Religious fragmentation, social identity and conflict: Evidence from an artefactual field experiment in India*

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Abstract

We examine the impact of religious identity and village-level religious fragmentation on behavior in Tullock contests. We report on a series of two-player Tullock contest experiments conducted on a sample of 516 Hindu and Muslim participants in rural West Bengal, India. Our treatments are the identity of the two players and the degree of religious fragmentation in the village where subjects reside. We find no statistically significant differences in rent seeking behavior across different villages. We also do not find any significant differences in behavior as a function of players' identities. This is in contrast to evidence from the same sample which recorded significant differences in cooperation levels in prisoners' dilemma and stag hunt games. We attribute this to the fact that social identity may have a more powerful effect on cooperation than on conflict.

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1 Introduction

We often observe agents competing with each other to receive or get access to resources in a wide variety of economic and social situations. Examples of such contests include political competition, lobbying, or violent conflict. Resources spent in these contests are not often recoverable and have little social value. While competition between such groups can be resolved through the ballot box, often we also find such competition ending up in violence and civil wars (Walker, 1994; Horowitz, 1985). Given the loss of welfare, understanding the cause of such conflict can reduce the likelihood of conflicts.

Civil conflicts often occur between social and/or ethic groups that compete for limited resources. A possible motivation for these social or ethnic groups to enter into socially expensive contests is that there are strong identities through which groups have ethnic preferences. These ethnic preferences can cause ethnic groups to restrict goods and services to members of their own ethnicity and deny them other ethnic groups, thus resulting in conflicts. Social scientists have documented and analyzed such competition among social groups (e.g. Collier et al, 2003, Mitra and Ray, 2014).

A significant number of quantitative studies (e.g. Sambanis, 2002 or Harbom et al., 2006) focus on aggregate cross-country analysis in order to explain violence. These cross-national studies find that the likelihood of wars and armed disputes among social groups increase with poverty and with weak institutions. More recently, there have been studies of competition and group violence using national-level data. Support for the increased competition for limited resources is found by Urdal (2008) who shows that scarcity of productive resources and urban inequality increase the risk of armed conflict. Similarly, Mitra and

Ray (2014) also find that the improvement of economic status of a minority group can be perceived by the majority group as a threat, and can be a catalyst for conflict.

In this paper, we analyse to what extent social identity motivations can explain conflict at the individual level. It is well understood that social identity influences economic decisions (e.g. Chen and Li, 2009; Miguel and Gugerty, 2005). Their preference for their own social group and or their bias against other social groups can lead greater competition and increased likelihood for conflict.

To this effect, we investigate what impact (if any) religious identities have on the likelihood of conflict over a resource using a simple lab-in-the-field experiment conducted in West Bengal, India. We study the effect of religious identity by comparing the behavior of Hindu and Muslim subjects when they play with their fellow in-group members to the case where they play with the out-group, i.e. someone belonging to a different religion. We furthermore study the effect of fragmentation on the likelihood of conflict by running experiments in villages where the overwhelming majority of the population is of one religion, as well as in villages where the population is roughly equally divided along religious lines.

Any individual likely identifies himself or herself with various identities: race, political affiliation, sexual orientation or religion shape our beliefs and actions (Tajfel et al. 1971; Sen, 2007 ; Shayo, 2009). Social groups formed from common links in race, religion and language can be more broadly classified as ethnic groups (Kanbur et al. 2011). Here, we focus on one aspect of ethnicity: religion. In India, religion has a prominent position in society and it plays an important role in defining an individual's identity. According to the Census of India 2001, Hinduism and Islam account for about 94% of India's population (81% being Hindu and 13% Muslim). These religious groups have competed, often violently,

in the past for resources, and continue to do so at present; this highlights the role religious identity could play in social and political spheres. West Bengal, India, the religion in which we conduct our study, has observed several episodes of severe violence between these two religious groups. Bengal as a state has been partitioned twice along Hindu-Muslim lines: once by the British empire in 1905 and, on the occasion of independence, in 1947 when India and East Pakistan (now Bangladesh) were created. On both occasions there were mass displacements of people from one side of the newly created border to the other and widely documented inter-religious violence (Akbar, 2003; Brass, 2003). Religious violence is still observed today, both in Bengal (Times of India, 2010) and elsewhere (New York Times, 2014). The continuing violence and competition among the religious groups indicate that religious identity potentially plays a crucial role, especially in contexts where individuals perceive competition or threat for resources from members belonging to other religious groups. Some scholars argue that this competitive relationship between Muslims and Hindus stems from the historical power structure of the two groups. While most of the last millennium India's political rulers belonged to the Muslim religion, up to 200 years prior to independence and since then, Muslims ceased to be the governing class (Turner and Brown, 1978).

In order to understand the effect of identity and social fragmentation on conflict and competition, we study the Tullock contest (Tullock, 1967; 1980). In this game, each competing party can spend part of its wealth to increase the probability of obtaining a resource. However, expenditures are sunk and therefore non-recoverable to both winning and losing parties (see Garfinkel and Skaperdas, 2007 and Konrad, 2007 for reviews on the economics of conflict and contests, respectively).

There is a vast experimental literature on behavior in contests in experiments, recently

reviewed by Dechenaux et al. (2015). The main finding from the literature on Tullock contest experiments is that subjects consistently bid above the risk neutral Nash equilibrium. In the overwhelming majority of the experiments done to date, individuals play the game in the absence of social context. While some experimental work has been done in the context of groups (Abbink et al. 2010; 2012; Ahn et al. 2011), these experiments study how individual effort provision changes when competition is done via groups. The fact that group effort is the sum of individual group members' efforts introduces a public good problem, as there is the incentive to free ride on teammates.

Chowdhury et al. (2016) study the role of identity in a three-player group Tullock contest in the lab. They consider artificial identities in the spirit of the minimal group paradigm, as well as real ethnic identities (South East Asian and Caucasian). The authors find that group expenditures in their control treatment are in excess of the risk neutral Nash equilibrium. However, unlike artificial identities, making ethnic identities salient leads to significant increases in effort. Our paper contributes to this literature by considering the effect of group identity on behavior in single player Tullock contests. We also study the effect of social fragmentation on behavior by postulating a saliency channel: religious identity should be more salient in fragmented villages and therefore, expenditure levels should be higher. We find however that religious identity does not significantly influence behavior in the Tullock contest. This holds even when we consider players belonging to villages with different proportions of Hindus and Muslims accounting for different level of saliency of social identity.

	0	20	40	60	80
0	40, 40	0, 60	0, 40	0, 20	0, 0
20	60, 0	20, 20	7, 13	0, 0	-4, -16
40	40, 0	13, 7	0, 0	-8, -12	-13, -27
60	20, 0	0, 0	-12, -8	-20, -20	-26, -34
80	0, 0	-16, -4	-27, -13	-34, -26	-40, -40

Table 1: Expected payoffs for our implementation of the Tullock contest

2 Experimental Design, Procedures and Hypotheses

2.1 The game

We implemented a simplified version of the Tullock contest. Subjects were endowed with INR 80, which they could spend to obtain a prize equal to INR 80.[1] The expected value of the contest, V_i is given by $V_i = 80 + 80p_i - E_i$, $i = 1, 2$, where $E_i \in \{0, 20, 40, 60, 80\}$ is the financial expenditure of player i. We opted for a reduced action set to facilitate participants' understanding of the game. The probability of player i winning the contest is given by p_i, which is equal to $1/2$ if both players spend zero and $E_i/(E_i + E_j)$ if at least one player spends a positive amount.

