Whitney $P = 0.038, N = 72$). In contrast, we find no significant differences in ethnic identity voting between the Conflicting and Ethnic Treatments (58% compared to 55%). This result is not surprising given that, as noted above, we find that ethnic identity voting is lower in the first period in the Conflicting Treatment and we know that in the Ethnic Treatment repetition and communication reduces ethnic identity voting.

What are the effects of repetition and communication on group coordination in these multi-identity treatments? We find that coordination is somewhat less successful in both the Reinforcing and Conflicting Treatments as compared to the Ethnic Treatment, but the differences are not significant (91% in the Reinforcing Treatment and 89% in the Conflicting Treatment as compared to 94% in the Ethnic Treatment). These results provide additional evidence that repetition and communication can reduce coordination failure to the same extent.

What is the effect of repetition and communication when there is an other-regarding choice in voting? We find strong evidence that groups coordinate on the equilibria in which they vote for candidate B even with repetition and communication. In the Other-Regarding Treatment 79% of subjects voted for candidate B in the periods with communication as compared to only 44% in the Baseline Treatment ($P < 0.001, N = 68$). Unlike the first period, both types of subjects engage in significantly more voting for candidate B in the Other-Regarding Treatment (for type a's

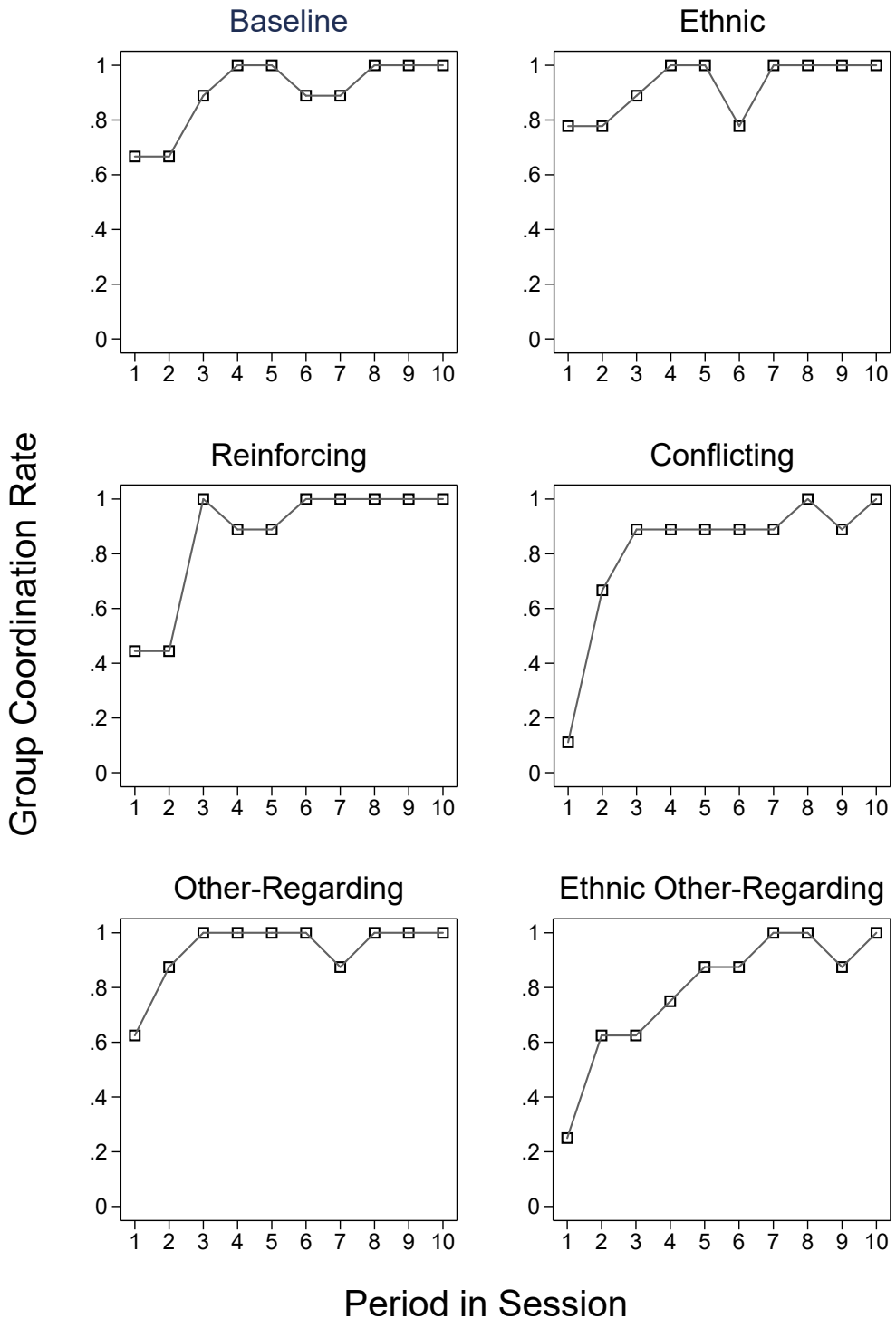


Figure 2: Group Coordination Over Time by Treatment

the comparison is 77% to 39% and for type b's the comparison is 83% to 49%).[16] While we find no significant difference in coordination levels with communication and repetition between the Baseline and the Other-Regarding Treatment (97% coordinate in the Other-Regarding Treatment as compared to 91% in the Baseline, $P = 0.155, N = 17$), of those groups who coordinate, we find that 79% coordinate on candidate B in the Other-Regarding Treatment as compared to only 40% in the Baseline, which is significantly different ($P = 0.001, N = 17$). When we examine behavior by group across periods, we find that all groups coordinate on candidate B for more periods (4 out of 8 groups for all periods) and only one group shows evidence of alternating behavior with 4 wins by A and 5 wins by B.

