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Cooperation under threat

The mobilizing force of ethnic competition

Max Schaub

Thesis submitted for assessment with a view to
obtaining the degree of Doctor of Political and Social Sciences
of the European University Institute

Florence, 18 November 2016

European University Institute
Department of Political and Social Sciences

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Researcher declaration to accompany the submission of written work
Department of Political and Social Sciences - Doctoral Programme

I Max SCHAUB certify that I am the author of the work 'Cooperation under threat: the mobilizing force of ethnic competition' I have presented for examination for the Ph.D. at the European University Institute. I also certify that this is solely my own original work, other than where I have clearly indicated, in this declaration and in the thesis, that it is the work of others.

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Abstract

This dissertation sheds new light on the old question of whether outside threat induces ingroup cohesion. In three independent but interrelated empirical chapters, I explore the link between threat, conflict and cooperation from a temporal, macro-, and micro-level perspective.

The first chapter looks at social mobilization before the outbreak of violence in Nigeria and in Africa more widely. By mapping the timing of survey interviews in relation to occurrences of violent communal conflict, the chapter demonstrates that in regions where the central state is weak, social mobilization predicts outbreaks of communal violence. Drawing on a variety of data sources, I demonstrate that the mobilization efforts we observe are indicative not of predatory intent but of efforts to prevent and prepare for the violence to come.

The second chapter explores the larger pattern of ethnic diversity and cooperation in Africa, combining data from 33 African countries with continent-wide information on ethnic diversity. I find that, overall, ethnically diverse regions tend to have higher levels of cooperation. I explain this finding by disaggregating ethnic diversity into first-order ethnic diversity – the ethnic diversity of a community proper, theorized to undermine local cooperation – and second-order ethnic diversity – the ethnic diversity of the *hinterland* of a community, theorized to reinforce cooperation by inducing ethnic competition. I demonstrate that while first-order ethnic diversity is associated with lowered levels of cooperation, second-order diversity consistently goes along with higher levels of cooperation, especially in regions that have seen high levels of interethnic tensions.

For the last chapter, I leave Africa and zoom in to a single region in Georgia, where exposure to ethnic outgroups varies on the micro-level. Using lab-in-the field methods I compare village-level variations in threat perceptions and cooperation. In order to measure threat perceptions behaviourally and without the confounding influence of a competitive setup, I introduce a new game, the threat game. Cooperation is measured with a standard public goods game. I find that levels of both ingroup cooperation and perceived threat are higher in regions more strongly exposed to ethnic outsiders, and that this effect is due to those feeling particularly threatened being spurred into investing in their ingroup rather than withdrawing their support from it.

The introduction and conclusion serve to discuss overarching issues. I highlight the need for a comprehensive theory integrating threat, conflict and cooperation; explore the potential of variations in threat levels for explaining the distribution of cooperativeness across regions; and draw out the implications of the threat-cooperation nexus for contemporary multicultural societies.

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Writing a PhD is at the same time a very lonely, and a very sociable activity. Drilling deeper and deeper into a topic, few people notice when you sway off the straight path, and even fewer people can help you when you hit a rock and get stuck. All the more important are those people who do follow you down the route of your twisted thoughts and help you to disentangle them.

The most important of them all is Anjula, my wife and companion, who spent hundreds of hours listening, discussing and helping me to formulate, develop and – more often than not – discard ideas. She knows best what it was like.

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Working on the comments by my examiners Macartan Humphreys, Peter van der Windt and Hanspeter Kriesi was at the same time challenging and rewarding, forcing me to dig into some of the hidden assumptions I make throughout the thesis. I much enjoyed this process, though, and am grateful for their helping me to make the best out of my work.

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Introduction

The beginnings of this dissertation can be traced back to a seminar room in Yerevan. During 2010/2011, I spent a year teaching and organising projects in Armenia, and as part of my activities I organized a student conference on the Karabakh conflict.[1] The conference served as a forum for German and Armenian students of international relations to discuss possible solutions to the conflict. The conference started out with a couple of presentations by the German students, presented in a neutral tone, as deemed appropriate by them for academic exchange. Not so the presentations that followed, by my Armenian students. Their delivery was passionate, and despite my urging them to take a balanced view, strikingly one-sided. They later explained that in the case of the conflict involving their people, neutrality was not an option. More surprisingly, as they gave their presentations one after the other declared their willingness to fight, should an Azerbaijani incursion into Karabakh ever occur. To defend their Armenian coethnics in Karabakh they were willing to physically take up arms. To the Germans in the room, me included, having been brought up in the anti-militarist and peaceful atmosphere of post-WWII, post-reunification Germany, such a high level of commitment was startling. Nevertheless, there could be no doubting the earnestness of the convictions presented. Their people, my Armenian students argued, had suffered genocide once and would not let it happen again. Couched between the country responsible for the massacre of their people to the west, and an openly hostile enemy to the east, they reasoned, there was little alternative to unquestioned loyalty. If there should be war, they would go and fight for their coethnics in Karabakh.

[1] The Karabakh conflict is the violent standoff over the Karabakh enclave located between Armenia and Azerbaijan. Nominally part of Azerbaijan, the enclave has been under the de-facto control of Armenian forces since a short but vicious war in 1994 (De Waal 2004).

The resolute stance and line of argument of my Armenian students echoed with a proposition that dates back right to the beginnings of social thought, and figures prominently in some of the most influential works in the social sciences – that the threat from an outgroup leads to increased cohesion within a group. Thucydides, Ibn Khaldun, Marx and Engels, Durkheim, Sumner, Simmel and Key all agree that the threat or experience of an outside attack induces members of a targeted community to close their ranks and to step up internal cooperation.[2]

However, below the surface of this straightforward theoretical proposition loom unaddressed questions and fascinating extensions, which motivated the writing of this dissertation. Three overarching themes stand out. First, despite the long scholarly tradition linking outgroup threat to ingroup cohesion, the central questions of *why* this link might exist – the question of which causal pathways lead from outgroup threat to cooperation with the ingroup – remains wide open. Second, a better understanding of how varying levels of threat differently shape social behaviour may provide a key to a better understanding of the variation in levels of cooperativeness observed between and within societies around the world – what Elinor Ostrom (1998, 9) referred to as 'the big puzzle' of the social sciences. Finally, fully integrating theories of outgroup threat into our understanding of the effects of ethnic diversity may allow us to better predict how diversity will shape social cohesion and cooperation – one of the key questions for 21st-century multicultural societies.

In this introduction, I will address each of these points in some detail. I will then provide an overview over the content of the three chapters of this dissertation and will discuss methods used. The individual chapters have been written independently, which means

[2]In the *History of the Peloponnesian War*, written in the fifth century B.C., Thucydides ([~404 B.C.] 1972, chapter 8.1), described how the threat of an attack on Athens created cohesion and order within the city. Ibn Khaldun in his *Muqaddimah* ([1377] 2005), saw *asabiyya* – aggressive solidarity proper to communities exposed to harsh environments and competition from other groups – as one of history's driving forces. Marx and Engels argue in the *Communist Manifesto* ([1848] 1998, 36) that the 'proletariat during its contest with the bourgeoisie is compelled, by the force of circumstances, to organise itself as a class'. In *Suicide*, Durkheim ([1897] 2002, 280) argued that 'great public dangers' would lead 'society as a whole' to assume 'that private interests, even those usually regarded most highly, must be wholly effaced before the common interest.' Sumner (1906, 14) theorized in *Folkways* that the 'closer the neighbors, and the stronger they are, the intenser is the warfare, and then the intenser is the internal organization and discipline of each'. And in *Der Streit*, Simmel ([1908] 1955, 92–93) argued that 'war with the outside is sometimes the last chance for a state ridden with inner antagonisms to overcome these antagonisms.' Finally, Key (1949, 667) in his *Southern Politics in State and Nation* saw the threat of Black voters as giving 'cohesion to the [White voters of the] South'.

that they follow their own logic and largely stand for themselves. The three overarching themes addressed in this introduction are picked up again in the conclusion, where I will discuss the contributions of the chapters to each of them.

Before continuing, let me clarify what I mean by cooperation. Cooperation is understood as the ability and willingness of communities to solve collective action problems. At the individual level, cooperating therefore typically implies engaging in a trusting interaction which only leaves an individual better off if the others also cooperate, or it implies forfeiting some individual advantages for the sake of gains to the collective. In game theoretic terms, cooperation can therefore be modelled by the multi-person assurance or prisoner's dilemma game.[3] Whether an individual only profits if others cooperate, or whether she actually forfeits individual gains for others depends on the exact structure of the interaction situation, however, which is often difficult to observe. As a practical shortcut, in the first two chapters of this thesis I therefore define cooperation as the observable participation in collective endeavours such as community meetings and protests, and Chapter 1 uses the term 'social mobilization' analogously to the term 'cooperation'. In the final Chapter 3, cooperation is conceptualised as the contributions made in a public goods game.

Causal pathways

Several unanswered questions and conceptual confusions still surround the nature of the link between threat and competition with outsiders, and internal cooperation. Is it the threat emanating from an outgroup – the awareness of the presence of a potentially harmful outgroup nearby – or the actual violent confrontation with that outgroup that causes increased cooperation? And is it processes before, during or after a violent confrontation that are responsible for increased cooperation? Finally, given that we have identified a process that can shift cooperation levels for the duration of the ongoing conflict, why do these raised levels 'stick'? These are question concerning the causal pathways by which threat or conflict induces cooperation in the first place, and that allow higher levels of cooperation to be sustained over time.

[3] My definition of cooperation thus resembles the concept of 'social cohesion' as understood by Fearon, Humphreys, and Weinstein (2009).

Central to most explanations outlining how outgroup thread and competition can lead to increased cooperation with one's ingroup is a psychological process by which competition or threat from an outgroup leads to higher identification with one's ingroup, which then results in an increased willingness to contribute to that ingroup. The existence of such a process seems well-supported by research in psychology and economics. Tajfel (1970) and Tajfel and Turner (1979) showed that even when groups are constructed on the basis arbitrary criteria – preference for one painter over the other, for instance – individuals will behave more favourably towards members of their ingroup than towards outgroup members. And when groups are made to compete with each other, this consistently results in high contributions to the ingroup, even when the interaction situation is structured in such a way that the best solution for the individual is not to contribute (Abbink et al. 2012; Bornstein 2003; Bornstein and Ben-Yossef 1994; Burton-Chellew and West 2012; Puurtinen and Mappes 2009).[4]

To date, it remains unclear whether this 'ingroup bias effect' is genetically hardwired – i.e. that (some) humans have an innate tendency to increase their levels of support to ingroup members – or rather driven by norms – i.e. that there exists a widespread social convention or norm prescribing that ingroup members should be favoured, especially when there is a threat to the group. Bacharach argues that 'team reasoning', a process during which each individual 'works out the best feasible combination of actions for all the members of her team, then does her part in it', is 'a basic decision-making proclivity of mankind' (Bacharach, Gold, and Sugden 2006, 121). Bicchieri (2006, 136) favours a norm-based explanation. She argues that one 'gives more to the in-group because one expects more

[4] A possible explanation for the phenomenon of overspending in competition situations is that individuals misperceive the nature of the prize they compete over. In the cited experiments, groups compete over continuous public goods. Here, it is always better for individuals not to contribute. However, the situation changes if competition is over a fixed prize/step-level public good. In this case, as long as a group member believes that the others are cooperating, contributing can be the dominant strategy even for a narrowly self-interested individual, since that individual's contribution can be crucial to win the prize (Bornstein, Erev, and Rosen 1990; Erev, Bornstein, and Galili 1993; Harrison and Hirshleifer 1989; Hirshleifer 1983). If the participants misperceive the competition to be over a fixed prize/step-level public good, this might explain the increased contributions. In this context it is also interesting to note that for much of human history, victory or defeat in war resembled a step-level public good, especially for the male combatants. In many societies, it was customary to kill all grown-up males of a defeated group when emerging victorious from a battle (Keeley 1996). In such a situation, it was always rational for men to cooperate in defence with their peers, as not-fighting would not leave them better off. On a more speculative note, this may even help to explain the finding, noted by some scholars, that men show a stronger proclivity to favour their ingroup than women when faced with external competitors (Rusch 2014; Yamagishi and Mifune 2009).

from them and less from the out-group, and one believes in-group members expect such behavior from each other'. The in-group favouritism norm, she argues, has a long history, probably evolving from family-favouritism to apply to a somewhat wider group, conferring evolutionary advantages on those groups. While in today's large-scale societies, it has lost its original purpose, it might still be possible to cue it.[5]

Presupposing the existence of the 'ingroup bias effect', one possible pathway leading from outgroup threat to ingroup cooperation is that the ingroup bias could remain 'switched on' as long as the threatening outgroup is present. On the flipside, this would imply that the removal of an outgroup threat should immediately lead to lower rates of cooperation. This has indeed been observed. Enos (2016) describes a case where the removal of a housing block inhabited mainly by Black Americans – which he argues had been perceived as a threat by White Americans – led to a drop in voting among White Americans living nearby.[6] Similarly, the external introduction of an outgroup threat should immediately lead to ingroup bias. Again, evidence presented by Enos (2014) is instructive. He had Hispanic American confederates riding a metro alongside a predominantly White American commuter crowd on randomly assigned trains. As a result, exclusionary attitudes became more prominent among commuters.

Persistent change

However, the idea that a process by which ingroup bias is flexibly switched on or off is at the root of the link between outgroup threat and ingroup-cooperation is at odds with the observation that effects seem to 'stick' even after open conflict has ended.[7] A possible process explaining *persistent* change is a shift of norms towards a new equilibrium level of cooperation. This hypothesis starts from the widespread assumption that the levels of

[5]Yamagishi and Kiyonari (2000) and Burton-Chellew, Ross-Gillespie, and West (2010) present similar arguments.

[6]Interestingly, a similar effect of the removal of an outgroup threat has been observed among non-human primates (Muller and Mitani 2005). Groups of chimpanzees normally show a high level of internal cooperation. Male chimpanzees patrol the borders of their group's territory together to protect it from intrusion from other groups. Muller and Mitani describe a case where the expansion of farmland had cut off the territory of one group from that of others, removing the threat of intrusion. Without the threat of external incursions, male chimpanzees stopped patrolling the border, and instead started to behave as competitors rather than allies.

[7]A number of sophisticated studies have produced evidence that cooperation levels are higher in the aftermath of violent conflict, although it remains largely unclear what may have caused these shifts or at which stage of the conflict they might have occurred (Bauer et al. 2014; Bellows and Miguel 2009; Blattman 2009; Gilligan, Pasquale, and Samii 2014; Grosjean 2014; Voors et al. 2012).

trustworthiness, cooperativeness or altruism in a society constitute social equilibria, whereby multiple stable equilibria are possible (Boyd and Richerson 2009; Gächter, Herrmann, and Thöni 2010; McNamara et al. 2009; Whiting and Whiting 1994). An example for a process of equilibrium-change is given by Nunn and Wantchekon (2011) with regard to trust, albeit working in the opposite direction – a downscaling of trust in response to the translatlantic slave trade. They argue that in western Africa during the period of the slave trade, the widespread threat of abduction into slavery, even at the the hands of other community members, resulted in people in coastal regions adopting more distrusting attitudes as a best response to an environment of rampant insecurity. An opposite process could lead to higher levels of cooperation in the face of attacks from the outside. Backed up by peer punishment, which has been found to be more frequently used in competition situations (Gneezy and Fessler 2012; Sääksvuori, Mappes, and Puurtinen 2011), the need for vigilance, collective defence and other forms of self-help during a violent confrontation could shift cooperative norms towards a more cooperative equilibrium. As long as such a shifted equilibrium is beneficial to most community members or is sufficiently enforced by social sanctions, it could persist after hostilities have ended.[8]

The question here is whether single episodes of violence are enough to induce a shift in the cooperative equilibrium. Research showing that norms can arise relatively quickly and then remain stable suggests this possibility.[9] What is more, new cooperative equilbria may be stabilized by intentional or inadvertent changes to the structure of social interactions. For example, Wood (2003) describes how the *campesino* insurgency in El Salvador was preceded by intense efforts of left-leaning leaders to educate the population and to reorganise farmers into more autonomous ways of producing. Apparently as a consequence of these

[8]An example of such a shift of a cooperative equilibrium is the widespread solidarity in the UK after the end of World War II, that enabled the implementation of extensive welfare reforms. This effect was anticipated by William Beveridge, the chief designer of the reforms, who argued that as 'war breeds national unity', it might be easier to realise changes to the welfare system that 'will be accepted on all hands as advances, but which it might be difficult to make at other times' (Beveridge 1942, par. 460). A similar process could already be observed during World War I, during which according to Keegan (1978, 225) a 'process of discovery' took place whereby 'many of the amateur officers were to conceive an affection and concern for the disadvantaged which would eventually fuel that transformation of middle-class attitudes to the poor which has been the most important social trend in twentieth-century Britain.'

[9]For instance, Bettenhausen and Murnighan (1985) study the emergence of norms by having groups of students interact at four occasions over the course of four weeks. They note that groups quickly developed distinct sharing norms during the first session that then remained relatively stable during the sessions that followed.

mobilization efforts, people who lived in rebel-held areas during the war remained more politically active, stayed more committed to change and equity and participated more in development projects than those in government-held areas even after the end of the war (Wood 2003, 220–223).[10]

A lasting shift towards a more cooperative equilibrium may also be the result of changes to settlement patterns that often accompany exposure to outside aggression. Settlement patterns in different world regions and historical periods have been observed to be influenced by the threat and prevalence of violence. The settlements of communities fearing or experiencing attacks typically tend to be larger and more densely populated. Moreover, the fear of attacks induced communities to invest in collective defence in the form of military societies or fortifications (Chagnon 2013; Dincecco and Gaetano Onorato 2016; Farmer 1957; Keeley 1996; Udo 1965).[11]

Regional variation in cooperativeness and social capital

Investigating how outside threat shapes ingroup cooperation also holds the potential to make inroads into what Ostrom (1998, 9) referred to as the 'really big puzzle in the social sciences... the delopment of a consistent theory explaining why cooperation levels vary so much and why specific configurations of situational conditions increase or decrease cooperation in first- or second-level dilemmas.' Can the idea that threat from an outgroup leads to increased cooperation with an ingroup help us solve this puzzle?

The phenomenon that communities in different regions of the world differ in their ability to solve collective action problems is well documented. In their comparative study of

[10]The 'organisations that constitute civil society', Wood (2003, 161) writes, 'emerged in the shadow of civil war through the efforts of insurgent campesinos, with the encouragement of their armed FMLN [the major rebel group] allies.'

[11]In his thinking on the matter, Darwin had a longer-term process in mind relying on the physical selection of more cooperative groups over less cooperative ones. He wrote that there 'can be no doubt that a tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to give aid to each other and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection. At all times throughout the world tribes have supplanted other tribes; and as morality is one element in their success, the standard of morality and the number of well-endowed men will thus everywhere tend to rise and increase' (Darwin [1871] 1981, 166). In this view, selection works directly on the norm-bearers, with communities comprising many cooperative members doing better in violent intergroup conflict and outcompeting those with fewer cooperators, despite the fact that individual cooperators are selected against (suffer higher mortality) than non-cooperators. Choi and Bowles (2007) and Bowles (2009) model this process formally.

small-scale societies around the world, Henrich et al. (2004; 2010) showed that patterns of pro-sociality varied widely between different societies. Similar inter-societal differences have been documented for punishment and trusting behaviour (Herrmann, Thöni, and Gächter 2008; Yamagishi 1998). To account for these different patterns of sociability, Henrich et al. identified religion, settlement size and market exposure, and in a related study, Hruschka and Henrich (2013) link the prevalence of communitarian forms of cooperation to the absence of social security mechanisms beyond the family.

However, stark variations in the degree of cooperation have also been observed in societies showing little variation in religion, settlement patterns, community size, market exposure or systems of social security. The paradigmatic case is the North–South divide in Italy. Italy's northern regions boast a larger number of voluntary associations, blood donations and have a generally greater abundance of 'civic' values (Guiso, Sapienza, and Zingales 2013; Putnam, Leonardi, and Nanetti 1994). Behaviourally-measured cooperativeness also declines from North to South in Italy, mirroring the more qualitative and anecdotal evidence reported in other studies (Bigoni et al. 2016). While these differences have been explained with reference to republican self-government (Guiso, Sapienza, and Zingales 2013) and the subversive force of the Spanish rulers (Pagden 1988), an explanation based on the experience of ubiquitous threat and conflict is also plausible. In the South of the country, first the Norman invaders and later the Spanish and French overlords enforced peace from the top, while in the north, smallish principalities were involved in a constant, violent struggle for influence and (political) survival. In the politically unstable environment that famously inspired Machiavelli's *Prince* ([1532] 2005), the threat of attack was constant. Bigoni et al. (2013) therefore argue and show that those places that had seen most conflict in the past exhibit the highest levels of cooperation in the present. Turchin (2003, 2009) makes a similar argument to explain the rise of empires throughout history. Empires would rise in such regions where extreme external threat induced people to behave cooperatively within large polities.[12]

[12] In a effort to explain the origins and variation in the distribution of social capital, Boix and Posner (1998, 687–688) argue that increasingly cooperative equilibria could have been generated by an 'evolutionary process, starting out in interactions producing private goods and ultimately graduating to groups producing public goods.' However, they go on to caution that this explanation 'fails to account for the emergence of different equilibria in different countries and communities. To explain why co-operation emerged in some places but not in others would require arguing, rather implausibly, that people *in some places historically*

Outgroup threat and ethnic diversity

Finally, how the presence of ethnic outgroups effects levels of cooperation provides insights into how ethnic diversity shapes collective action, and thereby for one of the key questions for life in 21st-century, multicultural societies.[13] Given the importance of ethnic diversity, scholars have paid close attention to how diversity shapes the interaction between and joint production of collective goods in ethnically diverse areas. Overall, local cooperation and collective action seems to suffer in the presence of ethnic diversity. On the one hand, one of the most dramatic and most forcefully presented claims – that people tend to 'hunker down' when faced with ethnic outsiders, to retreat to their personal life – has been shown to be a statistical hoax mainly caused by compositional effects and socio-economic factors unrelated to actual ethnic diversity (Abascal and Baldassarri 2015; Portes and Vickstrom 2011). On the other hand, several carefully executed studies do indeed provide evidence a causal link between ethnic diversity and lowered ability of communities to provide public goods. For example, Miguel and Gugerty (2005) provide evidence from Kenya that more diverse communities have more difficulty in raising money for schools and maintaining wells. A comprehensive review confirms that such localised effects are quite typical. Cooperation at the very local level – the neighbourhood or the census tract – is consistently found to be negatively affected by ethnic diversity (Schaeffer 2014).[14]

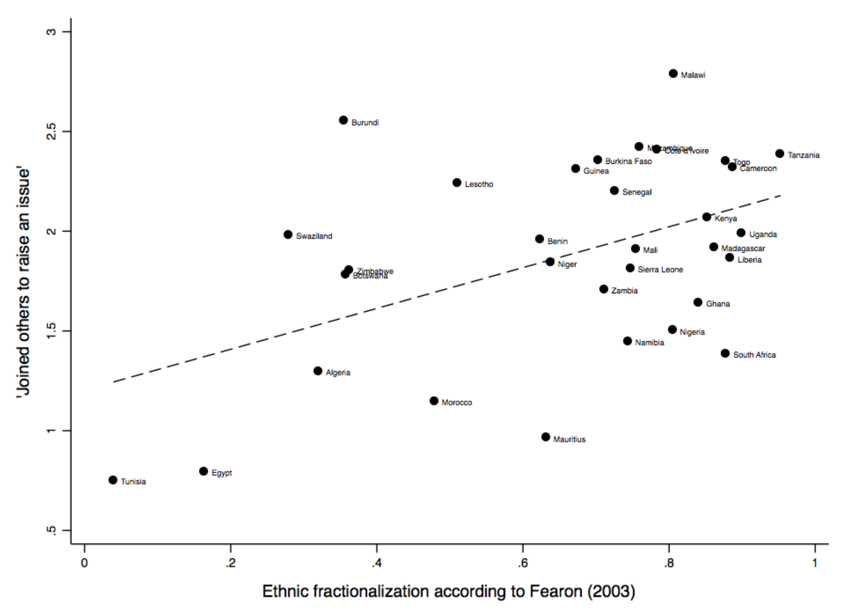
However, once ethnic diversity is measured at higher levels of aggregation – at the regional or national level – the straightforward relationship between ethnic diversity and lowered

had more common interests than their counterparts elsewhere' (emphasis added). The idea put forward here is that variations in the distribution of threat may have caused people to have more common interests in some regions rather than others.

[13]To illustrate this point, despite birthrates lying below the natural replacement rate in almost all European countries, Europe's population has been growing continuously due to migration from outside the continent (Eurostat 2011). In the US, continuing Hispanic immigration means that the US is now home to the second largest Spanish-speaking community in the world (Burgen 2015). And for most countries in sub-Saharan African, high levels of ethnic diversity have been part and parcel of their socio-political makeup ever since independence.

[14]Scholars have identified several mechanisms explaining the negative effect of ethnic diversity on cooperation. Miguel and Gugerty (2005) find that diversity goes along with lowered willingness to pressure others into contributing to collective projects, an analysis echoed by Algan, Hémet, and Laitin (2011) in their analysis of the production of collective goods in French housing estates, where they also find that poorer collective outcomes in more diverse housing blocks result from lowered levels of peer-pressure. The careful analysis by Habyarimana et al. (2009) adds 'technology mechanisms' to the list of causes. Being more strongly connected through social networks and sharing cultural resources, coethnics find it easier than non-coethnics to identify each other, which in turn also renders peer-punishment into a more effective tool for enforcing cooperation.

Figure 1. Ethnic fractionalization and collective action in 32 African countries



levels of cooperation vanishes (Schaeffer 2014). Can the idea that the presence of a threatening outgroup leads to increased ingroup cooperation help to explain these seemingly contradictory effects of ethnic diversity? One such puzzling finding is illustrated in Figure 1, in which I plot ethnic diversity according to Fearon (2003) against average levels of collective action in 32 African countries.[15] What we observe is a *positive* relationship between aggregate ethnic diversity and participation in collective activities (r=0.48, p=0.006) that will be explored in detail in the second of the empirical chapters to come.

Outline and character of the the chapters

The dissertation looks at the link between outgroup threat and cooperation from three different angles and in three different contexts. Chapter 1 explores social mobilization before the outbreak of violence in one country, Nigeria, demonstrating that outbreaks of violence are preceded by high levels of community cooperation with the aim of preventing and preparing for the violence to come. Chapter 2 takes a birds-eye perspective at several countries in Africa, showing that proximity to ethnic outgroups goes along with increased levels of cooperation. Finally, Chapter 3 zooms in to the microlevel, showing that threat of

[15]The measure for collective action is an Afrobarometer (afrobarometer.org) item for which people were asked whether, during the last year, they 'joined others to raise an issue', to which they could answer on a five-point scale ranging from 'No, would never do this' to 'Yes, often'.

ethnic outgroups alone is sufficient to induce higher cooperation levels threat perceptions and cooperation in six villages in Georgia.

The chapters vary in character and style, reflecting the different literatures they are embedded in. While the first chapter delves into the Nigerian case in some detail, the more conceptual character of the second chapter does not allow for such illustrations. The third chapter takes an even more detached approach to the specificities of the Georgian case in an effort to appeal to a broader community of scientists. What ties the chapters together is the pursuit to illuminate the link between outside threat and ingroup cooperation.

Methods

The dissertation combines statistical analysis of survey data with lab-in-the-field research. Large-n analyses are used to achieve external validity, and experimental methods are employed for obtaining valid measures of core concepts. The first two chapters draw on large-scale survey data collected on the African continent by the Afrobarometer project. Afrobarometer data is collected in face-to-face interviews according to random sampling plans that aim for national representativeness. Having collected over 150,000 observations since its initiation in 1999, alongside the World Value Survey and the European Social Survey, Afrobarometer is among the biggest cross-national survey projects in existence. The focus on Africa with its rich ethnic diversity makes the Afrobarometer a unique resource for the study of intergroup relations. This said, the main focus of the project lies on capturing attitudes towards the respective national polity and surveys include only a limited number of variables that can be used for assessing interethnic and intraethnic relationships. The analysis of social mobilization and cooperation therefore necessarily suffers from a somewhat limited measurement validity.

To counter this shortcoming, I used lab-in-the-field experiments to collect my own data. Fieldwork was carried out in Georgia in May and June 2015. In principle, lab-in-the-field methods can be used either to obtain consistent and comparable measurements of core concepts, or to test causal mechanisms (Grossman 2011). Here the first approach was pursued. To measure cooperation, I relied on a standard linear public goods game. The use of this standard measure has the great advantage that results are comparable to data from hundreds of other similar or identical experiments carried out throughout the world. Measuring threat perceptions proved more complicated. Existing experimental research on the effects of intergroup competition has used variants of Tullock's contest game (1980), or the intergroup prisoners dilemma developed by Bornstein and colleagues (2003; 1994; 1990) to simulate competitive intergroup situations.

While this strand of research has produced many of the insights that this dissertation relies on, the behaviour observed in the competition games are not clear-cut measures of threat perception. This is because both the contest game and the intergroup prisoners' dilemma include the possibility of gain alongside measuring fear of defeat in the competition. It is thus not clear whether the fear of the interaction partner, or the urge to dominate and gain are driving behaviour in these games. I therefore developed a new experimental measure – the threat game – in which players reveal, by means of costly decisions, how much they fear their interaction partner. The lab-in-the-field sessions and the threat game and its properties are discussed in detail in Chapter 3.

All of the empirical analyses feature a spatial dimension. I therefore heavily relied on the use of geographic information systems (GIS), notably for the geo-coding of interview locations and the calculation of control variables.[16] The use of data clustered within spatial units brings with it potential problems of spatial autocorrelation. At various points, I considered modelling the spatial dependence of units explicitly by means of spatial regression models (Ward and Gleditsch 2008), but in each case decided against this and in favour of more traditional methods that provided greater flexibility. Specifically, I dealt with potential problems of autocorrelation by clustering standard errors, by multilevel modelling and by stratified bootstrapping. The respective methodological choices are outlined in detail in the chapters to follow.

[16] While most of geo-coding was automised using online gazetteers, in about two hundred cases the location information included in the Afrobarometer was ambiguous and had to be verified 'manually' by cross-referencing from various sources. The geo-coded interview locations are available on my website for use by other scholars.

Chapter 1

Mobilization before conflict

Communal violence and the social mobilization of the fearful in Nigeria and the wider Africa

This chapter explores the role of social mobilization in the run-up to communal violence. It joins a growing literature that explores how violence interacts with social and political engagement. The chapter draws on both ethnographic and quantitative evidence. The link between social mobilization and communal violence is first explored through a case study of communal violence in Plateau state, Nigeria. The chapter then combines micro-level survey data with georeferenced conflict information to explore this relationship quantitively for the whole country. By mapping the timing of survey interviews in relation to occurrences of violent communal conflict, the chapter demonstrates that especially in regions where the central state is weak, social mobilization is predictive of outbreaks of communal violence. Highly mobilized individuals are up to two times more likely than less mobilized individuals to experience communal violence in the near future. This result is robust to the inclusion of various controls, and also holds true for within-state and within-group comparisons. A theoretical distinction is drawn between incidental and instrumental accounts of communal violence. Incidental violence is driven by structural factors and interaction dynamics between groups, whereas instrumental violence is orchestrated for personal economic or political gain. This distinction allows us to differentiate between mobilization out of fear and mobilization for the purpose of predation, and to trace these motives in the case study and the quantitative data. Both data sources suggest that mobilization before communal violence is indicative more of fear than of predatory intent. Finally, it is shown that the main result – that social mobilization can be predictive of future violence – also holds for a number of other African countries.

Introduction

The role of social mobilization in the context of violent conflict has attracted renewed interest in recent years, with scholars producing surprisingly consistent evidence that the experience of violence often leads to increased social and political engagement (Bauer, Fiala, and Levely 2014; Bellows and Miguel 2009; Blattman 2009; Gilligan, Pasquale, and Samii 2014; Grosjean 2014; Voors and Bulte 2014; Voors et al. 2012). Scholars typically have asked about changes in social engagement following violent conflict, although a number of scholars have also addressed mobilization during conflict (Arjona 2014; Gafaro, Ibanez, and Justino 2014; Rohner, Thoenig, and Zilibotti 2013; Staniland 2012; Wood 2003). Here, I explore the role of social mobilization *before* violent conflict, which has received less attention to date.[1] I show that especially in regions where the central state is weak, social mobilization is predictive of outbreaks of communal violence. Highly mobilized individuals are up to two times more likely than less mobilized individuals to experience communal violence in the near future.

Building on the rich literature discussing the onset of communal violence, I distinguish between incidental explanations of communal violence – security dilemmas and commitment problems – and instrumental explanations of communal violence – the use of violence for self-serving ends. This distinction lets us tease out the different motivational patterns driving mobilization ahead of communal violence, namely mobilization out for fear and mobilization out of predatory intent. I then trace these patterns through a detailed case study of communal conflict in Nigeria, showing that observable patterns largely conform with the incidental account of violence and mobilization out of fear. Mobilization ahead of communal violence seems to be driven by communities preparing for, and trying to avert violence.

In response to a call to re-evaluate established concepts using new tools and micro-level data (Blattman and Miguel 2010), the second part of the chapter provides quantitative evidence. In an approach similar to that of Eifert, Miguel, and Posner (2010), I leverage the timing of survey interviews from Nigeria to show that respondents from regions that

[1] A notable exception is the new work on forecasting violent conflict by Blair, Blattman, and Hartman (2015) who discuss levels of social engagement as a factor predicting local-level violence in Liberia.

will experience communal violence in the future show consistently higher levels of social mobilization than those from non-conflict regions. This result is robust to a variety of specifications and tests and also holds up when using a sample of other African countries, implying that social mobilization has considerable predictive power for future communal violence. I then go on to show that the quantitative evidence, too, suggests that in Nigeria mobilization ahead of first-time communal violence is indicative of efforts to avoid violence rather than to instigate it.

The chapter proceeds as follows. The first section provides a theoretical introduction to the role of social mobilization in communal conflict, distinguishing broadly between incidental and instrumental explanations of communal violence. The second section traces social mobilization ahead of violence through a case study of communal conflict in Nigeria's Plateau State. The third section introduces the quantitative data and provides estimates of the overall predictive effect of social mobilization. The fourth section presents various tests demonstrating that mobilization is most plausibly driven by fear. The last section concludes by highlighting implications for forecasting violent conflict.

Mobilization ahead of violence

What is the role of social mobilization in the run-up to violent communal conflict? This section outlines theoretical approaches to understanding violence between groups. The aim is to derive conjectures that will be used to make sense of the case study in the next section, and that will then be tested quantitatively in the remainder of the chapter.[2]

Social mobilization is understood as 'the process by which a group goes from being a passive collection of individuals to an active participant', here in processes preceding communal violence (Tilly 1978, 69). Communal violence is violence perpetrated between groups that define themselves and their adversary either in ethnic (racial, linguistic or religious) or communal (bearing a more localized identity) terms (cp. Tajima 2014, 4–5). The literature

[2]It is important to note that I here discuss the role of mobilization ahead of *violence* between groups, and only address underlying causes of conflict insofar as this is necessary to explain the use of violence. As several scholars point out, conflict and violence are not the same. While conflicts between groups are ubiquitous, violence is a comparatively rarely used 'tool' to resolve these conflicts (Brubaker and Laitin 1998; Guichaoua 2013; Kalyvas 2006).

allows us to broadly distinguish between approaches understanding communal violence as incidental and instrumental. Scholars arguing for an understanding of violence as incidental stress structural factors and interaction dynamics between groups which, by creating insecurity and fear, drive actors to use violence against each other, despite the fact that they would prefer a peaceful solution. In contrast, scholars promoting an instrumental understanding of communal violence stress the role of self-interested leaders and their followers who instigate communal violence for personal economic or political gain. Most scholars agree, however, that both processes can often be observed to operate in parallel (de Figueiredo and Weingast 1999; Kasfir 2004; Lischer 1999; Snyder and Jervis 1999). Nevertheless, the distinction is useful, as the two approaches lead to different predictions concerning who mobilizes ahead of violence, for which reasons and when. In what follows, I contrast instrumental and incidental violence and discuss ways of distinguishing between them (see Table 1.1 for a summary).

Communal violence as incidental

In response to the upsurge of civil wars at the end of the Cold War, scholars started to apply the logic of the security dilemma to intergroup relations (Kasfir 2004; Lake and Rothchild 1996; Posen 1993; Walter and Snyder 1999). Initially developed in international relations, the security dilemma explains why states, despite mutually being interested in peace and security, can nevertheless end up trapped in cycles of violence under the condition of anarchy (Herz 1950; Jervis 1978). Posen (1993) saw similar dynamics at work in conflicts between ethnic groups during the breakup of Yugoslavia. Rather than predatory intentions, it was fear driving groups into armed conflict. The context of state collapse and the structure of the situation turned offence into the perceived best option, given that other groups might also chose to attack. Similar consequences can follow from Fearon's (1998) model of the commitment problem. During the breakup of a state, minority groups might be tempted to fight immediately rather than to strike a deal with a majority group, as the latter will find it hard to credibly commit to such a deal in the absence of an external guarantor.[3]

[3]Fear and preventive violence can be exacerbated by information failures (Fearon 1995; Lake and Rothchild 1996). Groups that feel threatened might discount information on peaceful intentions of their adversary, as the adversary could be misrepresenting its intentions and the threatened group has no possibility to learn about their adversary's true preferences.

Instrumental accounts of communal violence

Instrumental accounts of violence focus on the motivations and behaviour of leaders and their followers (Guichaoua 2013, 70–73). Violence may be the fastest way to personal wealth, especially where lootable resources render this strategy promising (Collier and Hoeffler 2004), or in scarce environments where few excess resources exist except for those accessible through the state (Laitin 1999, 156–158). Behind the smoke screen of larger communal conflicts, individuals might also pursue their individual economic agendas. Local actors enter into coalitions with supralocal actors, who 'supply the latter with external muscle, thus allowing them to win decisive local advantage; in exchange the former rely on local conflicts to recruit and motivate supporters and obtain local control, resources, and information' (Kalyvas 2003, 486; cp. Brass 1997; Reno 2002). Another well-described pattern is politicians instigating violence when threatened with declining popularity. 'Gambling for their resurrection' (Downs and Rocke 1994), leaders try to escalate a conflict so that they can present themselves as the saviour and defender of the group and fend off domestic rivals (Gagnon 1994, 135).

Group formation and type of mobilization

Both the incidental and instrumental approaches stress the importance of the involvement of collective actors. Groups – not disconnected individuals – wield violence. Theories of intergroup violence therefore have to include an account of how the groups that enter into violent conflict are formed and their boundaries strengthened (Brubaker and Laitin 1998; Horowitz 1985).

The cohesiveness of groups plays an important role in accounts of violence as incidental. Only internally fairly cohesive actors are threatening to each other; likewise, only cohesive actors can commit, fail to commit or fight effectively (Hardin 1995, 142–143). For the internal security dilemma to unfold, social groups need to approach the form of unitary actors. In the context of an internal security dilemma, cohesion is a resource in the 'arms race'. 'Because the weaponry available to these groups will often be quite rudimentary', Posen (1993, 29) writes, 'each group will have to assess the other's offensive military potential in terms of its cohesion and its past military record.'

Incidental violence is likely preceded by broad-based, loosely organized 'mobilization of the fearful' in the form of meetings and consultations. People come together to exchange information, and to prepare defensive measures. In this very process, group identity and group cohesion likely get reinforced, too. Results from social psychology and economics indicate that members of groups that find themselves in a competition situation react with reinforced loyalty and increased solidarity with that group (Abbink et al. 2012; Bornstein 2003; Sherif et al. 1961; Tajfel and Turner 1979). Therefore, no special mobilization effort may be necessary to enhance group identification and loyalty among members of groups who feel themselves under threat, especially after first acts of violence have occurred. As Fearon (2006, 857) observes, 'violent attacks made along ethnic lines have often caused rapid and extreme ethnic polarization in societies in which ethnicity had not been much politicized.'

Groups using violence for self-serving ends also often rely on social mobilization to reinforce group cohesion. Even if collectively all members of a predatory group stand to gain, fighting remains individually costly, meaning that leaders have to find ways to overcome the resulting internal collective action problem (Gambetta 2009; Lichbach 1995). Leaders therefore often build on already existing groups (Staniland 2014), and seek to instil ideological zeal and strong, platoon-like solidarity in their fighters – arguably the cheaper alternative to the use of disciplinary violence and payment of selective incentives also commonly used in recruitment (Gates 2002; Herbst 2000a). Instrumental violence should thus be preceded by coordinated, intentional social mobilization (e.g. rallies or demonstrations) under the leadership of 'ethnic entrepreneurs of violence' with the aim of reinforcing and sharpening group boundaries (Gagnon 1994; Guichaoua 2013; cp. Kuran 1998).

What will differ in instances of incidental as compared to instrumental violence is the demographic profile of those mobilizing. In cases of incidental violence, we would expect a broad-based, relatively even mobilization through all social strata. Every member of a community – man or woman, working or unemployed, educated or not – has a good reason to take part in meetings to retrieve information and prepare for an imminent threat. In cases of instrumental violence, on the other hand, we would mainly see the mobilization of individuals with the classic profile of a fighter in a rebel or insurgent group: poor, relatively uneducated, underemployed and politically alienated younger men (Arjona and Kalyvas 2012; Humphreys and Weinstein 2008).