The payoff matrix in Table 1 displays the expected payoffs denominated in Indian Rupees (INR) in our experiment.[2] The unique Nash equilibrium of the game is $(20, 20)$, in which both players bid a quarter of the value of the prize, as in the continuous version of the game. A somewhat unusual feature of our implementation of the Tullock contest is the assumption that if neither player makes a positive expenditure, both players have an equal chance of obtaining the prize. Note also that spending 40, 60 and 80 is strictly dominated by spending 20. Once we eliminate the strictly dominated strategies, we obtain a game with the

[1] We set the prize value equal to the endowment to avoid the possibility of subjects incurring losses.

[2] The game was not displayed or explained to participants in this manner. See the following section on the experimental procedures, as well as the instructions and supporting materials in the Appendix for details.

same properties as the prisoners' dilemma: the joint profit maximizing outcome is achieved when both players spend zero on the contest, but it is in their individual best interest not to do so. This does not have any implications on equilibrium behavior; behaviorally though, this could lead to a decline in average effort levels as compared to the extant literature.

2.2 Experimental Design

The main purpose of the experiment is to understand how social identity preferences interact with religious fragmentation to affect behavior in Tullock contests. To understand the role of identity, we ran two treatments where subjects were playing with their fellow in-group members: one where Hindus were paired to play with other Hindus (H-H) with certainty, and another one where Muslims were paired with Muslims with certainty (M-M). We also ran a treatment where subjects were matched with an out-group: Hindus were paired with Muslims with certainty (H-M). Finally, we ran a treatment where there was a 50% chance a participant would be matched with someone of their own religion and a 50% he or she would be matched with someone of a different religion, which we denote as MIX. It was not possible for us to design a treatment in which identity was absent, since our experimental manipulation of religious identity relies on the names of all participants in the session being common knowledge, as well as the fact that subjects can observe the set of potential partners in the game. We opted for implementing a treatment in which there is uncertainty as to the identity of participants' matches, and use that as the control treatment. We explain in detail how we implemented these treatments and how we induced group identity in the subsection dedicated to experimental procedures below.

		Treatment			
		M-M	H-H	H-M	MIX
Village Type	Homogenous - Muslim	(94, 3)	-	-	-
	Fragmented	(40, 1)	(70, 2)	(130, 4)	(58, 2)
	Homogenous - Hindu	-	(124, 4)	-	-

Note: (# of subjects, # of villages).

Table 2: Experimental design

To understand the role of village-level fragmentation, we implemented M-M and H-H treatments in two types of villages: one in which one group accounted for at least 90% of the population, which we denote as homogeneous villages; and another type of village in which each religious group accounted for about 50% of the population of the village, which we denote as fragmented villages. Although the Indian Census collects village-level data on religious composition, that information is classified and not available to researchers. We use data from Das et al. (2011) household survey in West Bengal on religious discrimination to select villages. Table 2 outlines the different treatments.

2.3 Hypotheses

To develop our hypotheses, we will rely upon the simplified version of the model of other-regarding preferences proposed by Charness and Rabin (2002), in which individuals exhibit disutility from obtaining payoffs either higher or lower than others.[3] In a two-player setting,

[3]Charness and Rabin (2002) also include a parameter θ to capture reciprocity concerns. Since reciprocity concerns do not play a role in our experiment, we exclude this parameter from the analysis.

with players i and j, the utility function for player i takes the following form:

$$u_i(\pi_j, \pi_i) = (\rho r + \sigma s)\pi_j + [1 - (\rho r + \sigma s)]\pi_i. \quad (1)$$

The parameter ρ captures the extent to which player i cares about advantageous inequality, since $r = 1$ if $\pi_j < \pi_i$ and 0 otherwise; it is referred to by Chen and Li (2009) as capturing charity concerns. The parameter σ captures the extent to which player i cares about disadvantageous inequality, since $s = 1$ if $\pi_j > \pi_i$ and 0 otherwise. Chen and Li (2009) refer to this parameter as capturing envy. This formulation coincides with the model proposed by Fehr and Schmidt (1999) if $\sigma < 0 < \rho < 1$ (Charness and Rabin, 2002, p. 823), but it can also encompass spiteful/competitive preferences if $\sigma \leq \rho \leq 0$.

Chen and Li (2009) estimate the effect of group identity on other-regarding preferences using artificial identities in the spirit of the minimal group paradigm developed by Tajfel et al. (1971). Subjects were assigned to an artificial group and were asked to make a number of decisions. In each decision, subjects had to choose between two income distributions, whose recipients were (i) both in-group members, (ii) both out-group members, or (iii) one was an in-group member and the other was an out-group member. Chen and Li econometrically estimate ρ and σ conditional on the identity of the recipient. They find subjects in their experiment exhibit greater charity concerns and lesser envy towards in-group members than towards out-group members. In particular, their estimates are such that $\rho_I > \rho_O > 0$ and $\sigma_O < \sigma_I < 0$, where the subscript I indicates in-group and the subscript O denotes out-group.

We incorporate other-regarding preferences into the Tullock contest, this time using the more general specification proposed by Charness and Rabin (2002). The best response

in the Tullock game by a player with Charness-Rabin preferences is given by:

$$BR_i(E_j) = \max\left\{-E_j + \frac{[1-2(\rho r+\sigma s)]}{1-(\rho r+\sigma s)}\sqrt{\frac{80E_j\,[1-(\rho r+\sigma s)]}{1-2(\rho r+\sigma s)}}, 0\right\} \tag{2}$$

The symmetric equilibrium of this game is given by

$$E_i^* = \frac{20-40(\rho r+\sigma s)}{1-(\rho r+\sigma s)} \tag{3}$$

If we assume that individuals are inequality averse (i.e. $\sigma < 0 < \rho < 1$), as has been found in the literature on other-regarding preferences to date, then similar to what Fonseca (2009) has shown for Fehr-Schmidt preferences, $\frac{\partial E_i^*}{\partial \sigma} > 0$: an increase in "envy" concerns leads to higher effort. Conversely, lower "envy" leads to higher effort. Also, $\frac{\partial E_i^*}{\partial \rho} < 0$: an increase in "charity" concerns leads to lower equilibrium effort and vice versa.

Having established our theoretical framework, we now apply it to our experimental design. We start by looking at the effect of identity preferences on behavior keeping religious composition fixed – focusing on fragmented villages. Our baseline condition will be the MIX treatment, in which there is uncertainty about the identity of the person with whom our participants were interacting. To measure the effect of in-group biases, we compare MIX to H-H and M-M. Other-regarding concerns should be larger in the latter treatments than MIX, which based on our model generate the first hypothesis.

Hypothesis 1: *Expenditure levels in fragmented villages should be lower in the H-H/M-M treatments than in the MIX treatment.*

The theoretical literature in social psychology has long argued that in-group biases

and out-group biases can be orthogonal (Allport, 1954; Brewer, 1999), and Morita and Servátka (2013) find evidence of this in the lab. This means that the presence of out-group aversion in the preferences does not necessarily imply the presence of in-group bias and if both are present they can be of different intensity. While the first hypothesis deals with in-group bias, the next hypothesis deals with out-group aversion. Out-group derogation, if it exists, should manifest itself in a higher degree of envy and lower charity concerns (Chen and Li, 2009). Our model shows that these two effects lead to an increase in the best response in a Tullock contest. Therefore in our present context, out-group aversion will lead to higher bids and greater expenditure levels in case of competition against out-groups. This forms our second hypothesis.