We find that repetition and communication also have strong effects on behavior in the Ethnic Other-Regarding Treatment. Specifically, we find that voters coordinate on the Tibetan candidate despite the ethnic identity divisions. Although Han Chinese vote for the Tibetan candidate still less than type a voters choose B in the Other-Regarding Treatment (72% compared to 77%), this difference is not significant and falls over time. There are less coordination successes in the Ethnic Other-Regarding Treatment than in the Other-Regarding Treatment (85% compared to 97%), which is significant ($P = 0.037, N = 16$), but for periods after 5 is virtually identical (95% compared to 98%). When we examine the outcomes when coordination occurs we find that more than 80% of the time are wins for the Tibetan candidate and when we examine individual group behavior we find that the Tibetan candidate wins a majority of the time in all groups, and the only group where the number of wins are close to equal has more tie outcomes than wins by either candidate (although only one group coordinates 100% of the time on the Tibetan candidate).

In summary, we find strong evidence in support of the positive influence of repetition and communication on reducing identity voting and increasing intergroup coordination. The effects are strong and robust across the level of identities and focal effects.[17]

[16] We conducted Mann-Whitney tests and for a, $P < 0.001, N = 34$; for b, $P < 0.001, N = 34$.

[17] We conducted additional empirical investigations by only examining the results of the 10th period or the

How do repetition and communication reduce identity voting and improve intergroup coordination as compared to period 1? To answer this question, we analyze the communication transcripts (reported in Appendix A3). We coded the chat transcripts using Han and Tibetan subjects recruited in Shanghai at Jiao Tong University in an incentivized procedure described in Houser and Xiao (2011). We find no significant differences in the types of messages sent overall by treatments, and subjects largely use communication effectively in achieving the cooperation that we observe. We find that in the chats voters report what they actually intend to do. When we examine those subjects who stated how they intended to vote or that they agreed with a clear group decision on how to vote, we find that the vast majority follow through with their stated intentions. The behavioral pattern in communication seems to build trust between individuals and groups, which makes intergroup cooperation possible and improves coordination.

5 Concluding Remarks

As noted in the Introduction, voter coordination is necessary in many situations in which one group of voters must acquiesce to another in order to prevent a third option which both groups dislike. Yet, it is well known that such coordination can be difficult. It is also often argued that ethnic and other group identities can prevent voters from achieving coordination leading to outcomes that are least desired by the majority. It is an important question then whether such identities can and do reduce the ability of voters to coordinate and what factors might overcome any negative effects.

Most previous research has examined the effects of identity on voter coordination using the minimal identities that can be assigned in the laboratory exogenously. In this paper we have examined the effects of minimal and naturally occurring identities on voter coordination. We find that naturally occurring identities can have stronger negative effects on the ability of groups to coordinate than minimal identities, even when one choice is clearly focal as in the case with

averages of periods 5-10, and these additional investigations report consistent and stronger effects. We also conducted the empirical analysis with the results after the 10th period, and we find qualitatively the same results.

a choice that is arguably more other-regarding. However, repetition and communication help groups significantly overcome their divisions by identity and facilitate group coordination. We also find that when one choice is clearly more focal than the other, as in our other-regarding choice, voters find it easy to coordinate on a common outcome even in the face of natural ethnic divisions.

While our experiments are conducted in a laboratory environment, providing us with the ability to control the choices before voters and their payoffs, we combine our laboratory methods with the use of naturally occurring and highly salient ethnic identities in our study. This allows us to have both the control of the laboratory and the ecological validity of the naturally occurring identities. We also allow for subjects to engage in free form communication which provides us with greater insight into how successful such communication can be in facilitating cooperation.

Our results are largely good news for concerns about the possible negative effects of ethnic identities on coordination among voters. That is, our results suggest that voters are willing to use communication to coordinate when faced with that necessity and can do so successfully. However, our results suggest problems for groups that have little experience with prior coordination and little opportunity for communication. Our results also suggest that multiple identities, when they are conflicting, can be serious impediments to coordination, even when repetition and communication are possible.

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Supplemental Online Appendix

A1 Theoretical Framework and Equilibria in the Basic Voting Game

Like the classic battle of the sexes game, the equilibrium predictions of our basic voting game illustrate the difficulties that can exist when voters wish to coordinate but have asymmetric preferences. In particular, it has multiple pure strategy Nash equilibria in which voters *coordinate* to avoid a tie election. Pure strategy symmetric Nash equilibria exist in which all voters coordinate on choosing A and A wins unanimously or coordinate on choosing B, with B winning unanimously. However, these equilibria involve some voters choosing weakly dominant strategies and voting strategically when indifferent. That is, consider the case where all are voting for A. The b type voters expect to receive 70 from the win by A, regardless of how they vote. They are therefore indifferent between voting for A and B, so an equilibrium exists in which they vote for A. However, given that only a majority is required for a candidate to win, asymmetric pure strategy Nash equilibria also exist in which three voters vote for A (B) and one voter votes for B (A). These equilibrium again rely on weakly dominant strategies and would appear to require considerable advance coordination on which voter would choose contrary to the other three. There is no Nash equilibrium in pure strategies in which voters are exactly divided into equal camps and a tie election is expected; in such a case any voter would prefer to change his or her vote and increase his or her payoffs from 0 to either 70 or 100 given what other voters are choosing.