Bargains and peacemaking initiatives

The basic premise of the security dilemma is that the involved parties do not want to use violence against each other. Rather, they are driven into violent conflict out of fear that the other group might strike first. However, from this it does not follow that groups automatically engage in violence. Quite on the contrary, group members should be highly motivated to strike a deal to avert violence. Since fighting is always costly, there normally exists a bargain that should leave both conflicting groups better off (Fearon 1995). Indeed, it is very rare that inter-communal conflicts escalate into violence. Among the thousands of dyadic interethnic relations, only a small fraction ever turns violent, as leaders of conflicting groups, mindful of the costly consequences of violent confrontation, attempt to avoid escalation by engaging in ingroup policing (Fearon and Laitin 1996; Varshney 2002; cp. Bates 1983a, chapter 1).

Especially in cases of communal conflict following the incidental pattern, we should therefore see intense efforts for conflict diffusion and peacemaking ahead of violence. Indeed, such peace initiatives should be an observable hallmark of the incidental type of communal conflict that sets it apart from instrumental violence. In the case of instrumental violence, we would likely see less, or less earnest, efforts to contain violence, although even predatory actors may try to coerce their victims into submission by signalling their willingness to fight rather than attacking immediately so to avoid the costs of overt fighting (cp. Gambetta 2009, chapter 4). However, such processes would likely only involve one-sided threats, or negotiations between narrow sets of leaders rather than mass-mobilisation.

The role of leaders is hence particularly important, but highly ambiguous. They play a central role in the instigation of instrumental violence, but may also act as peacemakers. To complicate matters further, both types of leaders can mobilize at the same time for opposite ends: one with the aim of fermenting violence, the other in order to stop escalation (Kasfir 2004, 67).

Table 1.1. Comparison of instrumental and incidental violence

	Instrumental violence	**Incidental violence**
Actors	'Insurgent types', often young males	Actors of all different ages and sex
Structure of interaction	One-sided, predatory violence	Security dilemma
Motivation	Personal gain	Fear, security
Scope of mobilization	Small groups, cliques	Broad-based mobilization, involving wide strata of society
Purpose of mobilization	Recruiting and motivating followers	Peacemaking, preparation of defense
Role of leaders	Incite followers	Diffuse tensions, organize defense
Role of state	Suppresses	Mediates, suppresses
Direction of causal arrow	From mobilization to violence	From anticipated violence to mobilization

Causation in instrumental and incidental episodes of violence

From the logic of the instrumental and the incidental accounts of violence, two opposing causal connections between social mobilization and violence result. The instrumental approach draws our attention to the ways actors themselves make conflicts turn violent: leaders and their followers mobilize with the purpose of using violence to further their goals. In contrast, in the incidental approach it is the tensions associated with the potential for violence that causes the actors to mobilize. So, in a way, the causal relationship is reversed and runs from future violence, or more specifically the *expectation* of future violence, to the social mobilization of anyone trying to avert or to prepare for it.

The role of the state

Approaches to understanding communal violence as incidental have at their core the weakening or breakdown of the state. Internal security dilemmas online unfold under 'emerging anarchy' (Posen 1993) – the weakening of the state to the point that it loses its 'ability to arbitrate between groups or provide credible guarantees of protection for groups' (Lake and Rothchild 1996, 43). Similarly, commitment problems typically unfold after central control has broken apart and power is being distributed anew. In addition to this primary effect of the weakness of the state, a secondary effect might result from situations where state collapse occurs in a context where previously the central authority had been particularly strong. Having grown accustomed to security being provided by a central state, communities might be less well positioned to keep the peace among themselves, as previously existing, local conflict-regulation institutions may have been crowded out (Tajima 2014, chapter 2); specifically, communities can no longer rely on the state to enforce bargains they might arrive at (Kreutz and Eck 2011).

Scholars arguing for an instrumental understanding of communal violence often treat the weakness of the state as a contextual factor allowing entrepreneurs of violence to act without restraint (Collier and Hoeffler 2004, 569–570). From this it follows that mobilization for predatory violence should be more likely where the state is weaker. Other authors stress how it is often actors who are part of or close to the state that instigate violence or co-opt security forces to abstain from intervening (Guichaoua 2013; Wilkinson 2004). In this case, the relation between mobilization for violence and state-presence is less straightforward: all that is needed for communal violence to be unleashed is a biased state, not necessarily a weak one.

Communal conflict in Nigeria

To make these general ideas less abstract, I draw on a narrative of communal violence in Plateau state, Nigeria, as illustrative of the dynamics preceding and accompanying the outbreak of violence in communal conflicts. Formerly known for its relatively amicable communal relations, since 2001 Plateau state has been affected by recursive waves of communal violence, starting with a disastrous riot in the state capital of Jos, and eventually effecting most its regions.

Despite some particularities, the conflict dynamics observed in Plateau state are fairly representative of episodes of violence in several other Nigerian states during the 1990s and 2000s – notably Anambra, Benue, Delta, Kaduna, Kano, Nasarawa and Taraba states, and parallels can be drawn with communal conflicts in other parts of Africa (ICG 2012; Olaniyi 2015). Plateau State is located in the centre-north of Nigeria. In 2006, the time of the last census, it was home to 3.2 million inhabitants (National Population Commission 2010). The state is ethnically diverse, with over 30 ethno-linguistic groups being formally recognised as indigenous. Previously a predominantly agricultural region, during the 20th century tin mining attracted migrants from other regions, including many Hausa/Fulani from the North of the country, who also engage in cattle herding and farming (Krause 2010; Plotnicov 1967).

At the core of the conflicts in Plateau State are questions of access to land, political offices and state employment. Differences in religion – with the Hausa/Fulani being largely Muslims and the indigenous peoples and immigrants from the South and East of the country being predominantly Christian – add an ideological dimension to the conflict (Danfulani 2006). Violence started in September 2001 when Jos, the capital of Plateau State, experienced large-scale riots between Christians and Muslims that left up to a thousand people dead (HRW 2001, 10). From Jos, violence spread to the rural hinterland. By 2011, most regions in the state had seen some communal violence, although there remained marked differences in the intensity and extent to which individual locations were affected (Higazi 2008, 116). While violence in the city, at least in 2001, seemed to have erupted largely spontaneously (Scacco 2012, 18–20), the slower pace of violence spreading in the countryside lets us trace the role social mobilization played in the run-up to communal violence.

Actor mobilization in Plateau state

Ethnicity is highly salient in Nigeria, even when compared to the situation in other African countries (Robinson 2014, 721), and members of the different ethnic groups resident in Plateau state have long been observed to express relatively strong ethnic identities (Plotnicov 1967). This seems particularly true for members of the 'indigenous groups' like the Berom, Anaguta and Afizere, who can trace their ancestors to villages in the region. For the Hausa/Fulani, Islam is a strong marker of identity that sets them apart from the other groups. Intermarriage rates across the religious divide are low, and where intermarriage occurs, the usual constellation is Christian women marrying Muslim men, while Muslim women are usually not allowed to marry Christian men – a fact that now regularly incites anger among Christians (Krause 2010). At least in rural areas, this segregation is also reflected in settlement patterns as 'settlers from the north scarcely mix with the local population, but prefer to establish their own settlements apart from the existing villages' (Harnischfeger 2004, 444). All this means that group boundaries were relatively clearly defined even before the recent violence. This notwithstanding, the region had enjoyed a reputation for good communal relations, reinforced frequent by commercial exchanges and knowledge of the other group's language (Higazi 2008, 113).

An important organisational prerequisite for the violence to come was the existence of vigilante groups. These had sprung up in many parts of Nigeria in response to soaring crime rates after the end of the military dictatorship in 1999, and are a common phenomenon in other parts of Africa (Harnischfeger 2009; Kirsch and Grätz 2010). The vigilante groups usually consisted of local young men, who, initially only lightly armed, would patrol streets in order to prevent and punish crime. In ethnically or religiously mixed settlements, the vigilante groups often mirrored the mixed composition of the population (Higazi 2008, 115).

Mobilization immediately preceding violent clashes

The relatively high level of integration started to fall apart when news of the violence in Jos broke through in late 2001, and the disintegration accelerated after events of violence became more frequent in other parts of Plateau State. In response to the violence in Jos, agitators from Jos attempted to incite revenge attacks, but this was reportedly without much success (Blench 2003, 5). In fact, the far more common response, especially from traditional leaders, were calls for moderation and peace. In line with the model of ingroup policing by Fearon and Laitin (1996) community leaders would meet and agree to constrain their youths (Blench 2003, 10). A wide range of actors – village elders, religious leaders, women's groups – engaged in peacemaking efforts. Krause (2010, 57) reports a case where

> women regularly met in several smaller groups to address problems and establish dialogue with each other [and also] went to their religious leaders and pleaded with them to forbid any violence and to undertake measures of violence prevention. Pastors and imams met together with several elders and agreed on a 'peace declaration' that was read out to the community. Elders organised local youths into mixed vigilante groups to guard the settlement against outside attackers.

The absence of such meetings precipitated violent confrontations. Areas where leaders did not come together saw among the highest levels of violence (Blench 2003, 10).

In parallel, efforts were made to reinforce vigilante patrols and to improve their armament. The aim of these efforts was to create 'fear of retaliation' in other groups, as respondents to a survey on the subject admitted (Harnischfeger 2009, 2). This entailed raising money for arms acquisition, the recruitment of new members and the organisation of reinforced patrols. Given that group structures were already in place, this could be quickly achieved. There is little evidence of elites or supralocal actors inciting violence or motivating the reinforcement of group boundaries. Individuals close to the military profited by selling weapons, and local leaders provided support to vigilante groups. However, rather than an elite machination, the arming of groups in Plateau state was 'a situational response to insecurity...Militias mobilized along religious or ethnic lines, typically with a localized support base, specific to each village' (Higazi 2008, 109-119).

Dynamics after the onset of violence

As efforts to peacemaking failed in more and more regions, a cycle of (preventive) attacks and counter-attacks was set in motion. Previously integrated vigilante movements rapidly split along the ethno-religious divide. These groups were subsequently turned into heavily armed militias, reportedly trained and equipped with the help of former soldiers of the Nigerian army (Higazi 2008, 124). While in the city of Jos, communal violence typically took the form of more or less spontaneous riots (Scacco 2012), in the countryside, violence more closely resembled small-scale warfare. Attacks were often planned in advance and were carried out in the form of raids against undefended villages during the night or early dawn. The weapons used to attack were often crude – clubs, machetes or torches – but nevertheless caused tremendous havoc. According to one careful estimate, between 2001 and 2004, in Plateau State alone, up to one hundred villages were destroyed and depopulated and at least 2,000 villagers were killed and many more displaced in fighting between members of the Berom, Tarok and Goemai ethnic groups and those of Hausa and Fulani ethnic affiliation, among others (Higazi 2008).

The most common immediate goal of the violence seemed to be to 'drive people away' from a certain area. Attacks on villages are executed in such a way as to terrorize the population. In most cases, the assailants seem to aim more to destroy than to loot, killing people and setting houses ablaze seemingly at random (HRW 2013). With attacks ostensibly designed to induce terror and to cause members of the adversary group to flee, one of the first results of the violence were settlement patterns that were much more ethnically and religiously polarized than before. Previously existing social and commercial bonds were cut and community relations are now marked by deep distrust (Krause 2010, 44). Sectarian group identities also hardened, with leaders reinforcing rather than evening out the communal divide (Ostien 2009).

As violent clashes went on, the instrumental use of violence became more common. Groups also started to use the pretext of general insecurity for personal enrichment. Higazi (2008, 122) reports that in one of the regions in Plateau state, up to half of the cattle stock of 1.2 million was lost due to cattle rustling. While some of the money earned in this way was invested into arms acquisitions, other parts were kept for profit. In elections following the first round of violence, armed youth gangs were systematically used by political leaders to intimidate adversaries (Krause 2010). This set the stage for repeated rounds of violence in 2008 and 2010.

The response of the security forces

The first round of violence was eventually stopped in 2004 by the intervention of the Nigerian armed forces after a state of emergency was declared. Before that, the Nigerian state had made its impact mainly through its absence. In most recorded cases of attacks, security forces either did not react or intervened only after fighting had ceased. While the inefficiency of the reactions mainly appear to be due to incompetence,the armed forces may have been complicit by non-intervention in individual cases. In the case of an attack on a provincial town in 2004, security forces only arrived after 700 inhabitants had been killed. A week earlier, security forces had been removed from the town (Higazi 2008). In almost no cases were attacks followed by criminal investigation or persecution (HRW 2005, 2013). When interventions occurred, they were extremely heavy-handed. At least 133 people were killed extra-judicially by security forces after an escalation of communal violence in 2008 (HRW 2009). Consequently, especially in rural areas, community leaders do not trust the state security forces for their safety, stating that 'vigilante security remains their only option to defend their territory' (NWGAV and AOAV 2013, 44).

In the section that follows, I will test whether the patterns reflected in this case study are mirrored in the quantitative data, too. I start by testing the more general hypothesis that future violence is associated with increased levels of social mobilization. That is, I will test whether in districts exposed to communal conflict people attend community meetings more regularly and volunteer more frequently. I show that this is indeed the case, and demonstrate the robustness of the result. I then go on to demonstrate that in the case of Nigeria, social mobilization is likely a response to incidental, not instrumental violence, i.e. is driven by fear, not predatory intentions. The last empirical section shows that the basic finding – that social mobilization can be predictive of future violence – also holds for a number of other African countries.

Data and empirical strategy

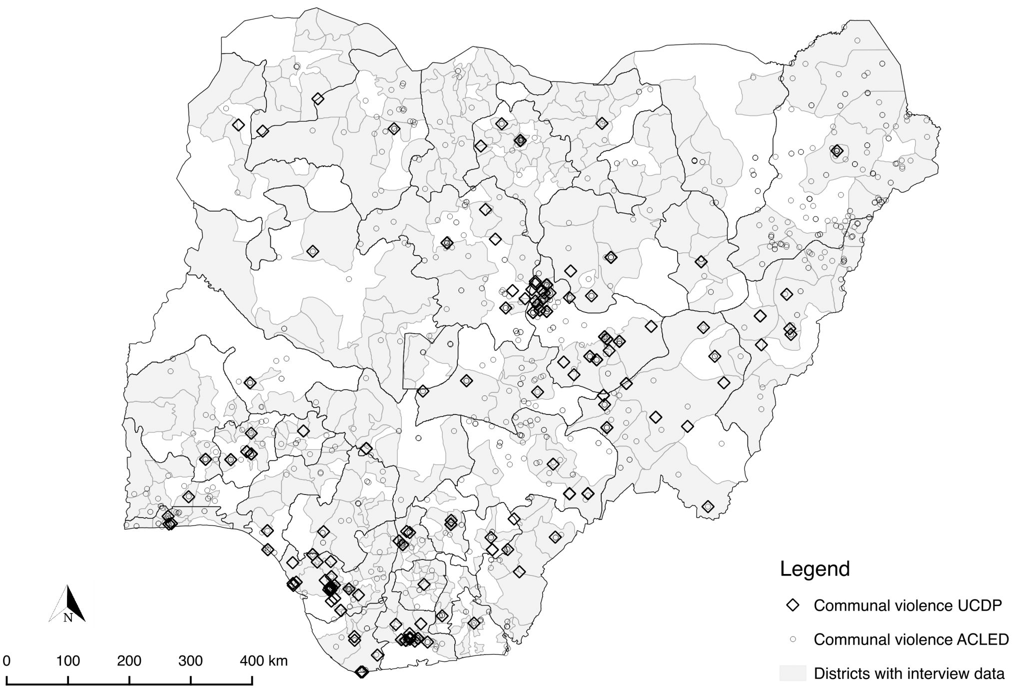
For the quantitative analyses to follow, I combine individual-level survey data with georeferenced information on violent conflicts. My measure of social mobilization in Nigeria comes from the Afrobarometer, a non-partisan research network that conducts public attitude surveys on democracy, governance and economic conditions across a range of countries in Africa.[4] Nigeria has been included in the project from its beginnings in the late 1990s, and a total of seven survey rounds have been conducted. I use data from three rounds of surveying in 2005, 2007 and 2008 that include full information on all my core variables. The three surveys contain a total of 7097 observations, collected at 655 locations.

The place information, which I used to georeference the interview data, typically refers to Local Government Areas, but sometimes also to distinct towns or parts of larger cities. I therefore use Admin 2 level districts from the 'Global Administrative Unit Layers' (GAUL) (FAO 2008) to link interview locations with conflict data.[5] This leaves me with 324 districts for which I have data both from interviews and on communal violence, out of a total of 537. Figure 1.1 shows these districts in relation to the location of instances of communal violence, and Figure 1.1 shows the timing of interviews relative to that of conflict events.

[4]http://afrobarometer.org/

[5]In Nigeria, Admin 2 districts are relatively small. The median size is 790 km^2, about 1/3 the size of Luxembourg or 1/4 the size of the US state Rhode Island. Serious conflict events, like those coded by UCDP, can therefore be assumed to affect large parts of the population.

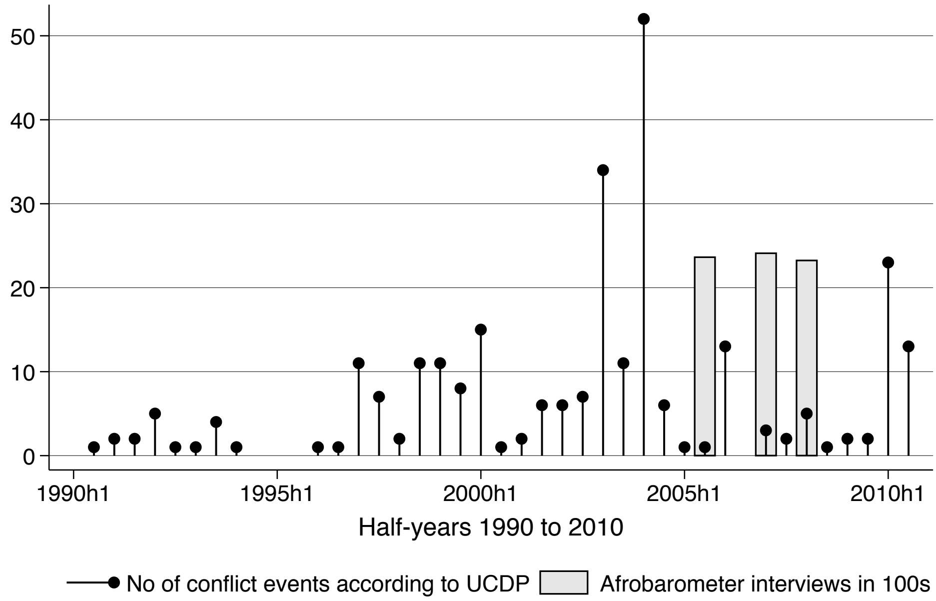
Figure 1.1. Distribution of districts with Afrobarometer data and instances of communal violence in Nigeria



The social mobilization measure used here is the composite score from two questions on community meeting attendance and collective action, respectively. Respondents were asked whether, during the last year, they took part in a community meeting, or whether they 'got together with others to raise an issue'. They could answer both questions on a five-point scale ranging from 'No, would never do this' to 'Yes, often'. As the indicators are fairly highly correlated (r=.67, p=.00), I combine the answers to both questions to create a nine-point scale, ranging from zero for those who show no interest in social mobilization efforts to eight for those taking part zealously. The distribution of mobilization scores in the sample is shown in Figure 1.3.

As my main source of conflict information I use the 'Uppsala Conflict Data Program's Georeferenced Event Dataset' (UCDP) in version 1.5 (Sundberg and Melander 2013). The dataset covers the time period between 1990 and 2010, bracketing the data from Afrobarometer. The only conflict events that are recorded in UCDP are those i) that resulted in at least one casualty, ii) for which all actors involved can be identified, and

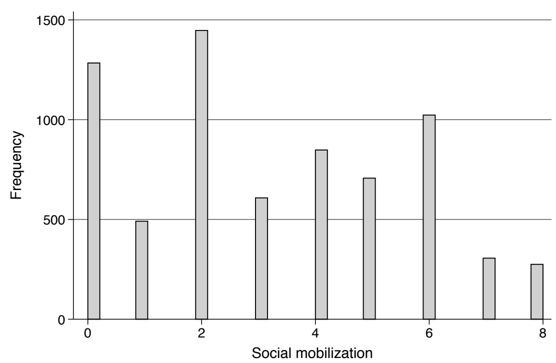
Figure 1.2. Relative timing of Afrobarometer interviews and conflict events



iii) that belong to a conflict that led to at least 25 deaths in any one year of recording. These restrictions set a threshold to capture only serious conflicts i.e. to exclude one-off clashes and criminal violence. For Nigeria, the dataset records a total of 431 conflict events, subdivided into inter-state violence (45), non-state/communal violence (275) and one-sided violence by the government against civilians (111). To code my independent variable I use information from all 275 instances of communal violence, 261 of which took place in districts for which I have Afrobarometer data (69 out of 324 districts).

Besides the geo-location, the UCDP records the precise date for each event. This allows me to calculate an indicator for the timing of conflict affectedness for each individual, which

Figure 1.3. Distribution of mobilization scores in Nigeria sample



serves as my core dependent variable. By comparing the interview date with the conflict date recorded by the UCDP I can classify the respondents into four sub-samples: 1) Those who have not been exposed to communal violence in their home district, and will not in the future (i.e. before 2011, when the conflict information recorded by the UCDP ends), 2) those not exposed in the past (before 1990), but who will be exposed for the first time in the near future, 3) those exposed in the past, but not in the future, and 4) those repeatedly exposed in both past and future.

Table 1.2. Comparison of mean mobilization level by conflict-affectedness status

No previous violence	Future violence	
3.12	3.38	Δ 0.26
Repeated violence	Past violence only	
3.34	3.33	Δ 0.01
Δ 0.22	Δ 0.05	Δ 0.21

Bonferroni adjusted for multiple comparisons, * p<0.10, ** p<0.05, *** p<0.01.

Table 1.2 compares the mean level of mobilization for the four subsamples. The table shows clear differences, although none of them reaches statistical significance at usual levels when using the Bonferroni adjustment for multiple comparisons. Social mobilization is highest among those who will be exposed to violence in the future, followed by those repeatedly exposed and those that saw violence only in the past. The lowest mobilization levels are found among those living in districts where no communal violence has ocurred.[6] The focus here is on the difference in mobilization levels between those not previously exposed to violence and those to be exposed in the future.

I argue that we can observe this difference because mobilization is part of the process leading up to violent conflict. I start by providing estimates of the predictive effect of

[6]This overall pattern is intriguing. Post-conflict mobilization levels seem to 'lock in' at a higher level. It seems that mobilization increases before violent events take place, stays high during the hot phase of a conflict – but then does not decline again. It is also noteworthy that the differences between the 'no exposure' sub-sample and the two sub-samples with previous exposure to violence are sizeable, and some further tests (not shown here) suggest that they are significant and robust, too. It therefore seems that in Nigeria, as in other cases cited in the literature, individuals in post-conflict regions tend to be more socially engaged than those in non-conflict regions.

mobilization for future communal violence. To support the idea that mobilization is part of the process leading up to violence, I show that individuals in first-time and never-exposed districts are in fact comparable, and that concerns such as omitted variable bias and self-selection through migration are unlikely to affect results. I estimate the probability that an individual will be exposed to communal violence in the near future conditional on that individual's level of social mobilization using variants of the following probit model:

$$Pr(cv_{id} = 1 | soc_{id}, X_{id}) = \Phi(\alpha + \beta soc_{id} + \gamma X_{id}) \tag{1.1}$$

whereby $Pr(cv_{id} = 1 | soc_{id}, X_{id})$ is the probability that an individual i will be exposed to communal violence in district d conditional on predictors, Φ is the cumulative density function of the standard normal distribution, α is the intercept, soc_{id} is an individual's social mobilization score and X_{id} is a vector containing individual-level and district-level controls. The parameter of interest is β.

As control variables, I include attributes that plausibly could have an effect on both future conflict exposure and social mobilization. These include individual measures for gender, age, education, poverty and access to information. On the district level, I control for population density and area size (Herbst 2000b; Raleigh and Hegre 2009), level and dynamics of economic development (Collier and Hoeffler 2004), rain variability (Miguel, Satyanath, and Sergenti 2004), roughness of terrain (Fearon and Laitin 2003; Nunn and Puga 2010), ethnic fractionalization and relative power (Habyarimana et al. 2007; Horowitz 1985; Montalvo and Reynal-Querol 2005), the district's history of slavery (Nunn and Wantchekon 2011) and distance from the capital and market towns (Raleigh and Hegre 2009).[7] All models include dummies for the Afrobarometer round used and a time trend. Standard errors are clustered at the district level to account for possible within-group correlation on this level.

Table 1.3 shows the results of the regression analysis. I report adjusted risk ratios, which indicate the relative probability that an individual with the full social mobilization score of eight will experience communal violence, as compared to the probability that an individual with a score of zero will be exposed to violence.[8] Panel 1 demonstrates that individuals

[7] The exact coding of the control variables is described in the supplementary information.

[8] Average marginal effects for all variables are shown in Table 1.6 in the supplementary information.

Table 1.3. Risk of exposure to future communal violence

	(1) UCDP	(2) UCDP	(3) UCDP	(4) ACLED	(5) ACLED	(6) ACLED
Social mobilization	1.98***	1.37***	1.74***	1.22**	1.12*	1.20**
	(0.415)	(0.133)	(0.252)	(0.110)	(0.056)	(0.087)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Ethnic group FE	No	No	Yes	No	No	Yes
Observations	4472	4472	4472	3530	3530	3530
Pseudo R^2	0.36	0.64	0.41	0.24	0.50	0.31

The dependent variable 'UCDP' takes the value 1 if a respondent is to experience communal violence according to UCDP data for the first time in the near future, and 0 if a respondent has not been exposed to violence in the past nor will be in the future; the dependent variable 'ACLED' is coded analogously using ACLED data. Reported are adjusted risk ratios from a probit regression. Delta-method standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

with full mobilization scores are almost twice (1.98 times) as likely to experience communal violence in the future than those with a mobilization score of zero.

An analysis of potential omitted variable bias using the approach proposed by Oster (2014; cp. Altonji, Elder, and Taber 2000; Bellows and Miguel 2009) shows that under the assumption that selection on non-observables is proportional to that on observed controls, none of the information contained in the observed variables hints at problems with unobserved variable bias. This is because most of the control variables leave the size of the effect unchanged and some, especially conditioning on a district's population size, strengthen it (a more detailed explanation and results can be found in the supplementary information).

In a further attempt to address concerns that individuals not exposed to future conflict may not compare well with those living in future conflict districts, I compare only persons living in the same state by introducing fixed effects for 35 Nigerian states, plus the FCT Abuja. This is a demanding form of control because of likely contagion effects. The causes of future conflict are likely to be felt in neighbouring districts as well, and so we may not expect mobilization behaviour to vary much between districts of the same state, no matter whether a conflict event takes place in them or not. While this specification therefore reduces the coefficient somewhat, here, too, mobilization behaviour significantly predicts future conflict (Panel 2). Individuals with a similar cultural background are compared in Panel 3, where I include fixed effects for 20 major ethnic groups. This again reduces the coefficient slightly in comparison to the initial estimate (probably for the same reason, as many of the groups live clustered in the same geographical area). Nevertheless, statistically significant differences persist (Panel 3).[9]

Panels 4–6 repeat these analyses using data from the ACLED data set (Raleigh et al. 2010) to determine future conflict exposure. The ACLED differs from the UCDP in that it contains a very wide range of events – from minor protests to full-out interstate war, making it a more comprehensive but also noisier source of conflict information. Isolating those events that can be counted as communal conflict leaves me with no less than 1532 events, compared to the 275 included in the UCDP.[10] Although the estimated risk ratios are hence somewhat smaller, all estimates are substantially positive and statistically significant, increasing the confidence that the results obtained are not spurious.

In the supplementary information I conduct a bounding exercise demonstrating that the results are unlikely to be caused by the migration of highly mobilized individuals selecting into future conflict districts (for predatory purposes), or by particularly socially inactive individuals selecting out of these regions. I show that the number of immigrant agitators and socially passive emigrants would have to be fairly high – around 100,000 and 250,000 out of a population of 3 million, respectively – to explain away the difference in collective mobilization levels. It thus seems unlikely that migrant movements, rather than generic social processes involving the resident population, are at the root of the heightened mobilization levels in districts affected by future conflict.

Analysis and discussion

This section serves to analyse in more detail the 'quality' of the social mobilization we are observing. Specifically, I seek to tease out whether the increased mobilization levels are

[9]In Tables 1.9 and 1.10 in the Appendix I investigate whether these results could be produced by underlying time trends and/or sample selection. Although there is some evidence that the relative timing of interviews in the 'future conflict' and 'never exposed' conditions influenced the results, different methods give different results, producing no consistent challenge to the results presented in Table 1.3.

[10]The coding conventions adopted to isolate events of communal violence from ACLED data are described in the supplementary information.

better explained by the incidental or the instrumental account of violence, i.e. whether what we observe is mobilization out of fear, or out of predatory intent.

The impact of state institutions

In the theory section, it was argued that mobilization out of fear is conditional on 'emerging anarchy' – the weakness or absence of the state. Mobilization for the purpose of predation is also facilitated by a weak state, but might rely even more on biased state institutions. I therefore test to what extent the predictive effect of social mobilization for future communal violence relies on the presence or absence of the state. Afrobarometer records, on the level of the primary sampling unit (PSU), the presence or absence of different state institutions and infrastructure endowments. I use this information to code an additive scale of state presence that takes a value between zero and eight depending on whether a school, a police station, a market, a health centre or a post office are present in the PSU, and whether houses have access to piped water, the sewage system and the electricity grid. Tables 1.4a and 1.4b demonstrate the important effect of state presence. To produce the tables, I split up the sample into high (above the median of four) and low (median and below) state presence and compare estimated mobilization rates for those never, previously, in the future or repeatedly exposed to communal violence analogous to Table 1.2 above.

Table 1.4. Estimated mean mobilization level in areas with high and low state presence and in the presence of a 'minimal state', UCDP data

(a) High state presence

No previous violence	Future violence	
2.99	3.00	Δ 0.01
Repeated violence	Past violence only	
3.72	3.34	Δ 0.38
Δ 0.73*	Δ 0.33	Δ 0.35

(b) Low state presence

No previous violence	Future violence	
3.10	3.90	Δ 0.80***
Repeated violence	Past violence only	
3.43	3.51	Δ 0.08
Δ 0.33	Δ 0.39	Δ 0.41**

(c) Minimal state presence

No previous violence	Future violence	
3.04	3.46	Δ 0.42
Repeated violence	Past violence only	
3.65	3.36	Δ 0.29
Δ 0.61*	Δ 0.10	Δ 0.32

Bonferroni adjusted for multiple comparisons, * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Tables 1.4 (a) and 1.4 (b) demonstrate that only in areas with low state presence is there a difference between the social mobilization levels of those who will experience communal violence in the future compared to those not experiencing any violence. What is more, this difference is substantially large and highly statistically significant, despite the tough

Bonferroni adjustment. In contrast, in areas with high state-presence, the link between social mobilization and future violence is effectively cut. Even a 'minimal state' presence – the presence of security forces only – seems to be enough to largely sever the link between mobilization and future conflict. This is shown in Panel (c). The difference in mobilization levels is cut by half and is no longer statistically significant, although social mobilization levels remain elevated.[11] This resonates with the case study, where it was shown that the intervention of the army could end episodes of violence, but did not stop violence from breaking out again in the future.[12]

Group formation in time

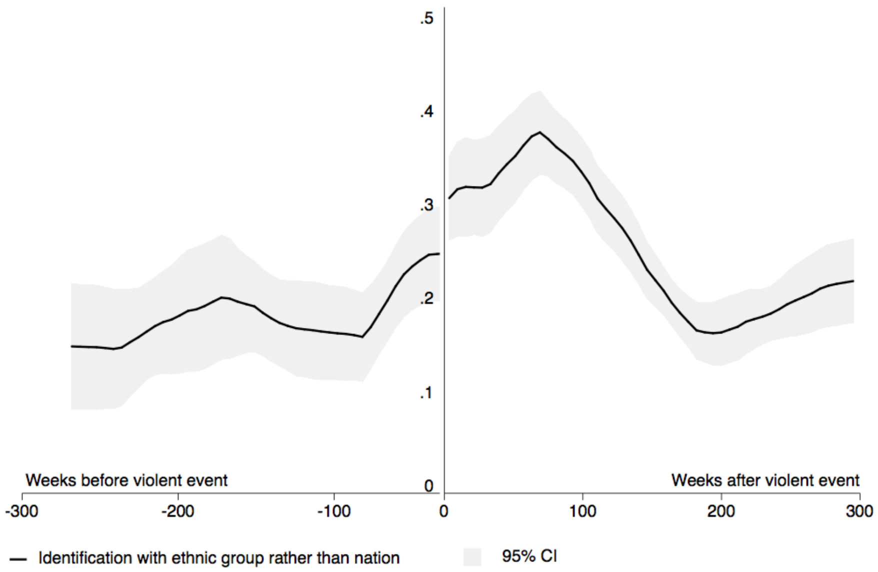
Above it was argued that tensions ahead of violence, and the actual experience of it, can cause group boundaries to harden. The Afrobarometer includes a question on whether people identify more strongly with their ethnic group, or, in contrast, with the wider nation. In Figure 1.4, I plot ethnic identification levels against the timing of interviews in districts that will experience violence in the future, and against identification levels in districts that have experienced violence in the past. We can see that levels of identification with one's ethnic group are higher the closer in time to a violent event interviews were conducted. Ethnic identification then reaches a peak after the occurrence of violent events, and is lower again with distance in time to such events. The impressive general shift towards a more parochial self-identification in the context of violence suggests that this process is driven by dynamics involving large parts of the population.

Although both these group formation dynamics and the dependence of mobilization effects on the local weakness of the state, are squarely in line with the incidental account of communal violence, they are also compatible with the instrumental account. In the

[11]Theoretically, state presence could moderate the link between social mobilization and communal violence in different ways, as state institutions and absence could also proxy grievance levels, for instance. I thank an anonymous reviewer for pointing this out. I here assume that it is the presence of the security forces or the 'minimal state' that is decisive. Empirically, it is hard to determine which state institution 'does the work', as the presence of virtually any of them reduces the predictive effect of social mobilization for future violence. This is shown in Figure 1.9 in the supplementary information.

[12]Social mobilization is also positively correlated with future acts of one-sided violence perpetrated by the state. Violence committed by the state has no bearing on the relation between social mobilization and future communal violence, however. This is explored in Panels 3 and 4 of Table 1.8 in the supplementary information.

Figure 1.4. Ethnic identification relative to the timing of communal violence



The line marks the share of respondents indicating that they identify more with their ethnic group than with their Nigerian nationality. Polynomial smooth with bandwidth 25. 95% confidence intervals marked in grey.

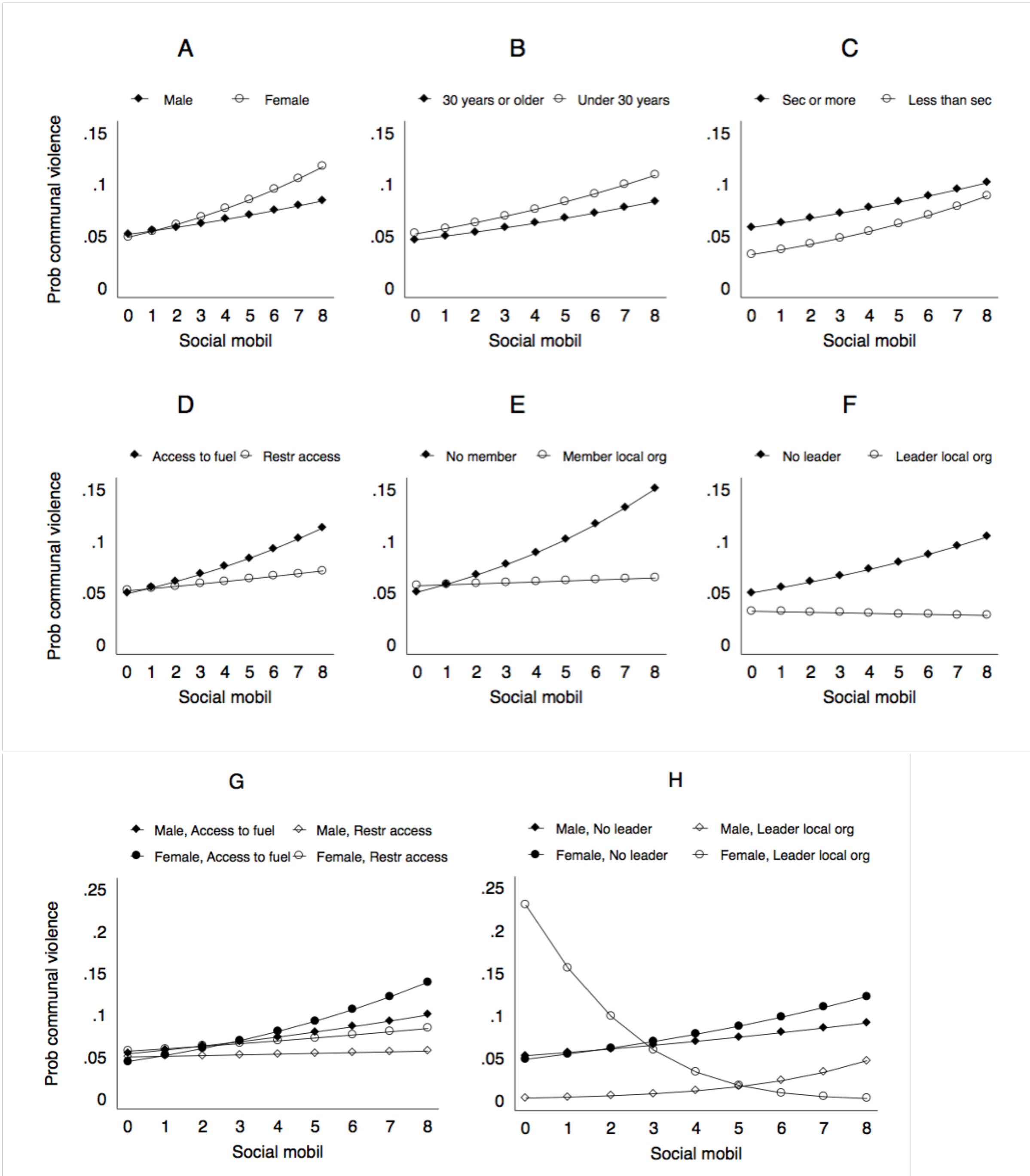
following I therefore disaggregate social mobilization further to demonstrate that what we are observing in the data more plausibly is mobilization out of fear.

Types of actors

In the theory section we derived several conjectures concerning the 'type' of actor we should see mobilizing ahead of either incidental or instrumental violence. I test these conjectures by interacting respondents' mobilization score with their individual characteristics, namely their gender, age, education, organizational membership and leadership status. Figure 1.5 then plots marginal effects showing to what extent the mobilization of different types of actors is predictive of future violence.

Here it is important to keep in mind that the fact that the mobilization of a particular type of actor is associated with a higher probability of future violence does not necessarily mean that these actors directly cause the violence to come. This is merely the causal story postulated by the instrumental approach to understanding communal violence. In contrast, in the incidental approach to understanding violence, it is the expectation of future violence that causes the social mobilization of actors.

Figure 1.5. Predictive effect of social mobilization of different types of actors on future violence



Predictive margins for different levels of social mobilization interacted with individual-level variables. Margins calculated based on the standard Model 1, Table 1.3.

Figure 1.5A shows that the mobilization of both men and women has a similar predictive effect on future conflict, with the high mobilization of women actually being more strongly associated with future violence then that of men. This hints at broad-based mobilization efforts ahead of communal violence, hypothesized above to be typical for mobilization out of fear. This impression is reinforced by Panels B and C, which show that the mobilization of younger actors is only slightly more predictive of future, and that the mobilization of the better educated (those who finished secondary education) has more predictive power for future violence than that of the less educated. Panels D and G show that the mobilization of poor people – those without regular access to cooking fuel – is *less* predictive of future violence than that of better-off individuals. These patterns are clearly at odds with the mobilization of young, poor, and disenfranchised men that we would expect to see if the instrumental pattern of explaining violence applied.

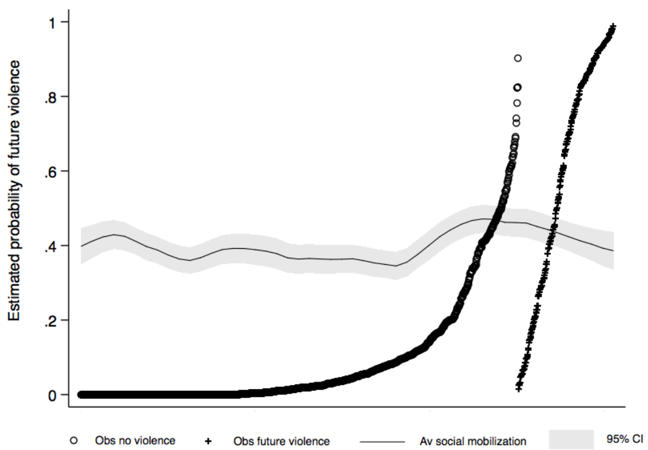
Panels E shows that the mobilization of those already part of a local organization has little predictive power for future communal violence. The same goes for leaders (Panel F): whether they are highly mobilized or not does not have a strong bearing on the probability of future violence. This is somewhat surprising in light of the case study where we saw that leaders were strongly involved in peacemaking efforts and that existing groups, notably vigilantes, were an integral part of the preparations for the potential violence to come. Arguably, the mobilization of these actors is not predictive for future violence as they are already fairly mobilized.[13] Rather, it seems to be precisely the involvement of those previously not part of organizational structures that is indicative of future violence. This finding is qualified by Panel H, which splits up the effect of leader-mobilization by gender. Here it shows that where female leaders are highly mobilized the probability of conflict approaches zero, whereas their non-mobilization predicts conflict. As the number of female leaders in the sample is small (n=47), this finding is not particularly robust, but nevertheless suggestive of interesting heterogeneity in leadership effects.

