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Religious fragmentation, social identity and other-regarding preferences: 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 other-regarding preferences. We report on a series of two-player binary Dictator 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. Both Muslims' and Hindus' aversion to advantageous inequality declines as the probability of facing an out-group member increases. We find no evidence of aversion to disadvantageous inequality on either religious sample. Both Muslim and Hindu participants display aversion to advantageous inequality in both fragmented villages and homogeneous villages. The effect of village fragmentation on aversion to disadvantageous inequality differs across religious groups.

1. Introduction

Over the last 20 years, development economists have uncovered a negative correlation between social fragmentation and economic performance (Easterly & Levine, 1999; Alesina, Devleeschauwer, Easterly, Kurlat, & Wacziarg, 2003; Miguel & Gugerty, 2005; Khwaja, 2009). Social identity theory makes a plausible case for why socially homogeneous groups might be more cooperative. Indeed, group membership positively affects cooperation in the lab, provided that group identity is sufficiently salient (Eckel & Grossman, 2005; Charness, Rigotti, & Rustichini, 2007), as well as in high stakes, lab-in-the-field experiments with real social groups (Goette, Huffman, & Meier, 2006; Chakravarty, Fonseca, Ghosh, & Marjit, 2016b). Social preferences have long been identified as a primary mechanism through which identity operates (Tajfel, Billig, Bundy, & Flament, 1971; Chen & Li, 2009).

In the present paper, we examine the extent to which social preferences are affected by social fragmentation, and if this occurs as a result of in-group/out-group differences. We estimate group-contingent social preferences through individuals' choices over income distributions. The relevant dimension in our experiment is religious affiliation: Hindu and Muslim. We conducted our experiment in rural West Bengal, India, where religious identity and religious fragmentation are central to almost all aspects of life.

Our experimental design varies the group membership of the dictator player and the recipient player to generate in-group/out-group pairings. The main innovation of our experimental design is that it varies the degree of social fragmentation within the locality of the experimental subjects. We do so by selecting villages on the basis of their religious breakdown: Hindu-dominated, Muslim-dominated, and villages with a relatively equal proportion of both religious groups. This quasi-experimental dimension of our design is motivated by the insights from Allport (1954) and Brewer (1991, 1999) that individuals may identify more with their in-group in a heterogenous environment than in a homogenous environment. Therefore, inter-group biases ought to be more pronounced in more heterogenous communities.

We find consistent evidence with our hypothesis. We find in-group/out-group differences in social preferences, in that subjects are on average more averse to inequality when sharing financial resources with an in-group member than with an out-group member. As predicted, those differences in preferences are more pronounced in more

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socially fragmented villages. However, our estimates of inequality aversion are rather small compared to estimates from similar tasks in a minimal group paradigm (and no fragmentation). This suggests that inequality aversion may not be the principal channel through which group membership operates in religious identities.

Understanding social preferences is important because they afford us insight into individual preferences for redistribution (Dimick, Rueda, & Stegmueller, 2018). Social identity is important to consider in the context of redistribution, since it creates a wedge between inequality and group membership. The former is typically conceptualized and/or measured at a level that supersedes group identities (nationality being the obvious exception). But reducing overall inequality may come at the expense of reducing inter-group income or status differences, which may be unpalatable to those with strong in-group preferences and lead to the emergence of political movements that cater to specific social groups. The BJP is a prominent case in point in India, although examples abound worldwide, including Northern Ireland (where the two main religious groups are Catholics and Protestants).

Tajfel et al. (1971) first established in-group/out-group biases in distribution games using an unincentivized third-party dictator game, although they did not operate in an expected utility framework. The first paper that establishes and formally quantifies an effect of identity on preferences is Chen and Li (2009), who find in-group biases in social preferences in a minimal group paradigm. Our results show a much weaker effect of social identity on preferences than that estimated by Chen and Li (2009). Our results are also in line with a recent wave of work on identity and redistribution. Berge et al. (2015) study the role of ethnic biases on the standard dictator game in Kenya. They find no evidence of ethnic biases in preferences. Kranton, Pease, Sanders, and Huettel (2016) study the role of group affiliation on social preferences. They study this both in a minimal group framework, as well as political membership (Democratic vs. Republican). They find large heterogeneity in their sample: some subjects exhibit no difference in social preferences towards in-group or out-group, while others exhibit in-group biases regardless of whether their group is minimal or political in nature – the latter individuals are more likely to affiliate with political parties than the former. The authors suggest that group divisions may be more important than group identity. In other words, our results confirm a line of work that suggests that distributional preferences may not be the main channel through which social identity operates.

Social preferences are an important determinant of cooperation in social dilemmas (Fehr & Schmidt, 1999). The literature on social identity has identified three mechanisms for why group membership may affect cooperation in social dilemmas. Individuals may care more for the welfare of their own in-group members than for that of outsiders (Chen & Li, 2009). Group membership may change individuals' beliefs about others' cooperativeness, which in turn may amplify the effect of social preferences (Berge et al., 2015). Group membership can also introduce prescriptions of behavior, which facilitates cooperation among group members (Akerlof & Kranton, 2000). It is still an open question as to which of the three mechanisms is most important. By measuring the impact of religious identity on distributional preferences, we are able to inform the existing literature on religious identity and cooperation.