To complicate matters further, there is of course also a non-degenerate symmetric mixed strategy equilibrium in which voters randomize between voting for A and B. Assume that p is the probability that a voter of type a chooses A, $1-p$ is the probability she chooses B and q and $1-q$ are the probabilities that a voter of type b chooses B and A, respectively. Assuming symmetric voter strategies (i.e. voters of the same type use the same strategies), then a voter of type a chooses p such that voters of type b are indifferent between voting for A and B and

vice-versa. It is straightforward to derive the following reaction equations and the equilibrium prediction that $p^* = q^* = 0.69$, which is graphed in Figure A1 below:[18]

Reaction Equation 1 for a voter of type a:

$340p + 100q + 510p^2q - 540pq - 240p^2 - 100 = 0$

Reaction Equation 2 for a voter of type b:

$540pq - 340q - 510pq^2 - 100p + 240q^2 + 100 = 0$

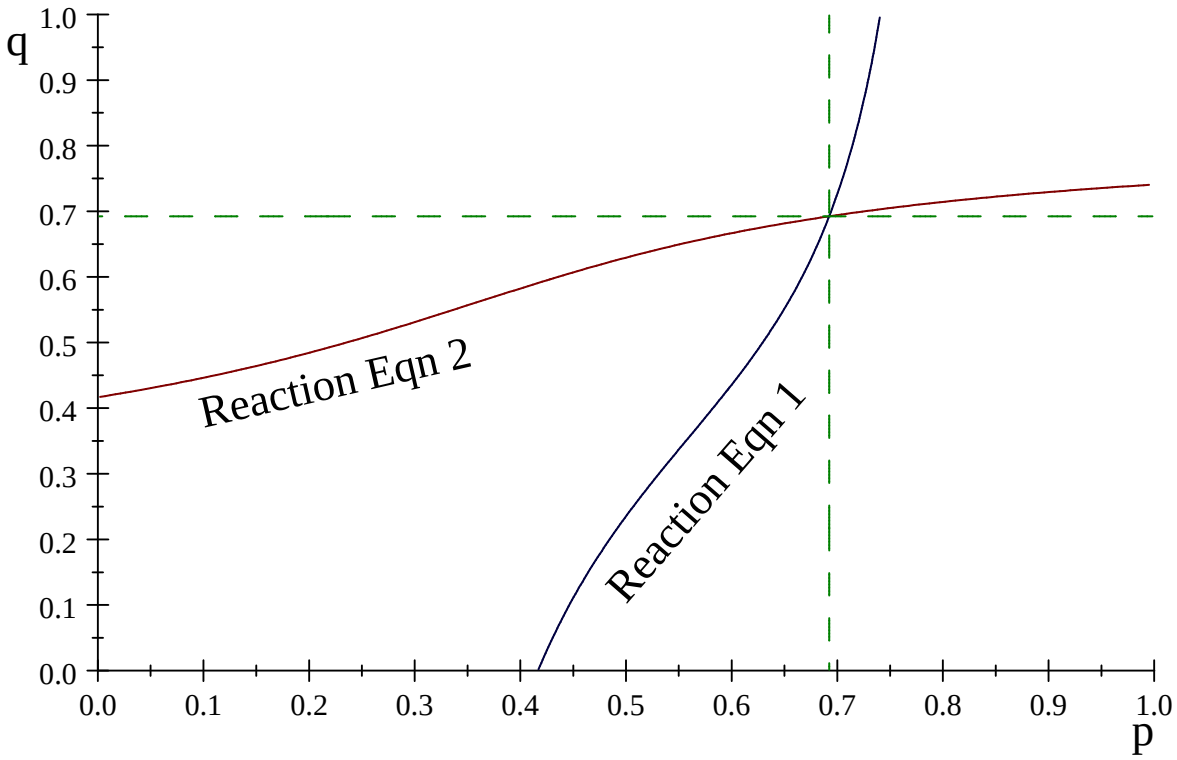

Figure A1: Symmetric Mixed Strategy Equilibrium in Basic Game

Note that in the symmetric mixed strategy equilibrium all voters engage in some identity voting, choosing their identity candidate more than 2/3 of the time. Furthermore, as is found in traditional battle of the sexes' games, the symmetric mixed strategy equilibrium yields a lower expected payoff for all actors than in any of the pure strategy equilibria identified above, an

[18]The expected utility for one b type voter from voting for A given that other voters are using the symmetric mixed strategies is given by: $70(p^2(1-q) + 2p(1-p)(1-q) + p^2q) + 100(1-p)^2$ and for voting for B: $70p^2(1-q) + 100((1-p)^2 q + (1-p)^2(1-q) + 2p(1-p)q)$. Setting these two utilities equal to each other yields Reaction Equation 1 in the text. Reaction Equation 2 can be similarly derived.

expected payoff of 49.28 compared to 70 for a voter who coordinates strategically on his or her second choice and 100 if voters coordinate on a voter's first choice. The expected payoff from the symmetric mixed strategy equilibrium is also lower than the expected payoff of a correlated equilibrium in which voters coordinate between coordination equilibria via an independent randomization device or a neutral outside observer such that with 50% probability all coordinate on A and 50% probability all coordinate on B, which has an expected utility of 85. Voters therefore should have considerable incentive to attempt to coordinate on one of the pure strategy equilibria or some sort of correlated equilibria.