[13] The average mobilization score for members of local organisations in the whole sample is 4.35, that for leaders 5.33, and that for non-members 2.14.

'Cauterization' of violence

A further observation suggests that social mobilization ahead of violence is indeed indicative of peacemaking efforts. An implication of the theory of 'interethnic peace' is that in cases similar to those where violence broke out, i.e. in places where 'tensions exist, but interethnic disputes are...'cauterized' short of war' (Fearon and Laitin 1996, 715), we should also see high levels of social mobilization. This is because the onset of violence indicates that peacemaking efforts have (at least partially) failed – whereas in other, similarly tense situations, they may have worked. We can see this in Figure 1.6. The figure shows that in districts with a high probability of future conflict, but which nevertheless stay peaceful, average mobilization scores are elevated, and appear to be even slightly higher than those for districts that will experience violence in the near future.[14]

Figure 1.6. Putative 'cauterization' of violence due to social mobilization



The figure shows the predicted probabilities of future violence for observations from districts with no violence (marked with ∘) and districts where violence is to take place in future (marked with +), plus a polynomial smooth (bandwidth 65) of social mobilization scores (scaled to 0-1 and marked with a black line; greyed areas are 95% CIs). It shows that mobilization scores are elevated not only in regions that would actually be affected by violence, but also in regions where the probability of conflict is predicted to be high but no violence occurs. The probabilities were calculated with Model 2 in Table 1.3, the model with the best overall fit.

Reciprocal dynamics

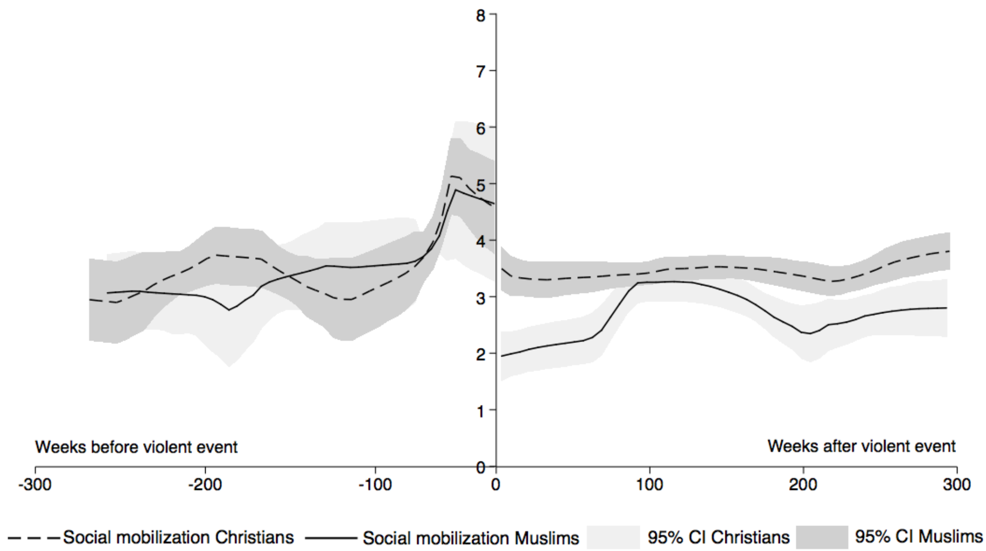
One of the hallmarks of incidental violence is the reciprocal interaction of groups over time – the mobilization of one group spurs that of the other, either because peacemaking efforts are reciprocated (i.e. community leaders meet, agree on ingroup policing and then call for

[14] The graph also shows that violence broke out in districts with very low probabilities of future violence, indicating the high degree of uncertainty still present in the model.

internal meetings to communicate what was decided), or because the mobilization and preparation for (defensive) violence makes a community more threatening for neighbouring communities, so that the latter feel induced to also prepare – the security dilemma dynamics.

This reciprocal dimension of mobilization ahead of communal violence is tested in Figure 1.7. As discussed in the case study, alongside ethnicity, religion is the most commonly invoked category across which fighting takes place in communal conflicts in Nigeria. As 94% of respondents in the sample identify themselves either as Christian (58%) or Muslim (36%) of various denominations, data loss is minor. The figure shows the extent to which the average mobilization scores of Muslim and Christian respondents correspond in the context of episodes of communal violence. As can be seen, mobilization scores for both groups closely trace each other ahead of violence, providing suggestive evidence that members of the two groups react to the mobilization efforts of the other. What is more, there is a marked increase in mobilization rates just before the outbreak of violence, just as would be predicted by security-dilemma-type dynamics. In post conflict districts, no close correlation can be observed and mobilization rates are generally lower.

Figure 1.7. Mobilization dynamics of Christian and Muslim respondents in the context of communal violence



The solid line shows average mobilization levels of Muslim respondents relative to the timing of instances of communal violence. The dashed line indicates the same for Christian respondents. Polynomial smooths with bandwidth 25. 95% confidence intervals marked in grey.

Taken together, the evidence from Nigeria strongly suggests that what the quantitative data is picking up on is the mobilization of the fearful – the social dynamics ahead of future, 'incidental' violence. This does not entirely preclude that mobilization to wield violence for instrumental ends is not taking place in parallel, as such mobilization efforts might be smaller in scale, or more secretive. As we could see in the case study, the instrumental use of violence became more prominent once violence had escalated. However, there is little qualitative or quantitive evidence that would suggest that predatory motives were of particular importance in the period preceding first-time violence.

Generalizability of results to the wider African context

Up to this point, I have drawn on the controlled context of a single-country study, so to be able to trace and distinguish between specific explanations. However, this approach has the disadvantage that we do not know how generalizable the results are. I therefore collected data for the other 10 countries included in rounds 3 and 4 of the Afrobarometer that saw communal violence as defined by UCDP.[15] Only four countries – Madagascar, Senegal, Ghana and Kenya – experienced any occurrences of future communal violence as defined here, i.e. communal violence that happened after interviews were conducted in 2005 and 2008 and occurring in districts that had not seen other instances of intergroup conflict since 1990. This is because serious communal conflict was relatively rare after 2005 and 2008 outside the cited countries and Nigeria, but also because some countries – such as Uganda and Liberia – had experienced widespread violence during the 1990s that had left virtually all districts within those countries affected.

Table 1.5. Probability of experiencing future communal conflict in four (using UCDP data) and ten (using ACLED data) African countries

	(1) UCDP	(2) UCDP	(3) ACLED	(4) ACLED	(5) ACLED
Social Mobilization	1.61^{***}	1.12^{***}	1.11	1.13^{*}	1.11^{**}
	(0.211)	(0.040)	(0.104)	(0.083)	(0.055)
Ind.-level controls	Yes	Yes	Yes	Yes	Yes
Distr.-level controls	Yes	Yes	Yes	Yes	Yes
State FE	No	No	No	No	Yes
Ethnic group FE	No	Yes	No	Yes	No
Country FE	Yes	Yes	Yes	Yes	–
Observations	6932	6932	20636	20635	20636
Pseudo R^2	0.67	0.88	0.20	0.40	0.66

Dependent variables coded as in Table 1.3 above. No model with state-level fixed effects is estimable using UCDP data due to lack of within-state variation in conflict exposure in the four-country sample. Reported are adjusted risk ratios from a probit regression. Delta-method standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

[15] These countries are Ghana, Kenya, Liberia, Madagascar, Mali, Mozambique, Senegal, South Africa, Tanzania and Uganda. Round 3.5 was specific to Nigeria.

To estimate the effect of social mobilization on future violence in this four-country sample, I use the same specifications of the dependent and independent variable, but include additional country fixed effects. The results, presented in Table 1.5, resemble those from Nigeria. Highly mobilized respondents are on average 1.6 times more likely to experience future communal violence (Panel 1), and this effect is robust to the inclusion of ethnic group fixed effects, although this reduces the size of the coefficient. Using the more inclusive ACLED data allows me to broaden the analysis to all ten countries, albeit at the cost of potentially introducing some noise. Again, the estimated effect is substantial and, upon the inclusion of fixed effects, fairly precisely estimated, suggesting that social mobilization can be predictive of communal violence in contexts beyond Nigeria.[16]

Conclusion

This chapter presents evidence from Nigeria and the wider Africa that raised levels of social mobilization consistently predict communal violence. Combining survey data and information on the timing and location of communal violence, it is shown that highly mobilized individuals are up to two times more likely to experience communal violence in the future than are less mobilized ones. This finding resonates with qualitative evidence from a case study of Plateau state, Nigeria, demonstrating widespread mobilization efforts ahead of communal violence.

The cumulative qualitative and quantitative evidence suggests that the link between social mobilization and future violence is fear. Part of the mobilization effort likely serves to prepare for the troubles to come, for instance by recruiting and arming community patrols. From the logic of the internal security dilemma it follows that this form of mobilization may inadvertently escalate the conflict. Another part of the mobilization efforts, however, seems to be dedicated to ingroup policing, whereby delegates of conflicting groups meet so to agree on keeping their communities in check.

[16] In the supplementary information I use data from mid-20th-century India for an out-of-sample test, in which I show that organizational membership has a strong predictive effect for violent Hindu–Muslim riots and communal violence more generally. As I use a modified independent variable, the results of this test are not strictly comparable to the present data, but nevertheless suggest that results may generalize even beyond the African context.

Several pieces of evidence demonstrate that the incidental approach to understanding violence is better suited to account for the dynamics we observe. This shows particularly clearly in the demographic profile of those that mobilize. Rather than being driven by impoverished male youths, as would be expected by the instrumental account of violence, future conflict is best predicted by the mobilization of women (with the notable exception of female leaders), the relatively wealthy, and those not previously organized. Furthermore, districts with a high predicted probability of violence but no actual outbreak of violence feature high levels of social mobilization, suggesting that peace-making efforts may have worked to 'cauterize' violence. Finally, mobilization patterns of potentially antagonistic groups closely trace each other before violent events, but not afterwards – a pattern likely resulting from widespread, reciprocal efforts to prevent and prepare for inadvertent violence.

The implications for the wider literature linking violent conflict and cooperation are twofold. On the one hand, the chapter confirms the general argument that violence goes along with increased social mobilization and cooperation. Splitting up the sample into subsamples it shows that all types of districts exposed to violence – whether the exposure happened previously, repeatedly or was about to happen in the near future – had higher rates of social mobilization than non-exposed districts.

On the other hand, the findings in this chapter reinforce the uncertainty regarding what drives this effect. The chapter highlights the driving role of organizational processes before the escalation as such a driver, implying that the high levels of post-conflict mobilization observed by other authors may simply be carry-over effects from pre-conflict mobilization. This would contradict well-identified studies (Blattman 2009; Voors et al. 2012) attributing increased levels of mobilization directly to wartime experiences, however. A more plausible interpretation, therefore, is that there is a multitude of pathways connecting violent conflict with cooperation, and a major research area for the future will be to spell these out concisely.

It is important to note that the link between mobilization and future violence observed here is very likely specific to the type of violence observed. It was argued here that much of the communal violence in Nigeria is incidental, i.e. highly conditional on the structure and the dynamics of the situations conflicting groups find themselves in. This is different from cases where violence is used instrumentally for the purpose of furthering economic or political agendas. The current Boko Haram insurgency in Nigeria is a case to the point. For the security-dilemma dynamics to apply, all sides to a conflict have to consider violence as unattractive (Lischer 1999, 349). Boko Haram, however, is clearly a predatory actor that uses violence to press for its hegemonic agenda. In the context of the insurgency, the mobilization of classic insurgent 'types' – young, disenfranchised men, here shown to be largely irrelevant for predicting communal violence – may be a better predictor of future violence. Such distinctions may prove important for the emerging research agenda on predicting local violence, to which this chapter contributes.

Chapter appendix

Coding of ACLED data

I use data from the 'Armed Conflict Location and Event Data Project' (ACLED), Version 5, to conduct robustness checks for my analyses (Raleigh et al. 2010). In contrast to UCDP, ACLED contains a wide range of events – from minor protests to full-out interstate war. For Nigeria alone, for the 1997–2014 period, 6,781 events are listed. In order to isolate serious events of communal violence, I adopt the following coding conventions (not dissimilar to those adopted by the UCDP dataset): In a first step, I only retain those events resulting in at least one fatality. This reduces the number of events to 3,103. I then select those events where two non-state actors clash, or where one none-state actor attacks civilians. For instance, these events include militant groups such as Boko Haram or ethnic militias fighting each other or attacking civilians, and fights between adherents of different religious or political groups; I exclude battles between militants and state forces, rioters clashing with the police, and other instances of government violence towards civilians.

Some of the entries list 'Unidentified Armed Groups' as being involved in conflict events. I only code those events as communal violence that mention an ethnic or sectarian category (e.g. Fulani, Christian) in the description of the event, or report attacks on specified villages by unknown militias which likely have a inter-communal dimension. As I am here interested in inter-group conflict, I exclude events where the description hints at individual personalities being assassinated (e.g. prominent politicians or journalists), or mentions an explicit criminal intent (e.g. robbery). This leaves me with 1,532 events that can tentatively be classified as communal violence. The coding as to whether an individual was likely never, previously, in the future or repeatedly exposed to these events is done in analogy to the procedure for the UCDP data described in the main text.

For the analysis of the 10 additional countries discussed, I likewise retain only observations of violent events that resulted in at least 1 casualty. This leaves me with 5,409 data points. Only 796 of these instances are identified as inter-group violence using the procedure above – half as many as for Nigeria alone (this result therefore mirrors the likewise relatively low number of cases of inter-group violence recorded in the UCDP dataset for the sample of countries). See Figure 1.10 below for a graphical illustration of the location of interview districts relative to instances of communal violence according to UCDP and ACLED.

Estimating omitted variable bias

In order to estimate the amount of omitted variable bias in my regression model, I apply the approach promoted by Oster (2014), who builds upon the approach pioneered by Altonji, Elder, and Taber (2000). Here, I only provide an outline of the intuition of the approach and apply it to my data. Mathematical details can be found in Oster's paper. The basic idea of Altonji, Elder and Taber was to look at how much a coefficient of interest changes when various controls are added to the regression model. If we assume that unobserved variables have a similar influence on our variable of interest as have the observed variables, this may give us an indication how robust our results are to the fictional inclusion of further unobservables. Oster expands this approach by not only focusing on coefficient movement, but also on r^2 movements.

She defines two parameters of interest to be set by the researcher. First is the maximum r^2 that the researcher believes can be achieved for a given regression model (since external shocks by definition cannot be included in the model, this estimated maximum probability will rarely be 1). She leverages data from randomized studies to suggest a rule-of-thumb value of 1.3 times the highest r^2 observed in the model as the r^2_{max}. A second concern is the ratio between observed change from observed controls and the estimated change from unobservables, dubbed δ. In the approach by Bellows and Miguel (2009), δ was assumed to be 1, whereas Oster's formulas let us vary it freely. Nevertheless, in absence of any further information, she also suggests to choose 1 as a maximum value for δ, as researchers should typically have tried to include the most relevant possible confounders. Given a maximum r^2 and a value for δ, her formula provides a range estimate for our coefficient of interest β, adjusted for possible omitted variable bias.

The approach relies on OLS, so instead of the probit model, I estimate a linear probability model using all the available information used in my main specifications. In the present case, a model including both state and ethnic group dummies achieves the highest possible r^2: .35 for the primary model using UCDP data, and 0.49 for the specification using

ACLED data. Hence using 0.46 and 0.63 as the respective maximum values for r^2_{max}, and setting δ to 1, I obtain range estimates for β of .0037–.0041 for the UCDP specification, and 0.0065–0.0074 for the ACLED specification. It thus appears that both estimates are highly resilient to possible unobserved confounders.

Possible selection through migration – bounding exercise

Could the effect of prior mobilization on future violent conflict be caused by selection i.e. by highly mobilized individuals from other regions selecting into future conflict districts (for predatory purposes), or by particularly socially inactive individuals selecting out of these regions? While such an observation would not change the basic logic of the argument that social mobilization can be predictive of conflict, it is important to understand the causal mechanisms underlying these dynamics. Unfortunately, Afrobarometer does not provide precise migration information, so I have to resort to more indirect forms of analysis.[17]

If we assume that the differences are caused by the immigration of particularly active individuals, we would expect future conflict districts to feature disproportionally many of these agitators/ potential predators. Put another way, we would expect the right tail of the density distribution of the collective mobilization scores to be thicker than in non-conflict districts. Conversely, if the effect was caused by the emigration of the socially passive, we would expect a particularly thin left tail. This is not what we observe, however. Rather, Figure 1.8 shows that the differences stem from a general shift to the right of the mobilization levels in future conflict districts, while the tails look fairly similar for both groups. This pattern also provides some evidence that what we are observing are indeed the dynamics of a security dilemma as the higher mobilization levels are supported by a broad social base.

The following bounding exercise further shows that migration/self-selection is an unlikely cause of the observed effect, as numerically, migration would have very substantial indeed to explain-away the effect. In Nigeria, about 3.03 million people live in those districts for which I have Afrobarometer data and which were exposed to future communal conflict

[17] A rough measure for long-range migration can be constructed by comparing a respondent's ethnicity and the language she or he speaks (cp. Nunn and Wantchekon 2011). In case that language and ethnicity do not concur, a person is counted as being a migrant. In Table 1.8 Panel 2 below I test for – but fail to find – effects of being a migrant.

Figure 1.8. Density of social mobilization scores in future-conflict vs. non-conflict subsamples

according to UCDP (around 55.9 million people live in non-affected districts). How many of these 3 million would have to be immigrant agitators to explain away the difference in average mobilization scores between non-conflict and future conflict regions? As reported in Table 1.2, the difference in mobilization scores was 0.26 – the average in non-conflict regions being 3.12, and that in future conflict regions 3.38. It turns out that it would suffice if 9 of the 11 highly active people in the sub-sample of 277 non-missing observations – each with a maximum value of 8 on the social mobilization scale – had immigrated. The new score for the future conflict sample would then likewise be 3.12. What does this mean in terms of population numbers, however? Assuming that the future conflict sub-sample is representative of the population, this implies that a share of 9/277=0.0325 of the population would have to be immigrant agitators – corresponding to a total number of 98,448 individuals out of a population of 3.03 million. Even more agitators with lower scores would be needed to level the differences.

To explain away the difference with reference to the emigration of particularly passive individuals, 23 completely passive individuals (with a score of 0) would have had to have had emigrated from future conflict districts. This corresponds to a total number of (23/277)*3,030,000 = 251,588 individuals. While not impossible, this seems rather improbable. Combined with the finding that future conflict districts do not actually seem to feature disproportionally many agitators or particularly passive individuals, this bounding exercise suggests that the observed affects are unlikely to be caused by self-selection in or out of future conflict districts.

Table 1.6. Probability of future communal conflict according to UCDP and ACLED, full model

	(1) UCDP	(2) UCDP	(3) UCDP	(4) ACLED	(5) ACLED	(6) ACLED
Soc. mobilization	0.070***	0.058***	0.063***	0.040**	0.029*	0.042***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Female gender	-0.003	0.022	-0.004	0.063**	0.050*	0.044
	(0.06)	(0.05)	(0.04)	(0.03)	(0.03)	(0.03)
30 or younger	0.014	0.079	0.007	0.002	-0.006	0.005
	(0.10)	(0.07)	(0.10)	(0.05)	(0.06)	(0.06)
Employed	-0.301**	-0.206**	-0.305***	-0.029	-0.055	-0.040
	(0.12)	(0.09)	(0.11)	(0.07)	(0.07)	(0.06)
No second. edu	-0.070	-0.158	-0.101	-0.016	0.109	0.019
	(0.11)	(0.13)	(0.10)	(0.10)	(0.10)	(0.10)
Lack cook. fuel	-0.140**	-0.072	-0.149**	-0.103+	-0.080	-0.074
	(0.06)	(0.10)	(0.07)	(0.06)	(0.06)	(0.06)
Rural abode	-0.133	-0.429	-0.122	0.019	0.088	0.004
	(0.19)	(0.47)	(0.23)	(0.17)	(0.17)	(0.15)
Access to radio	-0.091	-0.097	-0.137+	-0.103	-0.030	-0.053
	(0.10)	(0.09)	(0.09)	(0.09)	(0.10)	(0.09)
Population ’00	0.217+	0.762***	0.231*	0.373***	0.537***	0.452***
	(0.13)	(0.29)	(0.13)	(0.13)	(0.18)	(0.12)
Pop. density ’00	0.000	0.000*	0.000	-0.000**	-0.001*	-0.000**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Area in sq. km	-1.965*	-2.771	-2.003*	4.366***	1.164	3.596***
	(1.14)	(2.95)	(1.20)	(1.23)	(1.71)	(1.05)
Nightlights ’05	-0.031	0.004	-0.034	0.012	0.051	0.005
	(0.04)	(0.05)	(0.04)	(0.02)	(0.05)	(0.02)
Rainf. variability	-0.132	-0.809	-0.526+	-0.393*	0.751*	-0.201
	(0.37)	(1.16)	(0.35)	(0.21)	(0.43)	(0.25)
Ruggedness	0.009*	0.008	0.009*	0.007+	0.022***	0.009*
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Av. altitude	0.001	0.002	0.000	0.001	-0.000	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
No. slaves export.	-0.053	-12.419	-0.073*	-0.033	0.136+	-0.014
	(0.04)	(11.52)	(0.04)	(0.04)	(0.08)	(0.04)
Ethnic fraction.	-1.902	-2.193	-3.041	1.928+	2.670	2.294*
	(2.96)	(3.92)	(2.90)	(1.34)	(2.15)	(1.34)
Ethnic pow. balan.	-0.192	1.333	0.519	-1.792+	-2.097	-2.049*
	(2.44)	(2.76)	(2.39)	(1.17)	(1.59)	(1.17)
Travel time 50k	0.103**	0.284***	0.116***	-0.215	-0.650***	-0.283**
	(0.04)	(0.09)	(0.04)	(0.17)	(0.20)	(0.14)
State presence	-0.107**	-0.147**	-0.126***	0.025	0.046	0.047
	(0.05)	(0.07)	(0.04)	(0.04)	(0.04)	(0.04)
Distance to capit.	-0.142	-0.779	-0.125	0.131	-0.997**	0.034
	(0.15)	(0.82)	(0.13)	(0.13)	(0.40)	(0.13)
Urbanisation ’95	0.000*	0.000	0.000**	-0.000	0.000**	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
State FE	No	Yes	No	No	Yes	No
Ethnic group FE	No	No	Yes	No	No	Yes
Observations	4472	1526	4295	3530	3015	3523
Pseudo R^2	0.34	0.46	0.38	0.24	0.42	0.31

Average marginal effects from probit regression. Standard errors in parentheses. Standard errors clustered at district level. $^+$ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.7. Probability of future communal conflict according to UCDP and ACLED, district-level average of mobilization scores as independent variable

	(1) UCDP	(2) UCDP	(3) UCDP	(4) ACLED	(5) ACLED	(6) ACLED
Av. mobilization	0.345^{***}	1.425^{**}	0.291^{**}	0.182^{*}	0.223	0.208^{**}
in district	(0.12)	(0.70)	(0.11)	(0.10)	(0.16)	(0.10)
Ind.-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Distr.-level controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Ethnic group FE	No	No	Yes	No	No	Yes
Observations	4530	1543	4345	3577	3056	3568
Pseudo R^2	0.37	0.52	0.41	0.25	0.43	0.32

Average marginal effects from probit regression. Standard errors in parentheses.

Standard errors clustered at district level* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The table replicates the main results reported in Table 1.6 but uses district averages of the mobilization scores as independent variable. As can be seen, the resulting coefficients are substantially larger in size but somewhat less precisely estimated.

Table 1.8. Auxiliary Analyzes

	(1) UCDPn	(2) UCDPs	(3) UCDPs	(4) UCDP	(5) UCDP	(6) ACLED
Social mobil.	0.063^{***}	0.059^{***}	0.025	0.069^{***}		
	(0.02)	(0.02)	(0.02)	(0.02)		
Mobil. x Long-dist. migrant		0.085^{**}				
		(0.03)				
Previous state violence				0.091		
				(0.75)		
Future state violence				0.000		
				(.)		
Repeated state violence				0.000		
				(.)		
Memb. soc./rel. org					0.079^{*}	0.103^{**}
					(0.05)	(0.04)
Ind.-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Distr.-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3976	4472	6853	4386	4508	3554
Pseudo R^2	0.41	0.36	0.33	0.36	0.35	0.24

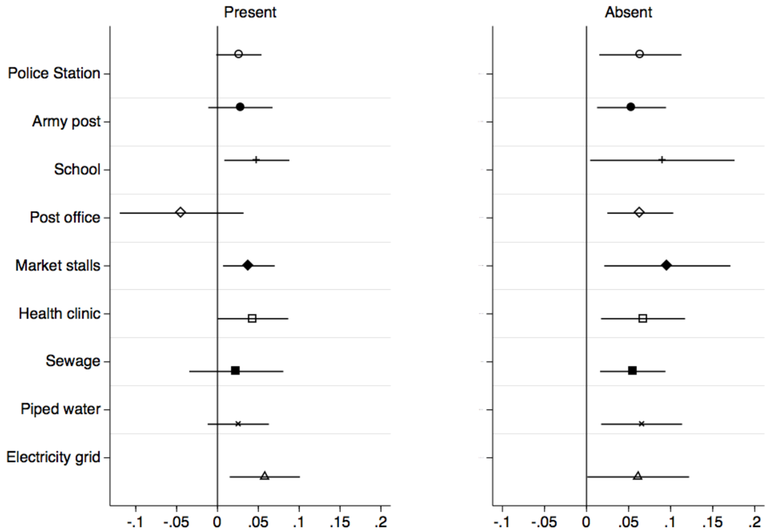
Average marginal effects from probit regression. Standard errors in parentheses.

Standard errors clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel 1: Conflicts that have seen neither communal *nor* state violence as reference; Panel 2: Interaction with measure for potential long-range migrant (self-reported ethnicity and language do not concur); Panel 3: Future acts of one-sided violence perpetrated by the state as dependent variable; Panel 4: Regression of future communal conflict on social mobilization, simultaneously controlling for past, future and repeated state violence; Panel 5: Regression of future communal conflict on measure for membership in religious or other community organizations, UCDP data; Panel 6: Regression of future communal conflict on measure for membership in religious or other community organizations, ACLED data

Robustness checks and additional analyses

Figure 1.9. Predictive effect of social mobilization for future communal violence in the presence or absence of state institutions and state infrastructure



The figure shows point estimates and 95% confidence intervals for the estimated predictive effect of social mobilization on future communal violence in the presence or absence of various state institutions and infrastructure. Standard errors clustered at the district level.

Potential temporal selection effects

In the main analysis (summed up in Table 1.3), individuals exposed to conflict in the future are compared with individuals never exposed *no matter when these individuals were interviewed*. This appears justified given the large number of temporal controls in the model (interview year dummy, time trend). However, a concern might be that cooperativeness is influenced by an underlying trend that is not captured by these controls. Assuming that such a trend was negative, the results obtained could be artefacts of the timing of the interviews. At present, individuals in the future exposure/treatment group drop out of the comparison the moment they experience conflict. This implies that, on average, they have been interviewed before individuals in the control group. This is particularly relevant in the case of the UCDP data, where the average interviewee in the treatment group was interviewed on 4 Oct 2006, while the average interviewee in the control group was interviewed on 3 Feb 2007.

In order to balance the samples and shield against artifactual effects cause by a time trend, I construct a control group that was interviewed no later than the individuals in the treatment group. This task is complicated by the fact that individuals in the treatment group were exposed to violence at different points in time. I thus pursue a matching approach to construct the control group. I use coarsened exact matching (CEM) (Iacus, King, and Porro 2012) to match the 279 individuals in the UCDP 'future exposure'/treatment condition 1:1 to individuals in the 'never exposed'/control condition. Data is matched *exactly* on the interview year, and coarsely on 10 interview–date categories, explicitly excluding dates that lie beyond the last date that an individual in the treatment category has experienced violent conflict. The matching results in a good balance, with almost identical means and standard errors for the distribution of interview dates in the 'future conflict'/treatment and 'never exposed'/control condition. I then run the regression model on this reduced sample. Since, in case of the UCDP data, this procedure arbitrarily picks 279 observations from the 3,840 eligible control group observations (512 were discarded in the matching process), I repeat this procedure 1,000 times and report the mean recorded values.

Table 1.9. Probit regression on data matched by interview date

	(1) UCDP	(2) UCDP	(3) ACLED	(4) ACLED
Social mobil	1.24*	1.75***	1.18*	1.19*
	(0.097)	(0.003)	(0.071)	(0.064)
Ind.-level controls	Yes	Yes	Yes	Yes
Distr.-level controls	Yes	Yes	Yes	Yes
Observations	538	3977	3226	3530
Pseudo R^2	0.43	0.37	0.21	0.21

The table shows adjusted risk ratios from probit regressions on matched data. Column 1 holds the average results from 1,000 regressions on data resulting from matching observations in the treatment condition 1:1 with observations in the control condition. Column 2 holds data matching observations in the treatment condition with observations in the control condition with weights supplied by the Coarsened Exact Matching algorithm. Columns 1 and 2 are both based on UCDP data. Columns 3 and 4 hold analogous analyses using ACLED data. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results, summed up in Table 1.9, show that the concern about temporal selection effects seems justified at first glance. Using individually matched observations only, the adjusted risk for exposure to future violence for individuals with a mobilization score of 8 as compared to those with a mobilization score of 0 is now only 1.24 times higher (as compared to 1.98 times previously), and is only marginally significant at the 9.7% level. In the case of the ACLED data, where interview dates in the treatment and control condition were distributed more evenly to start with, the matching procedure is less consequential, but nevertheless results in diminished coefficients and reduced certainty of estimates. Here, the estimated adjusted risk ratio is slightly reduced to 1.18 (as compared to 1.22), and significant at the 7.1% level.

However, by discarding a lot of information contained in the 'never exposed'/control condition data, this approach may actually be too punishing and seems to introduce excessive variance. Using the same matching protocol, but allowing for several control-group observations per treated unit that are weighted by the CEM-supplied algorithm, results in coefficients much closer to the original estimate. The adjusted risk ratio for the UCDP data is now 1.75 (significant at the 0.1% level), and 1.19 for the ACLED data (significant at the 6% level).

Table 1.10. Multinomial probit regression of violence-exposure states on mobilization

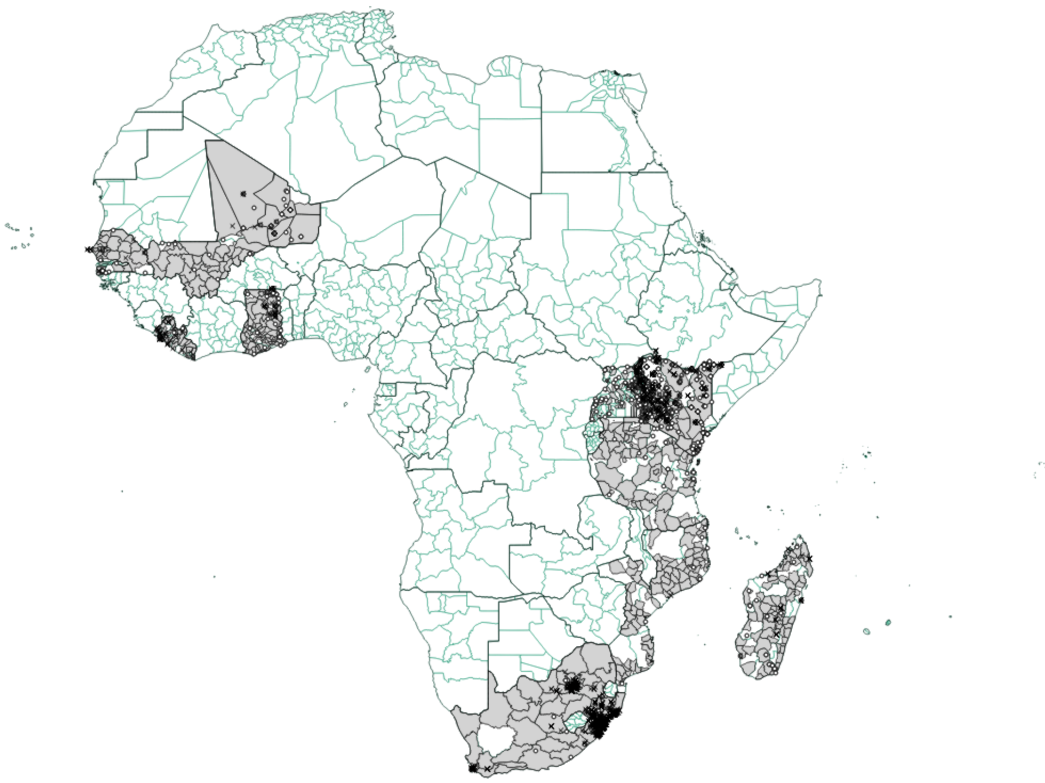
	(1) UCDP	(2) ACLED
No exposure		
Social mobil	base level	base level
Previous exposure only		
Social mobil	1.29**	1.01
	(0.14)	(0.19)
Future exposure only		
Social mobil	1.86***	1.09
	(0.43)	(0.12)
Repeated exposure		
Social mobil	1.30	1.11
	(0.27)	(0.08)
Ind.-level controls	Yes	Yes
Distr.-level controls	Yes	Yes
Observations	6853	6853
Pseudo R^2		

The dependent variable 'UCDP cat' takes the value 0 for observations from districts never exposed to communal violence, 1 for those previously exposed only, 2 for those only exposed in the future and 3 for those repeatedly exposed. 'ACLED cat' is coded analogously using ACLED data. Reported are average marginal effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Finally, to provide another benchmark for the results reported in the main text that does not rely on truncating the data set, in Table 1.10 I report the results of a multinomial probit regression.[18] The model has the four different violence-exposure states – never exposed, exposed in the future, exposed previously only, repeatedly exposed – as dependent variable. The adjusted risk ratios for individuals with a mobilization score of 8 as compared to those with a mobilization score of 0 are 1.86 for the UCDP dataset, and 1.09 for the ACLED dataset, somewhat similar to those obtained above when employing the CEM weighting algorithm (although the latter is not statistically significant at conventional levels). In line with theory, not only are future exposure but also past and repeated exposure to violence associated with increased levels of mobilization.

10 African countries, additional information

Figure 1.10. Distribution of districts with Afrobarometer data and instances of communal conflict in 10 African countries



Districts with interview data shaded; instances of communal violence according to UCDP marked with × ; instances of communal violence according to ACLED marked with o.

[18]Due to collinearity issues, both the models using matched data and the multinomial probit models cannot be estimated with state and ethnic group fixed effects, which is why I here report only the comparison of individuals exposed in the future and those never exposed.

India out-of-sample test

For an out-of-sample validation exercise, I use data from India from the 1960s and 1970s – the India National Election Study (INES) (Eldersveld, Ahmed, and Marvick 2011) – combined with information on ethnic riots and communal violence collected by Varshney and Wilkinson (2006). This is the only combination of datasets known to me that allows us to apply a similar study design as used with the African data. The INES was a series of surveys conducted in the aftermath of India's 1967, 1971, 1979 and 1981 general elections on the political perceptions, attitudes and behaviour of the Indian public. The material is available in digitized form through ICPSR (http://www.icpsr.umich.edu). I use the 1967 and the 1971 waves as they record information on community group and religious group membership, which I use as measure for social mobilization.[19]

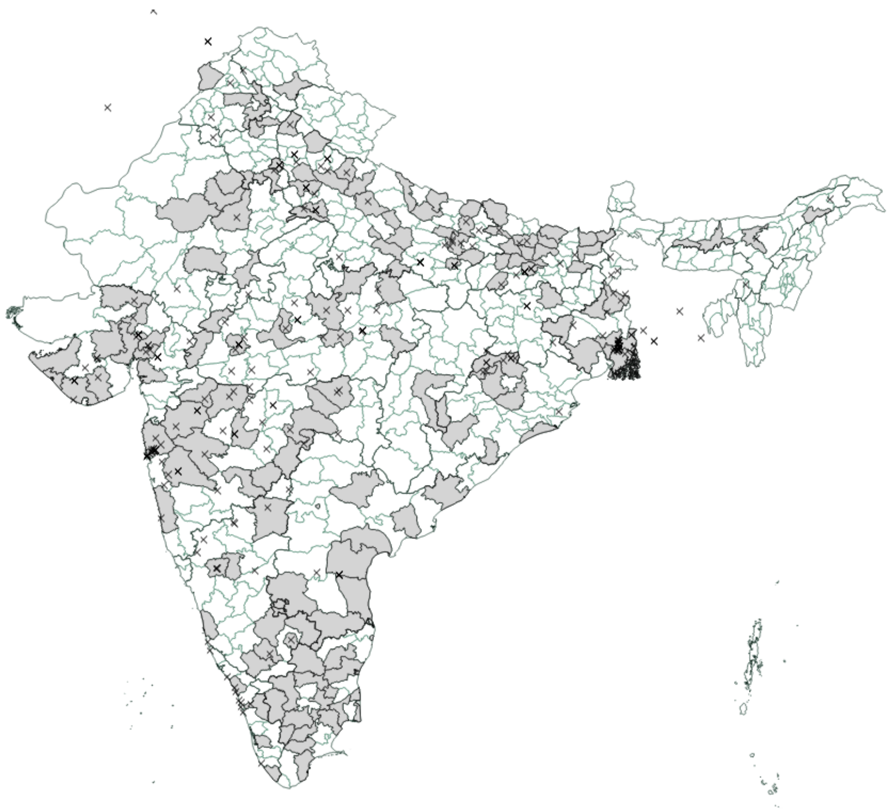
The dataset comprises over 7,000 observations, 6,439 of which include full information on all variables used here. Conflict information is taken from Varshney and Wilkinson's dataset, which codes all cases of communal violence in India as reported in *The Times of India* between 1950 and 1995. Using analogous procedures to those outlined above, I relate the survey data to incidences of future ethnic riots and violence, comparing those individuals who had not experienced any communal violence in the past 10 to 15 years (since 1957) to those individuals who had not experienced violence in the past, but would do so in the future (before 1976). I again use GAUL Admin 2 districts as my common frame of reference and code control variables analogous to those used in Africa (except for the measure on slavery).

The INES data is only partly coded so that some information – notably that on places, provided in the form of names of election constituencies – had to be retrieved from the original questionnaire. As the quality of the scans is not perfect, some coding error might have occurred here, although in most cases it was possible to assign highly plausible coordinates for the historic constituencies by cross-validating with other sources. Both survey waves

[19] This is not a perfect equivalent to the main measure of social mobilization used in the main chapter, so the results should be interpreted with some caution. In the Afrobarometer data, group membership is correlated moderately highly with social mobilization (r=.45, p=.00). Using a membership measure constructed from Afrobarometer data as independent variable results in effects that are similar in size, although estimates are only statistically significant when using ACLED data (shown in Table 1.8, Panels 5 and 6 above).

contain questions on membership in religious/caste or other organizations which I use as my measure of social mobilization. The 1967 wave asks how many organizations there are in a respondent's community, while the 1971 wave asks for individual membership. I combine the two measures, although all analyses can also be conducted on each sample separately. In total, I am left with 6439 non-missing observations (1660 from the 1967 wave, 4779 from the 1971 wave) from 225 locations throughout India.

Figure 1.11. Distribution of districts with INES data and instances of communal conflict 1957–1976 in India



Districts with interview data shaded in grey; instances of communal violence marked with ×

The dataset on Hindu–Muslim violence was assembled by Varshney and Wilkinson and used in their respective books on the topic (Varshney 2002; Wilkinson 2004). The dataset codes all cases of communal conflict reported in the Bombay edition of *The Times of India* between 1950 and 1995. The original dataset contains 1,193 instances of Hindu–Muslim clashes and communal violence more generally. I assigned geographic coordinates to all reported cases based on the place names included in the data. Again, some coding error is possible as some place-names exist several times in India. In these cases, I included the most plausible entry; in any case, I include the precise address that my geo-coding is based on in my data for future reference. In total, I identify 511 unique locations, located in 234 different Admin 2 regions. As my survey data is from 1967 and 1971, I use only those cases that took place up to 10 years before or 5 years after the interview period i.e. between 1957 and 1976. This is done to ensure comparability with the analyses using UCDP and ACLED data, where similar time frames applied.

For the first specification, I use all events of communal violence included in the dataset that took place between 1957 and 1976. 280 riots match these criteria, 103 of which took place in districts for which I have survey data. In the second specification, in order to establish stronger consistency with the other data sources, I drop all cases where it is not clear that violence resulted in fatal casualties. This reduces the number of events considered to 142, 74 of which took place in districts with survey data.As before, I map both the interview data and that on communal violence on Admin 2 districts according to the Global Administrative Unit Layer dataset (FAO 2008), which also allows me to calculate control variables on this level. Figure 1.11 shows a map indicating survey locations and riot/communal violence events 1957-1976.

Table 1.11. Probability of future communal violence in India, 1967-1976

	(1) Varsh./Wilk. all	(2) Varshn./Wilk. all	(3) Varshn./Wilk. fatal
main			
Memb. soc./rel. org	2.98***	1.23**	2.02**
	(0.643)	(0.099)	(0.570)
Ind.-level controls	Yes	Yes	Yes
Distr.-level controls	Yes	Yes	Yes
State FE	No	Yes	No
Observations	4400	2501	5222
Pseudo R^2	0.47	0.82	0.65

Reported are adjusted risk ratios from a probit regression. No model with state-level fixed effects is estimable for instances of fatal violence due to a lack of within-state variation. Delta-method standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

I present two tests. In a first specification, I include all riots and instances of communal clashes included in the dataset to construct my dependent variable; in a second, I exclude those cases where it is uncertain that clashes resulted in fatal casualties. Results are shown in Table 1.11. All of the coefficients are substantial in size and precisely estimated. Indian respondents in the 1960/70s with a full membership score of 6 were almost three times more at risk of experiencing communal violence in the near future. In this very different context and time period, too, social mobilization appears highly predictive of future communal violence.