There is a small literature on religious identity and cooperation to which our results may speak. Chakravarty et al. (2016b) study the role of religious affiliation and religious fragmentation along Hindu-Muslim lines on cooperation in the Prisoners' Dilemma and Stag Hunt game in West Bengal, India. They vary the religious identity of the two players, as well as the degree of religious fragmentation at the village level (through choice of village). They find strong evidence of in-group biases in the Prisoners' Dilemma, but only partial evidence in the Stag Hunt game. In-group biases were higher in villages that were socially fragmented, supporting the hypothesis that a given identity is more salient in a heterogeneous society. Chuah, Hoffmann, Ramasamy, and Tan (2014) find similar evidence of religious in-group biases in the Prisoners' Dilemma in Malaysia.

The fact that we find small estimates on group-contingent other-regarding preferences suggests that the large differences in cooperation in the aforementioned studies might not be explained by social preferences alone. Our evidence, in addition to existing evidence from social dilemma games, suggests that social preferences play a limited role in determining behavior in circumstances in which a religious identity is relevant.

2. Social identity theory

The theory of social identity (Tajfel & Turner, 1979; 1986), postulates that individuals derive well-being from group membership, even if said membership provides no survival benefits. This positive group identity comes in large part from favourable comparisons with those who do not belong to one's group. Social identity theory argues that individuals belonging to a social group exhibit positive biases towards other members of the same group relative to individuals who do not belong to the same group.

2.1. Incorporating social identity in social preferences

Chen and Li (2009) extend the utility function proposed by Charness and Rabin (2002), which assumes economic agents derive (dis)utility not only from their own wealth, but also from wealth differences with regards to other agents.[1] Eq. (1) describes a simplified version of Charness and Rabin's functional form[2]:

$$U_i = \pi_i + \rho_i(\pi_i - \pi_j)r + \sigma_i(\pi_j - \pi_i)s, \tag{1}$$

where $r = 1$ if $\pi_i > \pi_j$ and 0 otherwise; $s = 1$ if $\pi_j > \pi_i$ and 0 otherwise.

The ρ parameter captures our attitudes to inequality in income when we are better off than our counterpart; σ captures our attitudes to inequality when we are worse off than our counterpart. This formulation coincides with the model proposed by Fehr and Schmidt (1999) if $\sigma \leq \rho \leq 0$ (Charness and Rabin, 2002, p.823), but it can also encompass spiteful/competitive preferences if $\sigma < 0 < \rho < 1$.

This model can be easily extended to incorporate group-contingent social preferences. Let $g = I, O$, where I and O stand respectively for in-group and out-group. Charness and Rabin's modified, group-contingent model of social preferences becomes:

$$U_i = \pi_i + \sum_g \rho_i^g(\pi_i - \pi_j)r + \sum_g \sigma_i^g(\pi_j - \pi_i)s, \tag{2}$$

The social identity model predicts that individuals care about the welfare of in-group members more than that of out-group members. This implies that $\rho_i^I < \rho_i^O$ and $\sigma_i^I < \sigma_i^O$. That is to say, player i places more weight on interpersonal comparisons of income between herself and out-group members than between herself and in-group members. A consequence of this assumption is that individuals will tolerate higher degrees of inequality within their in-group than across social groups.

2.2. Muslim and Hindu identities in West Bengal, India

Studying social identity is complex, especially given the difficulty in isolating the identities which play a dominant role in socioeconomic contexts. A key social institution which forges identity of an individual in India is religion. Since the modern Indian state was formed in 1947, religious divisions have caused social and economic tensions. Turner and Brown (1978) suggest that there is an insecure relationship

[1] For other theoretical models of social identity in economics, see Akerlof and Kranton (2000), Basu (2007) and Shayo (2009).

[2] Charness and Rabin's functional form also includes a reciprocity parameter, θ. Since our experiment does not test for reciprocity concerns, we do not consider the full version of that utility function.

between Hindus and Muslims. The tension between the two communities is caused in part by India, after partition, being Hindu dominant, as well as the fact there has been a reversal of power relations, as Muslims provided most of the ruling elite a couple of centuries back. The underlying division between the two religious groups has often manifested itself in conflict and violence in regular intervals, with over 7000 deaths between 1950 and 2000 (Mitra & Ray, 2013). Such regular conflicts suggest that the religious differences are socially entrenched in India.

Bengal has been politically divided twice on religious (Hindu-Muslim) lines, both in 1905 and in 1947.[3] Both partitions caused significant involuntary human displacements, with Muslims migrating to East Bengal (East Pakistan or Bangladesh at present) and Hindus moving in the other direction to West Bengal.[4] There have also been major violent incidents attributed to religious conflict between Hindus and Muslims after 1947 (Akbar, 2003; Brass, 2003). The violence and religious tension between the two groups has continued in the state as seen recently in the riots in Canning in 2013 and Deganga in 2010.

According to the Census of India 2001, 80.5% of the total Indian population is Hindu and 13.4% is Muslim. The Muslims are the majority in the states of Lakshadweep and Jammu & Kashmir. The percentage of Muslims is sizeable in Assam (30.9%), West Bengal (25.2%), Kerala (24.7%), Uttar Pradesh (18.5%) and Bihar (16.5%). In West Bengal, the state in which we conduct our study, 5 districts have significant Muslim population, two of which are Murshidabad and Burdawan (the districts in which we carry out our experiments). In West Bengal there are 64.63% Hindus and 33.45% Muslims in rural areas and there are 85.26 Hindus and 13.24% Muslims in urban areas.