A1.1 Adding in Expressive Identity Utility

In our study we are interested in the extent that identity impedes coordination. As is clear from the above analysis, theoretically even minimal identities that are instrumental can make coordination difficult because of the asymmetric nature of the payoffs. In our study, however, we wish to investigate the effects of identities above and beyond minimally induced ones. Such identities may not be payoff relevant, but may lead voters to be unwilling to vote strategically for a candidate of a different identity.

We thus expand our voting game and assume that subjects receive additional utility from voting their identity, which we label w_i, where $w_i \geq 0$. This utility is best called expressive or consumption utility since it is derived purely by voting one's identity and is independent of who wins the election. For simplicity of analysis, we assume that w_i are common knowledge to all voters. We assume that the utility from voting one's identity is additively separable from the utility received from the outcome of the election. That is, the identity modified payoff matrix for the voters is given by Table A1 below.

First we consider the simple special case where $w_a = w_b = w$. That is, consider the case where all voters receive the same expressive identity utility which is known to all voters. How does w affect the pure strategy coordination equilibria identified above? It is clear that with expressive identity utility there are no longer symmetric pure strategy coordination equilibria

Table A1: Payoff Matrix with Expressive Identity Utility

		Election Outcome		
Voter Type	Voting Choice	A	B	Tie
a	A	$100 + w_a$	$70 + w_a$	w_a
	B	100	70	0
b	A	70	100	0
	B	$70 + w_b$	$100 + w_b$	w_b

in which all voters either choose A or B. For example, if all voters are choosing A, then a b type voter would prefer to vote for B and receive utility of $70 + w$ as compared to 70. Thus, the only pure strategy coordination equilibria exist are the asymmetric ones in which the winning candidate receives a minimal coalition of three voters. Notably, these equilibria no longer rely on weakly dominant strategies for support if $w < 70$. Furthermore, these equilibria only exist if $w \leq 70$. That is, if $w > 70$, then the sole voter choosing contrary to his or her identity prefers to vote his or her identity and the coalition supporting coordination on a common candidate collapses.

Without expressive identity utility we found there were no pure strategy Nash equilibria in which candidates are exactly tied. Do such equilibria exist with expressive identity utility? As long as $w < 70$, such equilibria do not exist. However, when $w \geq 70$, the equilibrium in which everyone votes his or her identity and the outcome is exactly tied is the only pure strategy equilibrium to exist.

What about the mixed strategy equilibria? Since w is independent of the outcome of the election, but purely depends on voting behavior, it is the equivalent of adding a constant to the reaction equations 1 and 2 above, transforming these equations to the following:

Reaction Equation 1 with expressive identity utility for a voter of type a:

$340p + 100q + 510p^2q - 540pq - 240p^2 - 100 - w = 0$

Reaction Equation 2 with expressive identity utility for a voter of type b:

$540pq - 340q - 510pq^2 - 100p + 240q^2 + 100 + w = 0$

It is straightforward to show that the symmetric mixed strategy equilibrium values of $p^* = q^*$

increase as w increases, such that for $w \geq 70$, the unique equilibrium is for all voters to choose the candidate that matches their identity and there is no non-degenerate mixed strategy equilibrium, as shown in Figure A2 below.