Summary statistics

Table 1.12. Summary statistics Nigeria

	mean	sd	min	max	count
Age in years	31.62	12.11	18	95	7060
Female gender	0.50	0.50	0	1	7097
Education	4.97	2.10	0	9	7086
Rural abode	0.51	0.50	0	1	7097
Lack cook. fuel	1.15	1.20	0	4	7051
Access to radio	0.84	0.37	0	1	7083
Population '00	3.41	2.62	0	13	7097
Pop. density '00	1821.78	4043.70	11	24327	7097
Area in sq. km	0.14	0.16	0	1	7097
Nightlights '05	9.53	15.06	0	60	7097
Rainf. variability	2.66	0.72	1	6	7097
Ruggedness	27.10	30.24	0	276	7097
Av. altitude	244.55	220.19	3	1188	7097
No. slaves export.	2.36	3.79	0	18	7097
Ethnic fraction.	0.14	0.20	0	1	7097
Ethnic pow. balan.	0.11	0.22	0	1	7097
Travel time 50k	6.25	8.46	1	54	7097
State presence	4.20	1.92	0	8	7097
Distance to capit.	3.80	1.32	0	8	7097
Urbanisation '95	1881.57	2207.20	90	16905	7097
Soc. mobilization	3.24	2.37	0	8	6989
State presence	4.20	1.92	0	8	7097
Minimal state	0.43	0.49	0	1	7097
Subj. living cond.	2.07	1.23	0	4	7075
Rel. living cond.	2.92	1.07	1	5	6897
No of cattle	14.58	25.71	0	273	7097
Distr. otherethn.	2.96	0.91	1	4	2327
Future confl. ACLED	0.47	0.50	0	1	3665
Future confl. UCDP	0.06	0.24	0	1	4632
Future state confl.	0.26	0.44	0	1	7097
Confl. no state ref.	0.07	0.25	0	1	4125
Long-dist. migrant	0.13	0.34	0	1	7097
Memb. soc./rel. org	0.79	0.79	0	2	7048

Table 1.13. Summary statistics 10 African countries

	mean	sd	min	max	count
Age in years	36.94	14.25	18	102	27749
Female gender	0.50	0.50	0	1	28096
Education	3.04	1.96	0	9	28012
Rural abode	0.63	0.48	0	1	28096
Lack cook. fuel	0.88	1.22	0	4	27922
Access to radio	0.74	0.44	0	1	28053
Population '00	485778.02	733043.44	720	4478252	28096
Pop. density '00	735.36	1999.78	0	14603	28096
Area in sq. km	2643.16	2483.41	9	9933	28096
Nightlights '05	5.12	12.24	0	61	28096
Rainf. variability	3.40	1.47	0	10	28096
Ruggedness	83202.44	88287.26	588	452195	28096
Av. altitude	717.29	596.77	3	2549	28096
No. slaves export.	2394.77	5432.07	0	69146	27148
Ethnic fraction.	0.20	0.23	0	1	27904
Ethnic pow. balan.	0.19	0.29	0	1	27904
Nightl. '95-'05	0.17	1.95	-8	23	28096
Travel time 20k	3.41	3.19	0	46	27512
State presence	3.77	2.37	0	8	28096
Urbanisation '95	11335.78	26110.31	19	414724	28096
Soc. mobilization	4.30	2.36	0	8	27711
State presence	3.77	2.37	0	8	28096
Prox. to diamonds	0.13	0.34	0	1	28096
Prox. to oil	0.02	0.15	0	1	28096
Cropland '90	0.16	0.15	0	1	27580
Cropland '05	0.19	0.17	0	1	27580
Suit. agr. produc.	0.44	0.21	0	1	28096
Future confl. UCDP	0.02	0.14	0	1	22589
Future confl. ACLED	0.16	0.37	0	1	22645

Table 1.14. Summary statistics India

	mean	sd	min	max	count
Age (groups)	3.86	2.56	0	9	7192
Female gender	0.35	0.48	0	1	7208
Education	2.03	1.54	1	8	7105
Reads newspaper	0.26	0.44	0	1	7175
Rural abode	0.81	0.39	0	1	6685
Population '70	1498378.24	815233.43	157426	5669682	7116
Pop. density '70	627.42	1417.90	40	11457	7116
Ruggedness	39555.22	56766.31	1082	670309	7116
Av. altitude	249.36	252.17	4	2946	7116
Nightlights '05	6.11	11.34	0	63	7116
GDP '90	11.75	30.08	1	232	7116
Travel time 50k	3.41	0.88	1	8	7116
Urbanisation '70	380805.54	542198.42	0	3140823	7116
Ethnic fraction.	0.13	0.19	0	1	7116
Ethnic pow. balan.	0.12	0.23	0	1	7116
Future comm. viol.	0.12	0.32	0	1	4841
Memb. soc./rel. org	0.52	1.27	0	6	7151
Fatal comm. viol.	0.10	0.30	0	1	5785

Coding of control and auxiliary variables not detailed in main text

A respondent's **age** is recorded in years; his or her **gender** and **urban or rural abode** noted down by the interviewer. In the INES data, age is recorded as a categorical variable recording a respondent's age in five-year intervals ranging from 21-25 to 65 and above. Gender and place of living are recorded analogous to the Afrobarometer.

Education is a categorical variable measured on a 10-point scale ranging from 'No formal education', over 'Some primary schooling' and 'Secondary school completed/high school' to 'Post-graduate.' In INES, education is recorded on a similar 8-point scale.

Access to information is measured with the question 'How often do you get news from the following sources: Radio? Newspaper? etc.' to which respondents could answer (if they chose to) 'Never', 'Less than once a month', 'A few times a month', 'A few times a week' or 'Every day'. In INES, access to news is measured with a question as to whether a respondent ever reads a newspaper.

As a measure of **poverty/income**, I use the Afrobarometer question 'Over the past year, how often, if ever, have you or anyone in your family gone without: Enough fuel to cook your food?' Possible answers, save for refusals, were 'Never', 'Just once or twice', 'Several times', 'Many times' and 'Always'. In INES, actual income is measured on a 8-point scale, although this data is frequently missing. I leave out this variable in the analyses reported here. Including it leaves results virtually unaffected and improves precision, but severely truncates the dataset.

Distrust in members of other ethnic groups is based on the Afrobarometer question 'How much do you trust each of the following types of people: Nigerians from other ethnic groups?' The possible answers were 'Not at all', 'Just a little', 'I trust them somewhat' and 'I trust them a lot'. The variable was coded by reversing the order of answers.

A respondent's **perceived living conditions**, and her or his **living conditions relative to others** (the inverse of which was used as the measure for relative deprivation) are assessed with the questions 'In general, how would you describe: Your own present living conditions?' and 'In general, how do you rate: Your living conditions compared to those of other Nigerians/Ghanaians/etc.' Respondents could answer on five-point scales with 'Very bad', 'Fairly bad', 'Neither good nor bad', 'Fairly good', 'Very good' as possible answers to the first question, and 'Much worse', 'Worse', 'Same', 'Better' and 'Much better' as possible answers to the second question.

Population size, population density and level of urbanization were calculated using GIS software from raster data provided through the WorldPop project (Linard et al. 2012), and by the Columbia University Center for International Earth Science Information Network (CIESIN) in collaboration with the International Food Policy Research Institute (IFPRI), The World Bank, and Centro Internacional de Agricultura Tropical (CIAT) (CIESIN et al. 2011). **Population size, population density and level of urbanization in 1970** (used in the analysis of the Indian data) were calculated using data from Klein Goldewijk et al. (2011).

A district's **size**, average **altitude** and **ruggedness** were calculated from the Global

Administrative Unit Layer data (FAO 2008), and from raster data provided by the CGIAR Consortium for Spatial Information (CGIAR-CSI 2008) and Nunn and Puga (2010), respectively.

Ethnic fractionalization and ethnic relative power were calculated similar to the procedure described in Rohner et al. (2013). Based on the 'Georeferencing of Ethnic Groups' (GREG) dataset (Weidmann, Rød, and Cederman 2010), I calculated the relative share of a district occupied by any one ethnic groups. The ethnic power index simply divides the share occupied by the second largest group by that of the first one. The fractionalization index is calculated from the relative shares of all groups (g) according to the formula $EthnFrac = \sum_{g=1}^{n} share_g * (1 - share_g)$.

Nightlight intensity as a measure of economic development was calculated using data from the National Geophysical Data Center of the National Oceanic and Atmospheric Administration (NOAA NGDC 2013). The **absolute year-to-year deviations from a district's mean annual rainfall** since 1990 were calculated as a measure of the frequency of economic shocks (cp. Miguel, Satyanath, and Sergenti 2004) using the CRU TS3.21 dataset (Harris et al. 2014).

Slave exports is a variable constructed using data provided by Nunn (2008). Each district is assigned the total number of slaves that was taken from an ethnic group's 'homeland' (extends according to Murdock (1959)) between 1400 and 1900 as recorded by Nunn, divided by the number of districts in this 'homeland' . This adjustment is necessary because the 'homelands' are bigger than the GAUL Admin 2 districts. The numbers for individual districts are therefore often identical and should merely been taken as indicative of the approximate affectedness of each district by the slave trade.

Chapter 2

Second-order ethnic diversity

The spatial pattern of diversity, competition and cooperation in Africa

It is widely believed that ethnic diversity undermines the capacity of communities to engage in collective action and to provide public goods, with the consequence that ethnically diverse regions tend to be less cooperative. However, the existing evidence is far from unequivocal, with many scholars finding no or even a positive link. Here, a modified understanding of ethnic diversity is developed that allows us to make sense of these conflicting findings. I differentiate between two partial effects of ethnic diversity that have opposing consequences: first- and second-order ethnic diversity. While first-order ethnic diversity – the diversity of a local community – is theorized to undermine cooperation, second-order ethnic diversity – the ethnic diversity of the *hinterland* of a community – is theorized to reinforce cooperation by inducing ethnic competition. Relating data from over 100,000 individuals interviewed at 2,942 locations in 33 African countries to novel sub-national indicators of first- and second-order ethnic diversity, the theory is tested and its basic tenets confirmed. I then demonstrate that it is indeed ethnic competition that accounts for the positive association between second-order diversity and increased cooperation: second-order diversity is a much better predictor of cooperation in regions where contemporary or historical factors exacerbated inter-ethnic tensions.

Introduction

Ethnic diversity is widely seen as undermining the capacity of communities to engage in collective action and to provide public goods (Alesina, Baqir, and Easterly 1999; Alesina et al. 2003; Costa and Kahn 2003; Habyarimana et al. 2009; Putnam 2007). This is particularly true for Africa, where scholars have produced evidence that countries are economically and politically held back by their abundance of ethnic groups. According to one estimate, the continent would be several times wealthier were its countries ethnically homogenous (Easterly and Levine 1997). In politics, ethnic heterogeneity has been theorised as hurting democracy by making it easier for special interest groups to capture parts of the population and undermine social cohesion, and has been linked to the prevalence of patronage politics in the African context (Arriola 2009; Rabushka and Shepsle 1972; Sandbrook and Barker 1985).

However, while most evidence points at a negative relationship between ethnic diversity and cooperation, findings are not unequivocal, with several studies from various geographical regions finding no, or no consistent effect (Alexander 2007; Andersen and Milligan 2011; Anderson and Paskeviciute 2006; Baldwin and Huber 2010; Gesthuizen, Van Der Meer, and Scheepers 2009; Glennerster, Miguel, and Rothenberg 2013; Hopkins 2009). Scholars from various disciplines have linked these conflicting findings to problems of aggregation in the study of ethnic diversity, highlighting that ethnic diversity is often measured at vastly different scales, ranging from neighbourhoods to countries (Abascal and Baldassarri 2015; Enos 2016; Koopmans and Schaeffer 2013). It remains unclear, however, why the scale at which ethnic diversity is assessed should matter for outcomes.

In response to this question, this chapter develops and tests a modified understanding of ethnic diversity that differentiates between two partial effects with opposing consequences: first- and second-order ethnic diversity. First-order ethnic diversity is the diversity of a local community – how many different groups live together and interact in one place. Through various mechanisms, first-order or local ethnic diversity *undermines* cooperation (Habyarimana et al. 2009). Second-order ethnic diversity is the ethnic diversity of the *hinterland* – how many different groups settle in the surroundings of a given community. In sharp contrast to first-order ethnic diversity, second-order ethnic diversity can *strengthen* cooperation. This is because second-order diversity induces ethnic competition. Ethnic competition, in turn, has been linked to increased levels of mobilization and cooperation in historical and contemporary cases (Enos 2016; Olzak 1992), and is deemed particularly important in the African context (Bates 1974, 1983b).

The theory is tested by relating data from over 100,000 individuals interviewed at 2,942 locations in 33 countries in Africa to novel subnational indicators of first- and second-order ethnic diversity. In line with previous research, I show that first-order ethnic diversity consistently has a negative impact on local cooperation. Effect sizes are substantial and comparable to those found by other scholars (Miguel and Gugerty 2005). Moving from full homogeneity to full heterogeneity is associated with a 14% drop in cooperation levels. At the same time, local cooperation rises as second-order ethnic diversity increases. Moving from ethnically homogenous surroundings to fully heterogenous surroundings is associated with a 28% upsurge in cooperative behaviour. At the aggregate level, the cooperation-inducing effect of second-order ethnic diversity thus overcompensates the negative effects of first-order ethnic diversity, leading to an overall positive relationship between ethnic diversity and cooperation on the African continent. These findings are robust to a extensive set of controls and fixed effects, and an instrumental variable strategy suggests causality.

In a second step, I present evidence showing that it is indeed ethnic competition that accounts for the positive association between second-order diversity and increased cooperation. Drawing on Bates's theory of ethnic competition in Africa (Bates 1974, 1983b), I identify factors that should reinforce ethnic competition, and interact measurements of these factors with my measure for second-order diversity. The resulting evidence is largely supportive but somewhat inconclusive, and likely suffers from endogeneity bias. I therefore turn to history to identify factors that are linked to competition but are also plausibly orthogonal to cooperation dynamics. I present three tests.

First, inspired by research on the political salience of externally determined borders (Asiwaju 1985; Laitin 1986; Miguel 2004; Posner 2004c), I demonstrate that ethnic diversity that is attributable to ethnic groups being separated by colonial borders has a weaker effect on cooperation than other types of ethnic diversity. Second, I examine the legacy of the trans-Atlantic slave trade – one of the main causes of intergroup conflict during 400 years of Africa's more recent history – on cooperation (Nunn and Wantchekon 2011). I show that the link between second-order ethnic diversity and cooperation is stronger in regions historically more severely affected by the slave trade, despite the fact that the overall effect of the legacy of the slave trade is to undermine contemporary trust and cooperation. Finally, I show that second-order ethnic diversity has a stronger effect on cooperation where states had in the past found it hard to establish control, and where societies relied more on indigenous slavery. In tropical Africa, both phenomena are linked to the presence of the tsetse fly, which weakens or kills domesticated animals such as horses and oxen used for transport and the projection of power (Alsan 2015; Herbst 2000b). I demonstrate that the relationship between second-order diversity and cooperation is stronger in regions hospitable for the tsetse fly.

The chapter contributes to two bodies of literature. Most importantly, I add to the literature on ethnic diversity and ethnic fractionalization by directing attention to the effects of ethnic competition that are often overlooked. This chapter is also inspired by and draws on research on the long-term effects of historical processes for contemporary developments in Africa. I contribute to this literature by demonstrating the counterintuitive, cooperation-increasing effect of historical ethnic conflict and competition.

Diverging effects of first- and second-order ethnic diversity

Even a cursory review of studies on ethnic diversity and cooperation from Africa demonstrates that the field is still riddled with contradictions. On the one hand, a range of studies argues that regions that are ethnically heterogenous are economically and politically held back. According to one estimate, the African continent would be several times wealthier were its countries ethnically homogenous (Easterly and Levine 1997), and other scholars have linked the prevalence of harmful patronage politics in the African context to the continent's abundant ethnic diversity(Arriola 2009; Sandbrook and Barker 1985). On the more micro-level, an influential body of research argues that ethnic diversity undermines public goods provision and cooperation (Alesina, Baqir, and Easterly 1999). As a consequence, development projects may tend to be more poorly managed in more diverse societies, and local public goods like schools and water wells less well maintained, for instance (Collier 2000; Miguel and Gugerty 2005).

Other studies have produced confuting evidence, however. For example, in one study from Sierra Leone, the effect of ethnic diversity on collective activities such as road clearing or attendance at community meetings is estimated precisely at zero, and another paper even presents survey evidence from Uganda pointing at a positive relationship between ethnic diversity and respondents' willingness to contribute to public goods (Glennerster, Miguel, and Rothenberg 2013; Schündeln 2013). Comprehensive reviews of the literature are inconclusive, too. One review finds that, overall, only about one third of studies demonstrates a negative relationship between ethnic diversity and measures of social cohesion, trust and cooperation (Meer and Tolsma 2014, 468; cp. Portes and Vickstrom 2011 for similar results). And while another review shows that a slight majority of studies does in fact establish a negative relationship between ethnic diversity and measures of cooperativeness and trust, about half of the studies sampled report no such finding (Schaeffer 2014).

In trying to account for the contradicting findings, scholars have pointed out that different studies use different levels of aggregation to assess levels of ethnic diversity – and often with vastly different results. In the most comprehensive review article to-date, it is shown that only ethnic diversity measured at the regional or sub-regional level – but not at the national level – is found by a majority of studies to reduce levels of trust and cooperation.[1] While authors have linked this finding to the 'modifiable areal unit problem' widely discussed in geography (Openshaw and Taylor 1979) – that the same spatial phenomenon measured at different scales of measurement does not necessarily have the same effect at all scales – it remains unclear *why* ethnic diversity should negatively impact on cooperation in some cases and not in others. The solution proposed in this chapter is that ethnic diversity

[1] (Schaeffer 2014, 16; cp. Abascal and Baldassarri 2015; Enos 2016; Koopmans and Schaeffer 2013). Meer and Tolsma (2014) do not find differences with regard to the level of measurement, however. Another interesting approach to account for contradicting findings focusses on ethnic economic inequality rather than diversity as such (Alesina, Michalopoulos, and Papaioannou 2014; Baldwin and Huber 2010).

can have two internally consistent effects: ethnic diversity on the local level consistently works to undermine cooperation, while ethnic diversity of the surroundings consistently induces cooperation within groups. The net effects of ethnic diversity then depends on which partial effect dominates or whether the two effects cancel each other out.

Several theories account for why first-order or local ethnic diversity i.e. the number and distribution of different ethnic groups that mix at one place, should undermine cooperation. A first strand of research suggests that people feel intimidated by the presence of ethnic others, they 'hunker down' and are less socially active (Putnam 2007). Others draw on insights from the extensive research programme on the evolution of cooperation (Axelrod and Hamilton 1981; Fehr and Fischbacher 2003; Fowler and Christakis 2010; Nowak 2006). Multiethnic neighbourhoods go along with fractured, less integrated social networks since friendship and acquaintances tend to be formed along ethnic lines (McPherson, Smith-Lovin, and Cook 2001). In such multiethnic neighbourhoods, the probability of future contact with any inhabitant is thus reduced, making cooperation motivated by future consequences of present behaviour less likely than in ethnically homogenous neighbourhoods. The lack of traceability through networks also complicates the use of social sanctions to enforce cooperation (Algan, Hémet, and Laitin 2011; Habyarimana et al. 2009; Miguel and Gugerty 2005). Other scholars have pointed out that ethnic diversity may go along with different groups having conflicting preferences, making it harder to cooperate in the pursuit of common goals (Enos and Gidron 2016; Kimenyi 2006; Lieberman and McClendon 2013). Finally, there is some evidence that cooperation is inhibited by a lack of shared cultural 'tools' (Habyarimana et al. 2009). When lacking a common language, for instance, individuals will find it difficult to organise and act collectively.

Theories as to why the second-order ethnic diversity – the extent to which the *hinterland* of a community's place of settlement is populated by members of other ethnic groups – should increase cooperation, on the other hand, usually invoke ethnic competition and threat.[2]

[2] More abstractly put, first-order ethnic diversity is the ethnic diversity that affects spheres of day-to-day interaction. For example, for interactions on the local market, the ethnic diversity of the catchment area of that market is what matters. second-order diversity, in contrast, is concerned with the spheres that lie beyond such direct, day-to-day interactions – but which nevertheless potentially affect the life of a community. second-order ethnic diversity is unlikely to affect cooperation directly, as other groups typically live too far away to be an obstacle to solving local collective action problems. Rather, second-order ethnic diversity should matter most in politics and military matters. Having a *hinterland* that is populated by

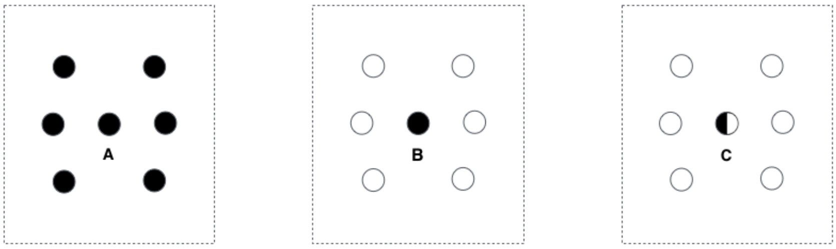
The idea is that by increasing – or historically having increased – the level of interethnic threat and competition, the presence of other groups nearby can induce local cooperation. This conjecture has been widely discussed in 20th-century sociology and anthropology, and the effects of outgroup presence and competition on ingroup cooperation have triggered a rich research programme in psychology and economics (Abbink et al. 2010; Brewer 1979; Leibbrandt and Sääksvuori 2010; LeVine and Campbell 1972; Puurtinen and Mappes 2009; Sherif et al. 1961; Simmel 1908; Sumner 1906; Tajfel 1982). In politics, a similar concept to that of outgroup competition has been explored under the heading of 'racial threat'. In a classic account, race relations were shown to drive much of the cohesiveness of politics in the mid-20th-century American South, where White constituencies formed cohesive coalitions to exclude African Americans from politics (Key 1949, cp. Enos 2016). Similar dynamics observed in interethnic conflicts in the USA at the turn of the 20th century led Olzak to conclude that "factors that raise competition among race and ethnic groups increase rates of collective action" (Olzak 1992, 2). Somewhat surprisingly, these ideas have rarely been brought to bear on the debate on the effects of ethnic diversity, however (cp. Enos 2014 for an exception).

To see more clearly how the distinction between first- and second-order diversity may help to analyse the effects of ethnic diversity more precisely, consider the stylized example of three villages, A, B and C, depicted in Figure 2.1. Villages A and B are ethnically homogenous, i.e. have a first-order diversity of zero, while village C is ethnically diverse, i.e. has a first-order diversity greater than zero. We also see that village A is surrounded by other villages inhabited by co-ethnics, while villages B and C are surrounded by villages inhabited by members of another ethnic group. For village A, second-order diversity is zero, while for both villages B and C, second-order diversity takes a high positive value.

Now imagine a researcher seeking to explain levels of cooperation with reference to ethnic diversity. Assume that, in line with the theories discussed above, first-order ethnic diversity

co-ethnics should increase the probability that a community will find allies to push through a political agenda or to defend itself in case of an attack by outsiders. Such a community faced with low second-order diversity is thus less dependent on its own cooperativeness, while a community located in surroundings marked by high second-order ethnic diversity will be induced to cooperate more. An obvious difficulty with this abstract formulation is in determining the borders of the spheres of first- and second-order diversity. This is why, for the purpose of this chapter, I define first- and second-order local diversity solely in relation to geographical space.

Figure 2.1. Stylized comparison of three villages with different levels of first- and second-order local ethnic diversity



negatively correlates with levels of cooperation, while second-order ethnic diversity positively correlates with cooperation. Not making the distinction between first- and second-order diversity, the researcher might focus on the ethnic diversity of the villages proper. The researcher could then explain the lower level of cooperation in village C in comparison to villages A and B, but could not explain the higher value in village B in comparison to village A.

Alternatively, the researcher might calculate an index for ethnic diversity at the level of the district that the villages are placed in (here indicated with dashed lines). This index would be zero for the district that village A is located in, and would take high positive values for the districts that villages B and C are located in. In this case, from a comparison between villages A and B the researcher would now have to conclude that ethnic diversity increases levels of cooperation, while a comparison between villages A and C could lead her to the opposite conclusion (assuming that the effects of first-order diversity dominate those of second-order diversity). A complete explanation therefore has to consider both the effect of first-order diversity and, conditional on this, the effect of second-order diversity. This is the approach I take in the empirical section below.

Ethnic diversity and cooperation in Africa

I test the impact of first- and second-order ethnic diversity on the cooperativeness of communities in Africa. The African continent is in many ways a natural environment for such a study. Most African countries are extremely ethnically diverse. Continent-wide estimates are hard to come by, but especially those countries located along the equator are typically home to several dozen ethnic groups. Africa's most populous country, Nigeria, alone hosts members of over 200 distinct ethnic groups (Sklar 2004).

Cooperation here is understood as the capacity of a community to solve local collective action problems.[3] Scholars disagree sharply on the question as to how they should assess the role of local cooperation in social and political developments on the African continent. Some authors have argued that communities in many African countries may actually be too cooperative, leading to civil society overly restraining the state (Migdal 1988). Others see the vibrancy of social communities as panacea and a partial substitute for weak state institutions Chazan (1994).

I here concur with others who argue that it is impossible to tell *a priori* whether local cooperation is to be judged positively or negatively for political development on the African continent Posner (2004a). While some forms of association – civil society groups lobbying for transparent government, for instance – can certainly have a positive influence, other forms of association can be harmful. The cooperativeness of a criminal group can be bad for the wider society; indeed, it can undermine it (Gambetta 1988b, 1993). And in the violent conflicts between ethno-religious communities in Nigeria described in the first chapter, the cooperativeness of the one community constitutes a threat to the other.

Data and model

The indicator for a community's cooperativeness, as well as all other individual-level data, come from the Afrobarometer. The Afrobarometer is an independent and non-partisan research project conducted by a consortium of research institutions with the aim of measuring the social, political, and economic atmosphere in Africa. I use data from three rounds of surveying (Afrobarometer Rounds 3, 4 and 5) conducted between 2005

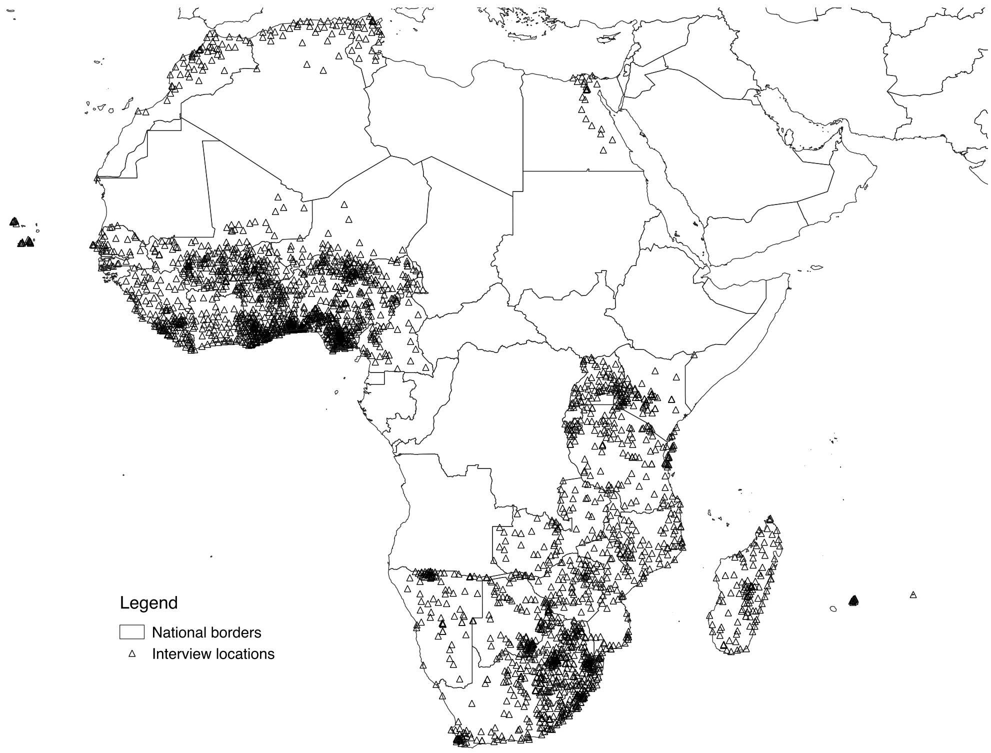
[3]Fearon, Humphreys, and Weinstein (2009) and Gilligan, Pasquale, and Samii (2014) use the term 'social cohesion' analogously. Cooperation as understood here is also closely related to some understandings of social capital. The ability to solve collective action problems has been placed at the core of concept by scholars such as Putnam and Ostrom and has been termed 'behavioural social capital' (Carpenter, Daniere, and Takahashi 2004). Putnam (1995, 67) stressed that social capital allows "dilemmas of collective action to be resolved" and Ostrom and Ahn (2009) define social capital as the rules and formal and informal institutions that make it possible to overcome collective action problems.

and 2013.[4] The data included in the sample comprises 102,282 observations collected by means of face-to-face interviews in 33 different African countries. For all interviews, the region and district of interviewing is indicated. I used this information to assign geographic coordinates to each interview location using GIS software. This allowed me to identify 2,942 locations at which interviews took place. The interview locations are shown in Figure 2.2).

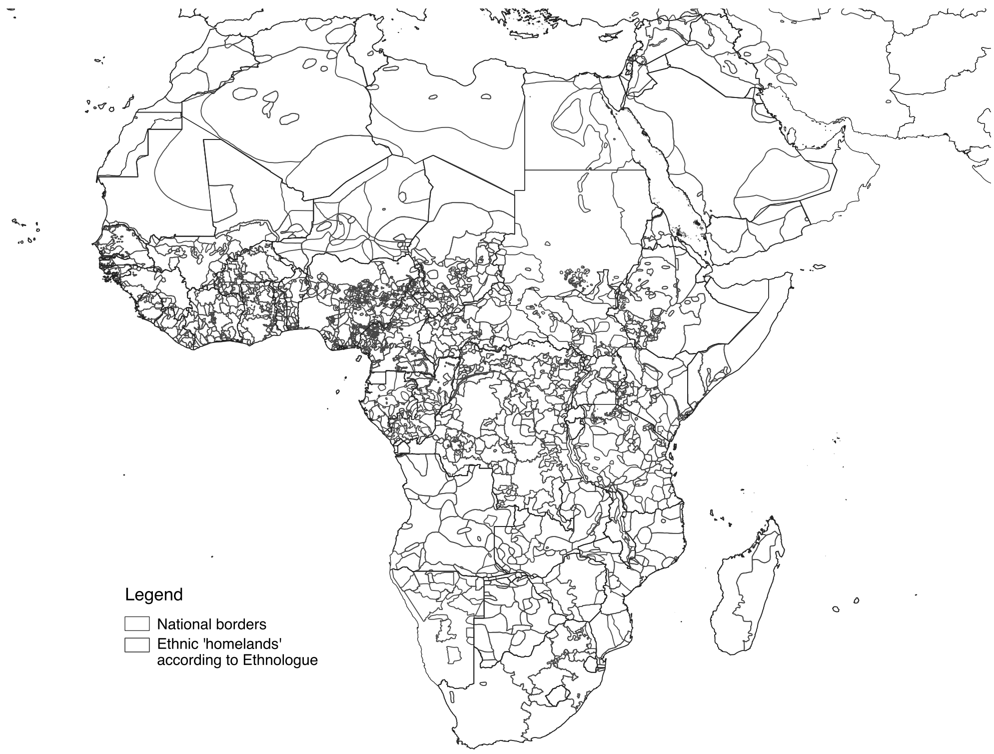
The cooperativeness measure is the composite score from two Afrobarometer items on community meeting attendance and collective action. Respondents were asked whether, during the last year, they took part in a community meeting, or whether they 'got together with others to raise an issue'. To both questions, they could answer on a five-point scale ranging from 'No, would never do this' to 'Yes , often'. As the indicators are fairly highly correlated ($r = 0.64, p = 0.00$), I combine the answers to both questions to create a nine-point scale ranging from zero for those who show no interest in collective efforts to eight for those eagerly taking part. In further specifications, I also look at political behaviour usually associated with collective action: addressing political representatives and protest behaviour. The Afrobarometer asks people whether, during the last year, they had 'attended a demonstration or protest march' and whether they had contacted a) their local councillor or b) their national representative 'about some important problem or to give them their views.' To the protest question, respondents could answer on the same five-point scale used to calculate the cooperation score. With regard to contacting representatives, respondents could choose from among the four answers 'Never', 'Only once', 'A few times' and 'Often'.

[4]The list of partners involved in the Afrobarometer project changed over time. The first two rounds (Rounds 3 & 4) of survey data used where conducted under the leadership of the Institute for Democracy in South Africa (IDASA), the Ghana Centre for Democratic Development (CDD-Ghana) and Michigan State University (MSU). For the collection of the last round of survey data used here (Round 5), several other research institutions from across the continent joined the Afrobarometer consortium. These and the datasets can be found at Afrobarometer.org.

Figure 2.2. Interview locations and ethnic 'homelands'



(a) Interview locations with survey data from the Afrobarometer



(b) Ethnic 'homelands' according to the *Ethnologue*

Measuring ethnic diversity at the local level

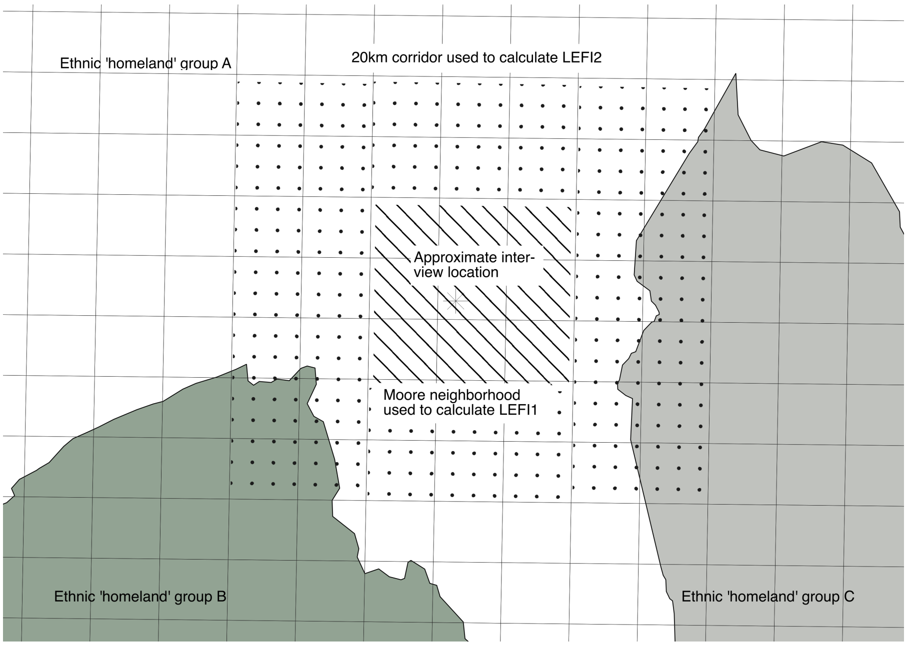
Virtually all measures of ethnic diversity and fractionalization that cover multiple countries are only available at the national level. This has arguably constrained cross-country research to primarily answer questions that are influenced by country-wide ethnic fractionalization, such as the development of the national economy or the functioning of the national political institutions. I develop a measure of ethnic diversity that allows for fine-grained measurement of first- and second-order local ethnic diversity by means of the local ethnic fractionalization ($LEFI$) indices. The calculation of the index follows a procedure similar to that used by Rohner, Thoenig, and Zilibotti (2013) in their work on Uganda. The indicator is based on the World Language Mapping System, the digital version of the *Ethnologue*, an inventory of the world's languages (GMI 2004). For most countries in the world, the *Ethnologue* lists all living languages and indicates the 'homeland' for each – the area where the language originates and is most widely spoken.

It is thus similar to one of the most widely used sources of ethnicity information, the *Atlas Narodov Mira*, produced by the Soviet Ethnographic Service in the 1960s and 1970s. The *Ethnologue* is preferred here, since for Africa it appears to contain the more reliable information as confirmed in an evaluation exercise.[5] I use the information of the location of ethnic 'homelands' to construct simple indices of first- and second-order ethnic diversity.

An important conceptual question is which ethnic diversity should be counted as first-order diversity, which as second-order diversity, and which is inconsequential to a given situation. Obviously, an answer is not easy to give and should ideally be decided case by case. Since this is hardly possible in a study covering 33 countries, I try to address this problem technically by calculating indices for first- and second-order ethnic diversity that cover discrete geographical areas, and by providing alternative measures for both concepts.

[5] I used the ethnicity information included in Afrobarometer for an evaluation exercise: I checked to what extent the ethnicity information (self-reported ethnic affiliation and mother tongue), which Afrobarometer respondents supplied about themselves, complied with the 'homeland' designated by either the *Ethnologue* or the *Atlas Narodov Mira* (ANM). While for the ANM this is the case for about 37% observations, in the case of the *Ethnologue*, 51% of respondents live in their ethnic 'homeland'. Although respondents could be living outside their 'homeland' because they migrated, the significantly higher share of matches between self-reported ethnicity/mother tongue and 'homeland' ethnicity in the *Ethnologue* in comparison to the ANM leads me to believe that the *Ethnologue* is the preferable source of ethno-linguistic information for Africa.

Figure 2.3. Calculation of the Local Ethnic Fractionalization Indices, $LEFI1$ and $LEFI2$



The figure shows an Afrobarometer interview location in the ethnic context as visualised by the *Ethnologue*. $LEFI1$ is calculated at the level of the Moore neighbourhood. As the central Moore neighbourhood covers the ethnic 'homeland' of ethnic group A only, $LEFI1$ is equal to zero. In contrast, roughly 8% of the 20km corridor is covered by the ethnic 'homeland' of ethnic group B, and roughly 15% by the ethnic 'homeland' of group C. $LEFI2$ therefore equals 0.38.

In order to calculate the indices for first- and second-order local ethnic fractionalization ($LEFI1$ and $LEFI2$), in a first step I overlay the whole of the African continent with a 10x10km grid layer. For each grid field, first-order fractionalization is evaluated at the level of that cell's Moore neighbourhood, i.e. the area comprising the central grid cell plus its 8 direct neighbours. My indicator of first-order ethnic fractionalization, $LEFI1$, is thus a moving average of ethnic fractionalization in 30x30km (i.e. 900km^2) areas.[6] Second-order ethnic diversity is evaluated at the level of a 20km corridor surrounding the central Moore neighbourhood. The index for second-order fractionalization, $LEFI2$, is thus calculated as a moving average of ethnic fractionalization in the 40 grid cells surrounding the central Moore neighbourhood (a 4000km^2-large donut'-shaped area formed by a 70x70km outer square with the the central 30x30km Moore neighbourhood cut out).

[6]The main reason why this approach is preferable to evaluating first-order diversity at the level of the 10x10km grid cell itself is the imprecision of the available interview data. In most cases the interview location refers to a larger area such as a district or quarter of a bigger city. The actual places where interviews were conducted may thus be scattered out over a wider area, which typically seems larger than one single grid cell but roughly corresponds to the size of the Moore neighbourhood. The Moore neighbourhood is also used to calculate all secondary and control variables.

For both the central Moore neighbourhood and the 20km corridor surrounding it, I record the number of intersecting ethnic homelands and record the size of each intersecting area. The fractionalization indices are then calculated as the size of an ethnic homeland relative to the size of the other ethnic homelands. Formally, the $LEFI$ indices are calculated as

$$LEFI = \sum_{j=1}^{k} ethn\_share_j \cdot (1 - ethn\_share_j) \quad (2.1)$$

whereby $ethn\_share_j$ is the relative size of the area covered by an ethnic group j in the central Moore neighbourhood or the 20km corridor, and k indicates the total number of groups. Figure 2.3 illustrates graphically how the indices are calculated, and Figure 2.6 in the Appendix visualises second-order fractionalization for a map excerpt of Western Africa. Under the assumption of perfect ethnic homogeneity per ethnic homeland and even population density, the indices would have the familiar interpretation that two people drawn at random were of a different ethnicity. Needless to say, these conditions are typically not matched in reality so that the indices have to be interpreted with due care. For the given sample, the indices range from 0 ($LEFI1$ and $LEFI2$), for Moore neighbourhoods inhabited only by a single group or surrounded only by coethnics, to 0.85 in the most ethnically fractionalized Moore neighbourhood ($LEFI1$) and 0.94 in the most fractionalized 20km corridor ($LEFI2$).