John and Mutaktar (2005) document that economic and social indicators are marginally worse for the Muslims in India. In rural areas there is a marginal difference in poverty ratios between Muslims and Hindus in India, but difference is more significant in urban areas. The authors estimate marginal per capita expenditure index for Muslims (Hindu = 100) for across India is 96.3; in West Bengal it is 86.63 in rural areas and 90.54 in urban areas. According to head count data on poverty, 36.96% Muslims are counted as poor and 28.7% Hindus are poor in rural West Bengal. In West Bengal, 31.7% are poor, while the India-wide rate of poverty is 27.02%. The Hindu-Muslim literacy gap in rural West Bengal is 11.2% (Hindus 66.8% and Muslims 55.6%) and in urban West Bengal it is 17.5% (Hindus 83%, and Muslims 66%).

3. Experimental design and procedures

3.1. Experimental design and village selection

To study the effect of religious fragmentation on social preferences, we sampled our participants from three different types of villages, based on their religious composition: “Homogeneous - Muslim” and “Homogenous - Hindu” villages, where 90% or more of the village’s population was of one religion, and “Fragmented” villages, where no more than 60% of the village’s population was of one religion. Village-level data on religious composition is not publicly available data — the Indian Census data only provides religious composition data at the district level. To circumvent this problem, we selected our villages based on data from Das, Kar, and Kayal (2011), who conducted a large-scale household survey on the effects of religious fragmentation in West Bengal villages.[5]

In order for this quasi-experimental design to be valid, we require village composition to be exogenous. If people self-select into different villages on the basis of their religious breakdown, we would not be able to identify the causal mechanism between fragmentation and behaviour. In India, rural-rural migration is predominantly due to marriage, whereby women move to their husband’s village; other motives include family reasons, employment and education (Bhattacharya, 2000). All of these motives are uncorrelated with a village’s religious composition. About 70% of our participants reported having been born in the village and/or their father and grandfather being born in the village. Another potential concern with using a quasi-experimental design is that the participant sample systematically differs on the basis of the type of village (i.e. homogeneous vs. fragmented) we sampled. We are confident that this is not the case on the basis of data on observable characteristics we collected from participants, including gender, age, caste, profession, marital status, place of birth, land ownership and literacy — see Table 4. We are therefore confident that our assumption about the exogeneity of villages’ religious composition holds.

In the fragmented villages, we conducted four different types of treatments, each of which refers to a matching protocol. The M-M (i.e. Muslim-Muslim) treatment consisted of sessions in which all participants were Muslim. Likewise, the H-H (i.e. Hindu-Hindu) treatment was such that the only participants were Hindu. The H-M (i.e. Hindu-Muslim) treatment consisted of sessions in which half of the participants were Hindu and the other half were Muslim, and participants knew they were playing someone from another religion. Finally, the MIX treatment consisted of sessions with both Hindu and Muslim participants, but where the religious identity of their match was uncertain. We elaborate on how we accomplished this when we describe the experimental procedures below. In the homogeneous villages we conducted only H-H or M-M sessions, the religious composition of these villages meant in most cases there were very few or no residents of the other religious group. Table 1 describes the experimental design.

3.2. Participant recruitment

We employed a mixed-gender, mixed-religion team of local research assistants to recruit participants and conduct the sessions, so as to minimise 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 neighbourhoods were randomly selected, and within each neighbourhood, 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.[6]

[3] The first partition of Bengal along Hindu-Muslim lines was during the British rule in 1905; the second partition of Bengal into West Bengal and East Pakistan (now Bangladesh) took place in 1947, when the modern Indian state was formed.

[4] An estimate of migration in Bengal during 1947, notes that around 6.31% of the local population migrated to East Bengal and 8.47% migrated to West Bengal (Bharadwaj, Khawaja, & Mian, 2008).

[5] The village selection was further restricted by whether or not a given village would have an appropriate building for the running of sessions — we opted for villages that had a primary school. The villages that fit our demographic criteria, had a primary school, and whose local authority would allow us to use it were the following: Alampur, Bhurkunda, Char Mathurapur, Chupi, Domohani, Ganfulia, Gokarno, Hasanpur, Jhikra, Kanakpara, Kirtipur, Pilsowa, Roshanpur, Shuhari, Sridharpur and Tungi.

[6] 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.

Table 1
Experimental design.

		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).

3.3. 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, Humphreys, Posner, and Weinstein (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.

Sessions took place in the village's school building. Upon arrival, 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 are quite different from Hindu names. Calling in participants individually made their religious identities salient (and established the existence of an out-group) in an inconspicuous way.[7]

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 recognising participants across the room.[8] However, since there were 13 to 20 participants on either side of the room (the average session size was 32; the smallest session size was 26, and the largest was 40), 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 recognised most of the participants in the room.[9]

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, Hindu and Muslim subjects sat on both ends of the room.

We split sessions in three parts. In the first part, participants played three games: 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 mini-dictator game, which we describe below.[10] 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.[11]

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

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. They could affect behaviour in the dictator game by priming subjects on the efficiency gains from cooperation, which could lead to choices that maximise the joint payoff to be chosen with higher probability. However, the hypotheses of interest are on differences in behaviour across villages and/or treatments, all of which were exposed to the same order of play. We minimised 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.

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 free to leave the session at any time, and they also had the right to opt out from the study and having their data removed from the study. An English language copy of the verbatim consent text is in the Appendix. This study was approved by the University of Exeter Business School Ethics officer (IRB equivalent).

Sessions as a whole lasted on average three hours. The average payment for the whole session was INR 598.70 ($9.65). 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).

3.4. The task

The instructions explained the mini-dictator games as a choice between two alternatives, presented side-by-side. Each alternative yielded a monetary payoff to the decision-maker and to someone else on the other end of the room. In order to account for the fact that many subjects were illiterate, we denoted payoffs using currency images. Subjects were handed a booklet; subjects chose their preferred outcome

[7] 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. Please see Table 9 in the Appendix for a breakdown on caste information.