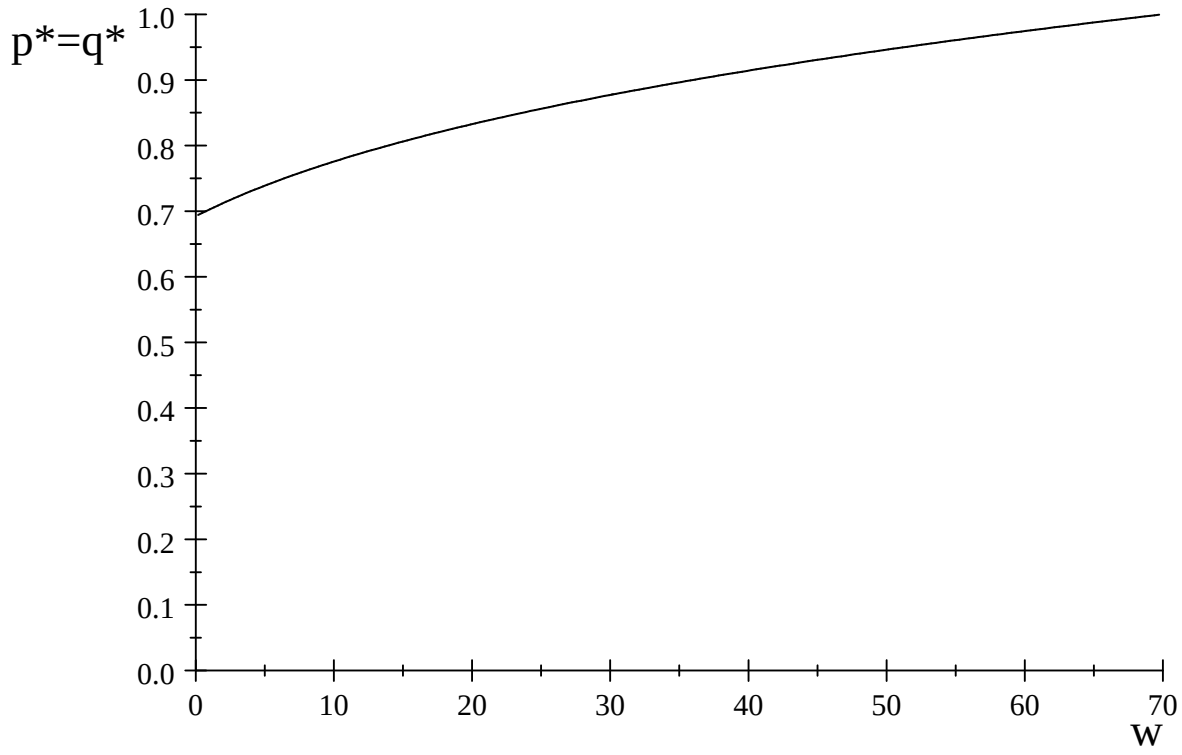

Figure A2: Symmetric Mixed Strategy Equilibrium and w

However, for values of $w \leq 70$, correlated equilibria also exist which yield higher expected utility than the symmetric mixed strategy equilibria for every value of w. For example, consider the correlated equilibrium which randomizes equally across the four possible asymmetric pure strategy coordination equilibria as compared to the mixed strategy equilibrium for given values of w,graphed in Figure A3 below.[19] While the expected utility from the mixed strategy equilibrium

[19]The expected utility in the mixed strategy is given by: $240(\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}-\frac{8}{289\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}}+\frac{26}{51})^3-410(\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}-\frac{8}{289\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}}+\frac{26}{51})^2+240(\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}-\frac{8}{289\sqrt[3]{\frac{1}{1020}w+\sqrt{\frac{1}{1040\,400}w^2+\frac{1409}{67\,652\,010}w+\frac{8161}{60\,886\,809}}+\frac{1409}{132\,651}}}+\frac{26}{51})$ and in the correlated equilibrium by $0.75w + 85.0$.

rises to 70 as w approaches 70 as shown in Figure A3 as well, the expected utility from the correlated equilibrium increases to 137.5, which is greater. However, for values of $w > 70$, the randomized correlated behavior is no longer an equilibrium as it is no longer a best response for the sole voter designated to vote strategically to do so.

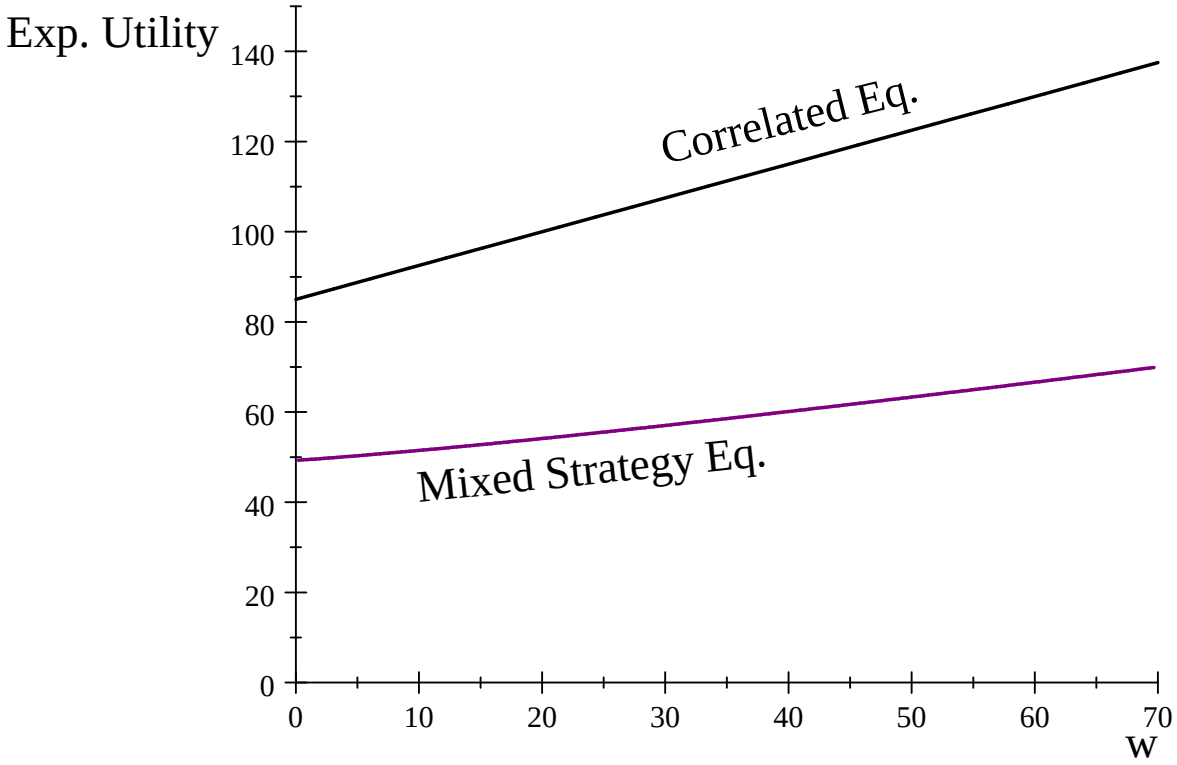

Figure A3: Expected Utility when $w \leq 70$

Hence, for values of $w < 70$, voters clearly would prefer the correlated equilibrium or any of the asymmetric pure strategy equilibria to the mixed strategy equilibrium. Yet, coordinating on one of these other equilibria is likely to be difficult, particularly since these equilibria require use of asymmetric strategies. We contend that naturally occurring identities are more likely to provide voters with expressive identity utility, $w > 0$, than minimal group identities. Thus, our results suggest that when naturally occurring identities provide equal expressive identity utility they are more likely to lead to coordination failures and higher levels of sincere voting than minimal group identities.