Hypothesis 2: *Expenditure levels in fragmented villages should be higher in the H-M treatment than the MIX treatment.*

We now turn to the final hypothesis of the paper, which concerns the interaction between social identity and fragmentation. Brewer (1991) proposes a theory of optimal distinctiveness, in which one's affiliation to a group – and therefore our sense of identity – is affected by two competing needs. One one hand, we feel the need to belong to a group. On the other hand, we feel the need to be distinct. The former drives isolated individuals to seek membership of social groups, while the latter leads one to identify more strongly with groups that emphasize one's uniqueness.

This theory therefore postulates that the degree of saliency of a particular identity will vary with how representative the members of the identity-relevant group are within a society. In his book on identity and conflict, Sen (2007) reiterates this point, when he

argues that "[T]he importance of a particular identity will depend on the social context." (p.25). Categories which provide a source of identity are naturally numerous, but Sen argues that meaningful identities are a small subset of the set of categories. They may become meaningful due to contextual specificity (i.e. national identity in the Olympics), or due to common circumstances which yield feelings of mutual solidarity (i.e. a natural disaster). Individuals consciously or unconsciously decide which identities they should assign greater weight when making decisions on a regular basis.

The corollary of this argument is that in settings where one religious group is predominant, individuals will put greater weight in other dimensions of their personal identity, since the religious domain of their identity does not provide sufficient distinctiveness, or is not sufficiently salient to provide the basis for meaningful trade-offs. In other words, our participants' sense of religious identity should be more salient in villages where there is an out-group, as opposed to villages where all citizens share the same religious beliefs. A stronger sense of religious identity in fragmented villages therefore should imply that other-regarding preferences should be stronger in fragmented villages than homogeneous villages: $\sigma^I_{frag} < \sigma^I_{homog}$ and $\rho^I_{frag} > \rho^I_{homog}$. This in turn, leads to our final hypothesis.

Hypothesis 3: *Expenditure levels in H-H/M-M treatments should be lower in fragmented villages than in homogeneous villages.*

2.4 Participant Recruitment

We selected West Bengal to conduct our study for two reasons. Firstly, this Indian state has historically witnessed several episodes of inter-religious tension. The partition on Bengal

along Hindu-Muslim lines in 1905 and the second partition of Bengal into West Bengal and East Pakistan (now Bangladesh) in 1947, when the modern Indian state was formed are particularly relevant to our study. In both cases, the mass displacements of people led to numerous episodes of inter-religious violence (Akbar, 2003; Brass, 2003). There are numerous recorded incidents of violence between members of the two religious groups since the 1950s and the present day (Mitra and Ray, 2013). As recently as 2010, religious riots were recorded in 2010 in West Bengal (Times of India, 2010).

Secondly, our experimental design requires us to sample experimental participants from (and conduct our sessions in) two types of villages: villages where one religious group dominates, and villages whose population is roughly split along religious lines. Unfortunately, although the Indian Census does collect religious level information, that data are not available to researchers at village level. Our sampling of the villages was instead based on data from Das et al. (2011), who conducted a large-scale household survey on religious fragmentation in West Bengal villages. Based on that survey, we labeled villages where 90% or more of the population was from one religious group as homogenous (they could be Homogenous-Muslim or Homogenous-Muslim), and villages were labeled as fragmented if they had no more than 60% of the village population from one group. Our choice of villages was further limited by the fact that we required a room that was big enough to hold 20-30 participants at a time for a few hours. The only such building in a village would be its primary school, which is where we conducted our experiments.

We employed a mixed-gender, mixed-religion team of local research assistants to recruit participants and conduct the sessions, so as to minimize any possible experimenter demand effect. A week ahead of a planned session, our research assistants travelled to

the village where that session would take place. A set of neighborhoods were randomly selected, and within each neighborhood, recruitment was done on a door-by-door basis. On a given street, every two consecutive houses were skipped and the third house would be approached and those who agreed to participate would be signed up. Participants were reminded about the session the day before it took place. Participants did not know the purpose of the experiment: when approached, they were informed that the research team would be conducting decision-making sessions. We conducted one session per village.[4]

2.5 Experimental Procedures

We made religious identity salient by making the names of participants common knowledge, and by allowing participants to visually identify their potential counterparts in the games participants played. This is a combination of two existing methods of making identity salient: Habyarimana et al. (2007) induce ethnic identity in experiments conducted in Uganda using photographs of participants, while Fershtman and Gneezy (2001) induce ethnic identity in experiments conducted in Israel using participants' names.

Upon arrival to the school building where the session was to take place, participants were asked to remain outside the main school building and wait for their name to be called out. Upon hearing their name, each participant was taken to the main classroom, and told to sit at one of the ends of the classroom, facing the middle. It is reasonably easy to identify someone as a function of their name, since Muslim names originate from Arabic, and are quite different from Hindu names. Calling in participants individually made their religious

[4]After the first session in the first village, it was clear that participants discussed the experiments among their social network. Due to a combination of the novelty factor and the generous incentive payments, the sessions themselves raised interest among villagers in the hours after the sessions ended, therefore contaminating the pool of potential participants in that village.

identities salient (and established the existence of an out-group) in an inconspicuous way.[5]

Participants were told they would be making a series of decisions with someone on the other side of the room, and they were told that they would always make each decision with a different person. This allowed participants to identify the religious identity of their potential counterparts, either through their choice of attire, or by recognizing participants across the room. The experiments were unusual events in the villages, and many participants came to the sessions in formal attire. In rural Bengal, Hindu men wear "dhoti," a long white cloth draped around the waist, and Muslim men wear "lungi," a piece of checkered cloth also worn around the waist. Hindu women wear "saris," as well as "bindi" on their forehead, while Muslim women wear "salwar" and "kamiz" and no "bindi". However, since there were typically 15 to 20 participants on either side of the room, it was impossible for participants to know who their counterpart was in each game, therefore preserving the anonymity of decisions – this was important since 83% of participants stated in the post-experimental questionnaire that they recognized most of the participants in the room.

In the H-H and M-M sessions, all subjects in the room shared the same religion, so the seating arrangement was irrelevant. In the H-M sessions, Hindu subjects were all seated in one end of the room, while Muslim subjects sat in the other end; finally, in the MIX sessions, the experimenter team randomly allocated Hindu and Muslim subjects to either end of the room, subject to the constraint that an equal number of Hindu and Muslim sat on either end of the room.

Sessions were split in three parts. In the first part, participants played three games:

[5]Eliciting religious identity through names could have also elicited participants' caste identity as well. We control for this possibility in the econometric analysis of the data, and our results are robust.

the Prisoners' Dilemma, the Stag-Hunt game and the Tullock contest (in that specific order). In the second part of the session, participants played a series of individual decision-making tasks.[6] In the third part, participants individually responded to a questionnaire in a separate room, got feedback on the decisions made in the experiment, and received their corresponding payment.

An experimenter standing in the middle of the room read the instructions aloud, using visual aids to explain the incentive structure of each game. We did not employ written instructions since about a third of our subjects was either unable to read or write or could only write their name. As such, we denoted payoffs in INR and used images of Indian notes and coins to represent payoffs. This enabled these participants to fully understand the incentive structure of the game. See the supporting materials for copies of the instruction sets, the visual aids we used as part of explaining the game and decision forms.