[8] 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."

[9] This was consistent across sessions; 13 out of 16 sessions had between 75% and 100% of participants stating that they recognised most others in the room. The other three sessions had rates of 56%, 63% and 69%. The average in the H-H, M-M and H-M treatments is 81%, 88% and 85%, respectively.

[10] The data from the Prisoners' Dilemma and Stag Hunt game, as well as the Tullock contest are the focus of two companion papers (Chakravarty et al., 2016b; 2016a). We analyse the dictator game data independently of the data from the other games because there are order effects which undermine our ability to make inference on any causal effect between other-regarding preferences and behaviour in these games.

[11] Repeated interactions might have influenced the degree of identification with the in-group/out-group, particularly in the MIX condition. The no-feedback feature of the experimental design should minimise the chance of this occurring.

Table 2
Mini-dictator decisions.

	Left option		Right option	
	My payoff	Other's payoff	My Ppayoff	Other's payoff
Task 1	70	20	50	50
Task 2	80	0	50	40
Task 3	50	0	40	50
Task 4	70	20	50	60
Task 5	40	40	30	100
Task 6	60	60	50	40
Task 7	40	120	30	20
Task 8	50	90	30	40
Task 9	70	70	70	20

Payoffs denoted in INR.

by ticking a box corresponding to their preferred alternative (see Appendix). The instructions also told subjects that they would receive a separate payoff on the basis of the choice made by someone else in the room. However, that person would not be the same person whose payment would be determined by their decision. Table 2 outlines the nine different choices made by participants in the mini-dictator experiment.

3.5. Subject characteristics

We next 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 3 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.

We estimate an OLS regression with a dummy variable for fragmented villages as the dependent variable and all subject characteristics in Table 4 as the independent variables. The regression is overall significant ($F(32, 484) = 2.68$, $p < 0.01$). Although most of the individual variables are insignificant, as expected from Table 4, the overall significance seems to be driven by few variables such as the dummy for scheduled caste/tribe and whether the subject is a tobacco worker or not. Subsequently, we conducted a F-test to find out whether the insignificant variables jointly have any explanatory power. This F-test included 25 variables with data on gender, age, marital status, birth place, land holdings, unemployment rate, housewife, student, office worker, seamstress, education, literacy and other variables from Table 4. This joint test could not reject the null ($F(25, 484) = 1.35$, $p = .12$), implying that these subject characteristics do not together explain the village type (fragmented or not).

Using 2011 census data, we compare village characteristics between fragmented and non-fragmented villages. We test for differences using the Mann-Whitney test due to the small sample size. Specifically, we compare villages on their size (number of households), population, unemployment rate and illiteracy rate. Homogeneous villages are smaller than fragmented villages, both in terms of number of households (1550 vs. 622, $z = 2.170$, $p = 0.030$), and population (6942 vs. 2768, $z = 2.064$, $p = 0.039$. However, both village types have similar illiteracy rates (0.42 vs. 0.39, $z = 0.477$, $p = 0.633$), while homogeneous villages have slightly higher unemployment rates than fragmented villages (0.66 vs. 0.58, $z = 2.248$, $p = 0.025$). We do not report a joint test of significance as the village sample size is too small. The fact that homogeneous villages are smaller may mean that individuals from those localities will be more likely to know each other than in fragmented villages and therefore display higher other-regarding concerns – this may mean we are underestimating the effect of fragmentation on preferences.

Table 3
Subject characteristics as a function of village type.

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.

3.6. Hypotheses

The primary focus of this paper is to understand how social fragmentation affects social preferences. We take a two-pronged approach: first we fix village-level religious composition and examine differences in other-regarding preferences when they apply to in-group members and out-group members. We then focus on in-group/in-group interactions and compare fragmented villages to homogeneous villages. We put forward our alternative hypotheses; the null throughout is that

Table 4
Village characteristics as a function of village type.

Village	Village type	No. of nouseholds	Population	Illiteracy	Unemployment
Bhurkunda	Homogeneous	512	2539	0.43	0.54
Chupi	Homogeneous	1596	7159	0.36	0.65
Hasanpur	Homogeneous	893	3942	0.44	0.68
Kanakpara	Homogeneous	303	1262	0.29	0.62
Roshanpur	Homogeneous	482	2191	0.34	0.53
Shuhari	Homogeneous	329	1319	0.41	0.53
Sridharpur	Homogeneous	240	964	0.46	0.49
Alampur	Fragmented	955	4206	0.32	0.55
Domohani	Fragmented	2603	12,480	0.35	0.65
Ganfulia	Fragmented	1179	5150	0.39	0.65
Gokarno	Fragmented	3720	16,198	0.42	0.68
Jhikra	Fragmented	913	3837	0.58	0.68
Kirtipur	Fragmented	765	3098	0.48	0.69
Mathurapur	Fragmented	1392	7112	0.44	0.72
Pilsowa	Fragmented	323	1274	0.40	0.61
Tungi	Fragmented	2103	9128	0.41	0.68