A1.2 Winners, Losers, and Differences in Expressive Identity Salience

Our analysis so far assumes that there is no difference in the salience of expressive identities across voter types. What happens if voters differ in the value they place on expressive identities? Consider for example the simple case where $0 = w_a < w_b = w$. What are our equilibrium predictions under such a scenario?

First note that the symmetric pure strategy coordination equilibrium exists in which all vote for B, however the one in which all vote for A does not. Asymmetric pure strategy coordination equilibria also exist when $w \leq 70$, both voting in favor of A and B, although the one in which all vote for A relies on weakly dominant strategies since only b type voters receive expressive identity utility (when $w = 70$, both rely on weakly dominant strategies). If $w \geq 70$, however, only type a voters are willing to choose strategically and only the asymmetric pure strategy coordination equilibria where one type a voter chooses B exists. What about equilibria in which candidates are tied? As long as $w_a = 0$, such equilibria do not exist as type a voters will always be willing to vote strategically rather than have a tied outcome. Thus, we find that when one type of voters possesses high expressive identity utility, greater than 70, only one coordination equilibrium exists, facilitating coordination by voters on that type's preferred outcome.

What happens to the equilibrium values of p and q in the symmetric mixed strategy equilibrium when only type b voters receive expressive identity utility? As mixed strategy equilibria rely on type a voters choosing such that type b voters are indifferent between voting for A and B, the expressive identity utility for type b voters has the perverse result of predicting greater identity voting by type a voters than type b voters in the mixed strategy equilibrium, as shown in Figure A4 below. Figure A4 shows the equilibrium values of p and q for values of $w = 0$, 10, 20, and 30. When $w > 0$, $p^* > q^*$. The highest value of w for which a symmetric mixed strategy Nash equilibrium exists is 51.85 in which $p^* = 1$ and $q^* = 0.74$. For values of $w > 51.85 = \overline{w}$, non-degenerate symmetric mixed strategy equilibria do not exist, since voters of type b cannot be made indifferent between voting for A and B and the only equilibrium that exists is in which

type a voters, either singly or both, vote for B.

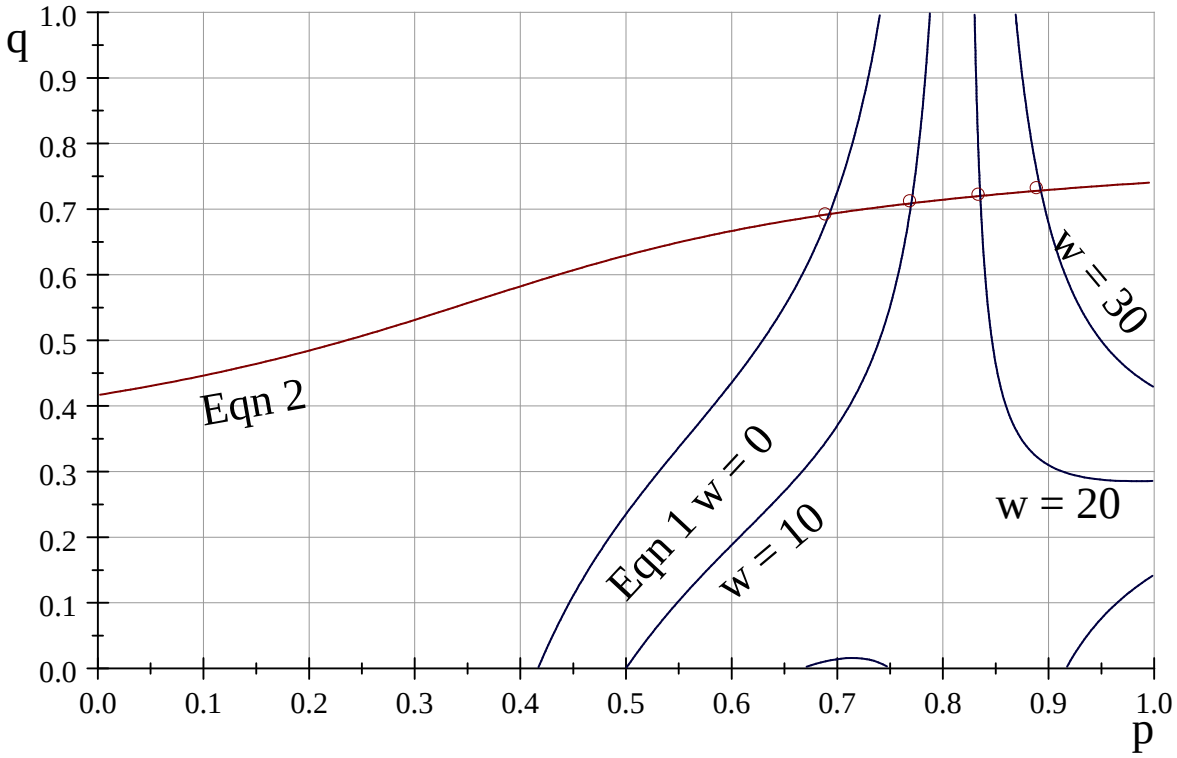

Figure A4: Eq. values of p & q when $0 = w_a < w_b = w$

It is straightforward to show that if $0 < w_a < w_b \leq 70$ then both types of asymmetric pure strategy coordination equilibria exist (that is, coordination on A and on B are both possible types of equilibria). If $w_a \leq 70 < w_b$ only the asymmetric pure strategy coordination equilibria exist where B receives three votes and if $w_a > 70$, the only equilibrium which exists is where all vote sincerely for their identity candidate and the election is a tie. For $0 < w_a < w_b \leq \overline{w}$, we continue to find that mixed strategy equilibrium such that $p^* > q^*$, but by a smaller difference, and the limit value of $w$increases, approaching 70 as the difference between w_a and w_b becomes smaller.

