

## Trust, Ethnic Diversity, and Personal Contact: A Field Experiment

*Henning Finseraas, Torbjørn Hanson, Åshild A. Johnsen, Andreas Kotsadam,  
Gaute Torsvik*

## **Impressum:**

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email [office@cesifo.de](mailto:office@cesifo.de)

Editor: Clemens Fuest

[www.cesifo-group.org/wp](http://www.cesifo-group.org/wp)

An electronic version of the paper may be downloaded

- from the SSRN website: [www.SSRN.com](http://www.SSRN.com)
- from the RePEc website: [www.RePEc.org](http://www.RePEc.org)
- from the CESifo website: [www.CESifo-group.org/wp](http://www.CESifo-group.org/wp)

# Trust, Ethnic Diversity, and Personal Contact: A Field Experiment

## Abstract

We study how close personal contact with minorities affects in-group and out-group trust in a field experiment in the armed forces. Soldiers are randomly assigned to rooms with or without ethnic minorities. At the end of the recruit period, we measure trust by using a trust game. Results indicate that close personal contact with minorities increases trust towards a generic immigrant. We replicate the result that individuals coming from more ethnically diverse areas trust minorities less, but random assignment to interact with minority soldiers removes this negative correlation. We conclude that social integration involving personal contact can reduce negative effects of ethnic diversity on trust.

*Henning Finseraas*  
*Institute for Social Research*  
*Oslo / Norway*  
*henning.finseraas@samfunnsforskning.no*

*Torbjørn Hanson*  
*Norwegian Defense Research Establishment*  
*FFI Kjeller / Norway*  
*Torbjorn.Hanson@ffi.no*

*Åshild A. Johnsen*  
*Norwegian University of Life Sciences*  
*Oslo / Norway*  
*asjo@nmbu.no*

*Andreas Kotsadam*  
*Ragnar Frisch Centre for economic research*  
*Oslo / Norway*  
*andreas.kotsadam@frisch.uio.no*

*Gaute Torsvik*  
*University of Oslo / Norway*  
*gaute.torsvik@econ.uio.no*

We would like to thank the Norwegian Defense Research Establishment (FFI), and in particular Frank Steder. This study could not have been conducted without the help of FFI and their project “Research on Cohorts”. We thank Eliana La Ferrara, Eva Mörk and seminar participants at Carlos III in Madrid, IAS in Norrköping, Linköping University, the University of Oslo, the Norwegian University of Life Sciences, Statistics Norway, the ESOP Workshop: Learning in Social Situations, the ESA European meeting 2016 in Bergen, the AEA Annual Meeting in Chicago, INAS 2017 in Oslo, RC28 2017 at Columbia University in New York, and the Nordic Conference on Behavioral and Experimental Economics in Oslo for helpful comments. Grant numbers 236801 and 270772 (Research Council of Norway) is acknowledged. The project is part of the research activities at the Centre for the Study of Equality, Social Organization, and Performance (ESOP) at the Department of Economics, University of Oslo. ESOP is supported by the Research Council of Norway. We thank research assistants Kristine D. Ruud and Øyvind Bruer-Skarsbø.

# 1 Introduction

Western societies are becoming more diverse. Diversity can spur more innovation, creativity and economic growth (e.g., Hunt and Gauthier-Loiselle, (2010) and Peri, (2012)), but some argue that it can also lead to less social trust and more tension and conflicts (Alesina and La Ferrara, 2002; Putnam, 2007). The effects of diversity on trust are essential to understand: When people trust each other, transaction costs are reduced, organizations run better, the need for formal regulation reduces, governments provide services more efficiently, policy promises become more credible, and financial systems develop better (Algan and Cahuc, 2013; Guiso, Sapienza, and Zingales, 2011; Guiso, Sapienza, and Zingales, 2008a,b). If migration and ethnic diversity have dismantling effects on the social fabric of societies, it becomes important to find out if and how public policy can mitigate such problems. For instance, can tensions be reduced and trust enhanced if governments create arenas where different ethnic groups regularly encounter each other? Can social contact build trust? We speak to these questions by investigating the effects on majority individuals' in-group and out-group trust from personal contact with minority individuals.

Several empirical studies find patterns that are consistent with what we denote conflict theory; diversity is associated with less trust (Alesina and La Ferrara, 2002; Dinesen and Sønderskov, 2015).<sup>1</sup> Putnam, (2007) extends the conflict perspective, arguing that ethnic diversity may not only lead to less trust between the majority and minority groups, it may also be detrimental to trust within the majority group. This hypothesis, which he labels constrict theory, is based on less diverse neighborhoods in the US having higher levels of in-group trust. These findings have spurred a debate on how diversity should be conceived and measured (Abascal and Baldassarri, 2015). Because more

---

<sup>1</sup>There is an extensive literature on the effects of ethnic diversity in other domains. For studies on diversity and economic outcomes, see for instance Alesina, Harnoss, and Rapoport, (2016), Alesina and La Ferrara, (2005), and Alesina et al., (2003). Another strand of literature study diversity within organizations, see for instance Lyons, (2016) on teams and national diversity, Ottaviano and Peri, (2006) on productivity, Hjort, (2014) on team productivity, and Shore et al., (2009) for a review. There is also a literature on ethnic diversity and provision of public goods, see Beach and Jones, (2016) for a review.

diverse US neighborhoods with lower trust levels are also poorer, more nonwhite, and less stable than the more homogenous neighborhoods, it is hard to disentangle the effect ethnic diversity has on trust from the effects of these other features of diverse societies.