Table 2.1. Pairwise correlations between first- and second-order local fractionalization ($LEFI1$ and $LEFI2$) and other fractionalization indices

	LEFI1	LEFI2	ELF	Alesina03e	Alesina03l	Fearon03	Posner04
LEFI1	1.00						
LEFI2	0.93^{***}	1.00					
ELF	0.55^{***}	0.57^{***}	1.00				
Alesina03e	0.59^{***}	0.59^{***}	0.72^{***}	1.00			
Alesina03l	0.64^{***}	0.70^{***}	0.94^{***}	0.78^{***}	1.00		
Fearon03	0.50^{***}	0.53^{***}	0.73^{***}	0.93^{***}	0.78^{***}	1.00	
Posner04	0.33^{*}	0.28	0.59^{***}	0.45^{**}	0.62^{***}	0.51^{***}	1.00

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

Notes: The calculations are based on the correlations between LEFI1 and LEFI2 (available for all countries included in this study) with the following numbers of countries for which the other named indices are available: ELF (31), Alesina03e (33), Alesina03l (32), Fearon (32) and Posner (28)

Table 2.1 compares the correlations of country-average $LEFI$ values with fractionalization indices developed by other scholars (that are only available at the country level). As can be seen, agreement between the indices is generally high and statistically significant at the 1% level. The only exception is the weak correlation between $LEFI1$, $LEFI2$ and Posner's (2004) index of politically relevant ethnic groups (PREG), which would be worth exploring elsewhere. The very high correlation between $LEFI1$ and $LEFI2$ is a natural consequence of aggregation at the country level. At the level of the interview location, where the quantitative analysis to follow, the correlation between the two $LEFI$ indices drops to 0.77 (p=0.00), allowing us to avoid collinearity issues.[7]

Model specification

To accommodate the data structure, I estimate a multilevel regression model allowing the intercepts of the model to vary between interview locations. This model specification is especially useful in a situation where observations per grouping unit vary greatly (Gelman and Hill 2007; Steenbergen and Jones 2002). This is the case for the Afrobarometer data, where observations per interview location vary from 4 to 920, with a mean of 126 and a median of 64. The distribution is thus highly skewed towards the right, i.e. towards interview locations with few observations, which implies that in individual-level OLS, interview locations with many observations dominate the estimates of average effects.[8] The mixed model represents a compromise between an individual-level analysis, where all observations are given equal weight, and the group-level analysis using group-level averages. The model can be written as:

$$y_{ji} = \alpha + \boldsymbol{X}_{ji}\boldsymbol{\beta} + \boldsymbol{\mu}_j + \epsilon_{ji} \tag{2.2}$$

where j stands for the interview location and i for individual observations. The model includes a set of covariates (X) that contains the independent variables $LEFI1$ and $LEFI2$,

[7] In the OLS version of the regression models introduced below, the variance inflation factor (VIF) for $LEFI1$ and $LEFI2$ varies between 2.4 and 2.9, indicating no serious problem with multicollinearity.

[8] Individual-level OLS assigns the same weight to each observation, so that interview locations with many observations would dominate the calculation of the overall effect. In the multilevel model with varying intercepts used here, each interview location is seen as providing crucial information, while the uncertainty stemming from cases where I have only a few observations per location is duly modelled. In the mixed model, I estimate one equation for each interview location, and the overall effect is the weighted mean of the estimated effect from all interview locations. An alternative approach would be to aggregate the data by interview location. This would leave me with the problem of determining which interview locations to include, as an interview location with four observations should not be given the same weight as one with one hundred.

controls and, in later models, dummies for countries and group affiliation. The difference between this and a normal OLS model is that the intercept is estimated separately for each interview location (j), which results in the additional error term μ. ϵ is the individual error term, which is assumed to be uncorrelated with μ. α is the overall intercept. The effect size is hence calculated as the weighted mean of the effects in each location rather than the mean of all individual observations (as in an individual-level OLS) or the unweighted mean of means (as when working with interview location averages). All models include a dummy variable indicating the Afrobarometer round. Generalized least squares are used to fit the models, and standard errors are clustered at the level of the interview location throughout.[9]

Results

Table 2.2 reports the effect of first- and second-order fractionalization on cooperation, given different model specifications. Panel 1 reports the overall relationship between the two ethnic fractionalization measures and cooperation. We can see that the variance due to the group variable (the interview location) is 21%, and therefore that the hierarchical model is clearly preferable to the individual-level analysis.[10]

As expected, first-order ethnic diversity has a negative effect on cooperation. Moving from a completely ethnically homogenous local community to one marked by complete heterogeneity is associated with a drop of the cooperation score by 0.6, or 14%, of the average score of 4.05 – an effect size roughly two-third of that reported by Miguel and Gugerty (2005, 2352). In contrast, second-order ethnic diversity is associated with an *increase* in cooperation. Moving from an interview location where second-order diversity is zero (i.e. the wider area belongs to a single ethnic 'homeland') to a location where the surroundings are populated entirely by members of other ethnic groups results in an

[9] In Table 2.8 and Table 2.9 in the Appendix, which replicate Table 2.2, I demonstrate that qualitatively similar results can be obtained when using OLS on individual-level and aggregated data instead of the multilevel model.

[10] This is the same as saying that the intra-class (here, intra-interview-location) correlation is 0.21. The much lower BIC and AIC scores of this model, in comparison to the individual level model also show the appropriateness of the multilevel model. For the multilevel model with random intercepts per interview location, these are 453067.8 (BIC) and 453020.1 (AIC), and for the individual-level OLS model these are 469958.6 (BIC) and 469920.4 (AIC).

Table 2.2. Effect of first- and second-order fractionalization on cooperation and measures of political engagement

	(1) Coop	(2) Coop	(3) Coop	(4) Coop	(5) Coop, IV est	(6) Protest	(7) Cont counc	(8) Cont MP
LEFI 1	−0.58***	−0.27**	−0.25*	−0.28**	−1.21*	0.00	−0.12***	−0.06**
	(0.14)	(0.11)	(0.13)	(0.11)	(0.68)	(0.04)	(0.04)	(0.02)
LEFI 2	1.12***	0.54***	0.57***	0.67***	1.65**	0.13***	0.16***	0.10***
	(0.12)	(0.09)	(0.11)	(0.10)	(0.76)	(0.03)	(0.03)	(0.02)
Suit for agrcltr,			0.66***		0.55***			
Michalopoulos 2012			(0.09)		(0.12)			
SD suit agrcltr,			0.38		0.30			
Michalopoulos 2012			(0.31)		(0.30)			
Av altitude in 1,000 m			0.72***		0.63***			
			(0.06)		(0.08)			
SD av altitude			−0.01		−0.01			
			(0.01)		(0.01)			
Abs dev from monthl			−0.02**		−0.02**			
rainf 1980-00			(0.01)		(0.01)			
Av temp, 1950-00			0.09***		0.07***			
			(0.01)		(0.02)			
Av intensity stbl			−0.05***		−0.05***			
nightlights 2000			(0.00)		(0.00)			
Gini coeff of nightl			−0.29***		−0.26***			
intensity			(0.06)		(0.06)			
Intercept	3.63***	2.03***	1.34***	5.59***	1.69***	0.66***	0.47***	0.17***
	(0.05)	(0.11)	(0.27)	(0.09)	(0.35)	(0.01)	(0.02)	(0.01)
Round indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country indicators	No	Yes	No	No	No	No	No	No
Ethnic group indicators	No	No	No	Yes	No	No	No	No
Observations	102282	102282	101401	100862	101401	96298	98130	100436
Random part:								
No. groups	2942	2942	2938	2937	2938	2838	2919	2912
sd(residual)	1.09	0.76	0.97	0.75	0.93	0.30	0.25	0.15
sd(intercept)	2.16	2.16	2.16	2.15	2.16	0.85	0.86	0.59
Rho/ICC	0.20	0.11	0.17	0.11	0.16	0.11	0.08	0.06

Notes: Multilevel linear regression of the index for cooperation on first- and second-order ethnic fractionalization. Intercepts are allowed to vary by interview location. Estimated using generalised least squares.

increase in the cooperation score by 1.12 points, or approximately 28% of the average cooperation score. The effect of first-order diversity is hence overcompensated by that of second-order diversity.

Columns 6-8 show that these basic correlations also hold for forms of collective (or collectively-beneficial) political engagement such as protest behaviour and addressing political representatives. An increase in second-order ethnic fractionalization from zero to one is associated with a 22% increase in the protest measure, and 33% and 51% increased scores for contacting one's local councillor and MP, respectively.[11]

[11] Note that the coefficients for second-order ethnic diversity are statistically different from zero even when applying Bonferroni correction, i.e. dividing the target p-value by the number of comparisons made. In this case, there are 4 different dependent variables. Given a conventional threshold for significance at 5%, the Bonferroni-corrected target p-value is now 1.25%, which is met by all 4 coefficients.

I here used ethnic fractionalization as my main independent variable because it provides a flexible measure, because the discourse in the literature centres around it and because it might be more useful for other scholars. Arguably a more concise measure for the exposure to ethnic outgroups – or the potential threat emanating from the surroundings of a given community – would be the share of non-coethnics in those surroundings. Calculating such a measure is complicated by the fact that more than one group can inhabit each grid cell. To simplify, I therefore focused on the group whose –homeland' covers the largest share of a given grid cell, and calculated indices for that group only. For each such group dominating a grid cell, I calculated indices recording which share of its Moore neighbourhood or 20km corridor is covered by the ethnic 'homeland' of another ethnic group. The resulting measures correlate strongly with the fractionalization indices ($r = .82, p = .00$ and $r = .81, p = .00$ for the correlations between LEFI1 and LEFI2, respectively), and Table 2.4 in the Appendix shows that the results presented in Table 2.2 are replicated when using this alternative measure. Further robustness checks are included in Table 2.5 in the Appendix, which shows that comparable results can be obtained when using analogously constructed fractionalization measures based on the *Atlas Narodov Mira*, when using ethnic polarization indices instead of fractionalization indices, with sample-based measures of ethnic diversity, and with distance to the closest interethnic border as a measure for second-order ethnic diversity. Table 2.5 also shows that the basic correlations hold when using membership in volunteer or religious associations as alternative measures of local cooperation. [12]

Threats to inference, controls and alternative formulations

Out of the two classic threats to causal inference, reverse causality and spuriousness, spuriousness seems to be more problematic for the current study, not least due to the heterogeneity of the sample. The positive relationship between second-order ethnic diversity and local cooperation may be caused by third factors that positively co-vary with both. To control for possible confounding effects, I therefore include a range of control variables in my model. To check for the influence of state institutions and other invariable country-

[12]Figure 2.7 in the Appendix shows that this positive relationship appears to be unique to Africa. This may have to do with the historical factors that have shaped interethnic relationships on the African continent (some of which are discussed below) and which set it apart from other continents.

level characteristics, in Panel 2 of Table 2.2 I include dummy variables for each of the 33 countries included in my sample. The reduced coefficients indicate that part of the association between second-order fractionalization and cooperation is explained by the fact that countries with high ethnic diversity on average also show higher levels of cooperation. However, even when relying solely on within-country variation, the effect of second-order fractionalization remains substantially positive and precisely estimated.

Another possibility is that the factors that cause ethnic diversity also cause communities to cooperate more. This idea is particularly relevant to the climatic and geographic factors which could plausibly also have a direct influence on local cooperation. In particular, previous research has shown that regions more diverse in terrain and suitability for agriculture produce a larger number of ethnic groups (Michalopoulos 2012). Adverse weather conditions in the mountains may force people to cooperate more, or more fertile and productive grounds may encourage more cooperative forms of agriculture, which in turn may raise a community's level of cooperation in other areas as well.

For each Moore neighbourhood I hence calculate the average values for suitability for agriculture and its variability (using an indicator provided by Michalopoulos), mean temperature, variability in rainfall, average altitude and variation of altitude for inclusion in my model. As Panel 3 demonstrates, while the effects of first- and second-order fractionalization on cooperativeness are slightly reduced in size when simultaneously controlling for these factors predicting ethnic diversity, they remain substantial and statistically significant.[13] Finally, my data allows me to include indicator variables for the 770 self-reported ethnicities included in the data. In many cases, members of the same self-reported ethnic group are present at several interview locations, often located in different countries, making it possible to check for effects among the members of the same ethnic group by including ethnic-group level fixed effects. As Panel 4 shows, even

[13]Several authors (e.g. Letki 2008; Portes and Vickstrom 2011) have pointed out that the effects of ethnic diversity are due to socioeconomic factors such as absolute levels of wealth and inequality. Although I agree with Schaeffer (2014) that these might be considered channels through which ethnic diversity can influence cooperation levels rather than confounders, I also include as controls a measure of wealth of the locality – measured in terms of nightlight intensity – and of local inequality – the Gini coefficient capturing differences in nightlight intensity within the Moore neighbourhood that an interview location is placed in. Although rather strong predictors of local cooperation in and by themselves, wealth and inequality do not strongly moderate the effect of ethnic diversity.

among members of the same group who likely share many of the same cultural attributes, second-order ethnic diversity positively correlates with local cooperation.[14]

Reverse causality may be considered less of an issue for the present analysis, as ethnic diversity is often considered exogenous (cp. Miguel and Gugerty 2005). This said, there is a possibility that cooperation has shaped ethnic settlement patterns in space, as particularly cooperative communities may have found it easier to keep other groups out of 'their' areas of settlement. However, the resultant correlation would be negative: more cooperative regions should be less ethnically diverse. If there was a parallel causal relationship running from cooperation to ethnic diversity, it would thus likely make it harder, not easier, to detect the positive relationship reported here. For additional confidence with regard to the direction of the causal arrow, I propose to instrument ethnic diversity with two of its ultimate predictors. Previous research has shown the distance from the equator as a major predictor of ethnic diversity, and has also identified migratory distance from mankind's cradle in present-day Ethiopia as reducing both genetic and, as a consequence, ethnic diversity (Ahlerup and Olsson 2012; Ashraf and Galor 2013; Mace and Pagel 1995).

Following this scholarship, I propose to use absolute latitude and the distance to Addis Ababa as instruments for second-order ethnic fractionalization. As demonstrated in the first-stage regressions (see Table 2.11 in the Appendix), both variables strongly predict ethnic diversity. One problem is that both absolute latitude and distance to Addis Ababa also correlate with climatic and geographic factors identified above as potential confounders. However, conditioning on the measures for climatic conditions and geographic factors already included in the model, the exclusion restriction that the instrument should impact the dependent variable only through its influence on the independent variable, should be met.[15] Panel 5 reports the estimates for the coefficient of second-order diversity instrumented by distance to Addis Ababa and absolute latitude. The coefficient is positive, about 1.5 times the size of the coefficient of the naïve estimate and statistically significant. The IV results hence confirm the intuition that second-order ethnic diversity induces

[14]For the rest of the chapter, I use the model in Panel 2, i.e. the model excluding the additional control variables but including country-level fixed effects, unless explicitly stated.

[15]Variations of the IV regressions excluding additional controls and using each instrument individually are explored in Table 2.10 in the appendix. All estimated effect sizes are positive, large and precisely estimated.

cooperation (and not the other way round) and that the estimates from the previous regressions likely constitute lower bounds of this effect.

Modelling spatial dependencies

As an alternative to the random effects model with ethnic-group or country-level fixed effects (which absorb much of the variation between interview locations), I estimate a spatial dependency model. Above, it was argued that not only should cooperation depend on fractionalization of a neighbourhood and its surroundings, but that the level of cooperation in those surroundings should also have an influence. This idea is addressed by means of a spatial dependency model. TThe spatial dependency model explicitly models the effect cooperation in nearby communities has on cooperation on a target community – the – 'spatial lag' of cooperation. The model more explicitly addresses and tests the idea that cooperation levels not only depend on the degree of ethnic fractionalization in the neighbourhood, but also on cooperation levels in nearby communities, which, in turn, are influenced by the degree of ethnic diversity in their surroundings.

Concretely, I estimate a spatial dependency model with a spatially lagged y variable (Anselin 1988; Le Sage and Pace 2008; Ward and Gleditsch 2008). This model has the mobilization score of a given individual/interview location on the left hand side of the equation, just as in the models before. However, in addition, the mobilization scores of all other interview locations are added onto the right hand side of the equation. These mobilization scores from neighbouring communities are weighted with weights ω held in a matrix $\mathbf{W}$ that records the relative influence of each interview location on the others.

Here, two types of weights are presented: first, I use binary weights that assign a weight of 1 to interview locations that are no more than 100km apart, and 0 to all others. Second, I use weights calculated as inverse-distance-squared spatial weights with a numerator of 1 and the square of the distance between two interview locations in km as the denominator (the same specification of the distance weights is used below when calculating an indicator for the impact of the transatlantic slave trade).[16] Based on these weighting schemes, we

[16] These two weighting schemes have different advantages and drawbacks. For the model estimation with maximum likelihood, the weighting matrix needs to be row-standardized, meaning that all weights for a given location have to sum up to 1. The first weighting scheme has the advantage that the row-standardization in this case is more plausible: only cooperation in close-by locations can influence the cooperation in a given

can calculate a simple measure checking for the presence or absence of spatial dependence, Moran's I. For the two weighting schemes, Moran's I are 0.5 and 0.43, indicating a high degree of spatial dependence in the data.

The full spatial lag model can be written as:

$$y = \boldsymbol{X\beta} + \rho \boldsymbol{W} y + \epsilon \tag{2.3}$$

where y is the cooperation score in a target community, the vector **X** includes LEFI1 and LEFI2 (plus additional controls) and ϵ is an error term. Spatial dependency in the data is captured by the coefficient for the weighted spatial lag ρ.

The results are presented in Table 2.3. As can be seen from the value for ρ, the spatially lagged dependent variable is clearly the strongest predictor in the model and highly significant, indicating that cooperation levels in one location strongly correlate with cooperation scores nearby. According to the model, a one-point increase in cooperation in connected communities is associated with a 0.65–0.7 increase (depending on the weighting matrix used) in the target community. This suggests that cooperation levels move up and down in terms of regional equilibria, which is in line with the idea that communities increase their level of cooperation.

As for the coefficients for $LEFI1$ and $LEFI2$, we can see that these are strongly reduced in comparison to the OLS and random effects model estimates. As cooperation appears both on the left hand side and the right hand side of the equation, and because cooperation scores absorb the effect of ethnic fractionalization, the coefficients for $LEFI1$ and $LEFI2$ cannot be interpreted in the same way as before. Rather, the coefficients should be interpreted

location. It comes at the cost, however, that the influence of the different locations within the 100km radius is not weighted, and that some interview locations simply have no neighbouring locations within the 100km, so they have to be discarded. This was the case for 59 interview locations. The second weighting scheme is probably more realistic, weighting the influence of each of the nearby locations with the square of the distance. It also has the advantage that no data is being discarded. However, row-standardization means that if an interview location only has far-away neighbouring interview locations, the cooperation scores of the latter are nevertheless modelled to have a strong influence (summing up to 1) on the given interview location, neglecting the fact that cooperation in that interview location is most probably more importantly influenced by cooperation in the surroundings, for which there is no interview data available, however.

Table 2.3. Spatial lag models of cooperation

	(1) Coop. binary W	(2) Coop. test binary W	(3) Coop. inv. sq. dist. W	(4) Coop. inv. sq. dist. W
LEFI1 short term	−0.23*	−0.21*	−0.28**	−0.26**
	(0.12)	(0.12)	(0.12)	(0.12)
LEFI1 total impact	−.76*	−.68*	−.85**	−.74**
	(0.40)	(0.38)	(0.37)	(0.35)
LEFI2 short term	0.42***	0.41***	0.52***	0.49***
	(0.10)	(0.10)	(0.10)	(0.10)
LEFI2 total impact	1.42***	1.30***	1.55***	1.37***
	(0.32)	(0.31)	(0.30)	(0.28)
Intercept	0.99***	0.99***	0.95***	0.95***
	(0.01)	(0.01)	(0.01)	(0.01)
ρ	0.66***	0.65***	0.69***	0.70***
	(0.02)	(0.02)	(0.02)	(0.02)
Additional controls	No	Yes	No	Yes
Observations	2884	2884	2942	2942
Moran's I	0.495***	0.495***	0.434***	0.434***
Test value (-1/(n-1)	−0.00035	−0.00035	−0.00034	−0.00034

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

as the short-term influence of $LEFI1$ and $LEFI2$, not taking into account the effect a change in fractionalization has through its knock-on influences on cooperation.

For example, a group invading the surroundings of one of the communities would change the second order fractionalization of that location. As a reaction, people would increase their level of cooperation in this district. Following on from this, neighbouring communities would respond by increasing their level of cooperation in response. This, in turn, would also affect the first community, although plausibly this impact would be smaller than that of the first shock, and so on. The change of mobilization scores in one location, induced by a change in second order mobilization or any other factor, would thus send ripples through the whole system causing recursive adjustments until a new steady state is found. The speed of the adjustment depends on how strongly the effects of an external shock diffuse in space. At the extremes, if the effect of each shock was passed on one-to-one to all neighbouring communities, any shock would escalate cooperation scores to their maximum. If the effect of each shock decays to zero very quickly, these ripple-on effects would be much less severe.

This can be seen more formally when considering the expected value for y in equilibrium, which results from moving all terms that contain y onto one side of the equation, solving for y and forming expectations:

$$\begin{aligned}(\boldsymbol{I} - \rho\boldsymbol{W})y &= \boldsymbol{X\beta} + \epsilon \\ E(y) &= (\boldsymbol{I} - \rho\boldsymbol{W})^{-1}\boldsymbol{X\beta}\end{aligned} \tag{2.4}$$

From this expression it follows that the equilibrium impact of the independent variables only equals $\boldsymbol{X\beta}$ if ρ equals zero. In all other cases, to obtain the equilibrium impact we have to multiply with the spatial multiplier $(\boldsymbol{I} - \rho\boldsymbol{W})^{-1}$, which tells us how much a change in the fractionalization indices will spill over to other units, depending on the estimated spatial lag ρ, the equilibrium influence of fractionalization, and the position of a interview location in the spatial network (captured in $\mathbf{W}$). Since the relative influence of interview locations in the spatial network varies, the effect of a change in the fractionalization is specific for each location. In the given case, the average knock-on effects of ethnic fractionalization are only moderate. Based on this, the total impact of a change from complete homogeneity to complete heterogeneity can be calculated as $^1/_{(1-\rho)}\boldsymbol{\beta}$ (Le Sage and Pace 2008, 38). The total estimated impact for $LEFI1$ is about -0.70, and that for $LEFI2$ about 1.4 – somewhat higher than estimated by the random intercept model, but similar to those resulting from a simple OLS regression using aggregate data (see Table 2.9 in the Appendix).

Ethnic competition as the connecting link between ethnic diversity and cooperation

Having now established the relationship between second-order ethnic diversity and cooperation, the next section demonstrates that it is indeed ethnic competition that forms the connecting link between the two. The demonstration starts with the identification of factors that reinforce or weaken ethnic competition, and then interacts these factors with the measure for second-order diversity. Interaction terms that show the hypothesized direction are interpreted as supporting evidence for the idea that competition and conflict are at the root of the link between the ethnic diversity of the *hinterland* and cooperation.

Bates's theory of ethnic competition

Arguably the most sophisticated theory of ethnic competition in Africa comes from Bates (1974, 1983b). Bates argues that competition between ethnic groups is mainly about the spoils of modernization, with ethnic groups being particularly well-suited vehicles to compete over these spoils. This is because scarce resources such as access to land suitable for cash cropping, modern sector jobs that promise higher incomes and status, and the educational opportunities to obtain these jobs are clustered in space, the latter two in or near cities. Since members of the same ethno-linguistic group tend to settle in geographically compact areas, ethnic groups are ideally placed to compete over such spatially-bound resources. Leaders hence mobilise the populace along ethnic lines and foster cooperativeness in areas where such resources are available. Bates further argues that this effect was reinforced by colonial authorities who tended to assign discrete territories to specific groups. After independence, the local administrative divisions of the newly formed states would often follow these boundaries.

I thus test whether the effect of second-order diversity is stronger in more urbanised areas, in areas particularly suited for cash crop production and where administrative divisions follow interethnic boundaries.[17]

The results are presented in Figure 2.4(a), which plots the effect of second order ethnic fractionalization on cooperation conditional on the interacted factors (see Table 2.6 in the Appendix for regression results). In line with the predictions of the theory, second-order ethnic diversity is more strongly correlated with cooperation in urbanised regions than it

[17] I measure the level of urbanisation of a Moore neighbourhood as the share of that neighbourhood covered by remotely sensed 'urban extents' around the year 2002, based on data from Schneider et al. (2003), and as suitability for cash-crop production using a composite measure for soil quality calculated with data from Fischer et al. (2008). I also calculate an indicator that records how many local administrative regions a particular Moore neighbourhood is divided into, using information on district level administrative boundaries from the Global Administrative Unit Layer published by the Food and Agriculture Organisation of the United Nations (FAO 2008). Assuming that ethnic competition is particularly severe where cultural and administrative boundaries fall together, second-order ethnic diversity should also more strongly affect cooperation here. I regress the cooperation measure on the interaction between these three measures and measures of second-order local ethnic fractionalization ($LEFI2$ in case of the interaction with the urbanisation and the soil quality measure, and the number of groups in the second-order Moore neighbourhood in case of administrative borders).

is in rural regions. As indicated by the wide confidence intervals enclosing the average unconditional effect of $LEFI2$ on cooperation, this effect is statistically relatively weak, however. At odds with Bate's theory, soil quality actually seems to temper the effect of second-order ethnic diversity rather than to reinforce it. Again in line with the theory, the presence of administrative boundaries positively and strongly mediates the effect of second-order diversity on cooperation.

While providing preliminary evidence that ethnic competition links second-order ethnic diversity and cooperation, the tests are not entirely conclusive. One conjecture is rejected, and while the other two are confirmed, the urbanisation measure is rather noisy, and the administrative boundary measure potentially suffers from endogeneity bias: more cooperative communities may have found it easier to have the boundaries of their ethnic territories demarcated by administrative borders. I therefore turn to history to identify factors that are linked to competition, but are plausibly orthogonal to cooperation dynamics. My aim is to show that second-order diversity has a stronger effect on cooperation in regions where historic, discontinued processes increased levels of conflict than in regions were intergroup conflict was less pronounced. These tests are based on the assumption that historic processes can shape contemporary attitudes and behaviour through cultural transmission (Alesina, Giuliano, and Nunn 2011; Cavalli-Sforza and Feldman 1981; El Mouden et al. 2014; Guiso, Sapienza, and Zingales 2013; Tabellini 2010).

Arbitrary borders and 'artificial' ethnic diversity

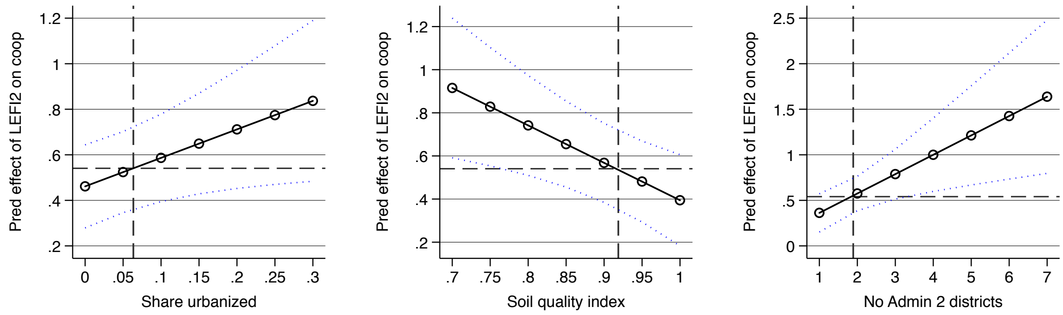
Most national borders in Africa were drawn by colonial powers with little attention to social realities on the ground. As a consequence, members of the same ethnic groups often ended up distributed over several countries. As Africa has seen remarkably few border changes in the period after independence, across the continent this situation persists until this day (McCauley and Posner 2015). In contrast to the local administrative borders referred to above, it is therefore unlikely that the drawing of national borders is affected by endogeneity bias.

The *Ethnologue* assigns several 'homelands' to the same ethnic group if that group is divided by a national boundaries. For instance, the Tumbuka in Zambia are assigned an ethnic homeland, and so are the Tumbuka of Malawi. This may be justified since the same ethnic identity may play fundamentally different roles, depending on the national political context (Posner 2004c). Nevertheless, we may assume that competition should be less pronounced between culturally highly similar groups than between more distant groups (see Figure 2.5(a) below for a graphical representation of groups spanning several national borders). Second-order diversity should therefore induce less cooperativeness in a context where some of the diversity is simply due to co-ethnics living in neighbouring countries. To test this hypothesis, I identify the number of co-ethnic groups of different nationalities among all neighbouring groups in the 20km corridor surrounding the central Moore neighbourhood. I then interact this measure with the total number of groups (the alternative measure for ethnic diversity introduced above) and regress the cooperation measure on the interaction term. As shown in Figure 2.4(b), as expected, the interaction results in a negative slope. Although this effect is statistically weak, communities in contexts where some of the ethnic diversity in the surroundings is made up of co-ethnics indeed appear to be less cooperative than communities where second-order ethnic diversity is made up of culturally distinct groups.

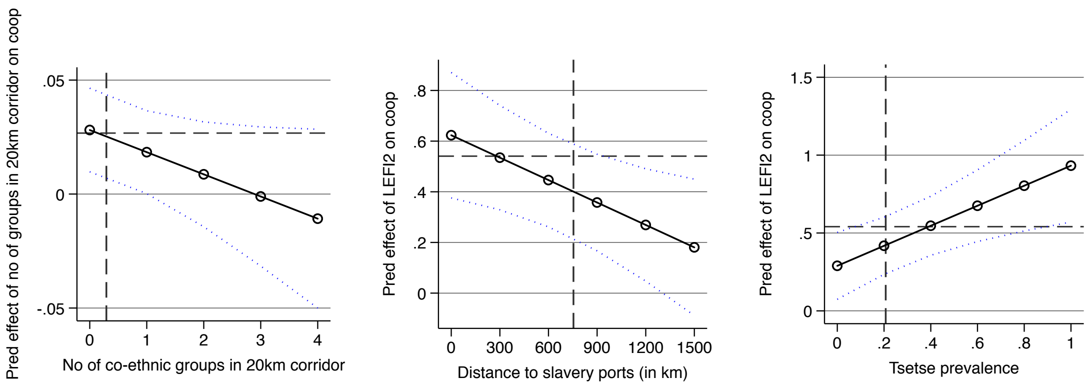
The legacy of the transatlantic slave trade

A historic process that made a deep impact on interethnic relations was the slave trade and the interethnic raids and feuds associated with it. Numerically by far the largest slave trade (in comparison to the Indian Ocean and Arab slave trades) was the transatlantic slave trade. Between the beginning of the 16th and the end the 19th century, an estimated 12.5 million Africans were captured, sold to European traders and shipped across the Atlantic (Richardson 2011, 463). While the demand from Europeans was driving the trade, the capture of slaves was typically carried out by rivalling African states, chiefdoms and communities. During these four centuries of Africa's more recent history, the slave trade hence constituted a major cause of ethnic conflict and competition, leading one contemporary observer and abolitionist to call the slave trade "the chief cause of wars in Africa" (Wilberforce 1789, 9).

Figure 2.4. Effect of second-order ethnic fractionalization conditional on contemporary and historical factors hypothesized to reinforce ethnic competition



(a) Contemporary factors



(b) Historical factors

Solid lines show the effect of LEFI2 on cooperation, conditional on the interacted variables. Dashed lines show the average effect of LEFI2/the variable mean of the interacted variable. 95% confidence intervals are indicated as dotted lines.

The effect of the slave raids were devastating, especially in regions close to the coast. Some regions were affected so badly that populations stagnated or shrank (Diagne 1992; Vansina 1992). Frequent slave trading and kidnapping disrupted the "economic and social systems of communities. . . villages were destroyed or dispersed, farms were abandoned and people lived in terror" (Alagoa 1992, 452).[18] Slave raiding also set off population movements, as it caused people to migrate inland in search of safer refuges. This process led to knock-on effects with migrating communities coming in conflict with others.[19]

[18]In some cases, the slave trade also let members of the same community turn against each other. A commonly applied rule during the years of the slave trade stipulated that one captive could be freed in exchange for two others, which sometimes meant that people would capture and sell members of their community into slavery to free family members or friends (Diouf 2003).

[19]Vansina 1992, 605–7. Phiri, Kalinga, and Bhila (1992, 622) describe how in present-day Zambia the migrating Maravians encountered "a Tumbuka people who were self-sufficient economically but loosely organized politically [that showed] little political or military cooperation among the different Tumbuka clans." As a result, they were easily defeated.

While the transatlantic slave trade therefore poisoned interethnic relations and undermined trust (Nunn and Wantchekon 2011), within communities, protection from slavery necessitated cooperation. In response to frequent slave raiding, communities would relocate to harder to access, easier to defend or easier to survey locations, or would built fortifications – a classic collective action problem.[20] Under the intense pressure of slave raiding, arguably only particularly cooperative communities could sustain themselves, as only they could muster the effort to pursue collective defence strategies. Slave raiding also affected settlement patterns, inducing people to move closer together and to adopt more cooperative methods of agriculture (Klein 2003; Udo 1965). Ethnographic accounts hence lend plausibility to the argument that more cooperative communities fared better in the violent environment created by the transatlantic slave trade, as less cooperative communities would be defeated or disintegrate.

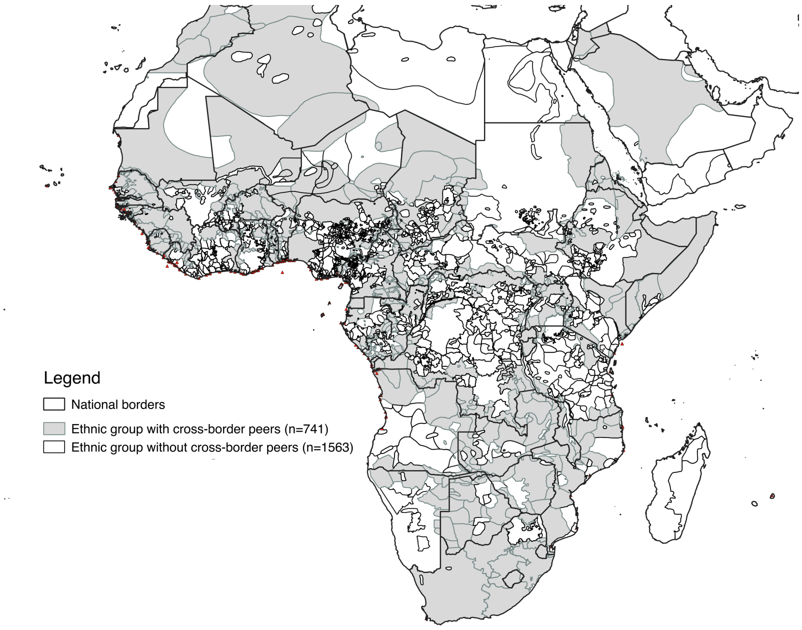
As a proxy for historic exposure to slavery, I use the average distance between an interview location and the 5 closest ports from where slaves were shipped to the Americas. As shown by the negative interaction effect, the relationship between second-order ethnic diversity and local cooperation is stronger in regions historically more heavily affected by the transatlantic slave trade.[21] The force of this test stems from the fact that the slave trade affected Africa in ways that are plausibly orthogonal to other factors potentially influencing present-day levels of cooperation. First, the transatlantic slave trade stopped during the 19th century – more than a century before the data for this study was collected. Second, the slave trade followed its own regularities unlikely related to previously existing levels of cooperativeness in the societies that slaves hailed from. For instance, communities at the West coast of Africa were far more strongly affected by the transatlantic slave trade than those on the East coast, for the obvious reason that the main 'markets' for slaves were in the Americas and the journey from the West coast shorter (see Figure 2.5(b)). Third, if anything, slave raiding might have been more common where cooperativeness was lower,

[20]For example, the inhabitants of the Mandara mountains (located between present-day Nigeria and Cameroon) fortified their villages with brick walls and walls grown out of thorny bush (Bah 2003, 21), and the Tofinu of Benin relocated their village into the marshlands to evade slave-raiding armies of Dahomey unfamiliar with this type of environment (Soumonni 2003).

[21]See Table 2.7 in the Appendix for details and additional tests.

as societies where less able to fend off the raiders. Selection should therefore bias against finding higher levels of cooperation where slave raiding was more common.

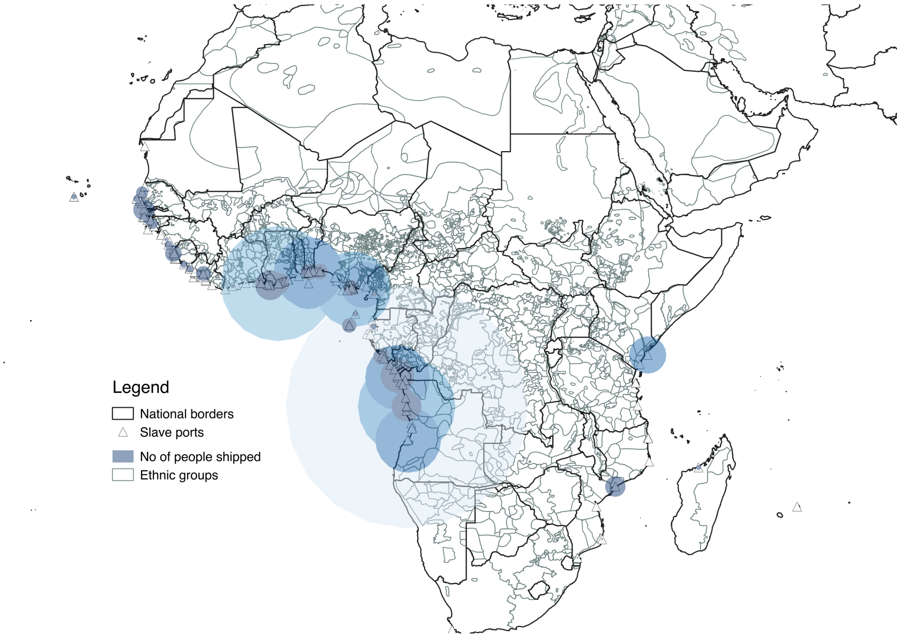
Figure 2.5. Factors associated with lower or higher ethnic competition



(a) Ethnic groups spanning national borders, creating 'virtual' ethnic diversity

The presence of the tsetse fly

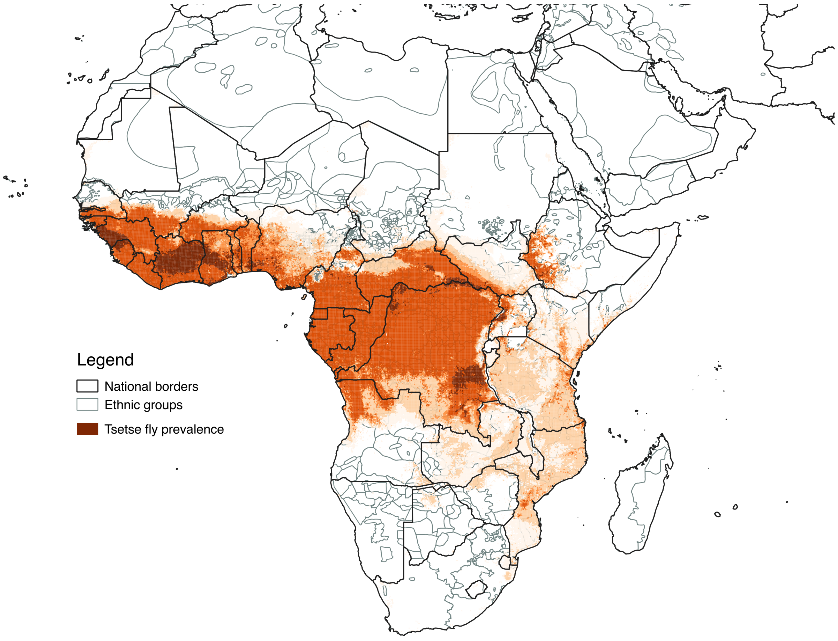
As a last test, I show that second-order ethnic diversity has a stronger effect on cooperation where the tsetse fly is endemic. The current spread of the tsetse fly, illustrated in Figure 2.5(c), serves as a proxy for its historical spread, which in turn proxies historically decreased political centralisation and increase demand for indigenous slaves – both factors arguably linked with inter-community competition and conflict. The tsetse is the main transmitter for *trypanosomes*, parasites that cause sleeping sickness in humans and *Nagana* in many animals. Nagana weakens and kills domesticated animals such as oxen and horses. The tsetse fly thus limits both agricultural productivity and the projection of power via cavalry. Both factors have been linked to the weakness of states (Diamond 1999; Law 1976), and a recent paper directly links the presence of the tsetse fly to lowered state centralisation (Alsan 2015).



(b) Regional affectedness by the transatlantic slave trade

Decreased state capacity, in turn, meant that communities could rely less on a centralised power to keep the peace, implying a more important role for self-organisation in military affairs. What is more, the non-availability of transport animals also increased the demand for human carriers – a role typically burdened on indigenous slaves – and by implication may have increased tensions between local communities in a way similar to the trans-Atlantic slave trade (Glasgow 1963, 3). I proxy the historic occurrence of tsetse flies with their current prevalence level using GIS-readable data on the probability of the presence of tsetse flies.[22] As shown in Figure 2.4, the ethnic diversity of a community's *hinterland* is more strongly associated with cooperation where the tsetse fly is currently – and presumably was historically – more common. Taken together, the evidence from these tests therefore suggests that the link from second-order diversity to cooperation runs through ethnic competition.

[22] The data was produced by Wint and Rogers (2000) for the UN's Food and agriculture organisation FAO (Figure 2.5(c)). In this case it is harder to argue that the effect of the prevalence of the tsetse fly is orthogonal to social dynamics, since unlike the legacy of slavery, tsetse prevalence actually correlates positively with local cooperation. To validate the interaction, I therefore include the climatic and geographic factors previously used as controls (which also correlate with the prevalence of the tsetse fly) in the equation. This only slightly weakens the interaction term between second-order diversity and tsetse prevalence (Panel 7).