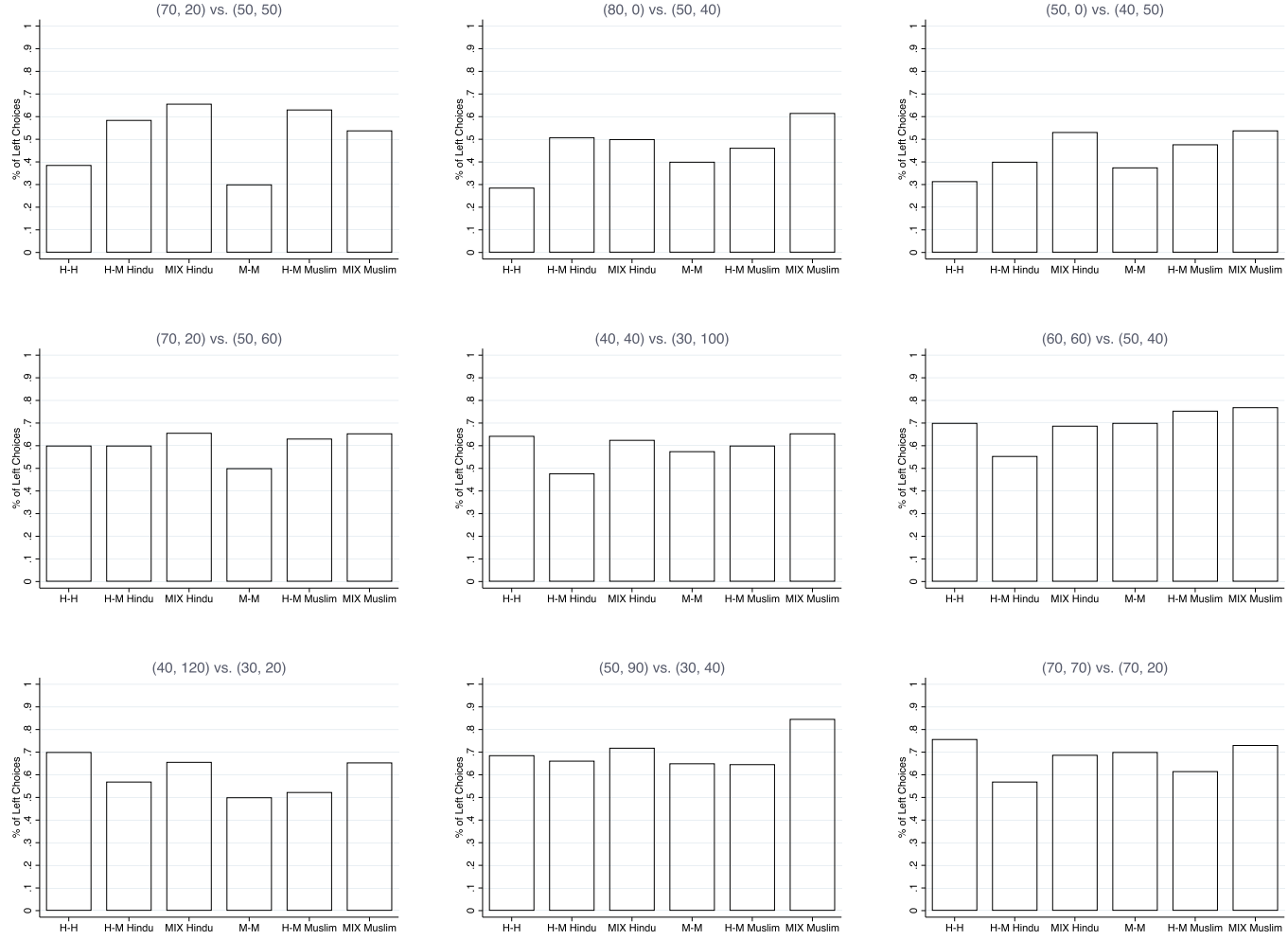

Fig. 1. Relative frequency of left option choices conditional on treatment in Fragmented Villages.

social identity and village fragmentation will have no impact on behavior.

Our first hypothesis comes from the literature reviewed earlier in the paper, from both social psychology and experimental economics, which postulates that individuals exhibit a bias in their concerns for the welfare for their fellow in-group members. To test this hypothesis, we compare treatments (within fragmented villages) where the likelihood of being matched to an in-group member is 100% (i.e. H-H or M-M) to treatments where that likelihood is either 50% (MIX) or 0% (H-M).

Hypothesis 1. In fragmented villages, the estimated ρ and σ will increase in the probability of facing an out-group member.

We now turn to the effect of fragmentation, and the possible role social identity plays in determining behaviour. Brewer (1991) theorizes that in-group identification is a function of two competing needs. On the one hand, individuals have a need for inclusion: an isolated individual would seek to identify herself with a collective. On the other hand, people require a degree of distinctiveness: members of very large

groups may search for alternative identities through which they can affirm their uniqueness. It follows that subjects' sense of religious identity should be less salient in villages where their own religion dominates: individuals ought to identify with groups which provide them with a better sense of uniqueness. In contrast, the salience of religious identity should be strongest in fragmented villages, since not only there is an out-group to provide a comparison, but also because both religious groups are equally numerous within the village. Existing lab evidence supports this argument: Eckel and Grossman (2005) and Charness et al. (2007) show in a laboratory setting that inducing group identity is only effective if that identity is sufficiently salient. In other words, group identity should be most salient in diverse villages, as opposed to homogeneous ones.

Hypothesis 2. The estimated ρ and σ should be larger in absolute value in fragmented villages than in homogeneous villages in both H-H and M-M treatments.

An important caveat is warranted with regards to the final hypothesis and our ability to test it. Village residency and religious composition are not randomly and exogenously assigned. Although rural-rural migration patterns are not a function of religious composition (Bhattacharya, 2000), it is possible that different villages have evolved with different customs and norms, and that those norms manifest themselves in different behavior in our experiment. We therefore cannot offer a causal explanation for behavior in the event that the data supports our second hypothesis; we can only offer a highly plausible explanation, based on social identity theory.