The instructions explained the Tullock game as follows: subjects were told they would receive INR 80, which they could use to purchase lottery tickets. The lottery tickets would be put in a bag, along with the lottery tickets purchased by the other person they were matched with for that game. One ticket would be randomly drawn and the outcome would determine who would win the INR 80 prize. The actual draw was done at the end of the session for each pair. Each ticket cost INR 20, which means that subjects could purchase 0, 1, 2, 3 or 4 tickets. The framing of the experiment is consistent with the literature on Tullock contests and it was sufficiently familiar to subjects to allow them to understand the incentive structure.

[6]The data from the Prisoners' Dilemma and Stag Hunt game, is the focus of a companion paper, Chakravarty et al. (2016).

A potential pitfall of running experiments in which subjects do multiple tasks is that there may be contamination of behavior across games, such as order effects, wealth effects, behavioral spillovers or hedging. Order effects are certainly possible in our experiment; while they would affect cooperation, the hypotheses of interest are on differences in behavior across villages and/or treatments, all of which were exposed to the same order of play. We minimized the scope for wealth, spillover and hedging effects in our experiment by (a) not informing subjects of the games they were about to play ahead of time; (b) not providing feedback between games; (c) implementing a turnpike matching scheme, whereby subject i was never matched with the same person twice, and any of i's matches would never play each other. Subjects were reminded of these features at the start of each game.

The first part of the session took approximately 60 minutes and sessions as a whole lasted on average 3 hours. The average payment for the whole session was INR 598.70 ($9.65).[7]

2.6 Ethics

Given that a substantial proportion of subjects could not read or write, we opted to administer a consent form verbally. Before the start of the session, an experimenter read a statement explaining that subjects' decisions would be strictly anonymized, that all decisions would be identified only through an ID number, which would not be matched with their name.

Subjects were told they were free to leave the session at any time, and that they also had the right to opt out from the study and having their data removed from the study. An

[7]The average daily wage for a rural worker in West Bengal in 2011 ranged from INR 105 ($1.74) for an unskilled female worker to INR 297.50 ($4.93) for a male well digger; in most agricultural occupations average daily wages were approximately INR 130 ($2.15), Government of India (2012).

English language copy of the verbatim consent text is in the Appendix. This study was approved by the University of Exeter Ethics officer (IRB equivalent).

Consent was obtained by asking each subject to raise their hand if they objected to participating in the study. Since not all subjects could write, we could not record consent in written form; the experimenter team kept a register of subjects who declined to give their consent. Participants who were unwilling to proceed with the session, either after being read the consent statement, or at any point were free to leave and their data removed from our database. This procedure was approved by the Ethics Officer overseeing this study.

We instructed our recruitment team not to recruit any participants under the age of 18. However, two participants reported in the post-experimental survey being 17 years old and another being 16 years old. We did not collect any identifying information from participants, including names, addresses, birthdays, or any identification numbers of any kind.

3 Results

We start by testing Hypothesis 1. Table 3 reports results from OLS estimations using the number of tickets purchased by participants as the dependent variable; we cluster standard errors at the village level.[8] Regression (1) reports the results from the restricted model, which only encompasses the different treatments, and the relevant interactions with a dummy variable for Muslim religion of participant i. The omitted condition relates to Hindus in the MIX condition. We find a negative and significant coefficient on H-H: Hindus spend less on

[8]Our results are robust if we use an ordered Logit estimator to account for the fact that our variable is ordinal and only takes four different values.

DV: E_i	(1)	(2)	(3)	(4)	(5)
Muslim	-0.01	-0.14	-0.02	0.23	-0.04
	(0.43)	(0.37)	(0.44)	(0.49)	(0.38)
H-M	0.21	0.20	0.56	0.22	0.30
	(0.48)	(0.41)	(0.45)	(0.51)	(0.37)
H-M×Muslim	-0.05	-0.05	-0.04	0.01	0.05
	(0.83)	(0.71)	(0.84)	(0.95)	(0.83)
M-M	-0.35	-0.18	1.62	-0.35	0.88
	(0.50)	(0.51)	(1.31)	(0.49)	(1.26)
H-H	-0.84***	-0.63**	-0.94*	-1.00***	-1.06**
	(0.10)	(0.19)	(0.44)	(0.17)	(0.35)
Male		-0.53			-0.54
		(0.33)			(0.37)
Married		-0.08			-0.19
		(0.29)			(0.33)
Age		-0.01			-0.01
		(0.01)			(0.01)
BornHere		-0.36			-0.30
		(0.37)			(0.33)
PrimEdu		-0.41			-0.41
		(0.55)			(0.58)
SecEdu		-0.70			-0.73
		(0.45)			(0.45)
TertEdu		-1.17*			-1.03
		(0.61)			(0.66)
VillPop			$<-10^{-4}$		$<-10^{-4}$
			($<-3\times10^{-4}$)		($<-3\times10^{-4}$)
Vill-Illit			-11.77		-5.96
			(7.41)		(7.35)
VillUnemp			5.87		-0.73
			(7.75)		(7.42)
DistHC			-0.004		-0.002
			(0.02)		(0.02)
DisOG_i				0.80**	0.67
				(0.32)	(0.34)
DisOG_i × Muslim				0.08	-0.01
				(0.31)	(0.35)
PropMyCaste				0.48	0.33
				(0.52)	(0.51)
KnowAll				0.16	0.12
				(0.54)	(0.58)
Constant	3.21***	4.59***	4.32	2.54***	7.04*
	(0.08)	(0.66)	(2.60)	(0.27)	(3.10)
R^2	0.03	0.05	0.04	0.05	0.07
N	298	298	298	298	298

Village-level clustered standard errors in parentheses. $^{***},^{**},^{*}: p < 0.01, p < 0.05, p < 0.10$.

Table 3: OLS estimates of the determinants of expenditure in fragmented villages.

the Tullock contest than in the MIX condition. The same is not the case for the Muslim sample (Muslim = M-M: $F(1,8) = 0.14, p = 0.722$).

However, one must take some degree of care, as our sample is highly heterogeneous. It is possible that other characteristics may drive behavior. We extend our econometric model to include observable socio-demographic characteristics, such as age, gender, marital status and educational attainment; an attitudinal measure (DisOG_i) measuring dislike of people of other religion, as well as data the proportion of individuals of the same caste as the decision-maker among the pool of potential matches (i.e. those on the other side of the room), which we collected in the post-experimental survey. We also include village-level characteristics from the 2011 Indian Survey, such as village population, unemployment rate and illiteracy rate. This result is robust to including individual observable characteristics in regression (2), village characteristics in regression (3), attitudinal measures in regression (4), or all possible controls in regression (5).

Introducing the controls never changes the significance of the estimated treatment dummy coefficients. The coefficient on H-H is always negative and significant in all specifications holds irrespective of controlling for individual effects.

Observation 1: *There is evidence of in-group bias in Tullock contests among Hindu participants as manifested by expenditure levels, but not among Muslim participants.*

We turn now to Hypothesis 2, which requires comparing behavior in H-M to that in MIX for both religious groups. Although we find nominally higher expenditure levels in H-M than in MIX for both religious groups, neither in the Hindu case (Hindu = 0: $t = 0.43, p = 0.680$), nor in the Muslim case (Muslim = H-M $\times$ Muslim: $F(1,8) = 0.02, p = 0.880$) are

these differences significant. The same finding extends to the four additional specifications.