What about correlated equilibria? As above, correlated equilibria can again be established in which an independent mechanism is used to randomize between the pure strategy coordination equilibria as long as more than one exists in the above cases. For example, in the case above

in which $0 < w_a < 70 < w_b$, a correlated equilibrium in which a neutral mechanism is used to randomize which type a voter chooses strategically for B in the asymmetric coordination equilibria is possible. As previously, these correlated equilibria lead to higher expected utility than the mixed strategy equilibria.

In summary, we find that when expressive identity utility varies across voter types, when voters can manage to coordinate there are more coordination equilibria which advantage the candidate who is the first preference of those voters with higher expressive identity utility and for some cases these are the only pure strategy equilibria. However, when voters are unsuccessful in engaging in coordination and instead use mixed strategies, perverse results can occur where voters who have less expressive identity utility engage in greater identity voting. Finally, when the expressive identity utility is high, strategic voting disappears entirely, leading to only tie elections and complete coordination failure.

Based on the theoretical analysis, we expect that even when voters receive no expressive identity utility, when using mixed strategies they are more likely to vote their identity (more than 2/3 of the time), than strategically. Thus, identity voting can occur without any additional expressive identity utility, but simply due to a rational response to payoff asymmetries. When expressive identity utility exists, there are fewer coordination equilibria, and identity voting when coordination fails is greater than without expressive identity utility. When voter types vary in their expressive identity utility in coordination equilibria it is likely the case that voter types with greater expressive identity utility are advantaged with their candidates winning. However, when voters use mixed strategies and coordination failure is more likely, it is likely the case that voter types with greater expressive identity utility are not advantaged as the other voter type engages in more identity voting.

A2 Instructions for Ethnic Treatment (English Translation)

You are about to participate in a decision making experiment. Please turn off your cell phone and do not talk to other participants. During the experiment, all interaction with other participants will be conducted via the computers. If you have any questions, please raise your hand, and the experimenter will come to answer your question. Any participant who violates the stated rules will be asked to leave the experiment and forfeit all accrued earnings.

Your earnings from the experiment will depend on your decisions as well as those of other participants in your group. The decisions that you make during the experiment will be kept anonymous to other participants. Likewise, you will not know the personal identities of other participants in the experiment.

In the experiment, your earnings will be calculated using experimental currency units. At the end of the experiment, your earned experimental currency units will be converted to RMB at an exchange rate of 3 experimental currency units = RMB 1, and be paid to you in cash.

At the beginning of the experiment, you will be randomly matched with three other participants to form a group of two Han students and two Tibetan students. The experiment will have ten identical rounds first, and after the tenth round, there is a 30% probability that there will be a next round and there is a 70% probability that the experiment will end. Once a group is formed, the group members will remain the same for all subsequent rounds. That is, you will play with the same participants in the experiment.

There are two candidates and you will choose to vote for one. One candidate is a Han named Hanming Li, and the other candidate is a Tibetan named Zhaxi Duoji. Each participant could only vote for one candidate. The candidate who has three or more votes will be elected. If no candidate has three or more votes, then neither candidate is elected.

Your earnings will be determined by the following rules:

To a Han participant (there are two Han participants in a group), if Hanming Li gets elected, you will earn 100 experimental currency units. If Zhaxi Duoji gets elected, you will earn 70

experimental currency units. If neither candidate gets elected, you will earn 0 experimental currency units.

To a Tibetan participant (there are two Tibetan participants in a group), if Hanming Li gets elected, you will earn 70 experimental currency units. If Zhaxi Duoji gets elected, you will earn 100 experimental currency units. If neither candidate gets elected, you will earn 0 experimental currency units.

Please note that your final earning will be 50% of your earnings in the first round, and 50% of your earnings in a randomly selected subsequent round. Besides, you will also earn a show up fee of RMB 5. So your total earnings will be RMB 5 plus your earnings in the experiment.

A3 Analysis of Communication Transcripts

A3.1 An Experiment Designed to Code the Transcripts

We coded the chat transcripts using subjects recruited in Shanghai at Jiao Tong University in an incentivized procedure described in Houser and Xiao (2011). That is, we brought in new subjects who first were told how the original voting game worked. Then the new subjects were asked to read the dialogues (which were ordered randomly and presented to them without any identifying information) and classify the intentions of the four players in each dialogue into one of the following categories: (1) vote for Hanmin Li (or A in the Baseline Treatment); (2) vote for Zhaxi Duoji (or B in the Baseline Treatment); (3) cooperate but no specific candidate intended; and (4) vague comment or unrelated to the game. Each coder was grouped with three others. If a subject's classification was consistent with the majority in his or her group (that is, at least one other subject classified a player's intention into the same category), the subject earned 1 Experimental Currency Unit, otherwise he or she earned zero. The exchange rate was 4 Experimental Currency Units to 1 RMB. A different group of subjects coded the chats at the group level using the same incentivized procedure; choosing whether the group agreed or not on a strategy and for which candidate they agreed to vote. We recruited both Han Chinese and Tibetan subjects for the coding of the chats, because although the chats were in Chinese

characters and used Mandarin, it may be the case that Tibetan subjects used slang or other hidden language in communicating. We coded messages using a majority rule determination from these evaluations. If a subject's assessment of the transcript was with the majority of other evaluators/subjects, they received monetary payoff for the evaluation. We expect that the recruited Tibetan subjects had incentives to make more money by participating in the experiment such that they had no incentives to hide the intention of the message in a majority rule determination experiment.