(c) Contemporary distribution of the tsetse fly

Conclusion

This chapter introduces the concept of second-order ethnic diversity – the ethnic diversity of the *hinterland*. In contrast to first-order ethnic diversity – the diversity of the local community, which tends to undermine local cooperation – second-order diversity increases cooperation through ethnic competition. Two novel indices, the local ethnic fractionalization indices $LEFI1$ and $LEFI2$, are used to measure first- and second-order ethnic diversity on the sub-national level. The empirical analysis shows that in contemporary Africa, in line with theoretical considerations, first-order ethnic diversity is typically associated with lower levels of cooperation, while second-order ethnic diversity is consistently associated with higher levels of cooperation. The cooperation-inducing effect of second-order ethnic diversity is particularly pronounced where contemporary and historical factors predict increased interethnic tensions. Several of these factors, such as the drawing of colonial borders, the geographic pattern of the transatlantic slave trade, and the distribution of the tsetse fly are plausibly exogenous to current-day social dynamics, suggesting a causal link running from ethnic competition to increased cooperation.

From the idea of second-order diversity, a new synthetic understanding of the effects of ethnic diversity could be developed. The study of cooperation so far has mainly looked at how ethnic diversity undermines cooperation when members of different groups interact locally. This chapter joins the more limited literature arguing that what matters is not only on the ethnic composition at the place of interaction, but also the ethnic profile of neighbouring communities. In addition, the chapter contributes to the debate on the origins of the global 'geography of social capital'. Outgroup threat may join market exposure, settlement size and monotheistic religion as a factor explaining why cooperation levels vary between different communities and regions.

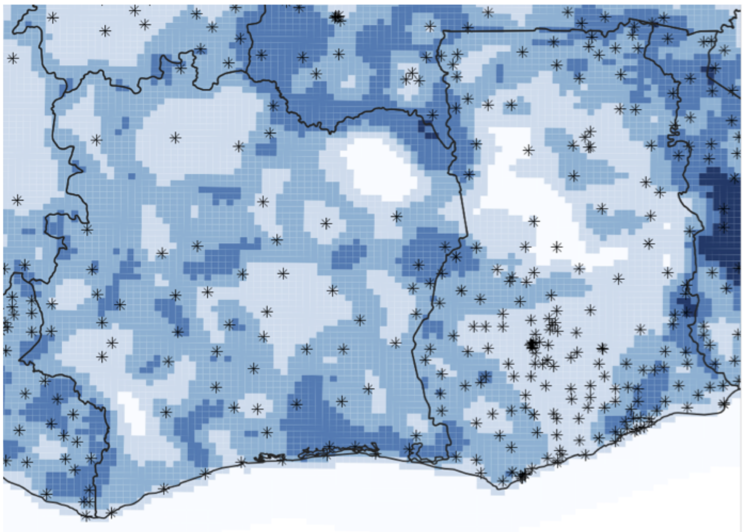
Due to the geographic scope of the study (covering a whole continent) and the limits on data availability, some of the concepts used in this chapter could only be measured somewhat imprecisely. As long as measurement error is random, this is not problematic *per se*, as it simply makes it harder to detect any effect. Nevertheless, further studies using more precise measurements, likely at a more micro level, would clearly be warranted. Such work should also probe for interaction effects. For instance, communities historically often reacted to outgroup threat with an increase in the size and density of settlements (Dincecco and Gaetano Onorato 2016; Udo 1965) – which suggests that outgroup threat and the size of settlements may interact. Other interaction effects – for example with the spread and adoption of monotheistic religions – are also possible.

A further task would be to draw out the implications of the link between second-order ethnic diversity and cooperation for politics and the state more broadly. As a first step, this would require qualifying the nature of the cooperation induced. It is likely that rather than reflecting virtuous citizenship, the type of cooperation associated with ethnic competition must be qualified as cliquish, 'dark' 'bonding' social capital undermining the development of a liberal society (Gambetta 1988a; Grosjean 2014; Satyanath, Voigtlaender, and Voth 2013). However, the fact that higher cooperation levels might only be the *legacy* of a violent and competitive past allows for a more positive view. It could be that the behavioural pattern observed is no longer motivated by the reasons that originally triggered it. Although contemporary high levels of cooperation may have had their roots in historic conflicts between communities, communities nowadays may use the habits and norms prescribing cooperation for purposes favourable to the wider society. The data presented in this chapter leave room for both interpretations and only more detailed studies will tell.

Chapter appendix

Illustration LEFI2

Figure 2.6. Second-order ethnic fractionalization in Côte d'Ivoire and Ghana



Higher second-order fractionalization/$LEFI2$ values depicted in darker colours.
Approximate interview locations indicated by cross hairs.

Alternative specifications

Notes on the alternative specifications presented in Table 2.5: Panels 1–4 report regressions of the cooperation index on different measures for first- and second-order ethnic diversity.

Panel 1 uses first- and second-order fractionalization measures calculated based on the digitized format of the *Atlas Narodov Mira* made available by Weidmann, Rød, and Cederman (2010) as alternative independent variables (IVs). This ethnic fractionalization index based on the *Atlas Narodov Mira* (ANM) generally seems to measure fractionalization less precisely than that based on the *Ethnologue*, and is not robust to the inclusion of country fixed effects. Panel 2 uses polarization indices calculated based on *Ethnologue* data as IVs. Inspired by Montalvo and Reynal-Querol (2005), the local ethnic polarization indices ($LEPOL$) are calculated as:

$$LEPOL = 1 - \sum_{j=1}^{k} \left(\frac{1/2 - ethn\_share_j}{1/2} \right)^2 ethn\_share_j$$

whereby, as before, $ethn\_share_j$ is the relative size of the area covered by an ethnic group j in the Moore neighbourhood or 20km corridor, and k indicates the total number of groups.

Table 2.4. Effect of the share of ethnic outsiders in the the Moore neighbourhood and the 20km corridor on cooperation

	(1) Coop	(2) Coop	(3) Coop	(4) Coop	(5) Coop, IV est	(6) Protest	(7) Cont counc	(8) Cont MP
Share of other groups than largest in Moore neighbourhood	−0.59***	−0.39***	−0.31**	−0.35**	−1.41*	−0.05	−0.16***	−0.08***
	(0.17)	(0.13)	(0.15)	(0.14)	(0.73)	(0.05)	(0.05)	(0.03)
Share of groups other than largest in 20km corridor	0.79***	0.46***	0.35***	0.53***	1.37**	0.13***	0.13***	0.07***
	(0.13)	(0.10)	(0.12)	(0.12)	(0.67)	(0.04)	(0.03)	(0.02)
Suit for agrcltr, Michalopoulos 2012			0.69***		0.60***			
			(0.09)		(0.11)			
SD suit agrcltr, Michalopoulos 2012			0.37		0.20			
			(0.31)		(0.32)			
Av altitude in 1,000 m			0.78***		0.74***			
			(0.06)		(0.06)			
SD av altitude			−0.01		−0.01			
			(0.01)		(0.01)			
Abs dev from monthl rainf 1980-00			−0.03***		−0.02**			
			(0.01)		(0.01)			
Av temp, 1950-00			0.10***		0.09***			
			(0.01)		(0.01)			
Av intensity stbl nightlights 2000			−0.05***		−0.05***			
			(0.00)		(0.00)			
Gini coeff of nightl intensity			−0.29***		−0.24***			
			(0.06)		(0.07)			
Intercept	3.77***	2.05***	1.14***	5.61***	1.40***	0.68***	0.49***	0.18***
	(0.05)	(0.11)	(0.27)	(0.10)	(0.30)	(0.01)	(0.02)	(0.01)
Round indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country indicators	No	Yes	No	No	No	No	No	No
Ethnic group indicators	No	No	No	Yes	No	No	No	No
Observations	101378	101378	100497	99967	100497	95397	97230	99515
Random part:								
No. groups	2916	2916	2912	2911	2912	2812	2894	2886
sd(residual)	1.10	0.76	0.97	0.76	0.93	0.30	0.25	0.15
sd(intercept)	2.16	2.16	2.16	2.15	2.16	0.85	0.86	0.59
Rho/ICC	0.21	0.11	0.17	0.11	0.16	0.11	0.08	0.06

Notes: Multilevel linear regression of the index for cooperation on first- and second-order ethnic fractionalization. Intercepts are allowed to vary by interview location. Estimated using generalised least squares.

Panel 3 uses the number of self-reported mother tongues divided by the number of interviewees at any given Afrobarometer interview location as an indicator for first-order diversity, and the number of self-reported mother tongues divided by the number of interviewees in the wider region as an indicator for second-order ethnic diversity as alternative IVs. Again, this measure is not robust to the inclusion of country-level fixed effects, however. Panel 4 uses the distance to the closest interethnic border/ the border between two ethnic 'homelands' as alternative IV. This distance is calculated as the crow-fly distance between an interview location and the closest border between two ethnic 'homelands' using the *Ethnologue*. The negative sign on the coefficient means that the further away from an interethnic border an interview location is located, the lower is cooperation. Panels 5 and 6 report regressions of alternative measures for cooperativeness on $LEFI1$ and $LEFI2$. 'Volunteer' is a survey item from the Afrobarometer asking whether a respondent is a member of a voluntary association or community group. This measure is only available for Afrobarometer rounds 4 and 5. 'Rel group mbr' refers to a survey item asking respondents whether they are a member of a religious group. To both items, respondents could answer that they are 'not a member', an 'inactive member', an 'active member' or an 'official leader'.

Table 2.5. Alternative specifications

	(1) Coop	(2) Coop	(3) Coop	(4) Coop	(5) Volunteer	(6) Rel group mbr
LEFI1 calculated with Atlas Narodov Mira data	−0.34**					
	(0.16)					
LEFI2 calculated with Atlas Narodov Mira data	0.82***					
	(0.13)					
LEPOL1, ethnic polarization of Moore neighbourhood		−0.01				
		(0.06)				
LEPOL2, ethnic polarization of 20km corridor neighbourhood		0.22***				
		(0.06)				
Sample-based linguistic diversity at interview location			−0.80***			
			(0.19)			
Sample-based linguistic diversity in region			3.11***			
			(0.84)			
Distance to closest interethnic border in 100km				−0.21***		
				(0.04)		
LEFI 1, local ethn frac					−0.05	−0.01
					(0.04)	(0.04)
LEFI 2, ethn frac of *hinterland*					0.21***	0.13***
					(0.04)	(0.03)
Intercept	3.73***	2.04***	3.88***	2.22***	0.11***	0.43***
	(0.05)	(0.11)	(0.06)	(0.11)	(0.02)	(0.02)
Round indicators	Yes	Yes	Yes	Yes	Yes	Yes
Country indicators	No	Yes	No	Yes	Yes	Yes
Observations	102282	102282	99622	102402	77304	102938
Random part:						
No. groups	2942.00	2942.00	2933.00	2943.00	2556.00	2942.00
sd(residual)	1.10	0.76	1.10	0.76	0.24	0.26
sd(intercept)	2.16	2.16	2.15	2.16	0.88	0.86
Rho/ICC	0.21	0.11	0.21	0.11	0.07	0.08

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Multilevel linear regression, estimated using generalised least squares.

Factors hypothesized to increase ethnic competition

Notes on Table 2.7: Panels 1, 2 and 6 report the regressions on which Figure 2.4 is based. The other panels report additional tests. As an alternative measure of exposure to slavery, the 'slavery legacy' indicator reported in Panel 3 uses the number of slaves shipped overseas from ports along the African coast weighted by a cost function for the distance to the 5 closest slave ports, rather than using that distance only. The number of slaves exported from each port was calculated based on Harvard's Africa map, created by Jerome Chang, which is based on data from slavevoyages.org. As cost function I use the inverse of the square of the distance to the 5 closest ports, similar to specifications used in gravity models of trade and migration. Specifically, I calculate the index as $slavery\ exp = 1/5 \sum_{i=1}^{n=5} no.\ slaves\ from\ port_i / port\ distance_i^2$. This is a more precise but harder to interpret index, which is why I report the distance-only measure in the main text. Panel 4 demonstrates that the primary impact of a legacy of slave raiding on cooperation is negative, in line with the findings reported by Nunn and Wantchekon (2011). Panel 5 shows that a similar

Table 2.6. Interaction of second-order fractionalization with contemporary factors hypothesized to increase ethnic competition

	(1) Coop index	(2) Coop index	(3) Coop index
LEFI1	−0.02**	−0.03***	−0.02**
	(0.01)	(0.01)	(0.01)
LEFI2 x Urban extents	0.03**		
	(0.02)		
LEFI2 x Soil quality		−0.02***	
		(0.01)	
LEFI2 x Admin2 borders			0.06***
			(0.02)
LEFI2 (const. term)	0.05***	0.06***	0.02
	(0.01)	(0.01)	(0.02)
Urban extents (const. term)	−0.11***		
	(0.01)		
Soil quality index (const. term)		−0.00	
		(0.01)	
No. admin distr in Moore neigh (const. term)			−0.07***
			(0.02)
Intercept	−0.75***	−0.78***	−0.61***
	(0.05)	(0.04)	(0.06)
Round indicators	Yes	Yes	Yes
Country indicators	Yes	Yes	Yes
Observations	102282	97555	102282
Random part:			
No. groups	2942	2911	2942
sd(residual)	0.31	0.31	0.31
sd(intercept)	0.89	0.90	0.89
Rho/ICC	0.11	0.11	0.11

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Multilevel linear regression estimated using generalised least squares; reported coefficients are standardized (beta) coefficients.

effect to that described by Nunn and Puga (2010) for trust holds for cooperativeness, too. Nunn and Puga found that the negative impact of the slave trade on current-day trust levels is mediated by rough terrain, which allowed for better defence and hiding during slave raids. Analogously, the interaction between the legacy of slavery and second-order fractionalization has a weaker effect on cooperation in more rugged areas, too, as shown by the negative and stastistically significant three-way interaction term between ethnic fractionalization, the legacy of slavery and average altitude – a proxy for rugged terrain. Panel 7 demonstrates that the negative interaction between $LEFI2$ and tsetse prevalence is robust to the inclusion of the climatic and geographic factors.

Table 2.7. Interaction of second-order fractionalization with historical factors hypothesized to increase ethnic competition

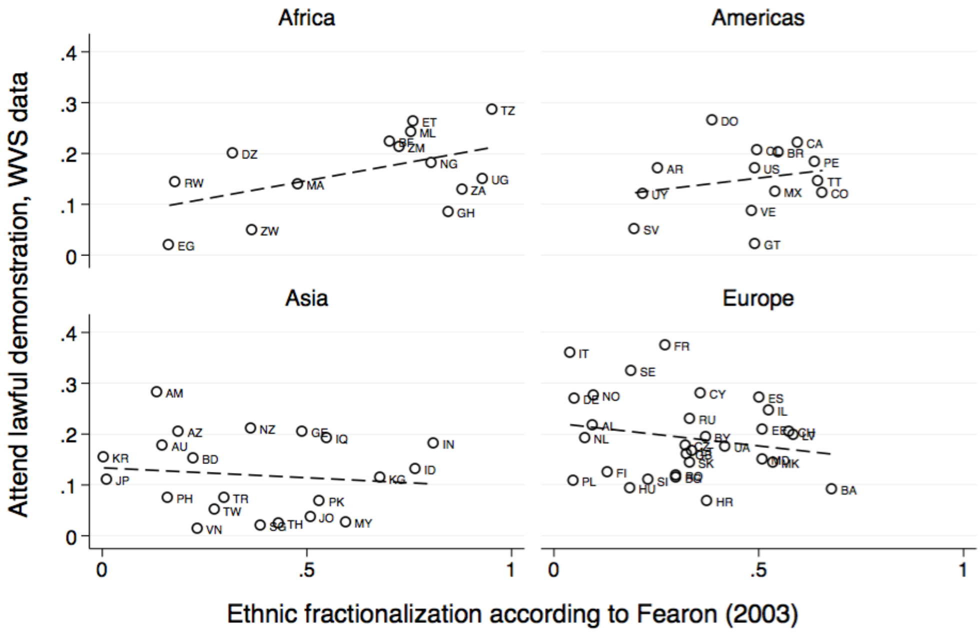
	(1) Coop index	(2) Coop index	(3) Coop index	(4) Coop index	(5) Coop index	(6) Coop index	(7) Coop index
No. groups in Moore1	−0.00						
	(0.01)						
LEFI1		−0.03**	−0.03**	−0.03**	−0.03**	−0.03**	−0.02
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of groups x Coethnics	−0.02*						
	(0.01)						
LEFI2 x slave ports distance		−0.03**					
		(0.01)					
LEFI2 x Slavery legacy			0.09***				
			(0.03)				
Slavery legacy				−0.04***			
				(0.01)			
LEFI2 x Slav. leg. x altitude					−0.13**		
					(0.05)		
LEFI2 x Tsetse prevalence						0.04**	0.03**
						(0.01)	(0.01)
No. groups in 20km corridor (const. term)	0.04***						
	(0.01)						
LEFI2 (const. term)		0.07***	0.06***	0.06***	0.07***	0.04***	0.04***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Remaining const. terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	101691	102282	102282	102282	53789	102282	101401
Random part:							
No. groups	2926	2942	2942	2942	1709	2942	2930
sd(residual)	0.32	0.31	0.31	0.31	0.31	0.31	0.30
sd(intercept)	0.89	0.89	0.89	0.89	0.92	0.89	0.89
Rho/ICC	0.11	0.11	0.11	0.11	0.10	0.11	0.10

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Multilevel linear regression; estimated using generalised least squares; reported coefficients are standardized (beta) coefficients.

Uniqueness of positive correlation between cooperation/ willingness to take part in collective action to Africa

Figure 2.7. Ethnic fractionalization and collective action by continent



The measure for collective action is the World Value Survey (5 round aggregate data, 1981-2008) item asking people if they would 'take part in a lawful/peaceful demonstration'. Ethnic fractionalization data is from Fearon (2003). The positive relationship between the two measures in Africa is the only one that is significant at conventional levels in a linear regression ($p = 0.07, n = 14$)

Coding of variables not detailed in main text

Nightlight intensity was calculated from nighttime images of stable lights collected by satellite remote sensing and made available by the US National Geophysical Data Center (NOAA NGDC 2013).

The **Gini coefficient of nightlight intensity** was calculated over the (usually nine) 10x10km cell values comprising the first-order Moore neighbourhood using the ineqdec0 package made available by Stephen Jenkins. Also see Kuhn and Weidmann (2015) and Alesina, Michalopoulos, and Papaioannou (2014) for similar approaches. The high average values result from the fact that in many Moore neighbourhoods only one or two grid cells have any measurable nightlights at all, while for the other cells the value is zero.

Soil quality was calculated from the 'Harmonized World Soil Database v 1.2' (Fischer et al. 2008) that provides 7 measures for land quality, each ranging from 1 (best) to 7 (worst); the index is calculated by taking the average sum of all indicators per Moore neighbourhood and then setting 7 as 1 and 49 as 0.

Average annual temperature was calculate for the for the years 1950–2000 with data from Hijmans et al. (2005).

The **absolute year-to-year deviations from a district's mean annual rainfall** since 1980 was calculated using the CRU TS3.21 dataset (Harris et al. 2014).

The **average altitude** and standard deviation in altitude of a Moore neighbourhood was calculated from raster data provided by the CGIAR Consortium for Spatial Information (CGIAR-CSI 2008).

Distance to an interethnic border was calculated as the crow-fly distance between an interview location and the closest border between two ethnic 'homelands' according to the *Ethnologue*. The coastline or lakeshores are not counted as interethnic borders.

The **index for tsetse fly prevalence** was calculated based on data from Wint and Rogers (2000). Wint and Rogers provide the predicted suitability of the terrain for each of the major species groups of the tsetse (*Fusca*, *Morsitans* and *Palpalis*). For the index, I added up the indicated values and then formed an average value for each Moore neighbourhood.

Replication of main results presented in Table 2.2 using individual-level and aggregate data and OLS

Table 2.8. Effect of first- and second-order fractionalization on cooperation, individual-level OLS estimates

	(1) Coop.	(2) Coop.	(3) Coop.	(4) Coop.	(5) Coop., IV est.
LEFI1, ethnic fractionalization in central	−0.79***	−0.44***	−0.36**	−0.34***	−0.09
Moore neighbourhood	(0.21)	(0.13)	(0.18)	(0.12)	(0.30)
LEFI2, ethnic fractionalization in 20km	1.28***	0.59***	0.45***	0.54***	0.14
corridor	(0.18)	(0.11)	(0.16)	(0.11)	(0.34)
Average suitability for agriculture in Moore			0.86***		0.90***
neighbourhood, Michalopoulos (2012)			(0.12)		(0.05)
Standard deviation suitability for			−0.05		−0.05
agriculture in Moore neighbourhood			(0.45)		(0.11)
Average altitude in Moore neighbourhood in			1.00***		1.03***
1000 meters			(0.08)		(0.04)
Standard deviation in altitude in Moore			0.02		0.02***
neighbourhood			(0.01)		(0.00)
Absolute deviations from monthly rainfall			−0.04**		−0.03***
1980-2000			(0.01)		(0.00)
Average annual temperature in Moore			0.14***		0.15***
neighbourhood 1950-2000, Worldclim data			(0.01)		(0.01)
Intercept	3.83***	2.11***	−0.15	5.89***	−0.28*
	(0.06)	(0.14)	(0.36)	(0.07)	(0.16)
Round indicators	Yes	Yes	Yes	Yes	Yes
Country indicators	No	Yes	No	No	No
Ethnic group indicators	No	No	No	Yes	No
Observations	102282	102282	101401	100862	101401

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Linear regression using OLS. Standard errors clustered at the level of the interview location.

Table 2.9. Effect of first- and second-order fractionalization on cooperation with data aggregated at the interview location, OLS estimates

	(1) Coop.	(2) Coop.	(3) Coop.	(4) Coop., IV est.
(mean) LEFI1, ethnic fractionalization in central Moore neighbourhood	−0.55***	−0.24*	−0.41***	−1.45*
	(0.15)	(0.12)	(0.15)	(0.76)
(mean) LEFI2, ethnic fractionalization in 20km corridor	1.10***	0.52***	0.57***	1.73**
	(0.12)	(0.10)	(0.12)	(0.84)
(mean) Average suitability for agriculture in Moore neighbourhood, Michalopoulos			0.63***	0.51***
			(0.10)	(0.13)
(mean) Standard deviation suitability for agriculture in Moore neighbourhood			0.26	0.17
			(0.33)	(0.34)
(mean) Average altitude in Moore neighbourhood in 1000 meters			0.91***	0.82***
			(0.06)	(0.09)
(mean) Standard deviation in altitude in Moore neighbourhood			0.00	0.00
			(0.01)	(0.01)
(mean) Absolute deviations from monthly rainfall 1980-2000			−0.04***	−0.04***
			(0.01)	(0.01)
(mean) Average annual temperature in Moore neighbourhood 1950-2000, Worldclim da			0.13***	0.11***
			(0.01)	(0.02)
Intercept	3.65***	2.07***	0.22	0.58
	(0.04)	(0.16)	(0.26)	(0.37)
Country indicators	No	Yes	No	No
Observations	2942	2942	2938	2938

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Linear regression using OLS.

Different IV specifications and first-stage regression for Table 2.2, Panel 5

Table 2.10. Alternative IV specifications instrumenting LEFI 2

	(1) IV Addis	(2) IV Eq	(3) IV Addis	(4) IV Eq	(5) IV Addis	(6) IV Eq
LEFI1, ethnic fractionalization in central Moore neighbourhood	-13.51^{***} (3.21)	-6.41^{***} (0.61)	-3.68^{***} (0.72)	-4.95^{***} (0.84)	-3.09^{***} (0.94)	-6.15^{***} (1.33)
LEFI2, ethnic fractionalization in Moore 2 (50x50km) neighbourhood						
LEFI2, ethnic fractionalization in 20km corridor	14.72^{***} (3.37)	7.27^{***} (0.63)	4.51^{***} (0.83)	5.98^{***} (0.97)	4.00^{***} (1.13)	7.64^{***} (1.57)
Average suitability for agriculture in Moore neighbourhood, Michalopoulos (2012)					0.08 (0.15)	−0.26 (0.22)
Standard deviation suitability for agriculture in Moore neighbourhood					0.14 (0.28)	−0.12 (0.42)
Average altitude in Moore neighbourhood in 1000 meters					−0.05 (0.12)	-0.35^{**} (0.17)
Standard deviation in altitude in Moore neighbourhood					-0.04^{***} (0.01)	-0.06^{***} (0.02)
Absolute deviations from monthly rainfall 1980-2000					0.01 (0.01)	0.01 (0.02)
Average annual temperature in Moore neighbourhood 1950-2000, Worldclim data					−0.03 (0.03)	-0.09^{**} (0.04)
Average intensity of stable nightlights in Moore neighbourhood in 2000					-0.03^{***} (0.00)	-0.03^{***} (0.00)
Gini coefficient of nightlight intensity in Moore neighbourhood					−0.09 (0.06)	−0.00 (0.09)
Intercept	1.33^{**} (0.57)	2.59^{***} (0.11)	1.45^{***} (0.21)	1.23^{***} (0.24)	2.40^{***} (0.47)	3.29^{***} (0.68)
Round indicators	Yes	Yes	Yes	Yes	Yes	Yes
Country indicators	No	No	Yes	Yes	Yes	Yes
Observations	102282	102282	102282	102282	101401	101401
Random part:						
No. groups	2942.00	2942.00	2942.00	2942.00	2938.00	2938.00
sd(residual)	2.55	1.52	0.88	1.09	0.78	1.29
sd(intercept)	2.16	2.16	2.16	2.16	2.16	2.16
Rho/ICC	0.58	0.33	0.14	0.20	0.12	0.26

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Multilevel instrumental variable regression of the index for social cohesion on and second order ethnic diversity, instrumented by either the distance to the equator or the distance to Addis Ababa; intercepts allowed to vary by interview location; estimated using generalised least squares; reported coefficients are standardized

First-stage regression for IV strategy in Table 2.2, Panel 5

Table 2.11. First-stage regression of second-order fractionalization on exogenous predictors

	(1)
	LEFI 2
Absolute distance from equator in degrees	-0.0054822***
	(0.001202)
Distance to Addis Ababa in km in Moore neighbourhood	0.000225***
	(0.00000)
LEFI1, ethnic fractionalization in Moore (30x30km) neighbourhood	0.877128***
	(0.0024775)
Average suitability for agriculture in Moore neighbourhood, Michalopoulos (2012)	0.1147577***
	(0.002659)
Standard deviation suitability for agriculture in Moore neighbourhood	0.0623134***
	(0.0083494)
Average altitude in Moore neighbourhood in 1000 meters	.0541979***
	(.002069)
Standard deviation in altitude in Moore neighbourhood	0.0007236***
	(0.0002614)
Absolute deviations from monthly rainfall 1980-2000	0.0072357***
	(.0003137)
Average annual temperature in Moore neighbourhood 1950-2000, Worldclim data	0.0071901***
	(0.000365)
Average intensity of stable nightlights in Moore neighbourhood in 2000	0.000301***
	(0.0000824)
Gini coefficient of nightlight intensity in Moore neighbourhood	-0.018207***
	(.0017577)
Intercept	-0.0905238***
	(0.0114559)
Round indicators	Yes
Observations	101401
No. groups	2938

First-stage of multilevel IV regression. Exogenous predictors printed in italics.

Table 2.12. Summary statistics of measures used

	mean	sd	min	max	count
Cooperation index, sum of comm meeting attendance and collective action	4.05	2.41	0.00	8.00	102402
Member of voluntary association or community group	0.65	0.95	0.00	3.00	77424
Member of religious group	1.04	0.98	0.00	3.00	103058
Attend a demonstration or protest march	0.58	0.89	0.00	4.00	96298
Contact local government councillor about issue or to give views	0.48	0.90	0.00	3.00	98250
Contacted MP about issue or to give views	0.20	0.61	0.00	3.00	100556
LEFI 1, local ethn frac	0.18	0.23	0.00	0.85	103395
LEFI 2, ethn frac of *hinterland*	0.33	0.28	0.00	0.94	103395
LEFI1 calculated with Atlas Narodov Mira data	0.12	0.19	0.00	0.81	103395
LEFI2 calculated with Atlas Narodov Mira data	0.27	0.25	0.00	0.85	103395
Share of other groups than largest group in Moore neighbourhood	0.14	0.22	0.00	1.00	102809
Share of groups other than largest in 20km corridor	0.28	0.30	0.00	1.00	102801
Ethno-linguistic fractionalization, World Hb of Pol and Soc Indicators, 1972	0.69	0.24	0.04	0.93	91437
Ethnic fractionalization according to Alesina et al. 2003	0.68	0.20	0.04	0.93	99365
Language fractionalization according to Alesina et al. 2003	0.68	0.25	0.01	0.92	95641
Ethnic fractionalization index according to Fearon (2003)	0.72	0.21	0.04	0.95	95637
Politically relevant ethnic groups index, Posner 2004	0.43	0.22	0.00	0.71	89117
LEFI1 calculated with Atlas Narodov Mira data	0.12	0.19	0.00	0.81	103395
LEFI2 calculated with Atlas Narodov Mira data	0.27	0.25	0.00	0.85	103395
LEPOL1, ethnic polarization of Moore neighbourhood	0.30	0.37	0.00	1.00	103395
LEPOL2, ethnic polarization of 20km corridor neighbourhood	0.46	0.37	0.00	1.00	103515
Sample-based linguistic diversity at interview location	0.10	0.09	0.00	1.00	100689
Sample-based linguistic diversity in region	0.03	0.03	0.00	0.33	100689
Distance to closest interethnic border in 100km	0.80	1.82	0.00	15.67	103515
Suit for agrcltr, Michalopoulos 2012	0.43	0.25	0.00	1.00	103515
SD suit agrcltr, Michalopoulos 2012	0.04	0.07	0.00	0.48	103395
Av altitude in 1,000 m	0.70	0.59	0.00	3.17	103395
SD av altitude	2.27	2.87	0.01	25.50	103395
Abs dev from monthl rainf 1980-00	3.68	2.38	0.00	29.88	103395
Av temp, 1950-00	22.44	4.01	8.62	30.09	102486
Av intensity stbl nightlights 2000	4.34	8.72	0.00	60.05	103395
Gini coeff of nightl intensity	0.56	0.29	0.00	0.89	103395
Percentage of Moore neighbourhod covered by urban extent, Schneider et al.	0.06	0.13	0.00	0.79	103395
Soil quality from 'Harmonized World Soil Databasev1.2'	0.92	0.08	0.00	1.00	98587
Average no of GAUL Admin2 regions in Moore neighbourhood	1.89	1.01	1.00	9.62	103395
Average weighted no of slaves shipped from 5 ports closest to interview location	0.03	0.52	0.00	11.76	103395
Average distance to 5 slave ports closest to interview location (in 100km)	7.54	6.31	0.10	38.23	103395
Cumulative prob presence of tsetse fly, all species	0.21	0.27	0.00	1.00	103395

Chapter 3

Outgroup threat and ingroup cooperation

Field evidence from rural Georgia

Competition between groups is widely considered to foster cooperation within groups. Numerous laboratory studies hint at the existence of a proximate mechanism by which humans increase their level of support for their ingroup when faced with an external threat. However, this relationship has been little tested in the field and existing studies are also limited by the lack of a direct measure of threat perception. Here, data from a rural context is presented where exposure to outgroups varies as a result of varying degrees of contact between different ethnic groups. This context made it possible to measure both levels of threat perceptions and cooperation directly by means of lab-in-the-field methods, rather than having to induce them externally. To this end, an experimental protocol was developed that captures perceived threat behaviourally, the threat game. Cooperation was measured with a standard public goods game. The results show that cooperation is higher in regions more strongly exposed to ethnic outsiders. Analysis shows that this effect is due to those feeling particularly threatened being spurred into investing in their ingroup rather than withdrawing their support from it.

Introduction

Humans frequently engage in cooperative behaviour that benefits group members despite a cost to themselves (Camerer 2003; Dawes et al. 2007; Fehr and Fischbacher 2003; Ostrom 2000; Peysakhovich, Nowak, and Rand 2014; Tomasello 2009). Examples range from food sharing to mutual defence in warfare (Gat 2006; Hill 2002; Otterbein 1970). Although the causes for this behaviour remain debated, threat and competition between groups figure prominently among possible explanations (Alexander 1985; Boyd and Richerson 2009; Darwin 1981; Smirnov et al. 2007).

Costly cooperation benefitting group members may ultimately have been selected for in a history of violent intergroup conflicts (Bowles 2009; Choi and Bowles 2007; Turchin et al. 2013). In terms of proximate mechanisms, scholars have described and tested a psychological response by which individuals raise their level of cooperation with ingroup members when competing with an outgroup for a reward (Abbink et al. 2010; Bornstein 2003; Bornstein and Ben-Yossef 1994; Burton-Chellew, Ross-Gillespie, and West 2010; Enos 2016; Erev, Bornstein, and Galili 1993; Gunnthorsdottir and Rapoport 2006; Halevy, Bornstein, and Sagiv 2008; Hugh-Jones and Zultan 2013; LeVine and Campbell 1972; Olzak 1992; Puurtinen and Mappes 2009; Rebers and Koopmans 2012; Sherif et al. 1961; Sääksvuori, Mappes, and Puurtinen 2011; Van Vugt, De Cremer, and Janssen 2007; Yamagishi and Mifune 2009). Even the mere awareness of a comparison group is sufficient to induce higher levels of cooperation (Burton-Chellew and West 2013). At the other extreme, the actual experience of violent conflict has been found to make people more cooperatively inclined, willing to punish their peers at a cost to themselves, politically engaged or egalitarian minded (Bauer et al. 2014; Bellows and Miguel 2009; Blattman 2009; Gneezy and Fessler 2012; Voors et al. 2012).

However, both in the analytic games used in laboratory research and in real-world violent conflicts it is often not clear whether it is the perception of threat – the fear of being harmed in the competition – or the prospect of winning the competition that motivates cooperative behaviour (Bornstein 2003; Wildschut et al. 2003). Work that exclusively focusses on threat often conceptualises it as residential proximity to an ethnic outgroup. These studies show that outgroup presence goes along with exclusionary attitudes, outgroup discrimination and increased participation in collective political processes (elections) (Bobo and Hutchings 1996; Enos 2014, 2016; Enos and Gidron 2016). Without threat perceptions being measured at the level of the individual, however, it remains unclear whether it really is fear that motivates the observed attitudinal and behavioural changes. One study that uses a survey instrument to measure perceived threat emanating from an ethnic outgroup finds less favourable treatment of outgroup members in response to threat, but no significant increase in ingroup cooperation (Silva and Mace 2014). This study was conducted in an urban context (Belfast).

Study setting and design

In order to test for the impact of threat perception on cooperation levels we would ideally like to compare communities that are identical in terms of history, geography, socio-ecomic opportunities and residential patterns, but which vary in the degree to which they are exposed to an outgroup. The setting of the present study approaches these idealized conditions by exploiting variation in outgroup exposure within the same sub-national region. The experiments were conducted in six villages in the Kvemo Kartli region, Georgia. Kvemo Kartli region is a compact (6,528 km^2), rural region in the vicinity of the country's capital, Tbilisi. The region is highly ethnically diverse, with ethnic Georgians constituting a numerical minority. In 2002, the year of the last census, 44.7% of the region's 497,530 inhabitants were ethnic Georgians and a similar share of the population (45.1%) were ethnic Azerbaijanis. Among the smaller minority groups, ethnic Armenians form the largest group, with 6.3% (see Table 3.6 in the Appendix for a detailed population breakdown).

All three groups look back on a long settlement history in the Kvemo Kartli region. The region is considered part of the Georgian heartland, where Georgian presence has been documented since classical antiquity (Lang 1966). The ethnic Azerbaijani population of Georgia dates back to the Persian conquests of the region during the 16th century, in the wake of which tribal people from Safavid Iran were settled in the Kvemo Kartli region to stabilize the rule of the area (Balci and Motika 2007). Most of the ethnic Armenians living in Georgia originate from the province of Erzurum in the Ottoman Empire, from where they had fled to Georgia, then part of the Russian empire, in search of greater cultural autonomy during the 19th century (Sabanadze 2001).

Unlike other regions in Georgia, Kvemo Kartli has seen no disruptive, organised interethnic violence, as have other parts of the country. For example, the wars over the control of Abkhazia in the west of Georgia and South Ossetia (in its centre-north) had gone along with the large-scale displacement of ethnic Georgians out of these regions, and ethnic Abkhazians and Ossetians out of Georgia (among more complex patterns), and a deterioration of previously amicable inter-ethnic attitudes among these groups (Jones 2013; O'Loughlin, Kolossov, and Toal 2011; Toal and O'Loughlin 2013). In contrast, the Kvemo Kartli region had seen no inter-ethnic violence, although intergroup relations are not tension-free, either. Groups compete over resources (such as access to farmland), and there have been occasional clashes involving protestors (International Crisis Group 2006; Wheatley 2009).

What is distinctive about the region is that the ethnic diversity exists largely between villages, not within villages: individual village-communities tend to be ethnically homogenous. Moreover, there is within-regional variation in settlement patterns. In the neighbouring Samtskhe-Javakheti region, for instance, ethnic Armenian settlements are highly concentrated, and there are few ethnic Georgian villages located close to or amid ethnic Armenian villages. While in the Kvemo Kartli region, villages in the northeast of the region tend to be ethnically Georgian and the south and northwest of the region tends to be dominated by non-Georgian villages, the dominantly non-Georgian regions are nevertheless interspersed by Georgian villages, providing the variation needed for the conduct of this study (Figure 3.1).

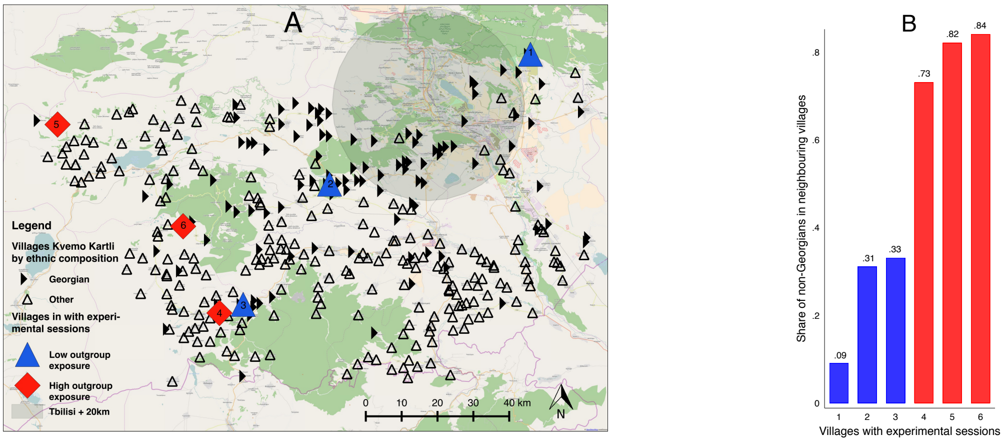


Figure 3.1. (A) Villages in the Kvemo Kartli region, Georgia, by ethnic composition. Villages in which lab-in-the-field sessions were conducted marked. (B) Share of ethnic outsiders in the 5 villages closest to each village where a lab-in-the-field session was conducted. Villages in the low outgroup-exposure condition marked in blue, villages in the high outgroup-exposure condition marked in red.

This settlement pattern allows for a controlled comparison of threat perceptions and cooperative behaviour between a) communities exposed to a high share of ethnic outsiders in their surroundings and b) communities with a low share of ethnic outsiders in their surroundings. Information on the ethnic composition of the villages and their surroundings was taken from the Georgian census 2002, in which the population and ethnic composition of villages in the Kvemo Kartli region region was recorded. Exposure to ethnic outgroups was measured as the share of non-Georgians in the population of the 5 villages closest to each village where a lab-in-the-field session was conducted. Based on these shares, villages were assigned to a low-outgroup exposure condition (with >50% ethnic Georgians in the surroundings) and a high-outgroup exposure condition (with <50% ethnic Georgians in the surroundings) (Figure 3.1 B).

Villages were sampled according to a predefined list of criteria and experiments were conducted in all eligible villages that could offer facilities in which to conduct the lab-in-the-field sessions.

Specifically, I sampled villages that were 1) ethnically homogeneously Georgian, in order to minimize the relevance of cultural differences as an explanatory factor; 2) located at a distance of 20km or more from the capital, Tbilisi, so to avoid comparing rural villages with suburban settlements; 3) were long-established (the youngest village in the sample was founded 3 generations ago); and 4) were relatively small in size, with under 1,000 inhabitants, so to allow for community relations to be regulated largely based on face-to-face contact (Bintliff 1999; Dunbar 1993). Excluding minor hamlets and larger towns, there are 214 villages in the Kvemo Kartli region, 69 of which can be considered as Georgian in the sense that at least 75% of the population self-identified as ethnic Georgian in the 2002 census. Of these, 10 villages matched the criteria. Inhabitants in all 10 villages communicated a willingness to take part in the experiments during an initial visit, but 4 villages had to be discarded as they did not have appropriate facilities (a school or community centre providing enough seating for 20-30 participants) to conduct the experiments in, leaving a final sample of 6 villages.

A team of three, including the author and two research assistants, conducted the recruitment of participants and the lab-in-the-field sessions. For the recruitment, within each village two to three individuals were approached who would help us organize the session. These typically included the director of the school and the village leader, the *Gamgebeli*. Although the resulting sampling is not representative of the respective village population, we urged our contact persons to balance participants according to sex, age and social background. In general, we attempted to stratify both the sessions and overall sample according to the distribution of sex and average age of the Georgian population as a whole. In Georgia in 2013, 52% of the population was female and 48% male, and the average age of the population eligible to take part in the experiments (i.e. over 18 year of age) was 46.5 years (Georgia 2013). For the overall sample this stratification worked out relatively well: the average age in the sample was 45.7 years, and 49.3% of participants were female, although individual villages were less balanced (see Table 3.1). Participation in the experiments was restricted to a maximum of two persons per household. The latter restriction to two instead of one person per household was necessary to ensure equal representation of women, who in Georgia may in some cases only take part in public events in the company of a male relative.