Observation 2: *There is no evidence of out-group bias in Tullock contests either among Hindu participants or among Muslim participants, as manifested by expenditure levels.*

Before we move to the final hypothesis, it is worthwhile to discuss the effect of the additional controls. Notably, the dummy coefficient on *TertEdu* in regression (3) is negative and significant, indicating that highly educated participants incur lower expenditures in the Tullock contest than individuals with extremely low levels of education. However, that coefficient is only significant at the 10% level ($p = 0.090$) and is not significant in regression (5), which includes all controls. While this evidence is consistent with the finding by Sheremeta (2015) that higher degree of sophistication maybe correlated with noisier behavior, it is far weaker than that reported in that study. Also, the coefficient on $DisOG_i$ is negative and signficant, while its interaction with the Muslim dummy is not. That is to say, participants who expressed a dislike for those of a different religion spent on average higher amounts in the contest than those who did not; furthermore, this effect was not different across religious groups. Like the *TertEdu* case, the coefficient on $DisOG_i$ is not statistically significant in regression (5), which limits the extent to which we can draw definitive conclusions.

We now turn to hypothesis 3, which pertains to the effect of village composition on in-group biases. Table 4 presents results from OLS estimates of the determinants of expenditure in H-H and M-M treatments in fragmented and homogeneous villages. Column (1) presents the estimates of the reduced model which includes only treatment dummies. The results are quite different across the two samples: expenditure levels among Hindu participants are on average higher in Homogeneous villages ($t = 3.10, p = 0.013$), while the reverse is true among

DV: E_i	(1)	(2)	(3)	(4)	(5)
H-H × Frag	-0.77**	-0.66**	-0.001	-0.77**	0.38
	(0.25)	(0.24)	(0.77)	(0.25)	(0.85)
M-M × Frag	0.57***	0.46***	-0.01	0.65**	-0.24
	(0.11)	(0.08)	(0.53)	(0.20)	(0.69)
M-M	-0.86**	-0.73***	-0.62*	-0.52	-0.29
	(0.27)	(0.20)	(0.32)	(0.39)	(0.48)
Male		-0.52			-0.51
		(0.43)			(0.47)
Married		-0.54			-0.49
		(0.39)			(0.40)
Age		0.01			0.01
		(0.01)			(0.01)
BornHere		-0.38			-0.44
		(0.48)			(0.46)
PrimEdu		0.07			0.03
		(0.56)			(0.62)
SecEdu		-0.37			-0.41
		(0.39)			(0.42)
TertEdu		-1.09*			-1.09
		(0.57)			(0.66)
VillPop			-0.002		-0.0003
			(0.002)		(0.0002)
Vill-Illit			3.34		2.99
			(2.57)		(3.26)
VillUnemp			-0.06		6.73
			(0.05)		(5.83)
DistHC			-0.06		-0.07
			(0.05)		(0.05)
DisOG_i				0.43**	0.18
				(0.18)	(0.26)
DisOG_i × Muslim				-0.93	-0.63
				(0.75)	(0.76)
PropMyCaste				0.18	0.09
				(0.46)	(0.54)
KnowAll				0.38	0.45
				(0.38)	(0.38)
Constant	3.14***	3.90***	1.32	2.46***	-0.18
	(0.25)	(0.54)	(2.84)	(0.51)	(3.45)
R^2	0.02	0.05	0.03	0.03	0.06
N	327	326	327	327	326

Village-level clustered standard errors in parentheses. $^{***},^{**},^{*}: p < 0.01, p < 0.05, p < 0.10$.

Table 4: OLS estimates of the determinants of expenditure in in-group/in-group matches: fragmented vs. homogeneous villages.

Muslim participants ($t = 5.36, p < 0.001$). Adding individual-level socio-economic controls does not affect the sign or significance of these results. However, village level controls (column 3) and individual-level attitudinal controls (column 4) significantly weaken the result. When we combine all the controls in column (5), treatment effects disappear.

As in the previous set of estimations focusing on fragmented villages only, we find some effect on tertiary education, as well as out-group attitudes, but these effects are not robust to different econometric specifications.

Observation 3: *There is no systematic effect of religious fragmentation at the village level on expenditure levels. The estimated effects are not robust to observable characteristics and attitudinal measures.*

4 Discussion

The main finding of our experiment is that competitive behavior by subjects in our experiment appears to be broadly insensitive to the identity of their match, or to the type of village in which they reside. We first want to place our results in context by comparing them to the extant literature on Tullock contests. We rule out the possibility that behavior in this experiment was somehow inconsistent with the typical behavior in this class of experiments. Average expenditure levels in our data are above the risk neutral Nash equilibrium, which is consistent with the literature (see Dechenaux et al., 2015 for an extensive review).

We now discuss the possible reasons why we do not find treatment differences in our data. We start with methodological issues. Unlike the overwhelming majority of Tullock experiments, we considered a very coarse action set, in which participants could spend one

of five different amounts, including zero. This design decision was made in order to make the game easier to explain to less well-educated participants. From a statistical point of view, the coarse action space could have inflated standard errors compared to the case where the same mean expenditure was drawn from a less coarse set of actions. Also, the coarse action set may have led to "bid compression", in that for some subjects the optimal expenditure level was an intermediate, non-available level of expenditure (e.g. $E_i = 3$). Since that action was unavailable, subjects may have selected a lower level of expenditure. This in turn could have led to smaller effect sizes.

Another possible explanation for a possible bid compression and smaller effect sizes may have been the fact that participants played the Tullock game after having played the Prisoners' Dilemma. Savikhin and Sheremeta (2013) study behavioral spillovers between a linear public goods game and the Tullock contest. They find average expenditure in the Tullock contest is lower in the treatment where participants play in a parallel public goods game than the treatment where they play the Tullock contest in isolation. However, we still observed a large variation in effort levels across all treatments with 30-50% of all observations being in excess of the risk neutral Nash equilibrium (and strictly dominated strategies), so it is unlikely that bid compression is the primary reason for the absence of treatment effects.

A separate possibility is that participants' strategic sophistication may have played an important role in determining behavior in the Tullock contest. Sheremeta (2015) studies the extent to which individual characteristics determine bidding behavior in Tullock contests. He finds that individuals with lower cognitive ability are more prone to overbidding in the Tullock contest, although impulsivity is the main driver of behavior (pp. 19-20). We neither have measures of impulsivity or of cognitive ability; we do have a very crude proxy, which

is educational attainment. We find a weakly significant correlation between educational attainment and overbidding, in that participants with tertiary education attainment bid less than illiterate participants. Sheremeta (2015) also finds understanding of the experiment is negatively correlated with overbidding; we took care when designing the experimental protocol to ensure that participants understood the rules of the experiment. Further, the notion of a lottery would be quite familiar to participants.

We argue that the relative insensitivity of expenditure levels to in-group/out-group variations is due to the fact that social identity preferences have a stronger bearing with regards to in-group "love" rather than out-group "hate". This view was first put forward by Allport (1954) and reiterated by Brewer (1999). In this sense, one would expect subjects to be more willing to cooperate with in-group members out of concerns for their well-being, rather than by regarding negatively the well-being of outsiders. While such preferences could explain higher cooperation rates in social dilemmas, it does not necessarily follow that identity will affect behavior in competitive environments. As such, subjects' willingness to expend resources competing for a prize may not be affected by their competitor's identity.