We conclude this section with a remark about the two religious groups that we are studying in this paper. Our model has nothing to say about comparisons of behavior across groups. That is to say, we do not have any a priori hypothesis about how other-regarding Muslims are relative to Hindus, and how that relationship changes as a function of fragmentation. All our hypotheses relate to the behavior of members of one group, fixing village type and changing the identity of the other player; or fixing the identity of the other player and changing the village type. Perhaps our data might be useful to scholars interested in cultural differences in behavior; those questions, however, are clearly beyond the scope of the present paper.

4. Results

4.1. Econometric specification

We use a mixed-effects logit model to estimate the latent utility parameters in Eq. (3).[12] Hence, we account for the unobserved individual heterogeneity which might affect the decision across observations per individual. We report results from separate regressions run on the religious sub-samples in each of the treatments separately, to facilitate the exposition of the results. To perform hypothesis tests on differences in parameters across different treatments, we ran a series of regressions using the whole data set, where we interacted the ρ, σ parameters with treatment dummies. The output from the pooled regressions is in Appendix A. We also report q-values in the pooled regression output since we are testing multiple hypothesis using these parameters. The q-values seem to be reasonably small to mitigate any concerns due to false positives.

The utility of an individual i from choosing option $k = \{L, R\}$ in a game n is given by,

$$U_{in}^k = \beta_0^k + \beta\pi_{in}^k + \sum_g \rho^g(\pi_{in}^L - \pi_{jn}^R)r + \sum_g \sigma^g(\pi_{jn}^L - \pi_{in}^L)s + \eta_i + \epsilon_{in}^k, \tag{3}$$

where ρ and σ capture player i's attitude towards inequality when she is better/worse off than her counterpart. While β measures the selfishness motive, β_0^k captures the (payoff-independent) latent utility of choosing k. η_i controls for the random effects which allows us to capture the player specific unobserved correlation across all the games. ϵ_{in}^k is assumed to be Type 1 i.i.d. error.

Since the left option in all choices gave the decision-maker (weakly) higher payoffs than the right option —which was a feature of the design by Charness and Rabin (2002)— the idiosyncratic utility from choosing left (β_0^k) and the selfishness motive (β) are jointly determining preferences for the left option without regard for the other individual's welfare. Therefore, for ease of comparison among treatments, we only keep the intercept term. Also, the mixed effects logit model combines $\eta_i + \epsilon_{in}^k$ into a single random error ξ_{in}^k, which gives us the following specification,

$$U_{in}^k = \beta_0^k + \sum_g \rho^g(\pi_{in}^L - \pi_{jn}^R)r + \sum_g \sigma^g(\pi_{jn}^L - \pi_{in}^L)s + \xi_{in}^k, \tag{4}$$

We assume that the binary response variable y_{in}, takes value 1 if player i chooses L i.e. ($U_{in}^L - U_{in}^R > 0$). We estimate the following mixed effects logistic regression,

$$Pr(y_{in} = 1|x_{in}, \eta_i) = \Lambda(x_{in}(\beta, \rho, \sigma) + \eta_i), \tag{5}$$

where i = 1, ...,N are clusters (= number of players) where each cluster contains 9 observations. Λ is the logistic cumulative distribution function. The function $x_{in}(\beta, \rho, \sigma)$ can be represented as,

$$x_i(\beta, \rho, \sigma) = (\beta_0^L - \beta_0^R) + \textstyle\sum_g \rho^g[(\pi_{in}^L - \pi_{jn}^L)r_L - (\pi_{in}^R - \pi_{jn}^R)r_R] + \sum_g \sigma^g[(\pi_{jn}^L - \pi_{in}^L)s_L - (\pi_{jn}^R - \pi_{in}^R)s_R] \tag{6}$$

4.2. In-Group/out-group differences in preferences in Fragmented Villages

We start by providing summary statistics on behavior in each of the mini-dictator games. These summary statistics are not the basis for any hypothesis; they simply provide an illustration of behavior game-by-game. We see marked differences in behavior in tasks 1–3, in which the left option implies a favourable division of the pie which results in large income inequality, and in which the right option gives a more egalitarian split of the pie, which also maximizes the total pie size. In these three mini-dictator games, the fraction of own-payoff maximizing choices is smallest in the H-H/M-M treatments, and it increases with the probability of the other player being an out-group member. The other six games put forward different trade-offs between equality and efficiency, but there is no clear pattern to be discerned on the aggregate level (Fig. 1). To test Hypothesis 1, we estimate the model in Eq. (4) using data from fragmented villages only. Table 5 presents results from the econometric analysis of treatment effects on preferences. We start with the Muslim sample. The estimated ρ coefficient is lowest (i.e. greatest advantageous inequality aversion) in the M-M condition (M-M < MIX: $z = 3.22$, $p < 0.01$; M-M < H-M: $z = 3.98$, $p < 0.01$); however, we find no difference between MIX and H-M ($z = 0.67$, $p = 0.51$). A similar pattern applies to the estimated σ coefficients, although the absolute differences in estimated coefficients in M-M and the other two treatments are smaller and we find no significant differences. (M-M = MIX: $z = 1.01$, $p = 0.315$; M-M = H-M: 0.47, $p = 0.64$; MIX = H-M: $z = 0.91$, $p = 0.36$).