In each of the 6 villages, between 20 and 28 participants took part in the lab-in-the-field sessions, totalling 71 in the three villages in the low-outgroup exposure condition, and 69 in the three villages in the high-outgroup exposure condition. There were no statistically significant differences between the two conditions in terms of sex (49% female, P=0.49, two-sided Mann-Whitney test), birthplace (61% born in village, P=0.44), education (12.9 years in kindergarten and school, P=0.96), and frequency of church attendance (2.6 times/month, P=0.70), although participants in the

Table 3.1. Summary statistics lab-in-the-field session participants

Village	1	2	3	4	5	6
Share female	0.55	0.46	.57	.50	0.35	0.52
Age in years	44.5	52	50.2	45.4	34.7	44.5
HH inc 100 GEL/month	6.84	2.81	6.64	3.76	5.69	6.68
Edu in years	13.7	10.4	15.2	12.6	12.6	14
HH inc 100 GEL/month	6.8	2.8	6.6	3.8	5.7	6.7
Freq church visits/month	3.73	2.03	1.48	2.23	4.65	1.98
N particip session	20	28	23	28	20	21

low exposure condition were on average somewhat older (49.3 years compared to 42.0 years in the high-outgroup exposure condition, P=0.01). In both conditions, average household income was similar (520 GEL/month, P=0.83, two-sided Mann-Whitney test), and similarly distributed (P=0.05, Kolmogorov-Smirnov test). Villages in the two conditions were also closely matched on most demographic, geographic and climatic indicators (see Table 3.3 and Table 3.1 in the Appendix for statistics and tests).

Measures

In order to measure threat perception behaviourally, a dedicated analytic game was developed: the threat game (more detailed information about the game is provided in the Appendix). In the threat game, participants are asked to make costly decisions that reveal how much they fear predatory behaviour from their interaction partner. The game captures the asymmetric nature of a typical threatener-threatened interaction where the more weakly positioned 'threatened' fears predatory behaviour from a dominant 'threatener'. The threat game consists of two roles: P, the potential predator or threatener, and T, the threatened. Both P and T are given an initial endowment of 20 monetary units (MUs). They are then asked to take decisions in parallel.

P is asked to decide how many MUs she wants to try to take away from T's endowment in order to add to her endowment. P can claim anything between 0 MUs, if she finds it unjust or unreasonable to take from T's endowment, to 15 MUs, if she is interested in maximising her own income. Each 1 MU that P manages to take away causes an additional loss of 1 MU to T, meaning that T can end up with a negative payoff.[1] This additional loss generates many of the advantageous properties of the threat game detailed in the Appendix. For explanatory purposes, the additional loss can be

[1]The amount that P could claim was capped at 15 MUs rather than the theoretically possible 20 MUs in order to prevent participants from encountering excessive losses.

likened to a burglary, where, in trying to steal valuables, the burglar also causes damage to the house. The P-role decision can thus be interpreted as a measure of predatory intent.

By contrast, the task of the threatened T is to estimate how much P will likely try to take away from his initial endowment, and then to decide how much of his initial endowment to spend on his protection. In his attempt to avoid losses or incurring negative payoffs, T can spend parts or all of his endowment on his protection. Each 1 MU that T spends reduces the amount that P can take away by 1 MU. However, the MUs T spends on his protection are non-recoverable, no matter the amount P actually claims. It is therefore optimal for T to spend exactly the amount on protection that he thinks P will try to take away. The number of MUs spent by T is therefore the behavioural measure of threat perception.

The threat-game procedures started out with participants first taking P-role decisions, either when randomly matched with another participant in the room, or when 'virtually' matched with a person from a neighbouring village. The order at which the decisions were taken was randomized. Participants then took decisions in the role of T, the threatened. Again, all participants took their decisions either first when matched with a another participant in the room, and then when matched 'virtually' with a participant from a neighbouring village, or the other way round, again in a randomized order.

'Virtual' matching was carried out in the following way: we told participants that we had previously carried out sessions in one the 5 closest neighbouring villages surrounding their village, but for anonymity reasons would not state the exact name. While in 2 of the 6 villages this statement was true as these are located in close proximity, for the other 4 villages it was not. Participants were then told that they would be matched at random with an inhabitant of one of those villages, whose decisions in the role of P and T had been recorded. In fact, payoffs for all participants were calculated by matching each participant's decisions with decisions taken by participants of a trial session conducted earlier in yet another Georgian village. This amount of deception was deemed necessary in order to avoid needing to translate the script and instructions into further languages. Matching the participants' decision with a stable set of PGG, P- and T-role decisions also ensured that the average payoffs were equal in all six sessions, and that inter-village relationships would not be affected by the game play in unforeseen ways. In order to obtain a measure of threat perception free of priming effects, at no point was the ethnicity of the inhabitants of neighbouring villages mentioned. Instead, it was assumed that participants were aware of the ethnic composition of neighbouring villages and could base their behaviour on this knowledge.

Cooperation was measured with a standard public goods game (PGG). For the PGG, groups of 3 were formed or simulated (in the case of 'virtual' matching with neighbours). Each group member received an endowment of 10 MUs and was then asked to decide to invest parts, all or none of this endowment into a public account. Whatever amount was invested in the public account was doubled and evenly distributed among all group members. From this payoff structure it follows that while the group income is maximised when all group members contribute their whole endowment, for any given level of contributions by the other group members, an individual can always be better off by not contributing. The amount of MUs a participant invested in the public account is therefore the behavioural measure of cooperativeness. Participants again took one decision when randomly and anonymously matched with other participants in the room, and one when 'virtually' matched with simulated participants from a neighbouring village.

During the sessions, each participant first took two PGG decisions, followed by four decisions in the threat game (two in the P-role, two in the T-role). This order was chosen so to avoid priming participants with the competitive setup of the threat game before assessing their cooperativeness. No information on the outcome of a previous decision was revealed before the next decision was taken. Detailed explanations and a quiz testing for understanding preceded the decision-making, and a survey was used to collect demographic information. A show-up fee ensured that participants would not incur an overall negative payoffs. In the empirical analysis to follow, I focus on the main measures of interest: PGG investments when interacting with participants from the same village, and T-role behaviour when virtually matched with others from neighbouring villages.

Results

Figure 3.2 analyses PGG contributions conditional on outgroup exposure. As shown in Figure 3.2 A, participants cooperated more extensively in the high outgroup-exposure condition, investing an average of 7.3 MUs in the PGG, as compared to the average 6.3 MUs invested in low outgroup-exposure regions (Δ .97 (15%). This difference is statistically significant at the 7% level, based on a regression model using a wild bootstrap procedure with 1,000 repetitions (Cameron, Gelbach, and Miller 2008). The wild bootstrap procedure is appropriate where data is potentially clustered (here: individuals nested in villages) and the number of clusters is small (here: 6).[2] Including demographic control variables does not change the size of the estimated effect but improves its precision (P=0.03, see Table 3.4 in the Appendix for details). A graphical analysis of contributions in individual

[2]All reported p-values are calculated with this procedure, unless otherwise stated.

villages shows that participants in high outgroup-exposure villages consistently outspent those in low outgroup-exposure villages (Figure 3.2 B).

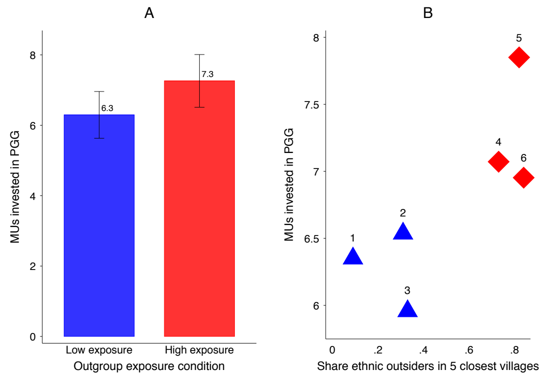


Figure 3.2. (A) Average amounts invested in the group account during the PGG in the low (blue) as compared to high (red) exposure condition. Error bars are 95% wild cluster bootstrapped standard errors for the condition mean (resampling at the village level, 1,000 repetitions). (B) Average village-level PGG contributions relative to share of outgroup members in neighbouring villages in the low (blue, △) as compared to the high (red, ◇) exposure condition.

Participants in the high outgroup-exposure condition also exhibited higher levels of perceived threat, spending an average of 8.9 MUs on their protection, as compared to the 7.8 MUs spent in low outgroup-exposure regions (Δ 1.12 (14%)) (Figure 3.3 A). However, village averages here do not map as closely onto the share of outgroup members in the surrounding villages as in the case of the PGG investments. Even in ethnically relatively homogenous areas, the threat emanating from largely *coethnic* neighbours was perceived as high, and the difference between the conditions is largely due to one single village (Figure 3.3 B). When potential clustering at the village-level is taken into account, the difference in threat perceptions between the high and low outgroup-exposure regions is no longer statistically significant (Figure 3.3 A, see also Table 3.4 in the Appendix). Interestingly, in the village with the highest average spending on protection, in post-game interviews villagers reported that there had recently been a fight between members of their village and villagers from one of the neighbouring villages.

More clearly than affecting the absolute level of perceived threat, the presence of an ethnic outgroup seems to influence the quality of the threat perceived, and the reactions triggered in response. This is shown in Figure 3.4 A. In the low-outgroup exposure regions, increased perceived threat has a strong negative effect on cooperation (ρ=-0.26, P=0.02, Spearman's rank correlation), whereas in the high outgroup exposure regions, no such relationship can be observed (ρ=0.12, P=0.30), resulting in a negative interaction between outgroup exposure and T-role-spending on protection (the coefficient for the interaction term is b=-0.25, P=0.09, estimated using wild cluster bootstrap regression, Table 3.5). This also means that the difference in aggregate PGG contributions between

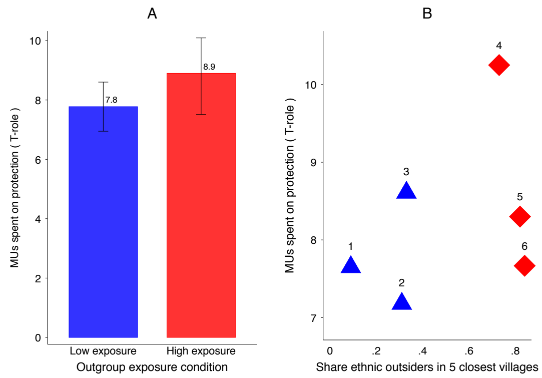


Figure 3.3. (A) Average amounts spent on protection during the threat game in the low (blue) and the high (red) exposure condition. Error bars are 95% bootstrapped standard errors for the condition mean (resampling at the village level, 1,000 repetitions). (B) Average village-level spending on protection relative to share of outgroup members in neighbouring villages in the low (blue, △) as compared to the high (red, ◇) exposure condition.

the low and high-outgroup exposure conditions is solely caused by the difference in spending behaviour of the more fearful, i.e. those who spent the median of 8 MUs or above in the threat game (Δ 1.74 (31%), P=0.005, wild cluster bootstrap estimate), and not by those who spent below the median (Δ 0.14 (2%), P=0.84) (Figure 3.4 B).

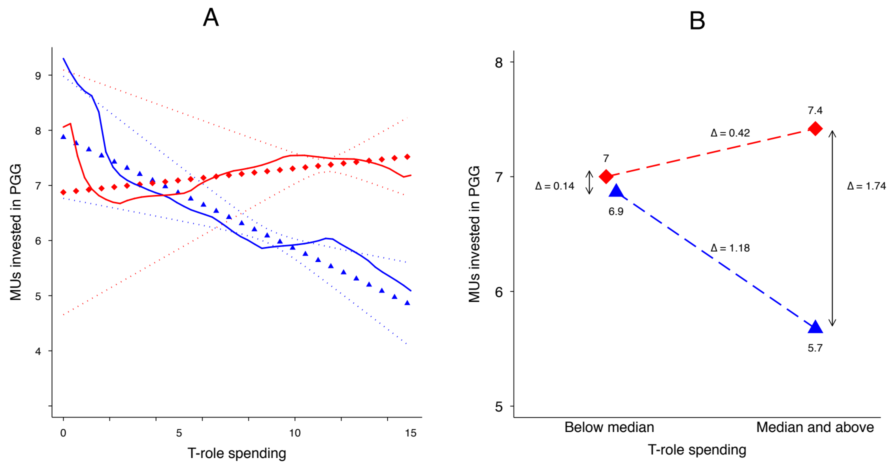


Figure 3.4. Differential effect of threat perception on cooperation in the low-outgroup exposure (blue, △) and high-outgroup exposure (red, ◇) condition. (A) Predicted values from linear regression (see Table 3.5 in the Appendix) and local polynomial smooths (Epanechnikov kernel). (B) Average values. Dotted lines are 95% clustered bootstrapped confidence intervals, 1,000 repetitions, resampling at the village level.

Although we can only speculate about the psychological underpinnings of this differential effect, one interpretation consistent with the data is that outgroup threat suppresses a general tendency to lower cooperation when fearful or distrustful. Previous research has shown that distrustful individuals are typically also less cooperative (Peysakhovich, Nowak, and Rand 2014). It seems that in the low-outgroup exposure regions, participants default to this behaviour, reacting to threat with lowered PGG contributions. In contrast, in the high-outgroup exposure condition the threat emanating from outgroup members is perceived as qualitatively different. Here, the need to maintain cohesiveness when faced with ethnic outsiders overrides the tendency of those feeling generally threatened to decrease cooperation, spurring them instead to cooperate at similar levels than those not feeling threatened.

Answers to trust questions, collected after each lab-in-the-field session, are in line with this reasoning. Participants were asked how much they trusted a) their fellow villagers and b) people from neighbouring villages. For participants in the low-outgroup exposure condition, there is an equally strong negative relationship between PGG contributions and both distrust in co-villagers (ρ=-0.33, P=0.005, Spearman's rank correlation) and distrust in people from neighbouring villages (ρ=-0.34, P=0.004). Conversely, in the high-outgroup exposure condition, PGG contributions are uncorrelated with distrust towards the ingroup (ρ=0.00, P=0.98) and somewhat positively correlated with distrust towards non-co-ethnic neighbours (ρ=0.20, P=0.11) (see Table 3.5 in the Appendix for further analyses).

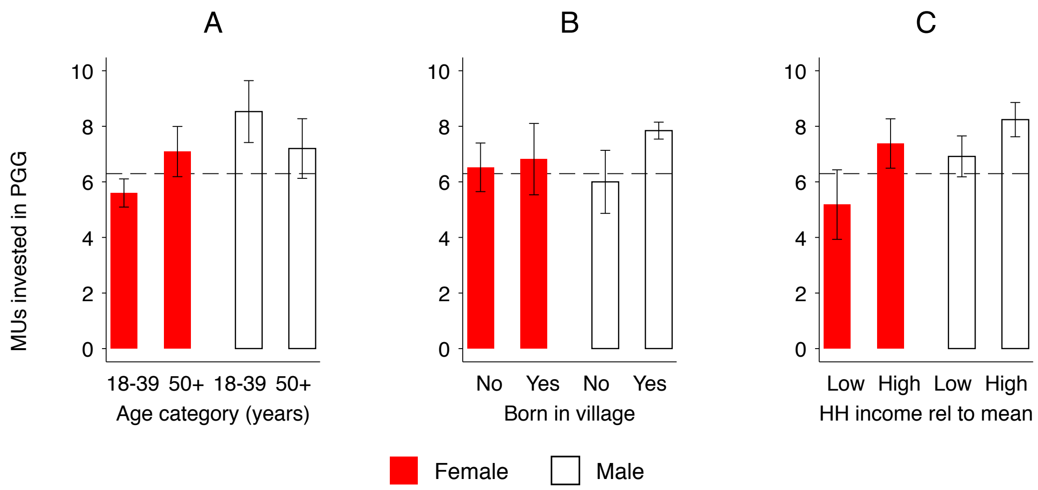


Figure 3.5. PGG investments of subgroups of participants in the high-outgroup exposure condition. The dashed horizontal line indicates the mean level of PGG investments in the low-outgroup exposure condition. Error bars are 95% bootstrapped CIs for the subgroup mean, 1,000 repetitions, resampling at the village level.

The data also allows us to analyse which subgroups of participants are responsible for the increased PGG contributions in the high outgroup-exposure condition as compared to the low outgroup-exposure condition. Figure 3.5 A compares PGG contributions for women and men of an older (40–81 y) and a younger (18–39 y) age cohort in the high-outgroup exposure condition to the average of PGG-contributions in the low-outgroup exposure condition. The demographic subgroup most clearly contributing more in the high outgroup-exposure condition was younger men, while younger women contributed even less than the average in the low-outgroup exposure region.

Differences in investment behaviour are also apparent when the sample is disaggregated according to place of birth. Sex and being born in the community strongly overlap, due to a widely followed norm of patrilocality (89% of male participants were born in the village in which the session took place, in contrast to 35% of female participants). Nevertheless, Figure 3.5 B suggests that only men born in the community are responsible for the increased PGG contributions in the high outgroup-exposure condition. Finally, Figure 3.5 C demonstrates that only participants with a household income that lies at or above the sample median were responsible for the higher contributions in the high outgroup-exposure condition.

The main finding that proximity to a threatening outgroup goes along with increased cooperation diverges from that of a similar study where no significant relationship between outgroup threat and willingness to benefit the ingroup was found (Silva and Mace 2014). For one, this divergence may be due to the use of a different reference point. As the cited study did not explicitly measure fear and distrust of co-ethnic peers, it lacked the baseline used here to demonstrate higher cooperation rates in high-outgroup exposure regions. The different effect may also be caused by the relative residential stability in the rural environment where this study was conducted. 61% of participants were born in the village where the experiment took place. This contrasts with the more fluid residential urban environment (Belfast) in which the cited study was conducted. Laboratory evidence shows that the option for free migration tends to suppress the cooperation-enhancing effect of intergroup conflict, potentially leading to smaller effects in urban as compared to rural areas (Sääksvuori 2014). High residential stability may also help to explain the remarkably high overall level of cooperativeness recorded in the PGG. The average PGG contribution of 6.8 MUs (68% of the initial endowment) went beyond the 40% to 60% contributions typically observed elsewhere (Ledyard 1995; Ostrom 2000).

The gendered pattern of cooperation in the high-outgroup exposure regions resonates with ethnographic accounts of Georgian society and the Caucasus more widely, where young men take on the role of protectors and young women are under particular protection in their role as young or future mothers (Dragadze 1988; Driscoll 2015). More generally, the results lend support to the idea that male coalitional behaviour, and especially that of young men in the reproductive age, differs from that of other groups of the population (Rusch, Leunissen, and van Vugt 2015; Tooby and Cosmides 1988; Van Vugt, De Cremer, and Janssen 2007; Yamagishi and Mifune 2009). Further, the finding that only men living in their place of birth contribute more when perceiving a threat from ethnic outsiders suggests that social network stability (Baldassarri 2015; Rand et al. 2014) or co-residence with male kin (Otterbein and Otterbein 1965) may be important determinants of cooperative behaviour under threat. A recent theoretical model predicts that under conditions of intergroup conflict, only high-rank individuals will engage in costly cooperative behaviour, while low-rank individuals free-ride (Gavrilets and Fortunato 2014). This is in line with the finding that only relatively wealthy participants increase their spending when exposed to threat from ethnic outsiders.

Conclusion

The study provides support from a field setting for the external validity of laboratory experiments and theoretical models linking group conflict to cooperation. Exposure to a threatening outgroup is shown to go along with higher rates of ingroup cooperation. However, the link established is more complicated than might be assumed. The higher aggregate cooperation is not caused by a direct positive correlation between outgroup threat and ingroup cooperation. Rather, outgroup threat appears to suppress a default behaviour that lets fearful or distrustful individuals lower their level of cooperation when no outgroup is near. The data were collected in rural, residentially stable communities marked by patriarchal family structures. This context is arguably more similar to the conditions under which human cooperative behaviour evolved and which inspired theoretical models, but less typical for the 21st century, marked by increasing urbanisation (Montgomery 2008). This limit of scope may be good news, however, as the type of cooperation observed here is likely exclusionary in nature and a poor foundation for cooperative life in contemporary multicultural societies.

Chapter appendix

Characteristics of the threat game

As outlined in the main text, the threat game is a bilateral game that provides a measure of aggressive behaviour when players take on the role of the potential predator or threatener, P, and a measure of fear of such aggressive behaviour when players take on the role of the threatened, T. Figure 3.6 details the payoffs for P and T, and Figure 3.7 provides examples of P/T interactions.

$$\text{Payoff P }(y, z) = \begin{cases} e + z - y & \text{if } z > y \\ e & \text{if } z \leq y \end{cases}$$

$$\text{Payoff T }(y, z) = \begin{cases} e - 2(z - y) - y & \text{if } z > y \\ e - 2z + y & \text{if } z > y \\ e - y & \text{if } z \leq y \end{cases}$$

with $z, y \in \{0, e\}$

z : amount claimed by P
y : amount spent by T on protection
e : initial endowment

Figure 3.6. Payoffs for P and T in the threat game

The threat game has several advantageous properties. 1) As both players are initially endowed with an equal amount, there is no good motivation except for greed or predatory intentions on the side of P, and defensive behaviour or fear on the side of T for their respective decisions. P can only harm the other person. T can only protect himself, but his actions do not lower the baseline payment of P. Therefore, unlike in the dictator game, for instance, there is no role for inequality aversion as a motive. Nevertheless, the threat game reflects the power asymmetry inherent in many threatening situations. 2) For P, aggressive behaviour is completely risk-free, so that risk-aversion should not influence her decision. 3) For the threatened T, the incentive to spend on protection strictly rises in the expectation of threatening behaviour, i.e. threshold solutions are avoided. 4) For T, spending on protection is also always costly – the maximum amount that T can possibly earn is strictly decreasing in the amount T allocates to fend off claims. 5) The behaviour of P and T is collectively costly. That is, the 'blame' for 'burning money' – leaving money with the experimenter – is on both P and T. Each unit T spends on protection reduces the money in the game by 1; likewise, each unit P claims from T also automatically reduces the money in the game, no matter what the threatened does. 6) The optimal response to a given threat level also minimises differences in payoffs (so that the threatened T cannot do better in terms of minimising relative

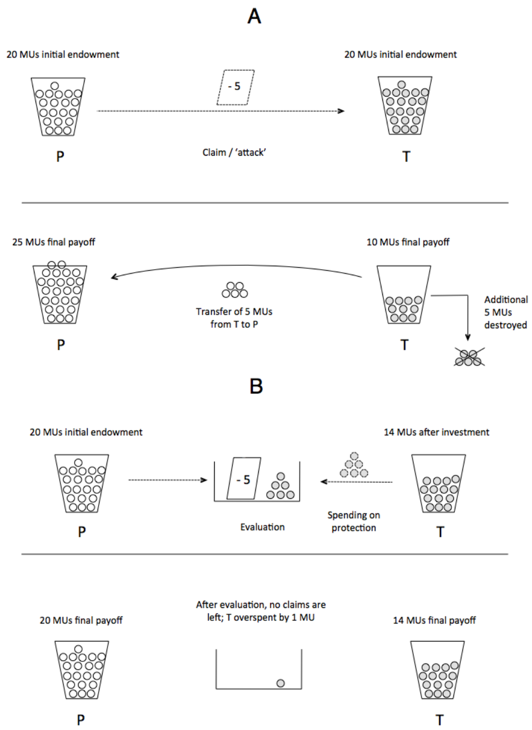


Figure 3.7. Payoff examples for the threat game. (A) shows payoffs for the potential predator or threatener P and the threatened T for the case that T does not spend on his protection. P claims and receives 5 MUs from T for a final payoff of 25 MUs. T consequently loses 5 MUs to P while another 5 MUs are 'destroyed' in the process so that T is left with a final payoff of 10 MUs. (B) shows payoffs for P and T when T slightly overspends on his protection. P claims 5 MUs from T. T spends 6 MUs on his protection. All claims by P are thus amortised so that she ends up with her initial endowment of 20 MUs as final payment. T does not lose to P, but the amount he spends on his protection is lost, so he ends up with a final payoff of 14 MUs. Note that this is a worse outcome compared to a situation where he had only spent 5 MUs on his protection, in which case T's final payoff would have been 15 MUs. T's outcome is considerably better, however, than if he had not spent on his protection at all, in which case he would be left with only 10 MUs final payoff.

payoffs than to play the optimally 'safe' response), which means that a concern with relative gains should not distort findings.

Summary statistics and regressions

This section reports the summary statistics and regression results referred to in the main text. Table 3.2 provides village-by-village summary statistics. Table 3.3 gives overall averages and the covariate balance between the high and the low outgroup-exposure condition. Table 3.4 shows regressions of the experimental decisions on the outgroup exposure variable, while simultaneously controlling for individual-level covariates. Table 3.5 shows regressions of PGG investments on the interactions between high-outgroup exposure and T-role spending, and between high-outgroup exposure and trust measures.

The covariates referred to in this section come from several sources. The village population and the percentage of ethnic Georgians within each village were taken from the 2002 Georgian census, which recorded these data for each village in the Kvemo Kartli region. Distance from Tbilisi and to the 5 closest neighbouring villages was calculated using GIS software, as were the variables capturing climatic conditions using publicly available data sources (Harris et al. 2014; Hijmans et al. 2005; Huld, Müller, and Gambardella 2012). A respondent's age, gender, birthplace, education and monthly household income were recorded by means of a survey delivered before the experiments took place. The church attendance and trust measures were collected in a second survey delivered after the experiments had been conducted. Further information on the selection of villages and the experiments is provided in the other sections of this document.

Table 3.2. Summary statistics by village

	1	2	3	4	5	6
Village						
High outgroup exp	0	0	0	1	1	1
Share outgroup in neighb	.09	.31	.33	.73	.82	.84
Pop in 100, 2002 cens	5.65	2.21	6.67	6.28	5.25	9.76
Perc ethn Georgian	.99	.93	.98	.97	.79	.97
Pop in 5 closest villages in 100, 2002 cens	53	24	18	33	44	25
Av dist to 5 closest neigh villages (km)	10.3	4.8	3.5	2.7	5.9	10.2
Distance to Tbilisi (km)	30.4	37.8	75.5	83.8	109	79.8
Av precip/month, 2000-2012, Hijmans et al. 2005	57.7	51.8	47.9	49.3	64.1	57.2
Av temp/month (∘C), 2000-2014, CRU TS 3.23	10.8	11.1	7.2	7.2	5.5	7.2
Av solar irradiation/day (kWh/m2), EC PVGIS	3.71	3.68	3.68	3.70	3.78	3.69

Table 3.3. Comparison of villages with low and high exposure to outgroup members

	Av	*Low*	*High*	Δ	*p*
Village					
Share outgroup in 5 closest villages	0.52	0.24	0.80	−0.55	0.05
Pop in 100, 2002 cens	5.81	4.84	7.10	−2.25	0.51
Perc ethn Georgian	0.94	0.97	0.91	0.06	0.27
Pop in 5 closest villages in 100, 2002 cens	31.95	31.77	33.88	−2.11	0.51
Av dist to 5 closest neigh villages (km)	5.92	6.20	6.27	−0.07	0.83
Distance to Tbilisi (km)	68.64	47.90	90.93	−43.03	0.05
Av precip/month, 2000-2012, Hijmans et al. 2005	54.65	52.44	56.86	−4.42	0.51
Av temp/month (°C), 2000-2014, CRU TS 3.23	8.27	9.72	6.64	3.08	0.11
Av solar irradiation/day (kWh/m2), EC PVGIS	3.70	3.69	3.72	−0.03	0.27
Session					
Female	0.49	0.52	0.46	0.06	0.50
Age in years	45.71	49.30	42.03	7.27	0.01
Born in village	0.61	0.58	0.64	−0.06	0.44
Edu in years	12.96	12.89	13.03	−0.14	0.96
HH inc 100 GEL / month	5.20	5.19	5.21	−0.02	0.83
Freq church visits/month	2.58	2.33	2.85	−0.52	0.70
N particip session	23.84	24.13	23.55	0.58	0.31

P-values from two-sided Mann-Whitney test.

Another way of showing how threat perceptions relate to ingroup cooperation is by calculating the difference between PGG investments when interacting with the ingroup and PGG investments when 'virtually' interacting with people from neighbouring villages (i.e. $PGG_{comm} - PGG_{neigh}$) – and by regressing this difference on that for spending on protection in the threat game (i.e.

Table 3.4. Regressions of PGG investments and T-role spending on outgroup exposure; regression of differences in PGG investments on differences in T-role spending

	(1) PGG invest, comm		(2) PGG invest, comm		(3) T-role spend, neigh		(4) T-role spend, neigh		(5) $(PGG_{comm} - PGG_{neigh})$		(6) $(PGG_{comm} - PGG_{neigh})$	
High outgroup exp	0.97*	(0.066)	0.96**	(0.03)	1.12	(0.83)	0.85	(0.93)				
$(T_{neigh} - T_{comm})$								−0.85	0.12	(0.14	0.16***	(0.00)
Female			−0.50	(0.37)			−0.48	(0.80)		(0.93)	0.85	(0.93)
Age in years			0.01	(0.52)			−0.03**	(0.01)		(0.93)	0.85	(0.93)
Born in village			0.61	(0.49)			−0.75	(0.71)		(0.93)	0.85	(0.93)
Edu in years			−0.02	(0.24)			−0.06	(0.09)		(0.93)	0.85	(0.93)
HH inc 100 GEL / month			0.03	(0.56)			0.06	(0.12)		(0.93)	0.85	(0.93)
Frequency of visiting church			0.14	(0.59)			−0.64	(0.49)		(0.93)	0.85	(0.93)
Constant	6.30***	(0.00)	5.19***	(0.00)	5.60***	(0.00)	12.41***	(0.00)	0.70***	(0.93)	0.85	(0.93)
Observations	140		132		140		132		140		132	

Table 3.4 shows regressions of PGG investments (Panel 1 and Panel 2) and of the amount spent on protection in the T-role (Panel 4 and Panel 5) on the outgroup exposure measure while simultaneously controlling for individual characteristics. Deviations from the full sample size are due to 2 missing observations on the birthplace question and 3 missing values for education and church attendance. OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at the village level.P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$T_{neigh} - T_{comm}$). This analysis shows that individuals that are relatively more afraid of their neighbours cooperate more with their co-villagers. Interestingly, this effect is similar in both the high and the low outgroup exposure condition. While the raw correlation between the two differences is not statistically significant at conventional levels (Column 5), the addition of control variables improves the precision of the estimate to meet the 0.00 level (Column 6).

Table 3.5. Regressions of PGG investments on interactions between high-outgroup exposure and T-role spending on protection and trust measures

	(1) PGG invest, comm		(2) PGG invest, comm		(3) PGG invest, comm		(4) PGG invest, comm		(5) PGG invest, comm		(6) PGG invest, comm	
High outgroup exp	−1.00	(0.45)	−0.94	(0.62)	−0.85	(0.56)	−1.05	(0.39)	−2.92***	(0.00)	−2.99***	(0.00)
T-role spending, neigh interact	−0.20	(.26)	−0.20	(0.25)								
High outgroup exp x T-role spending	0.25*	(.09)	0.24	(0.22)								
Distrust comm members (q: most can be trusted)					−0.78	(0.28)	−0.80	(0.19)				
High outgr exp x distrust comm memb					0.88	(0.19)	1.00	(0.19)				
Distrust people in neigh vill (q: most can be trusted)									−0.85***	(0.00)	−1.00***	(0.00)
High outgr exp x distrust neigh									1.43***	(0.00)	1.49***	(0.00)
Female			−0.51	(0.39)			−0.55	(0.30)			−0.33	(0.58)
Age in years			0.01	(0.40)			0.01	(0.40)			0.02	(0.37)
Born in village			0.54	(0.56)			0.54	(0.51)			0.72	(0.45)
Edu in years			−0.03	(0.26)			−0.07	(0.80)			−0.08	(0.12)
HH inc 100 GEL / month			0.05	(0.38)			0.05	(0.30)			0.08	(0.20)
Frequency of visiting church			0.15	(0.61)			0.07	(0.80)			0.07	(0.66)
Constant	7.87***	(0.00)	6.76***	(0.00)	7.93***	(0.00)	7.54***	(0.00)	8.51***	(0.00)	8.12***	(0.00)
Observations	140		132		137		130		133		128	

Table 3.5 shows regressions of PGG investments on the interaction between outgroup exposure and T-role spending on protection (Panel 1 and Panel 2), between outgroup exposure and the survey measure for community trust (Panel 3 and Panel 4), and between outgroup exposure and the survey measure for trust in people from neighbouring villages (Panel 5 and Panel 6). Deviations from the full sample size are due to 2 missing observations on the birthplace question, 3 missing values for education and church attendance and 7 missing values for the trust measures. OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level. Predicted values from the regressions are shown in Figure 3.8. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

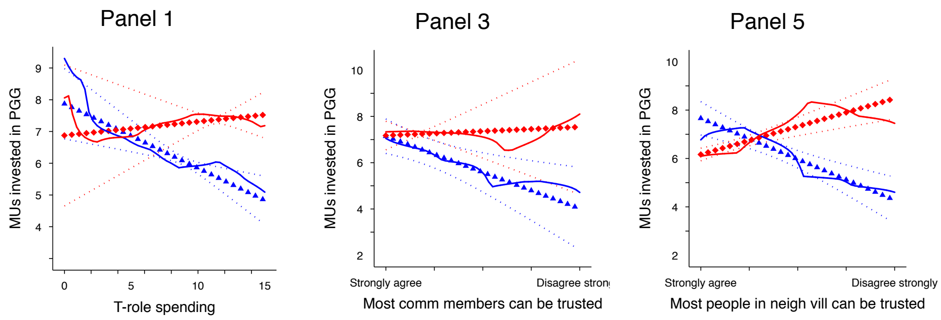


Figure 3.8. Predicted values from linear regressions reported in Table 3.5 and local polynomial smooths using kernel regression (Epanechnikov). Blue, △ = high-outgroup exposure; red, ◇ = low-outgroup exposure.

Selection of research site and procedures

This section provides more detailed information on the selection of the research site in Georgia and the individual villages. Research was conducted in May and June 2015 by a team consisting of the author and two local research assistants. Before the beginning of the field research, the study design was approved by the European University Institute's Research Ethics Committee. To test whether outgroup exposure goes along with ingroup cooperation, the aim was to identify a context where, in a compact geographical area, there is variation in the exposure to an ethnic 'outgroup'. In the search for an appropriate research site, a range of multi-ethnic countries were considered. Several of the potential choices had seen violent conflict, however, which often went along with a change of settlement patterns, reinforced segregation along ethnic lines and other confounders. Therefore, a context was to be chosen where settlement patterns of ethnic groups in space were relatively stable. Moreover, the sampling strategy would rely on access to detailed demographic information that could be used to calculate, for any given village, the share of ethnic outsiders in the vicinity.

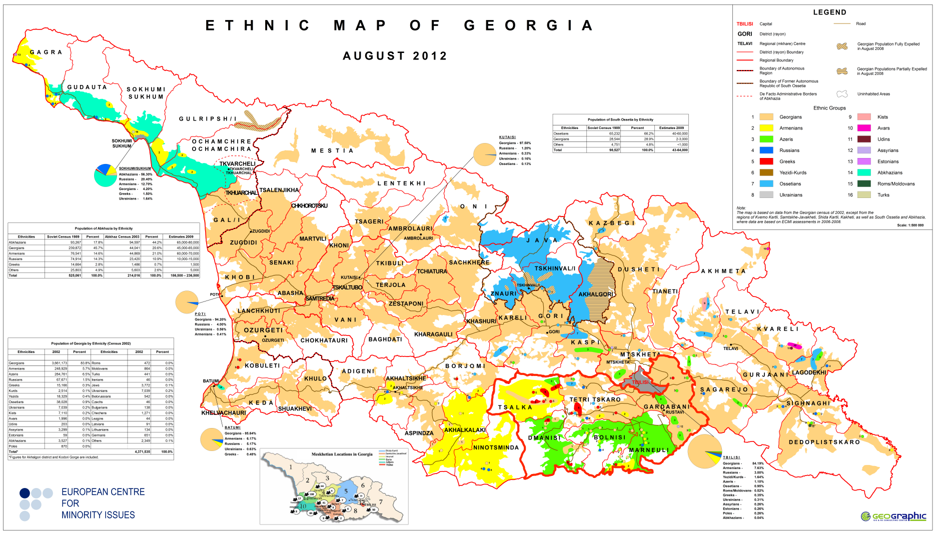


Figure 3.9. Ethnic composition of Georgia, Kvemo Kartli region marked with bold outline

With these criteria in mind, Georgia was eventually chosen as a research site, which had the additional advantage that the author was already somewhat familiar with the regional context from previous work experience in neighbouring Armenia. Georgia is remarkably ethnically diverse, as can be seen in Table 3.6 , which gives population breakdowns by ethnic group for the country as a whole and for the different regions, and in Figure 3.9 , which shows the distribution of the different ethnic groups in space.[3]

Table 3.6. Ethnic composition of the Kvemo Kartli region 2002

Municipality	Total	Georgians	Abkhazians	Ossetians	Armenians	Russians	Azerbaijanis	Greeks	Ukrainians	Kists	Yezids
Rustavi City	116,384	102,151	44	1,410	2,809	3,563	4,993	257	395	15	293
Bolnisi	74,301	19,926	35	80	4,316	414	49,026	438	14	-	-
Gardabani	114,348	60,832	48	412	1,060	994	49,993	236	65	6	162
Dmanisi	28,034	8,759	9	12	147	156	18,716	218	7	-	-
Marneuli	118,221	9,503	29	47	9,329	523	98,245	396	29	1	6
Tetri Tskaro	25,354	18,769	16	205	2,632	689	1,641	1,281	14	-	-
Tsalka	20,888	2,510	2	18	11,484	125	1,992	4,589	3	-	2
Kvemo Kartli	497,530	222,450	183	2,184	31,777	6,464	224,606	7,415	527	22	463
%		44.71	0.04	0.44	6.39	1.30	45.14	1.49	0.11	0.00	0.09
Georgia	4,371,535	3,661,173	3,527	38,028	248,929	67,671	284,761	15,166	7,039	7,110	18,329
%		83.75	0.08	0.87	5.69	1.55	6.51	0.35	0.16	0.16	0.42

Table 3.6 shows the absolute numbers and %-shares of ethnic Georgians and Georgian citizens of another ethnicity in the Kvemo Kartli region and Georgia in 2002. The data comes from the 2002 census conducted by the National Statistics Office of Georgia (Geostat).

As stated in the main text, information on the ethnic composition of the villages and their surroundings was taken from the Georgian census 2002. As this information was only available in Georgian, it had to be translated into English by a research assistant. For each village, either the exact shares (in percent) of the different ethnic groups present was indicated, or a village was marked as ‘Georgian’, ‘Azerbaijani’ or ‘Armenian’, designating villages overwhelmingly composed by the members of that ethnic group. For the purpose of the study, all villages where more than 75% of inhabitants indicated during the census that they were ethnic Georgians, or villages marked as ‘Georgian’ were counted as Georgian villages. This was the case for 69 out of 214 villages listed in the census material. For each village, the 5 closest neighbouring villages were then determined using GIS software. Using the information on the ethnic composition of these villages and population figures, the share of non-Georgians in the population of the neighbouring villages was calculated. These shares are shown in Figure 3.10 for all Georgian villages in the Kvemo Kartli region.

Villages where lab-in-the-field sessions were conducted are marked in red (high outgroup-exposure condition) and blue (low outgroup-exposure condition). The remaining villages were not selected for conducting experiments because they either have more than 1000 inhabitants (grey) or are located very close to the capital, Tbilisi (yellow).

Another class of villages not selected for conducting experiments, marked in green, are newly founded villages with a distinct demographic profile. Since the late 1980s, successive Georgian governments, aided by private foundations, have funded the resettlement of ethnic Georgians from ecologically volatile regions to the Kvemo Kartli region. These so-called ‘eco-migrants’ largely hail from the mountainous parts of Adjara region, in the south-west of the country, or from the likewise

[3]The map is made available by the European Centre for Minority Issues (ECMI) on their website http://www.ecmicaucasus.org/menu/info_maps.html (last checked on 1 Sep 2016).

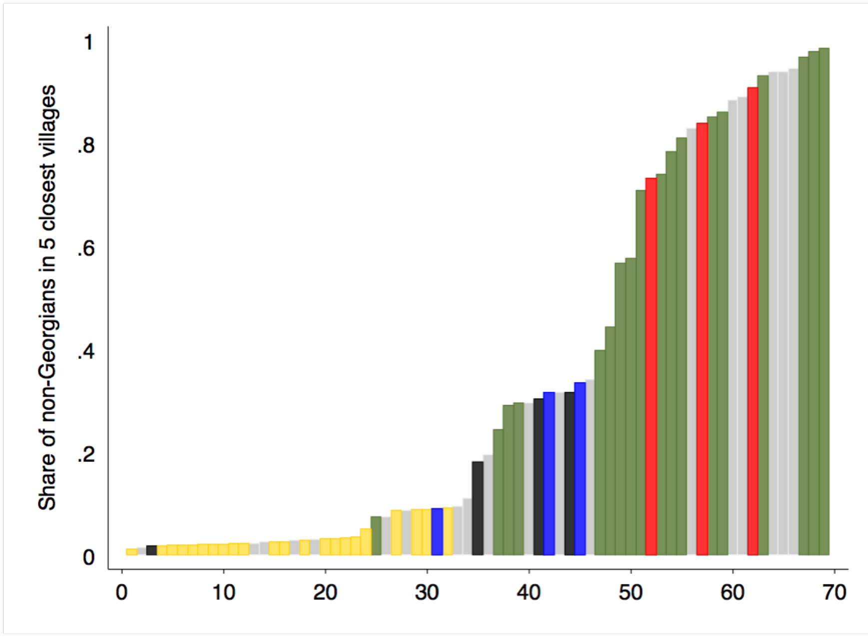


Figure 3.10. Georgian villages in the Kvemo Kartli region by share of non-Georgians in 5 closest villages; villages with lab-in-the-field sessions are marked in blue (low outgroup-exposure villages) and red (high outgroup-exposure villages); villages that were visited, but could not offer the necessary facilities are marked in black; villages populated by 'economigrants' are marked in green; villages close to the capital city Tbilisi are marked in yellow; villages with over 1000 inhabitants are marked in grey.

mountainous Svaneti region in north-western Georgia. The fact that the 'ecomigrants' have been settled largely amid ethnic minority settlements has raised concerns among minority representatives that the true motive behind the resettlement programmes is the 'Georgification' of regions with high minority presence (Trier and Turashvili 2007). Finally, four villages were so small so that they could not offer a venue for conducting the experiments. These are marked in black.