In this light, it is interesting to contrast the behavior of our participants in the Tullock contest to their own behavior in the Prisoners' Dilemma game, since when we eliminate strictly dominated strategies from the Tullock contest, both games share the same incentive structure (assuming risk neutrality). In our companion paper, Chakravarty et al. (2016), we documented significant differences in cooperation levels in the prisoners' dilemma as a function of whether subjects play an in-group member or an out-group member, as well as whether subjects reside in a homogeneous or fragmented village. In particular, we found that in religiously-heterogeneous villages, cooperation rates in the Prisoners' Dilemma were

higher in in-group/in-group matches than in in-group/out-group matches. In addition, co-operation rates among in-group matches were significantly lower in homogeneous villages than in fragmented villages. This is consistent with the view put forward by Mitra and Ray (2014), who model inter-religious conflict on the basis of income inequality and competition for resources. Our result is also similar to the findings of Berge et al. (2016) which finds that ethnic preferences have no impact on behaviour in dictator and public goods games in Kenya. Our Observation 3 is also consistent with the findings of Fearon and Laitin (2003) who find that degree of social fragmentation has no effect on likelihood of civil war if per capita income and growth rates are controlled in the analysis. However, experimental evidence from the lab (e.g. Hargreaves-Heap and Zizzo, 2009) shows that out-group derogation can also be a powerful driver of behavior. Espín et a. (2015) show that subjects make more competitive/spiteful choices when matched with out-group vs. in-group members, and there is evidence from the laboratory suggesting that competitive/spiteful preferences are correlated with higher expenditures in contests (Herrmann and Orzen 2008; Sheremeta 2013, 2015).

We conclude this section by discussion our results in context of the findings by Chowdhury et al. (2016), who find a significant effect of real ethnic identities on behavior in three-player group Tullock contests. While our ability to draw parallels is limited by the fact that the strategic nature of the two games is slightly different (a group contest has a public good element which is absent in the single player case), there are still important insights to be gain from the comparison. Chowdhury et al. (2016) use East Asian students and Caucasian students in a UK university. As Sen (2007) argues, the saliency of one's identity is a matter of context, and it is possible that Chowdhury et al.'s manipulation of identity was more

effective in the laboratory setting. In their method, subjects were explicitly told that people in their group were of a particular ethnicity, and all others were of a different ethnicity. In a laboratory setting, most experimental cues are very salient, perhaps more than in the field. That, added to the fact that our religious manipulation was less direct may have resulted in group identities being more salient. This is an important methodological issue which merits further study.

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A Appendix

A.1 Subject Characteristics

In this section, we outline the basic characteristics of our sample. In particular, we wish to understand whether the participant subsample from homogeneous villages differs in a systematic way than the subsample from fragmented villages. To this effect, we compare the two types of villages, pooling the two types of homogeneous villages on a number of characteristics, including caste, marital status, place of birth (both the subjects and their next-of-kin), land ownership, profession, and literacy level.

Table A1 displays the proportion of subjects in each type of village that belong to each of 37 categories. We do not find large discrepancies on any category, although some of the differences are statistically significant using Fisher's exact test. The two differences that are worthy of note are the proportion of advantaged caste subjects, which is ten percentage points higher in Homogeneous villages, while OBC subjects are more prevalent by eight percentage points in Fragmented villages. We also sampled more subjects who either finished or were enrolled in tertiary education in Homogeneous villages. Nevertheless, we reiterate that we do not find systematic differences across multiple categories; even those categories where we there are significant differences, these are not sufficiently large to warrant concern.

Variable	Fragmented Villages	Homogeneous Villages	p-value
Male	0.45	0.49	0.374
Age	35.24 (12.26)	33.52 (13.05)	0.127
SC	0.18	0.20	0.821
ST	0.00	0.02	0.168
OBC	0.16	0.08	0.003
Advantaged Castes	0.60	0.70	0.020
Single	0.18	0.24	0.098
Married	0.77	0.71	0.188
Widowed	0.04	0.04	0.823
Divorced	0.01	0.01	0.640
Separated	0.00	0.01	0.425
No Family Status	0.00	0.00	1.000
Born Here	0.69	0.71	0.699
Spouse Born Here	0.42	0.43	0.787
Father Born Here	0.65	0.69	0.346
Landless Contracted Labourer	0.01	0.03	0.179
Landless Farmer	0.12	0.15	0.294
Landless Non-contracted Labourer	0.11	0.05	0.011
Landed Less 0.5 H	0.06	0.05	0.711
Landed Less 1H	0.08	0.06	0.500
Landed More 1H	0.03	0.04	0.804
Seamstress	0.09	0.09	0.877
Student	0.08	0.15	0.024
Office Worker	0.02	0.02	0.739
Unemployed	0.03	0.06	0.048
Housewife	0.26	0.18	0.034
Attendant	0.03	0.01	0.080
Tutor House	0.01	0.01	1.000
Healthworker	0.00	0.00	1.000
Govt Rep	0.03	0.01	0.080
Quack	0.01	0.00	0.510
Tobacco Worker	0.03	0.10	<0.001
Other	0.01	0.01	1.000
Retired	0.00	0.01	0.076
Illiterate	0.20	0.19	0.911
Sign Name	0.13	0.11	0.498
Primary Education	0.15	0.14	0.802
Secondary Education	0.41	0.39	0.716
Tertiary Education	0.10	0.17	0.026

Standard deviations in paretheses.

p-values refer to 2-sided Fisher's exact tests except for "Age", where they refer to 2-sided t-test.

Table A1: Subject characteristics as a function of village type.

A.2 Methodological Note

Before reproducing the experimental materials, a methodological note is warranted. A large proportion of our participant sample was unable to read and/or write to a satisfactory level of proficiency. Around a third of our sample was completely unable to read or write and a further 17% only had basic primary education. As such, we had to describe the different games in a different way than that used in typical laboratory experiments. We took a number of design decisions, which we describe and justify in turn.

We opted not to present any payoff matrix to participants. Based on early pilots, we felt that a payoff matrix (even in simple 2×2 games) would be too confusing and abstract to many participants. Instead, we presented the game to participants using a simple, but familiar framing. We then enumerated the actions available to participants, and we described each contingency in the game in turn using visual aids. To circumvent the illiteracy problem, payoffs were described using rupee notes and coins, since all participants were familiar with currency.

We framed the Tullock contest as a task in which subjects were endowed with INR 80 and could spend any amount they wished on lottery tickets. Whatever lottery tickets were purchased would be put into a physical bag and one would be drawn. The winner would earn INR 80.

We piloted this frame in a session with a group of participants in the Birbhum district who had the same socio-economic background as our main subject pool. The feedback we obtained from post-session interviews suggested that our choice of framing led to participants understanding the incentive structure of the game without leading to experimenter demand

effects. It is possible that our choice of framing could have led participants to interpret games in unintended ways, but we feel that participant confusion would be a worse outcome.

A.3 Instructions

The following instructions are the English translations from Bengali. Experimenters read them aloud to participants as a fixed script. The team of experimenters used large A1-sized sheets mounted in the middle of the room to assist them in explaining every contingency of each game. The text in bold inside square brackets indicates an action by the experimenter, and was not part of the script. We include the example sheets along with the main text for ease of exposition. We also include the decision forms in separate sub-sections.

A.3.1 Preamble

Welcome to our session. In this session, we will ask you to make series of decisions.

This session is part of a large study sponsored by a university. The purpose of this study is to understand how people make decisions in a typical Indian village. The objective is to better understand how to improve the welfare of villagers in India.

The decisions you will make are not a test of your knowledge. There is no right or wrong way to decide. What we want to know is how you decide when faced with slightly different problems. These problems give you the chance of earning a significant amount of money, so please think carefully before making your decisions.

Please do not talk either to the people sitting next to you or the people across the room about the task. If you have any questions about the experiment, or if something does not make sense, please raise your hand, and one of my colleagues will take your question.