In the Hindu sample, we observe a negative and significant coefficient on ρ in the H − H case, which is significantly smaller to the estimated ρ coefficients in the MIX and H-M conditions (H-H < MIX: $z = 5.80$, p < 0.01; H-H < H-M: $z = 6.95$, $p < 0.01$). The ρ coefficients in the MIX treatment is only marginally significantly different from zero ($z = 1.82$, $p = 0.07$). The coefficient on ρ in the H-M condition is not significantly different from zero; the latter two coefficients are also not significantly different from each other (MIX = H-M: $z = 0.91$, $p = 0.36$). In the case of the σ coefficient, we only find a

[12] Both Logit and Probit models give similar results. We also tried to use a random coefficient utility model to account for individual heterogeneity, but our panel wasn't big enough to obtain stable parameter estimates.

Table 5
Estimated ρ, σ and β coefficients as a function of recipient's identity in fragmented villages.

	Muslim sample			Hindu sample		
	(1) M-M	(2) Mixed	(3) H-M	(4) H-H	(5) Mixed	(6) H-M
ρ	− 0. 0202***	− 0. 0110**	− 0. 0075**	− 0. 0223***	− 0. 0066*	−0.0030
	(0.0040)	(0.0047)	(0.0029)	(0.0029)	(0.0038)	(0.0030)
σ	−0.0035	0.0018	0.0033	0.0010	0.0014	0.0060*
	(0.0036)	(0.0047)	(0.0029)	(0.0026)	(0.0038)	(0.0031)
β	0.5720	1.2560***	0.7280**	0.7350***	0.7960***	0.3300
	(0.3510)	(0.4300)	(0.2850)	(0.1840)	(0.2610)	(0.3350)
Variance	3.7750***	3.307**	4.1620***	1.4450***	1.314**	6.795***
	(1.4420)	(1.6680)	(1.2900)	(0.4410)	(0.6330)	(2.2270)
N	360	234	585	630	288	585
Individuals	40	26	65	70	32	65

Standard errors in parentheses. ***: $p < 0.01$; **: $p < 0.05$; *: $p < 0.10$.

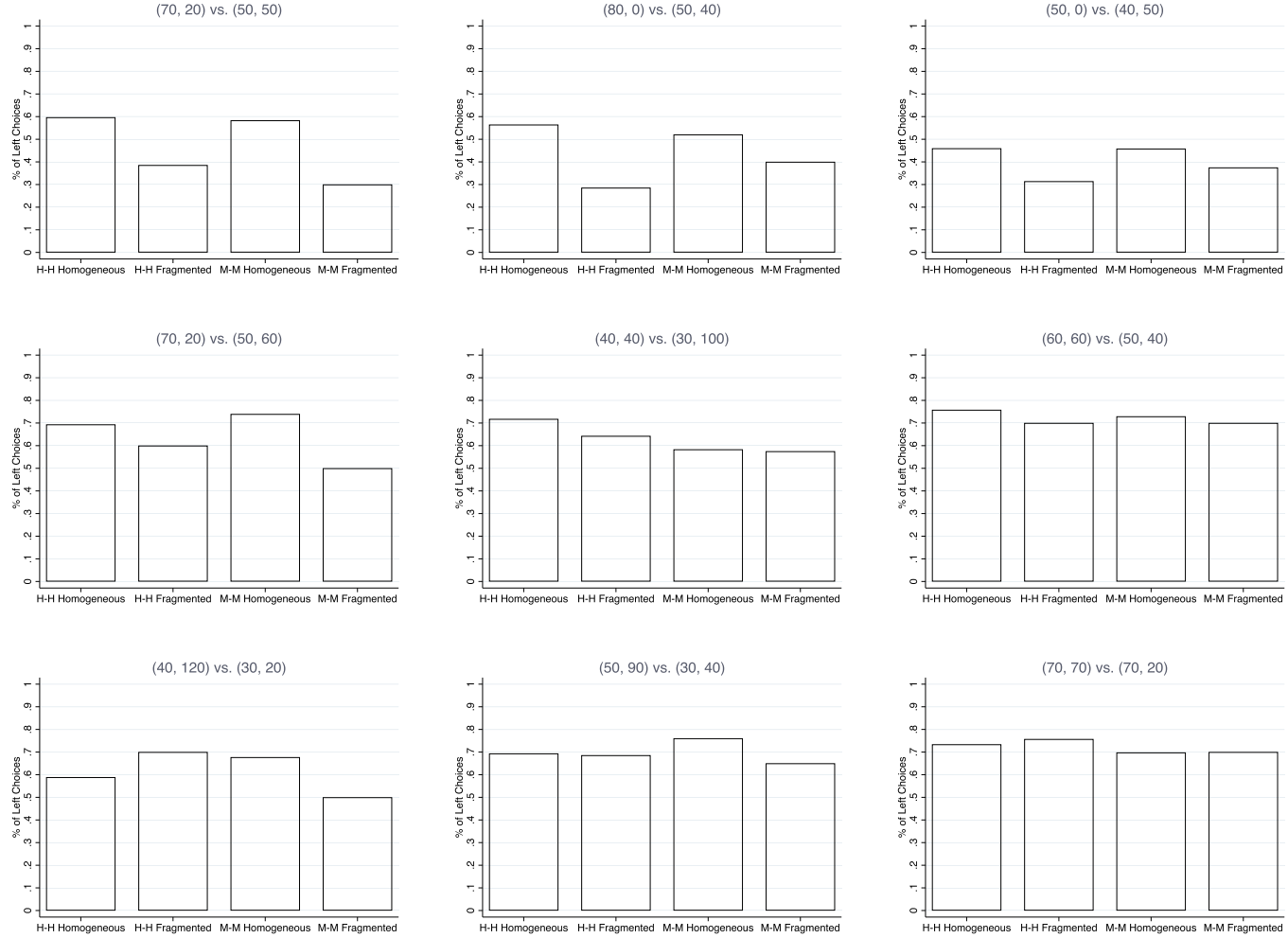

Fig. 2. Relative frequency of left option choices conditional on treatment in Fragmented and Homogeneous Villages.

marginally significant coefficient on H-M ($z = 1.83$, $p = 0.07$).