In the analysis of communication transcripts in the Baseline and Ethnic Treatments, we find no significant differences in the types of messages sent overall between these two treatments. In coding the individual messages we coded an individual as voting either co-ethnic or other if the individual merely stated her intention to vote with the group and the group was coded by the majority of evaluators as voting for her co-ethnic or other. When we code these observations as vague or merely agreement, we find as well no significant differences between the two treatments. Not surprisingly, the majority of messages are voters stating that they will vote for their own identity candidate, 39% of the messages in the Baseline Treatment and 41% of the time in the Ethnic Treatment. When we disaggregate by subject type we find some slight evidence of identity effects for Tibetan subjects. That is, Tibetan subjects in the Ethnic Treatment send messages that they plan to vote their own identity 40% of the time and the other 32% of the time in the Ethnic Treatment while the percentages for type b subjects in the Baseline Treatment are 32% and 43%, respectively. We find also that in both the Baseline and Ethnic Treatments type b and Tibetan subjects send more vague messages than type a and Han Chinese subjects (26% compared to 20%). However, none of these differences between subject types and treatments are significant. Hence, we find that the communications sent by voters in the two treatments are largely similar.

When we examine the chat transcripts of the Reinforcing and Conflicting Treatments, we find that individuals are less likely to report an intention of voting contrary to their ethnic

identity and more likely to provide a vague statement in both the Reinforcing and Conflicting Treatments as Compared to the Ethnic Treatment. We find that subjects are quite truthful in revealing their intentions, when they do so, in the Reinforcing Treatment, following through with intentions 94% of the time. They are much less honest in the Conflicting Treatment where they follow stated intentions only 85% of the time. Hence we find that subjects are less forthright in their communications with multiple identities. They communicate more vaguely in both the Reinforcing and Conflicting Treatments and less honestly in the Conflicting Treatment. Furthermore, unlike the Baseline and Ethnic Treatments, we find that vague messages do not decrease much over time in these two treatments. These findings may be related to the multiple identities that we introduced in the experiment, which is interesting and deserves more studies in the future.

Finally, when we compare the communication transcripts between the Baseline Treatment and the Other-Regarding Treatment, we find significantly more vague messages (35% compared to 24%) and less informative messages both regarding voting one's identity and voting contrary to one's identity.[20] However, we find little evidence that subjects are not stating their honest intentions as we found in the Conflicting Treatment, 90% of voters who stated an intention followed through. The evidence suggests that communication was more vague because it was less necessary. Because voters so overwhelming coordinated on candidate B, there was little need to communicate. There was greater need in the Baseline Treatment when communication helped facilitate the largely alternating equilibria strategies we observe. This effect is particularly noteworthy if we focus on the periods after period 5. In the Baseline Treatment only 16% of messages are vague, while in the Other-Regarding Treatment 42% are. In contrast to the Other-Regarding Treatment, only 22% of the messages in the Ethnic Other-Regarding Treatments are vague as to intentions and for communications after period 5, only 16% are vague; percentages that are significantly different from the Other-Regarding Treatment.[21]

[20] The χ^2 statistic for the comparison equals 9.89, Pr = 0.07.

[21] The χ^2 statistic for all the comparison of all the periods with communication 12.36, Pr = 0.00 and for the

In summary, it is clear that when we examine the chat transcripts that the subjects are using their communication opportunities to facilitate the increase in coordination we observe over time. While there are somewhat differences between treatments and types of voters in the analysis of communication transcripts, to a large extent, repetition and communication work to reduce the identity effects in voting, even when these effects are strongly reinforced by other identities. Communication seems to establish trust between individuals and groups, which is critical to promoting intergroup cooperation.

A3.2 Instructions for Communication Transcript Codings (English Translation)

Welcome to our experiment!

You have already earned RMB 5 for your participation.

We have previously conducted a series of experiments where four players voted on two candidates. Now please read the instructions of this experiment carefully.

(Now give the subjects 5 minutes to read the instructions of the voting game)

In the experiment, the four players could communicate with each other via the computer screen before they voted. We have recorded their dialogues and ordered them randomly. You need to read these dialogues now and classify the intention of the four players in each of the dialogues into one of the following categories:

1) Vote for Hanmin Li (Chinese candidate)

2) Vote for Zhaxi Duoji (Tibetan candidate)

3) Cooperative but no specific candidate intended

4) Vague or unrelated to the game

Please note that the dialogues are randomly ordered and collected from different sessions.

Two other subjects participating in this experiment will read and classify the same dialogues as you do. If your classification of a certain player is consistent with the majority in your group

periods after period 5, 28.84, Pr= 0.00.

(that is, at least one of the other subjects classifies the player's intention into the same category as you do), you will earn 1 experimental currency unit; otherwise, you will earn zero. Therefore, you can earn up to 4 experimental currency units from each dialogue because there were four subjects participating in one dialogue.

The experimental currency units that you earn will accumulate through the dialogues you read and be converted to RMB at the exchange rate of 4 experimental currency = 1 RMB at the end of the experiment.