The money you earn will depend on what you choose, on what other people in the room choose and sometimes depending on chance.

We will first explain to you carefully the nature of each decision, and how your payment is determined in each decision. This will involve some examples. Please pay attention to the rules. If you have any question or if the rules are difficult to understand, please ask. It is very important to us that you understand how each decision works.

You will make your decisions on a piece of paper, which we will provide. Please make sure you fill all the necessary decisions, since these will be what determines your payment for the session.

The pieces of paper you will receive will have a number. This number is unique to you. We will pay you based on your number. Please do not write your name on the piece of paper. That way, no one will ever be able to link the decisions you make in this session to you.

Your payment for each task will be determined at the end of the session. You will then be paid in cash. While you are collecting your cash we will also do a brief questionnaire with each of you individually.

A.3.2 Tullock Contest Instructions

In this task you will be paired with someone across the room. You will only be paired with that person for this game; you will never be paired with that person again in this session. You and person with whom you are matched will have to make a decision. Your payment for this task will depend on what you choose and what the other person chooses. We will give you 80 rupees. You may use any of the 80 rupees to bid for a prize. This prize is worth 80 rupees. The prize will be drawn in a lottery. To win, you must buy tickets; each ticket

costs 10 rupees. You can buy 0, 2, 4, 6 or 8 tickets. We will place each ticket you buy in a bag; each ticket the other person buys, we will place it in the same bag. We will draw one ticket at random; if that ticket is yours, you receive the prize; if not, the other person receives the prize. Note our lottery is slightly different from regular lotteries you might be familiar with. Unlike regular lotteries, in our lottery the total number of lottery tickets is NOT fixed. Therefore, while like regular lotteries, in our lottery too the more tickets you buy, the higher the chance you have to win. However, unlike regular lotteries, in our lottery, the more tickets the other person buys, the higher the chance you will lose. Remember, once you buy the tickets you cannot have the money you spent on them back, whether you win the prize or not. If you win, your payment for this task will be 80 rupees minus what you spent plus the prize. If you lose, your payment for this task will be 80 rupees minus what you spent. Both you and the other person must choose at the same time. This means you will not know what the other person has chosen while making your own choice. Let?s go through a few examples using my colleagues. **Example 1:**

The sheet on the wall shows the first example we would like to go through with you. Suppose [X] buys 6 tickets and [Y] buys 4 tickets. This means there 10 tickets in the bag. [X] has a 6-in-10 chance of winning the prize and [Y] has a 4-in-10 chance of winning. If the ticket that is drawn is [X]?s, he will win the prize. [X]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the value of the prize (80 rupees), plus the 20 rupees he kept = 100 rupees. [Y]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the 40 rupees she kept. If the ticket that is drawn is [Y]?s, she will win the prize. In that case [X]?s final payment is, [**TRY TO ELICIT ANSWER**

FROM A PARTICIPANT!] the 20 rupees he kept. [Y]?s final payment is [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] 80 rupees plus the 40 rupees she kept = 120 rupees. **Example 2:**

The sheet on the wall shows the second example we would like to go through with you. Suppose [X] buys 6 tickets and [Y] buys 8 tickets. This means there are 14 tickets in the bag. [X] has a 6-in-14 chance of winning the 80 rupees and [Y] has a 8-in-14 chance of winning. If the ticket that is drawn is [X]?s, he will win the prize. [X]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the value of the prize 80 rupees, plus the 20 rupees he kept = 100 rupees. [Y]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] 0 rupees since she did not keep any rupees from the original amount she had. If the ticket that is drawn is [Y]?s, she will win the 80 rupees. [X]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the 20 rupees he kept. [Y]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] 80 rupees. **Example 3:**

The sheet on the wall shows the third example we would like to go through with you. Suppose [X] buys 8 tickets and [Y] buys 8 tickets. This means [X] will have 8 tickets in the bag and [Y] will have 8 tickets in the bag. This means [X] has a 1-in-2 chance of winning the prize and [Y] also has a 1-in-2 chance of winning. If the ticket that is drawn is [X]'s, he will win the prize. [X]'s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the value of the prize, 80 rupees, since he did not keep any rupees from the original amount he had. [Y]?s final payment is, [**TRY TO ELICIT ANSWER**

FROM A PARTICIPANT!] 0 rupees, since she did not keep any rupees from the original amount she had. If the ticket that is drawn is [Y]?s, he will win the prize. [X]'s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] 0 rupees, since he did not keep any rupees from the original amount he had. [Y]?s final payment is, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] 100 rupees. **Example 4:**

The sheet on the wall shows the fourth example we would like to go through with you. Suppose [X] buys 0 tickets and [Y] buys 0 tickets. Since no person bought any ticket, we flip a coin to determine who wins the prize. This means [X] has a 1-in-2 chance of winning the prize and [Y] also has a 1-in-2 chance of winning.

If [X] wins, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] he will receive the prize plus the 80 rupees he started with which adds to 160 rupees. [Y] will receive, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the 80 rupees she started with. If [Y] wins he will receive, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the prize plus the 80 rupees he started with which adds to 160 rupees. [X] will receive, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the 80 rupees she started with. **Example 5:**

The sheet on the wall shows the fifth example we would like to go through with you. Suppose [X] buys 2 tickets and [Y] buys 0 tickets. This means [X] will have 2 tickets in the bag, while [Y] will have no tickets in the bag. Hence, [X] will win and his payment will be, [**TRY TO ELICIT ANSWER FROM A PARTICIPANT!**] the prize plus the 60 rupees he has left. His total payment is 140 rupees. [Y] will receive , [**TRY TO ELICIT ANSWER**

FROM A PARTICIPANT!] 80 rupees. ANY QUESTIONS? (wait for a few seconds) In your decision sheet, please choose how many lottery tickets you want to buy, where each lottery ticket costs you 10 rupees. [Experimenters should now hand the decision sheet to the subjects]

A.4 Post-experimental Questionnaire

After all participants completed the final task and the experimenter team collected all decision materials, participants were called individually to a separate room where they were asked a number of survey questions, prior to knowing the outcome of each game and receiving their payoff. Table A2 outlines each question, along with summary statistics.

Question Text	Category/Domain
Age	$[16, 80]$
Religion	{Hindu, Muslim, Christian, Sikh, Buddhist, Parsi, Other}
Caste	{SC, ST, OBC, Normal, Other}
Marital Status	{Single, Married, Widowed, Divorced, Husband Left, Other}
Born in Village?	{Yes, No, Don't Know}
If not, how long have you lived here?	
Spouse Born in Village?	{Yes, No, Don't Know}
If not, how long has (s)he lived here?	
Father Born in Village?	{Yes, No, Don't Know}
If not, how long has he lived here?	
Grandfather Born in Village?	{Yes, No, Don't Know}
If not, how long has he lived here?	
Education Level	{Illiterate, Sign Name, Dropped out at grade x, Completed grade x,

	Currently sitting grade x }
Profession	{Landless contract laborer, Landless farmer, Landless non-contract laborer, Attendant, Small-property farmer (< 0.5 Ha), Medium-property farmer (< 1 Ha), Big-property farmer > 1 Ha), Quarry worker, Student, Office worker, Unemployed, Housewife, Tutor House, Health Worker, Gov't employment program, Village quack, Village tobacco factory, Other}
Does your village have a pond?	{Yes, No, Don't Know}
Who owns it?	{Gov't, NGO, Village}
Do you use it?	{Yes, No, Don't Know}
Has it been appropriated/expropriated?	{Yes, No, Don't Know}
If yes, by whom?	{Higher caste, Land-owning villagers, Rich families, Political party, Panchayat, Other}
Does your village have a tubewell?	{Yes, No, Don't Know}
Who owns it?	{Gov't, NGO, Village, Private individual, Don't Know}