Observation 1. Muslims' and Hindus' aversion to advantageous inequality declines as the probability of facing an out-group member increases. We find no evidence of aversion to disadvantageous inequality on either religious sample.

4.3. Village-level fragmentation and the salience of social identity

We again start by examining aggregate choices for each of the nine games. Again, the most salient differences come from the first three mini-dictator games (first row in Fig. 2. This time, the proportion of "selfish" left choices is smaller in fragmented villages than in homogeneous villages in all the three cases and for both religious groups. In the other six games, there differences between village types are less accentuated.

We now formally test Hypothesis 2, which states that fragmentation along religious lines should make religious identities more salient and therefore the effect of group membership on preferences stronger. Table 6 displays the results of estimating Eq. (2) on the M-M and H-H

Table 6
Estimated ρ, σ and β coefficients within in-group interactions as a function of village type.

Sample	Muslim		Hindu	
Village type	Fragmented	Homogenous	Fragmented	Homogenous
ρ	−0.0202***	−0.0075***	−0.0223***	−0.0109***
	(0.0040)	(0.0022)	(0.0029)	(0.0021)
σ	−0.0035	0.0037*	0.0010	−0.0055***
	(0.0036)	(0.0022)	(0.0026)	(0.0021)
β	0.5720	0.8300***	0.7350***	1.0610***
	(0.3510)	(0.1430)	(0.1840)	(0.1740)
Variance	3.7750***	1.1020***	1.4450***	2.5470***
	(1.4420)	(0.3050)	(0.4410)	(0.5580)
N	360	864	630	1116
Individuals	40	96	70	124

treatments in homogeneous and fragmented villages. Again for clarity of exposition, we present the results from regressions on each of the sub-samples separately. Hypothesis test results are based on a regressions that pool both village types for a given religious sample. The output from these regressions is in the Appendix.

We start with the Muslim sample: we do not find a significantly higher coefficient on ρ in homogeneous villages than in fragmented villages ($z = 0.44$, $p = 0.66$); interestingly, we find a small, positive and marginally significant coefficient on σ in homogeneous villages, while the σ coefficient in fragmented villages is not significant; the difference between the two is significant ($z = 1.91$, $p = 0.06$). In the Hindu sample, we do not find that the ρ coefficient in homogeneous villages is significantly higher than in fragmented villages ($z = 0.35$, $p = 0.72$). We however find that the σ coefficient in homogeneous villages is negative and significant, and significantly smaller to that in fragmented villages ($z = 2.39$, $p = 0.017$).

Observation 4. Village fragmentation has no effect on Muslim and Hindu participants' aversion to advantageous inequality in both fragmented villages and homogeneous villages. The effect of village fragmentation on aversion to disadvantageous inequality differs across religious groups.

5. Discussion

In an increasingly globalised world, social fragmentation, be it at the religious, ethnic or linguistic level, is gaining relevance both at a political and social level. It is therefore important for social scientists to be able to understand the relevance of social identity on preferences. In this paper we jointly analyse the effect of religious identity and religious fragmentation on social preferences. While the evidence on social preferences is overwhelming, our understanding of how they are affected by group membership is limited.

How social preferences work across group memberships is crucial to our understanding of how individuals will value (and support through their votes) different forms of redistribution through taxation. Individuals that exhibit inequality aversion preferences should favour more redistribution as inequality increases. If their inequality concerns are group specific, this has dramatic implications for how taxation funds are used. This is particularly so in a country like India: Hindus and Muslims have a history of conflict, which has resulted regular episodes of inter-religious conflict over the course of recent history.

Our findings are rather surprising. We find evidence of aversion to being ahead, which declines as the probability of facing an out-group member increases. In contrast we find very little evidence of aversion to being behind; we only find some evidence of this for Hindu subjects (and only within-group in homogeneous villages), not Muslim. This suggests that income redistribution policies would be widely supported. Interestingly, while inequality-reducing policies would clearly find support, the lack of evidence for disadvantageous inequality aversion means that it is possible that Pareto-improving policies that increase inequality would also find support, particularly if they affect the out-group (for whom inequality concerns are weakest).

Another key finding is that fragmentation makes the social identity of players salient. This adds credence to Allport (1954)'s account that social identity of individuals becomes more salient in fragmented societies or groups. We find that aversion to advantageous inequality among both Muslims and Hindus is much stronger in fragmented villages in comparison to homogenous villages.

An important caveat to these findings is that the magnitude of the estimated parameters is rather small. It is pertinent to place our findings in the context of the rather large differences in cooperation rates in the Prisoners' Dilemma reported in our companion paper with the same participants (Chakravarty et al., 2016b). The two pieces of evidence suggest that the role of identity is perhaps stronger in shaping beliefs about the behaviour of others, perhaps through the establishment of norms of behaviour as suggested by Akerlof and Kranton (2000), or through differentiated priors. The latter explanation is certainly a very promising avenue of research.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at 10.1016/j.socec.2019.101451.

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