Session procedures

The lab-in-the-field sessions were conducted in local school buildings (in 5 cases) or in the building of the local municipality (1 case). Upon entering the room, participants were randomly allocated a seat by drawing a number, which was also used for identification purposes during the session. They were then given a 5-Lari show-up fee and a consent form. The purpose of the experiment was explained in Georgian by the two research assistants. After giving their written consent, participants answered to a short survey, which served to record the individual-level covariates (gender, age, household income, place of birth within/outside village). Participants then worked on the experimental tasks. Following a pre-prepared script, the research assistants gave instructions in Georgian. The script had been translated and back-translated from English into Georgian and had been pre-tested in several trial sessions. To facilitate understanding of the PGG and threat game, we explained the possible choices and payoffs using tools made from acrylic glass and wooden balls. Figure 3.11 shows the use of the tools during a lab-in-the-field session.

Before making an actual decision, each participant answered a quiz, in which they were asked to calculate hypothetical payoffs. Participants then communicated their game decision by writing on designated paper slips. In the lab-in-the-field session, participants took a total of six decisions. They first took two PGG-decisions – one when paired with others in the room, and another when paired 'virtually' with individuals from neighbouring villages. After having taken decisions in the PGG, they then decided in the P-role of the threat game, i.e. as potential predator or threatener, both when randomly paired with another person in the same room, and when virtually paired with an individual from a neighbouring village. Finally, subjects decided in the T-role of the threat game, again once paired with another member of the community in the same room and once with a 'virtual other' from a neighbouring village. Half of the participants were first paired with 'virtual others' and the other half with others participants in the same room. During decision-making, participants used cardboard separators to ensure their privacy. At the end of the session, participants were paid individually and in private. Sessions lasted 90–120 min and on average participants earned 18 Georgian Lari (about USD 8/Euros 7), 80% of the average daily wage of an employee in agriculture or education.

Figure 3.11. Demonstration of payoffs in the threat game using wooden balls and tools made from acrylic glass during one of the lab-in-the-field sessions

The main text reports the responses in the ingroup condition for the PGG, and in the outgroup condition for the threat game. Findings from the other decision tasks are summed up below. After the conclusion of the experiments, subjects answered a second survey, which served to collect additional measures for cooperation, trust and threat perceptions, the results of which are discussed

Figure 3.12. Use of cardboard separators during lab-in-the-field session

Figure 3.13. Decisions recorded on paper being entered into the computer

in the main text and below. All answers were recorded on paper and manually entered into a computer (Figure 3.12 and Figure 3.13).

Additional analyses

Apart from the decisions reported in the main text, several other pieces of information were recorded, which are analysed here. These data include the decisions from the remaining experimental measures, notably the PGG contributions of those virtually paired with participants from neighbouring villages, two decisions during the threat game in the P-role, and the decision in the T-role of those interacting with others in the same room. Histograms depicting the distribution of responses to all decisions are shown in Figure 3.14. The section also analyses the responses to survey measures, which were recorded after the experiments had been concluded as a way of checking the robustness of findings. Apart from the trust questions discussed in the main text, these are a survey item on real-life cooperativeness, two survey items on social distance, and two survey items on threat perceptions.

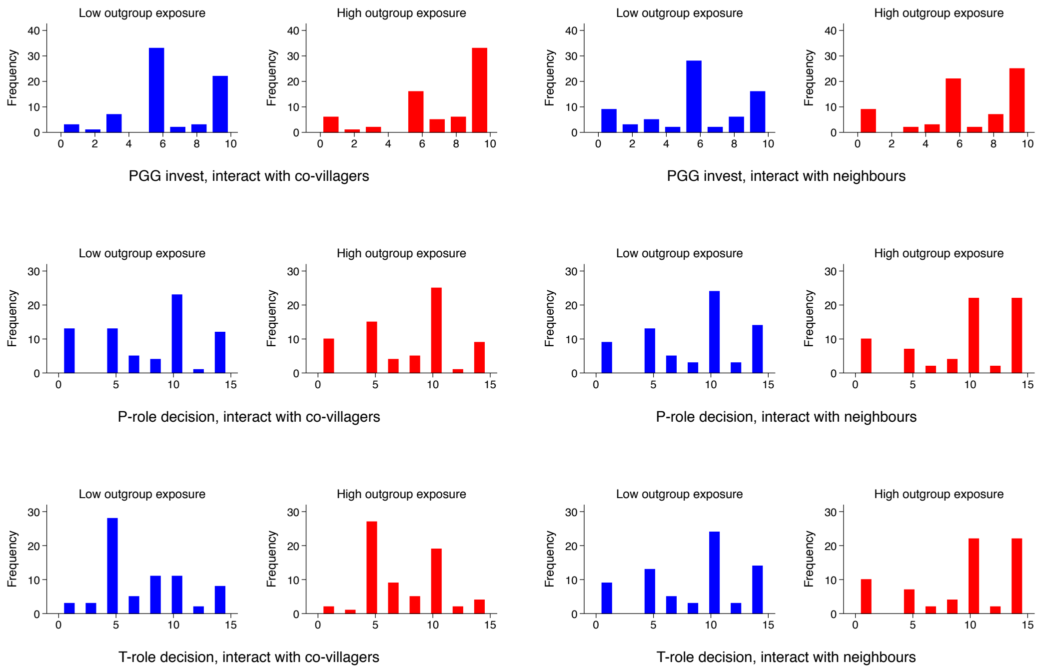


Figure 3.14. Histograms showing the distribution of responses for the different decisions, by outgroup exposure condition

PGG investments of participants interacting with outgroup members, and ingroup bias

Table 3.7 analyzes the participants' contributions to the PGG of those virtually paired with participants from neighbouring villages. Interestingly, contributions in the PGG were higher in the high outgroup-exposure region than in the low outgroup-exposure region (Panel 1) – similar to what was observed when the PGG was played with other participants from the same community.

One possibility is that participants in high-outgroup exposure regions have developed a more 'cooperative phenotype' (Peysakhovich, Nowak, and Rand 2014) than participants in low-outgroup exposure regions that leads them to extend their cooperativeness to outgroup members. In line with this interpretation is the fact that across both conditions, PGG contributions when interacting with co-villagers and PGG contributions when virtually interacting with people from neighbouring villages are positively correlated (ρ=0.37, P=0.000, Spearman's rank correlation). Another possibility is that participants in high-outgroup exposure regions see a stronger need to 'reach out' to their non-co-ethnic neighbours than those in low-outgroup exposure regions and use the PGG for this purpose. By subtracting the PGG investments recorded when participants were paired with subjects from neighbouring villages (PGG neigh) from the PGG investments recorded when participants were paired with others in the same room (PGG comm), and by then regressing this differential on the outgroup-exposure measure, we can check for ethnic ingroup bias. As shown, high-outgroup exposure does not go along with ingroup bias (Panel 3 and Panel 4). In line with previous research showing that fear of an outgroup induces discrimination against that group (Bobo and Hutchings 1996; Enos 2014, 2016; Enos and Gidron 2016; Silva and Mace 2014), when virtually interacting with participants from neighbouring villages, T-role spending is negatively correlated with PGG investments. However, as demonstrated by the non-statistically significant interaction term (in Panel 5 and Panel 6) and Figure 3.15, this finding applies equally to fear of co-ethnic neighbours as it applies to fear of non-co-ethnic neighbours.

Table 3.7. PPG investments of participants virtually paired with participants from neighbouring villages, and ingroup bias

	(1) PGG neigh		(2) PGG neigh		(3) PGG comm - PGG neigh		(4) PGG comm - PGG neigh		(5) PGG neigh		(6) PGG neigh	
High outgroup exp	0.89	(0.18)	1.02**	(0.03)	0.08	(0.90)	−0.07	(0.81)	−0.01	(0.96)	−0.04	(1.00)
T-role spending (neigh)									−0.28***	(0.02)	−0.30***	(0.02)
High outgroup exp x T-role spending									0.14	(0.49)	0.15	(0.46)
Female			−1.12*	(0.08)			0.62	(0.48)			−1.21*	(0.08)
Age in years			0.04*	(0.06)			−0.03	(0.44)			0.03	(0.12)
Born in village			−0.64	(0.44)			1.25	(0.37)			−0.82	(0.36)
Edu in years			−0.07*	(0.07)			0.05	(0.36)			−0.09**	(0.04)
HH inc 100 GEL / month			0.06	(0.57)			−0.03	(0.64)			0.08	(0.42)
Frequency of visiting church			0.52**	(0.13)			−0.38	(0.31)			0.41	(0.21)
Constant	5.54***	(0.00)	3.61	(0.12)	0.76	(0.21)	1.58	(0.00)	7.68***	(0.00)	6.80***	(0.00)
Observations	140		132		140		132		140		132	

Deviations from the full sample size are due to 2 missing observations on the birthplace question and 3 missing values for education and church attendance. OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level, P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

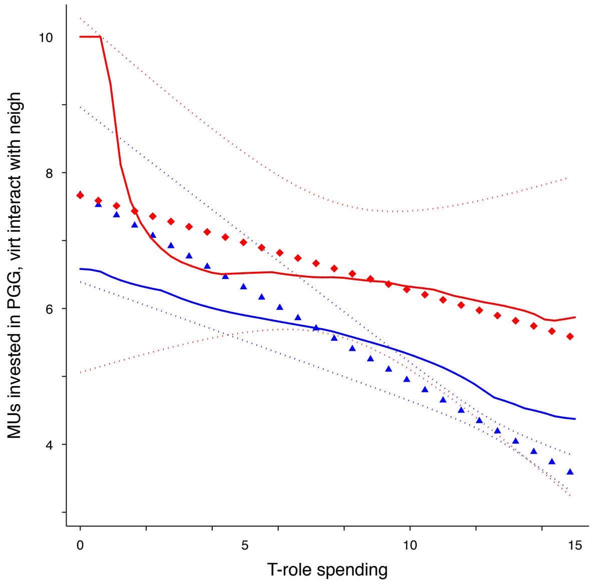


Figure 3.15. Predicted values from linear regressions reported in Table 3.7 Panel 5, and local polynomial smooths using kernel regression (Epanechnikov). Blue, △ = high-outgroup exposure; red, ◇ = low-outgroup exposure.

Threat game decisions in the P-role, and in the T-role of participants interacting with community members

Table 3.8 shows the remaining decisions in the threat game dependent on the low or high outgroup-exposure condition. In terms of aggressive behaviour towards the ingroup, there were no differences between the high and low outgroup-exposure condition (Panel 1 and Panel 2). Aggressive behaviour towards the outgroup was more pronounced in the high outgroup-exposure condition (Panel 3), but does not reach conventional levels of statistical significance, meaning that participants were no more willing to harm outgroup members than they were to harm ingroup members. There were no differences in the threat perception of other participants in the same session in the low as compared to the high outgroup-exposure condition (Panel 5 and Panel 6).

Table 3.8. Decisions in the P-role in the threat game, and T-role decision when interacting with other participants in the same session

	(1) P-role, comm		(2) P-role, comm		(3) P-role, neigh		(4) P-role, neigh		(5) T-role, comm		(6) T-role, comm	
High outgroup exp	0.02	(0.92)	0.46	(0.48)	0.93	(0.50)	1.38	(0.41)	0.07	(0.84)	0.30	(0.56)
Female			−0.23	(0.84)			−2.11	(0.17)			−0.42	(0.63)
Age in years			0.03	(0.28)			0.02	(0.17)			0.04	(0.18)
Born in village			0.49	(0.74)			−0.99	(0.47)			0.32	(0.63)
Edu in years			0.03	(0.64)			0.08	(0.51)			0.02	(0.72)
HH inc 100 GEL / month			−0.13*	(0.07)			0.02	(0.91)			−0.12	(0.14)
Frequency of visiting church			−0.29	(0.80)			0.41	(0.11)			0.28	(0.43)
Constant	7.79***	(0.00)	7.42*	(0.06)	8.59***	(0.00)	6.57***	(0.00)	7.39***	(0.00)	4.92	(0.15)
Observations	140		132		140		132		140		132	

Deviations from the full sample size are due to 2 missing observations on the birthplace question and 3 missing values for education and church attendance. OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Survey responses

The following survey measures were collected after the collection of experimental measures had been concluded, and it is possible that the experience of the game-play has influenced responses. The survey measures are therefore best seen as complementing the experimental results rather than constituting independent data points.

Social distance

Included in the post-experimental survey were two social distance items. Participants were asked whether they approved of members of their community i) doing business with and ii) marrying people from the five closest neighbouring villages (the reference group used throughout the session). They could answer on a 5-point scale ranging from 'Strongly approve' to 'Strongly disapprove'. As mentioned in the main text, at no point during the session was ethnicity mentioned. The social distance items, especially the one on marriage, were therefore also included as a way of checking whether the outgroup treatment worked. Given widespread endogamy, we would expect participants to be less approving of marriages with people from neighbouring villages in the high outgroup-exposure condition. Table 3.9 presents the results of a regression of the two survey items on the binary outgroup exposure item. While disapproval of doing business with neighbours between the low and the high outgroup-exposure condition becomes non-significant in the presence of controls (Panel 1 and Panel 2), participants in the high outgroup-exposure condition were much less approving of members of their community marrying others from neighbouring villages (Panel 3 and Panel 4). The results thus provide evidence that participants were aware of the ethnic composition of the neighbouring villages.

Table 3.9. Social distance conditional on outgroup exposure

	(1) Appr business		(2) Appr business		(3) Appr marriage		(4) Appr marriage	
High outgroup exp	−0.16	(0.12)	−0.12	(0.41)	−0.68***	(0.00)	−0.73***	(0.00)
Female			−0.03	(0.91)			−0.12	(0.16)
Age in years			0.00	(0.91)			−0.00	(0.81)
Born in village			0.06	(0.77)			0.05	(0.74)
Edu in years			0.00	(0.74)			−0.01	(0.76)
HH inc 100 GEL / month			0.01	(0.51)			−0.01	(0.85)
Frequency of visiting church			0.09***	(0.00)			−0.03	(0.82)
Constant	4.01***	(0.00)	3.61***	(0.00)	3.46***	(0.00)	3.79***	(0.00)
Observations	135		128		136		129	

OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Deviations from the full sample size are due to 2 missing observations on the birthplace question, 3 missing values for education and church attendance, and 7 missing observations for the social distance measures.

Cooperation and collective action

As additional measures to assess cooperation, three items measuring cooperation and participation in collective action were included in the questionnaire. The first item asked for cooperation among villagers in the strict sense. Participants were asked how many hours a week they spend helping other villagers, for example with household work, by helping with farm work, by looking after their children, etc. The second and third items inquire about participation in collective activities: whether people took part in community meetings, and whether they joined others to raise an issue with the authorities or to protest against a decision. To both questions participants could answer with 'no', 'no, but I would have done if I could' or 'yes'. Table 3.10 presents the results. Self-reported interpersonal cooperation is clearly higher in high outgroup-exposure regions, where respondents reported to spend about two hours more helping each other per week (Panel 1 and Panel 2). Participation in collective action, however, seems unaffected by outgroup exposure (Panel 3 to Panel 6).

Table 3.10. Survey measures of cooperation and collective action, conditional on outgroup exposure

	(1) Hrs helped		(2) Hrs helped		(3) Comm meet		(4) Comm meet		(5) Raised issue		(6) Raised issue	
High outgroup exp	1.65***	(0.00)	1.65***	(0.00)	−0.05	(0.77)	−0.06	(0.77)	0.25	(0.35)	0.27	(0.47)
Female			−1.42	(0.21)			−0.32**	(0.05)			−0.24**	(0.07)
Age in years			0.01	(0.54)			0.00***	(0.00)			0.01	(0.44)
Born in village			1.10	(0.18)			0.02	(0.67)			0.04	(0.78)
Edu in years			0.19	(0.18)			−0.01	(0.26)			0.01	(0.63)
HH inc 100 GEL / month			−0.09	(0.49)			0.00	(0.73)			0.00	(0.85)
Frequency of visiting church			0.07	(0.86)			−0.00	(0.92)			0.02	(0.73)
Constant	2.38***	(0.00)	−0.13	(0.94)	0.49	(0.22)	0.54*	(0.06)	1.52***	(0.00)	1.22*	(0.08)
Observations	134		127		138		131		137		130	

OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Deviations from the full sample size are due to 2 missing observations on the birthplace question, 3 missing values for education and church attendance, and 8 missing observations for the cooperation measures.

Types of threat

A final set of questions was included to understand more precisely the nature of the threat perceived (if any). These questions were included at the very end of the post-experimental survey. Participants were asked to what extent they agreed with the following statements: i) sometimes it worries me that people in neighbouring villages are more successful than people in this village; ii) sometimes I feel that people from other villages are after resources (e.g. over land for agriculture or grazing, or access to support from the authorities) belonging to this village; iii) the fact that the population in some of the mentioned neighbouring villages grows faster than here sometimes worries me. To all statements they could respond on a five-point scale ranging from 'disagree strongly' to 'strongly agree'. In Table 3.11 the responses are regressed on the measure for outgroup exposure. Participants in high outgroup-exposure regions exhibited similar levels of concern over their neighbours being more successful than did participants in low outgroup-exposure regions (Panel 1 and Panel 2). Similarly, they did not worry significantly more than those in low outgroup-exposure region about people in neighbouring villages being a threat to assets or privileges owned by their community

(Panel 3 and Panel 4). Where they diverged was in their perception of a 'demographic threat' emanating from their neighbours. Ethnic Georgian participants living among non-coethnics clearly worried more about the prospect of a growing population in their vicinity than those living among ethnic Georgians (Panel 5 and Panel 6).

Table 3.11. Survey measures of threat perceptions, conditional on outgroup exposure

	(1) Worry success		(2) Worry success		(3) Worry ressour		(4) Worry ressour		(5) Worry pop grow		(6) Worry pop grow	
High outgroup exp	0.17	(0.34)	0.24	(0.33)	0.47	(0.40)	0.48	(0.29)	0.60^{**}	(0.03)	0.76^{*}	(0.06)
Female			−0.27	(0.33)			−0.21	(0.32)			-0.41^{***}	(0.00)
Age in years			0.01^{*}	(0.07)			−0.01	(0.45)			0.02^{***}	(0.00)
Born in village			0.17	(0.52)			−0.37	(0.26)			-0.27^{***}	(0.00)
Edu in years			0.02	(0.75)			0.03	(0.54)			0.02	(0.37)
HH inc 100 GEL / month			-0.07^{**}	(0.03)			−0.03	(0.47)			−0.00	(0.78)
Frequency of visiting church			0.07	(0.54)			−0.06	(0.63)			−0.01	(0.89)
Constant	3.31^{***}	(0.00)	2.55^{***}	(0.00)	2.93^{***}	(0.00)	3.54^{*}	(0.06)	3.20^{***}	(0.00)	2.33^{***}	(0.00)
Observations	136		129		136		129		136		129	

OLS regression with wild bootstrapped standard errors, 10,000 repetitions, resampling at village level. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Deviations from the full sample size are due to 2 missing observations on the birthplace question and 4 missing observations for the threat measures.

Selective migration as potential cause of higher cooperation rates

An interesting question is whether the results, especially the higher PGG contributions in the high-outgroup exposure conditions, could have been caused by selective migration. Four types of selective migration processes could have caused this finding: 1. migration of more cooperative individuals into high-outgroup exposure regions, 2. migration of less cooperative individuals into low-outgroup exposure regions, 3. migration of less cooperative individuals out of high exposure regions, and 4. migration of more cooperative individuals out of low exposure regions.

One way of checking whether higher cooperation rates in the high-outgroup exposure region may have been caused by selective migration is to restrict the sample to those individuals born in the villages. Focussing on this subgroup only lets us preclude the possibility that the difference in PGG contributions was driven by selective *immi*gration (processes 1. and 2.). The difference in PGG investments between the two conditions was slightly larger among those residing in their village of birth than for the overall sample Δ .996 (P =.094, two-sided Mann-Whitney test, n=84, as compared to Δ .97 in the full sample), and not statistically different from that among those not residing in their village of birth (χ^2=0.33), suggesting that the selective migration processes 1. and 2. are less likely to have produced the results observed.

To check whether higher cooperation rates in the high-outgroup exposure regions may have been caused by selective *e*migration (processes 3. and 4.), the following test is proposed (Table 3.12). If process 3. applied, in the high exposure region older individuals (or those who have spent more years in the village) should be more cooperative, holding other things equal. That is, the interaction term between age/years in village and exposure should be positive. If process 4. applied, older/more venerate community members should be comparatively less cooperative, also resulting in a positive interaction term. As shown in Table 3.12, none of the interaction terms is statistically significance at conventional levels, suggesting that selective emigration is not likely to have caused the observed results. If anything, the negative sign implies that more cooperative individuals may have left the high-outgroup exposure region, meaning that the effect we observe is likely smaller than the effect we would have observed in absence of migration.

Table 3.12. Regressions of PGG investments on interactions between high-outgroup exposure and age/years spent in village

	(1) PGG comm		(2) PGG comm		(3) PGG comm		(4) PGG comm	
High outgroup exp	3.10	(0.16)	1.90	(0.14)	3.28	(0.11)	2.18	(0.12)
Age in years	0.03	(0.26)			0.07***	(0.00)	0.04*	(0.53)
High outgroup exp x age	−0.05	(0.29)			−0.05	(0.32)		
Years in village			0.01	(0.45)	−0.03	(0.39)	−0.02	(0.32)
High outgroup exp x years in vill			−0.03	(0.38)			−0.03	(0.24)
Female	−0.45	(0.41)	−0.49	(0.62)	−0.41	(0.37)	−0.45	(0.35)
Born in village	0.59	(0.51)	0.59	(0.13)	1.32	(0.43)	1.41	(0.36)
Edu in years	−0.01	(0.57)	−0.02	(0.69)	−0.01	(0.39)	−0.02*	(0.07)
HH inc 100 GEL / month	0.03	(0.76)	0.02	(0.84)	0.02	(0.74)	0.02	(0.68)
Frequency of visiting church	0.13	(0.68)	0.07	(0.29)	0.12	(0.70)	0.11	(0.74)
Constant	4.07	(0.12)	5.56	(0.12)	3.38*	(0.06)	4.11***	(0.00)
Observations	132		132		132		132	

Table 3.12 shows regressions of PGG investments on the interaction between outgroup exposure and age (Panel 1), between outgroup exposure and years spent in the village of residence (Panel 2), and while simultaneously controlling for both age and years spent in the village of residence (Panel 3 and Panel 4). Deviations from the full sample size are due to 2 missing observations on the birthplace question, 3 missing values for education and church attendance and 2 missing values for the years-in-village variable. OLS regression with wild bootstrapped standard errors, 1,000 repetitions, resampling at village level. P-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Experimental script

The draft experimental script and surveys were tested in two trial sessions held in English among student participants to ensure comprehensibility of the procedures. The two research assistants then translated the resulting drafts from English into Georgian. The translated script was translated back from Georgian into English by a trained translator, and discrepancies were discussed and corrected, where necessary. The resulting Georgian draft and translated surveys were again tested in two trial sessions, the first conducted with students at Ilia State University in Tbilisi, and the second among villagers, allowing the testing of all procedures. The resulting final script and surveys were used unaltered throughout the six lab-in-the-field sessions. Here a shortened version is presented, not repeating instructions for the ingroup and outgroup conditions (which are almost identical) and leaving out numerical examples.

General instructions

Thank you very much for taking part in this experiment in which you will be earning some money. We are interested in your decisions and in the questions we ask you, not in your personal identity. Everything you do is anonymous. We do not and will not know your name. All we need to know is the number you drew yourself when you came in. In all the decision tasks, you will be deciding about real money. During the sessions, we will use these balls to represent the money you can earn. The exact amount you earn will depend on the decisions made during the decision tasks.

Participation in this research is voluntary. If you feel uncomfortable at any point during the session, you are free to leave. We would like to ask you to read and, if you agree, sign the consent form that you find in the envelope that we gave you. To ensure anonymity, please use your initials to sign. Please do not write your participant number on the form.

Matching with other players

The first decision tasks involve groups of three; so you will decide in parallel with two other people. The group of three you are deciding in consists of you and two randomly chosen people from this room. The process of matching you with the two others works like a lottery. All your participant numbers are put in a box, mixed, and then the groups are formed by drawing three numbers at a time [put numbers in box, mix and draw three numbers]. So in this case the first group would consist of participant number [xxx], participant number [xxx] and participant number [xxx], the second group would consist of participant [xxx], participant [xxx] and participant [xxx] and so on. Note that these are only examples – the real group of three that you will be deciding in will likely be different. [Alternatively,] the group of three you are deciding in consists of you and two randomly chosen people from your neighbouring villages. For our research project, we conducted or plan to conduct the same experiments that you are working on at the moment in several of your neighbouring villages. These are the villages of [list of five closest neighbouring villages]. Just as in this village, we assigned numbers to the participants in the neighbouring villages that took part in the experiment. In order to speed things up, we let the computer do the assignment of people in groups of three. However, the process is the same, and we cannot influence it [...].

PGG

We will now start with the first decision task. I will first explain the task, then we do a small quiz, and then you take your decisions for which you will be paid. The three glasses with the Balls represent the personal accounts of the three members of your group. One of these accounts is yours, and the other two belong to the two other people in your group. For this task, you are each given ten Balls. In this decision task, you decide i) how much money you keep for yourself, from 0 to 10 , and/or ii) how much money to give to a group project, represented by this box here – again from 0 to 10. The money you keep is yours directly. The money you give to the group project is doubled by us, and the amount will be divided equally among the group members, and your earnings will also be paid to you at the end of the experiment. You will be paid both your share of the group project, and any money you kept in your account, at the end of the experiment – once you have completed all tasks.[...] Let us now do a short quiz. This will help you to do your decision in a more informed manner. We'll hand you out a sheet with a few questions. Please raise your hand if you need help with solving the quiz exercises.

> Quiz [PGG]. Please choose the correct answer: (1) If I give nothing (0 balls), the second member of my group gives 5 balls, and the third member gives 10 Balls I receive: □ 0 Balls, □ 15 Balls, □ 20 Balls; (2) If I give 8 Balls, the second member of my group gives 7 Balls, and the third member gives nothing (0 Balls), I receive: □ 4 Balls, □ 12 Balls, □ 17 Balls; (3) If I give 10 balls, the second member of my group gives 0 Balls and the third member also gives 0 Balls, I receive: □ about 3 Balls, □ about 7 Balls, 10 Balls.

Threat game

In the next two decision tasks, you will decide in pairs. In the decision situations there are two roles, A and B. In short, in this task A decides how many Balls to take from B. B is passive and cannot do anything. As you can see, A and B receive 20 Balls each for this task. In your role as A, your account with the 20 Balls in is secure. You will therefore earn 20 Balls for sure. All you have to do as A is to decide if you want to take Balls from B to further add to your account. You can decide to take nothing, or you can decide to take any number of Balls from B. Whenever you take a Ball from B, you also destroy an additional Ball in the process, however. So if you take 5 Balls from B, for example, you actually cause him a loss of 10 Balls. Let us demonstrate this with the Balls representing your money, the boxes representing your accounts and this panel tool here [the tool shown in Figure 3.11], which we use to explain the rules of the decision task. When interacting with a person from a neighbouring village, the exact same rules apply [...].

> Quiz [Threat game, P-role]. Please choose the correct answer: (1) If as A I take 0 Balls, the person I am paired with is left with: □ 10 Balls, □ 15 Balls, □ 20 Balls; (2) If as A I take 7 Balls, the person B I am paired with is left with: □ 20 Balls, □ 14 Balls, □ 6 Balls; (3) If as A I take 12 Balls, the person B I am paired with is left with: □ -10 Balls, □ -4 Balls, □ 0 Balls.

As B, you cannot take Balls from A. However, you can prevent A from taking money from you by spending Balls on protection. The best you can do is to spend as much on protection as you expect the person you are paired with to take. So if you think that person will take 10 Balls from you, you should spend 10 Balls on protection; if you think the person will take 5 Balls, you should spend 5 Balls, and if you think the person will not take anything, the best you can do is not to spend anything on protection either. Let us explain to you why this is so – why it is best for you to spend exactly the number of Balls on protection that you expect the person you are paired with to take. We use this panel tool to explain this [the tool shown in Figure 3.11]. Remember that when A takes 5 Balls, you as B lose 10 Balls – you lose 5 Balls to A, and the 5 Balls that are destroyed by A in the process. Let us see what happens if you spend 5 Balls on protection. When you spend 5 Balls before A comes to take them, the rest of your money is saved, so you take home 15 Balls, which is better than the 10 you would be left with when you did not spend anything on protection. But let's also consider the situation that A actually doesn't want to take Balls from you as B. In this case, you would have wasted 5 Balls on protection. You could have had 20 Balls, but now you are left with only 15. So in this situation it would have been better if you hadn't spent any Balls on protection [...].

> Quiz [Threat game, T-role]. Please choose the correct answer: (1) If A tries to take 8 Balls from me, and I as B spend 8 Balls on protection, I will be left with: □ 4 Balls, □ 12 Balls, □ 18 Balls; (2) If A tries to take 7 Balls from me, I as B earn the most if I spend on protection: □ 7 Balls, □ 10 Balls, □ 13 Balls; (3) If A tries to take 5 Balls from me, and I as B spend 8 Balls on protection, I will be left with more, less or the same number of Balls compared to a situation where I had spent 5 Balls on protection? □ more, □ less, □ the same.

Please now turn around your decision sheet, and write down how many Balls you want to spend on protection.

Conclusion

Rather than relying on deductive reasoning, historical inference and intuition, as did the venerable thinkers of the past, this dissertation builds on quantitative empirical research. Despite the different methodological choice, however, the general conclusion of this dissertation echoes the conclusion of those thinkers: outside threat produces ingroup cohesion and cooperation.

The other core empirical findings of this dissertation are quickly summed up: in Nigeria, social mobilization precedes future violence; in the wider Africa, second-order ethnic diversity is associated with higher levels of participation in collective endeavours, and in Georgia, perceived outgroup threat stops community members from withholding contributions from their peers. Instead of summarizing the content of the chapters in fine detail, in this conclusion I will therefore draw together some of the implications of the empirical findings for the overarching themes mentioned in the introduction, namely i) the outstanding task of spelling out, in a consistent fashion, the causal pathways leading from threat and competition to permanently raised levels of cooperation, ii) the idea that varying levels of outgroup threat explain regional variations in cooperativeness, and iii) the integration of the nexus between outgroup threat and ingroup cohesion into our understanding of the effects of ethnic diversity and life in multicultural societies.

Steps towards a theory of outgroup threat and cooperation

In the introduction I argued that the causal relationships between threat, conflict and cooperation remain underexplored. This thesis makes some moderate advances in this regard, but also points to remaining gaps in theory and avenues for future work. First, I highlighted that it remains unclear whether it is threat or open conflict that causes cooperation. In light of the evidence presented here, I believe that the best answer is that both conditions can lead to increased cooperation. The temporal dynamics of mobilization ahead of violence observed in the first chapter – with mobilization rates rising as a violent event nears – seems to indicate that in the Nigerian case it is the prospect of concrete, open and costly violence that motivates mobilization, rather than the diffuse threat of an outgroup, that induces cooperation in the Nigerian case. At the same time, we saw that 'cauterized' violent conflicts – situations that may have led to violence but were putatively stopped by peacemaking efforts – were also associated with raised levels of cooperation.[4] Clear support for the idea that diffuse threat is enough to encourage ingroup cooperation comes from the chapter on Kvemo Kartli region, Georgia. As the region did not see widespread interethnic violence in the past, and the likelihood of such violence in the future (which would trigger the intervention of the security forces of the by-now relatively consolidated Georgian state) is low, suggests that here, fear alone prompts cooperation.

Second, in searching for a mechanism causing (temporary) shifts in cooperation, this thesis finds nothing that contradicts the activation of ingroup bias as an explanation motivating cooperation. Especially relevant here is the third chapter, where I found that individuals from the same village perceive the threat emanating from others in nearby villages quite differently and adjust their level of support for their peers accordingly. The strong within-village variation points to an individual-level mechanism linking threat and cooperation – with the activation of ingroup bias as a plausible contender. This difficult-to-observe mechanism is joined by a more straightforward mechanism, outlined in the first chapter, which despite its simplicity has received little attention from the literature dealing with outgroup threat: intentional mobilization in response to the threat of violence. In the first chapter I showed that, with violent conflict looming, people come together for the purpose of preparing for and preventing violent clashes. Cooperation here is thus an intentionally chosen path of action. The logic individuals follow maps onto the ingroup-policing framework proposed by Fearon and Laitin (1996). As the costs involved in meeting and organising pale in comparison to the damage an outbreak of violence would cause, engaging in collective action is seen as the less costly option.

Third, I asked why changes in the level of cooperativeness should 'stick' even after conflict has ebbed. This is the area where most question marks remain. One the one hand, this thesis confirms that the effects of competition can be long-lasting. This is clearly shown in the second chapter, where tension and conflict in the past are shown to be associated with higher cooperation levels in the present. However, no evidence has been produced that provides insights into the process by which changes become permanent. I here therefore speculate what such a process could look

[4]The link between open hostilities and the presence of ethnic outgroups in a community's *hinterland*, explored in the second chapter, is similarly ambiguous. On the one hand, it is unlikely that many of the interethnic relationships picked up by the measure for second-order ethnic diversity will ever have escalated into open violent conflict, which supports the idea that threat alone can induce people to cooperate. At the same time, in places where historically the likelihood of interethnic conflicts escalating into violence was high, the connection between the presence of an ethnic 'other' and cooperation is still stronger than in other regions where escalation was less likely – evidence in support for a link between open violence and cooperation.

like, and which kind of data could allow us to see why changes can become permanent. The easiest explanation is that being threatened allows people to 'discover' a new equilibrium of cooperation that is beneficial to them. Meeting in order to avert or prepare for violence, they might realise that these coordination and cooperation efforts help them to address other problems they are facing as well.[5]

The question, then, is why communities had not discovered these equilibria at an earlier stage, in the absence of tensions and conflict with neighbouring communities? It might be that, despite the subsequent benefits that cooperation promises, under normal conditions communities cannot muster the initial investments that cooperation requires. Cooperation is initially costly – in the multi-person prisoners dilemma, which can serve as a model of cooperation, you first have to invest, and will only later find out if your investment has been worthwhile. The potential costs of conflict would thus help to overcome this initial hesitance to invest. During the course of the conflict, as a result of reiterated interactions and collective endeavours, individuals could incorporate the anticipation of future gains from cooperating with their peers into how they evaluate cooperation situations. Having this updated perception of the costs and benefits of cooperation with their peers would allow them to continue cooperating at higher levels even after the need to deal with an outside threat had ceased.

Another possibility is that competition and conflict with other groups lets communities develop stronger peer-to-peer enforcement, which then persists even after the confrontation has ended. Peer punishment, too, is costly for the punisher, either emotionally or because she fears retaliation. Again the looming, overwhelming potential costs of conflict with the group may make people more willing to engage in peer punishment (cp. Gneezy and Fessler 2012).[6] During inter-communal conflict, peer-punishment might be used, for instance, to prevent unruly youths from starting fights with neighbouring communities, and also to ensure high participation in community meetings and community organisations. Peer-punishment might then be used after the conflict to continue the same or similar patterns of cooperation.[7]

[5] Rather than inventing new forms of collaboration themselves, communities might also copy from their neighbours, especially those that they are competing with. That is, forms of cooperation might spread from one group to another, and they might spread more decisively during conflict than in absence of it. In the first chapter it was suggested that communities find themselves in an internal security dilemma situation, where the mobilization of the one group triggers that of the other. During the interaction, a learning process might take place whereby competing groups copy forms of sociability from each other in order not to lose out in the mobilization.

[6] Rather than peer-to-peer punishment, communities could also rely on centralised punishment. Adjusting structures to initiate higher levels of peer punishment likewise requires initial investments, so that an analogous argument applies.

[7] This is not to say that punishment will necessarily lead to higher cooperation levels. In fact, Boyd and Richerson (1992) show that punishment can enforce almost any behaviour, whether beneficial for a community or not.

In order to distinguish these mechanisms, we would need genuine, community and individual-level panel data of communities that experience varying levels of conflict with an outgroup. We could then measure actual cooperation levels, expectations of cooperation (to identify a shift of norms), and levels and frequency of peer punishment before, during and after a confrontation. The data should also allow us to check for selection effects and changes to social structure (settlement patterns, and, ideally, social network structure) which constitute plausible alternatives for permanent change.

Threat as explanation for regional variations in cooperativeness

The dissertation provides support for the hypothesis that variations in threat levels can help to account for regional variations in cooperativeness. In the second chapter, I showed that cooperation is higher where different ethnic groups are in contact with each other – at interethnic borders – and lower within ethnic groups' core-territories. Especially high levels of cooperation were observed where the presence of ethnic others goes along with historical or contemporary factors reinforcing competition between groups. Outgroup threat may therefore join market exposure, settlement size and monotheistic religion in the list of factors causing cooperation levels to vary. As the evidence presented here is rather incidental, it will need to be followed up with dedicated studies. Such dedicated work should also probe for interaction effects. It was mentioned in the introduction, for instance, that communities historically often reacted to outgroup threat with an increase in the size and density of settlements – which suggests that outgroup threat and the size of settlements interact. Other interaction effects – for example with the spread and adoption of monotheistic religions – are also possible.

Ethnic diversity and cooperation, reconsidered

The dissertation presents a modified understanding of ethnic diversity. I introduce the notion of second-order ethnic diversity, the ethnic diversity of the *hinterland* – which is shown to exert strong effects on cooperation, similar in size to those attributable to first-order ethnic diversity – the ethnic diversity of the local community. The effect of second-order diversity is identified with ethnic competition, and the empirical analysis in the second chapter shows the plausibility of this hypothesis. From the idea of second-order diversity, a new synthetic understanding of the effects of ethnic diversity could be developed, which better integrates research on the link between cooperation and collective action and research on the effects of ethnic diversity on (exclusionary) attitudes. The study of cooperation so far has mainly looked at how cooperation is influenced by ethnic diversity when members of different groups locally interact. There is no doubt that this class of what we may call 'interaction-based mechanisms' linking ethnic diversity to suboptimal collective outcomes is extremely valuable. For a complete picture of the effects of ethnic diversity, however, we will also need to look at how ethnic diversity affects beliefs and attitudes, which in turn affect cooperative behaviour. An expansive literature linking diversity with exclusionary attitudes exists (e.g. Alba, Rumbaut, and Marotz 2005; Blalock 1967; Bobo and Hutchings 1996), but the link back to collective action is rarely made. That is, what remains to be developed is a class of 'belief-based mechanisms' linking ethnic diversity and collective outcomes.

The poor integration of research focussing on the effects of ethnic diversity on interactions with those strands of research focussing on diversity's effect on attitudes might also be due to the different methodological choices these two strands of research rely on. The study of cooperation traditionally relies on behavioural measures, while the study of beliefs has largely used survey instruments.[8] Behavioural measures like the threat game, which was developed for this thesis, may help to bring the two strands of research together.

What does a modified understanding of ethnic diversity that fully integrates belief-based mechanisms mean for cooperation in multicultural societies? Some observers already embracing such a view are rather pessimistic. 'Developed nations and politically liberal subnational units', Enos (2014, 3699) writes, 'are expected to experience a politically conservative shift as international migration brings increased intergroup contact.' In the short term, such a negative outlook seems warranted. The cooperation induced by outgroup threat is often parochial in nature: cooperation with the ingroup is coupled with discrimination against the outgroup.[9] However, the forms of cooperation described in the first chapter – efforts of inter-community communication and conflict prevention – show that perceptions of threat may also lead to more constructive inter-community interaction; although in the case at hand, these efforts failed and inter-group violence ensued. A more important reason for a less pessimistic outlook can therefore be found in the putative long-run effects of ethnic threat and competition.[10] If high cooperation levels commonly persist even after the causes for conflict have ceased, a phase of intercommunal conflict may eventually lead to societal vibrancy, as the forms of collaboration initially developed or activated for the purpose of intergroup competition are put to use for society-wide cooperation.

[8] Behavioural measures for attitudes are still relatively rarely used in the social sciences. The major exception is risk-proneness, which is often measured with the Holt-Laury lottery (Holt and Laury 2002), and some researchers have also used public goods game played with different circles of people in order to obtain an individual measure of globalisation (Buchan et al. 2009), or dictator games played with different groups of recipients to obtain a measure of discrimination (Abascal 2015; Adida, Laitin, and Valfort 2012; Habyarimana et al. 2009). The threat game joins this family of games.

[9] This is demonstrated most clearly in the data presented in the appendix to the third chapter, where I find that those who feel threatened by their non-coethnic neighbours not only give relatively generously to their ingroup, but also behave aggressively towards the outgroup when in the P-role, the role of potential attacker or predator. As also argued in the third chapter, however, such parochial attitudes and behaviour seem to be less of a problem in urbanised areas more typical of contemporary societies.

[10] In fact, Enos (2014, 3702) concurs that 'more prolonged contact or interpersonal interaction can diminish the initial exclusionary impulse.'

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