Do you use it?	{Yes, No}
Has it been appropriated/expropriated?	{Yes, No, Don't Know}
If yes, by whom?	{Higher caste, Land-owning villagers, Rich families, Political party, Panchayat, Other}
How far is the Block Health Center?	
If you fall ill, where do you go?	{Dispensary, Primary Health Center, Block Health Center, District Hospital, Nursing Home, Private Doctor, Village Quack, Other}
Name 3 public goods your village lacked for the last 3 years	{Water, Education, Health, Transport, Road, Drainage, No Problems, Don't Know, Others }
Name 3 important public goods	{Water, Education, Health, Transport, Road, Drainage, No Problems, Don't Know, Others}
Do you think of yourself as an Indian?	{Yes, No, Indifferent, Don't know, I belong to this village/district}
Do you think of yourself as a Hindu/Muslim?	{Yes, No, Indifferent, Don't know}
Do you believe you belong to this village?	{Yes, No, Indifferent, Don't know}
If a close relative married a non-hindu/	{Good, Bad,

non-muslim, how would you feel?	Indifferent, Not Bad, Don't know}
If your neighbor belongs to a different religion, how would you feel?	{I like, I don't like, It's normal, Do not dislike, Indifferent, We do not mix, Don't know}
(Hindus only) If your neighbor belongs to a different caste, how would you feel?	{I like, I don't like, It's normal, Do not dislike, Indifferent, We do not mix, Don't know}
Would you like children from other religions in your child's school?	{Few, < half, Half, > Half, Almost everyone, I don't like children from other religions in school, Better everyone studies together, Don't know}
In your village, how many are of your religion?	{Few, < Half, Half, > Half, Almost everyone, Don't know}
In today's session, was there any person from your religion or other religion whom you personally knew?	{Few, < Half, Half, > Half, Almost everyone, Don't know}

Table A2: Post-experimental questions

B Ordered Logit counterparts to OLS regressions

DV: E_i	(1)	(2)	(3)	(4)	(5)
Muslim	0.06	0.04	0.01	0.16	0.06
	(0.40)	(0.34)	(0.39)	(0.43)	(0.34)
H-M	0.05	0.08	0.13	0.07	-0.04
	(0.33)	(0.28)	(0.36)	(0.38)	(0.34)
H-M×Muslim	0.04	-0.02	0.07	0.11	0.12
	(0.65)	(0.56)	(0.65)	(0.72)	(0.60)
M-M	-0.33	-0.28	0.42	-0.30	-0.24
	(0.34)	(0.34)	(0.70)	(0.29)	(0.67)
H-H	-0.52***	-0.38**	-0.78***	-0.66***	-0.94***
	(0.08)	(0.18)	(0.28)	(0.22)	(0.25)
Male		-0.34			-0.35
		(0.26)			(0.30)
Married		-0.13			-0.19
		(0.23)			(0.26)
Age		-0.01			-0.01
		(0.01)			(0.01)
BornHere		-0.31			-0.30
		(0.27)			(0.25)
PrimEdu		-0.31			-0.33
		(0.40)			(0.41)
SecEdu		-0.47			-0.52*
		(0.30)			(0.31)
TertEdu		-0.65			-0.59
		(0.44)			(0.48)
VillPop			2×10^{-5}		-4×10^{-6}
			(2×10^{-5})		(2×10^{-5})
Vill-Illit			-4.66		-0.29
			(3.89)		(4.10)
VillUnemp			0.50		-4.41
			(4.01)		(4.23)
DistHC			-0.001		0.005
			(0.009)		(0.01)
DisOG_i				0.48**	-0.45*
				(0.23)	(0.24)
DisOG_i × Muslim				0.12	0.005
				(0.26)	(0.01)
PropMyCaste				0.41	0.37
				(0.45)	(0.42)
KnowAll				0.13	0.12
				(0.38)	(0.42)
Cutoff 1	-1.38	-2.35	-3.14	-0.85	-5.13
	(0.23)	(0.41)	(1.25)	(0.46)	(1.87)
Cutoff 2	0.25	-0.71	-1.51	0.80	-3.46
	(0.06)	(0.44)	(1.29)	(0.39)	(1.95)
Cutoff 3	1.14	0.19	-0.61	1.70	-2.54
	(0.09)	(0.46)	(1.33)	(0.44)	(1.99)
Cutoff 4	2.00	1.06	0.26	2.57	-1.66
	(0.21)	(0.49)	(1.39)	(0.44)	(1.97)
LL	-445.78	-443.37	-444.39	-442.95	-439.49
N	298	298	298	298	298

Village-level clustered standard errors in parentheses. ***,** ,* : $p < 0.01, p < 0.05, p < 0.10$.

DV: E_i	(1)	(2)	(3)	(4)	(5)
H-H × Frag	-0.42**	-0.36*	0.25	-0.46***	0.27
	(0.18)	(0.20)	(0.42)	(0.17)	(0.63)
M-M × Frag	0.52***	0.40***	0.11	0.72***	0.14
	(0.08)	(0.12)	(0.35)	(0.14)	(0.56)
M-M	-0.70***	-0.61***	-0.55**	-0.61**	-0.52
	(0.18)	(0.22)	(0.22)	(0.24)	(0.34)
Male		-0.30			-0.30
		(0.32)			(0.32)
Married		-0.42			-0.36
		(0.29)			(0.29)
Age		0.01			0.01
		(0.01)			(0.01)
BornHere		-0.25			-0.31
		(0.34)			(0.31)
PrimEdu		0.01			-0.01
		(0.38)			(0.41)
SecEdu		-0.25			-0.33
		(0.30)			(0.34)
TertEdu		-0.69			-0.76
		(0.42)			(0.50)
VillPop			-0.0002**		-0.0002
			(0.00008)		(0.0001)
Vill-Illit			2.06		1.70
			(1.76)		(2.40)
VillUnemp			4.12*		5.51
			(2.35)		(4.01)
DistHC			-0.07**		-0.06*
			(0.02)		(0.04)
DisOG$_i$				0.24*	0.07
				(0.15)	(0.19)
DisOG$_i$ × Muslim				-0.53	-0.32
				(0.49)	(0.53)
PropMyCaste				0.55	0.47
				(0.37)	(0.40)
KnowAll				0.22	0.29
				(0.21)	(0.22)
Cutoff 1	-1.20	-1.79	-0.90	-0.58	1.34
	(0.25)	(0.46)	(1.41)	(0.41)	(2.34)
Cutoff 2	0.29	-0.27	2.40	0.92	2.88
	(0.18)	(0.45)	(1.40)	(0.39)	(2.32)
Cutoff 3	1.11	0.56	3.21	1.74	3.71
	(0.25)	(0.49)	(1.43)	(0.44)	(2.31)
Cutoff 4	2.05	1.52	4.16	2.69	4.67
	(0.27)	(0.56)	(1.42)	(0.39)	(2.34)
LL	-478.40	-473.76	-477.61	-476.64	-471.69
N	327	326	327	327	326

Village-level clustered standard errors in parentheses. ***,** ,* : $p < 0.01, p < 0.05, p < 0.10$.

Table A4: Ordered Logit estimates of the determinants of expenditure in in-group/in-group matches: fragmented vs. homogeneous villages.