A major limitation of previous studies of ethnic diversity and trust is the inability to control for selection and reverse causality. We randomize soldiers to rooms during boot camp, implying that soldiers from the majority group (ethnic Norwegian soldiers) are randomized to share living quarters with at least one minority member, while others have only members of the majority group as room-mates. At the end of the boot camp we ran a trust game with monetary stakes. Soldiers play either against a person with an ethnic minority identity, or against a person from the majority group. This design allows us to test if close contact with individuals from a minority group causally affects the trust majority members show to a stranger with a minority identity. As far as we are aware, ours is the first study with a research design allowing for a causal identification of how close contact between majority and minority individuals affects trust.

Social conflict is not the only potential outcome of ethnic diversity. The more optimistic contact theory (Allport, 1954) argues that personal contact with members of out-groups can reduce prejudice and misperceptions, and thereby increase trust. There is evidence from well identified studies using random assignment, either of students (e.g. Boisjoly et al., 2006; Burns, Corno, and La Ferrara, 2016; Scacco and Warren, 2018) or within the military (Carrell, Hoekstra, and West, 2015; Dahl, Kotsadam, and Rooth, 2018; Finseraas and Kotsadam, 2017; Finseraas et al., 2016), which shows that personal contact reduces prejudice and strengthens cooperation (Goette, Huffman, and Meier, 2006). Rao, (2018) studies how random exposure to poor students affect wealthy students in terms of pro-social behaviour, discrimination, as well as academically. Alexander and Christia, (2011) studies how personal contact affect cooperation in a public goods game.<sup>2,3</sup>

---

<sup>2</sup>For a review of the overall literature covering ethnic diversity and social trust, see Dinesen and Sønderskov, (2017), Kaufmann and Goodwin, (2016), Meer and Tolsma, (2014), and Schaeffer, (2014).

<sup>3</sup>One important distinction is between personal contact and shallow exposure. In a series of papers, summarized in Enos, (2017), Enos investigates the causal effects of shallow contact. He finds increases in prejudice from random assignment to exposure to diversity on commuting trains (Enos, 2014) or waiting rooms (Enos and Celaya, 2018). Enos, (2016) studies the electoral consequences of shallow exposure by using the demolition of a Chicago public housing project containing mostly black individuals

Finseraas and Kotsadam (2017) is of particular relevance to our paper. They report the results of a similar field experiment as ours conducted on the previous cohort of soldiers (in 2014).<sup>4</sup> Unlike us, they have no experimental outcome, but study the effects of minority contact on a set of survey outcomes. They find that contact makes treated soldiers more likely to state that immigrants have similar work ethics as Norwegians, but no effect on views on whether immigration is a net positive for society, or on support for equal rights to social assistance. We extend this work to study trust, and improve the research design by measuring the outcome in the lab rather than relying on self-reported outcomes. Moreover, we use our data to contrast and combine the conflict and contact perspective on ethnic diversity, by studying treatment heterogeneity according to previous exposure to diversity. In addition we examine heterogeneity on the ability of minority room mates (Carrell et al. 2015; Burns et al. 2016) and majority soldiers' initial attitudes toward immigration (Johnston, Newman, and Velez, 2015).

We find that individuals randomly assigned to close personal contact with minority soldiers send more money to the person with a name signalling minority origin (Ali). Random contact with minority soldiers does not affect the amount sent to the person with a Norwegian name (Morten). Next we find a negative association between immigrant share in the home municipality and trust in Ali (but not in Morten), which is consistent with the conflict perspective on diversity. We further find that the negative relationship between immigrant share in the home municipality and out-group trust is annulled for the soldiers that were randomly assigned to close personal contact with a minority soldier.

The rest of the paper is organized as follows: In Section 2 we present the field experiment. Section 3 illustrates the details of the trust game. Section 4 describes our data,

---

to get exogenous variation in diversity in white voters' neighbourhoods.

<sup>4</sup>Finseraas and Kotsadam (2017) follow a pre-analysis plan which was submitted to the AEA RCT Registry. We intended to do the same, however, the Army's confirmation that we would get the necessary time slot in the soldiers' busy schedule came only a few days before the data collection. The late confirmation made it impossible to write a high-quality pre-analysis plan. However, coding of background covariates follow the pre-specified procedure in Finseraas and Kotsadam (2017). The pre-analysis plan of Finseraas and Kotsadam (2017) can be accessed at <https://www.socialscisearch.org/trials/507>.

while our empirical strategy is outlined in Section 5. The results are presented in Section 6, with discussion and concluding remarks following in Section 7. Instructions for the trust game and additional analyses are included in the appendix.

## 2 Identifying effects of contact: The Field Experiment

The sample for the field experiment consists of incoming soldiers of the August 2015-contingent of the North Brigade of the Norwegian Armed Forces (NAF). The first day of service starts at a military camp close to Oslo. At the camp, the soldiers go through a program of medical and psychological testing and they fill out a survey questionnaire, which constitutes our baseline data.

After completing the program at the camp, soldiers board planes to Northern Norway to start their recruit period. When they arrive in Northern Norway, they are bussed to a number of different military camps. In the camps they are assigned to rooms for the eight weeks of the recruit period.

We provided the personnel officers in charge of room assignment with an excel sheet which they were instructed to use to randomize soldiers into rooms. The personnel officers enter the list of soldiers in the company and specify the size of the rooms in the camp, whereby the excel sheet randomizes soldiers into rooms. This room assignment for the 8 week long recruit period constitutes our main treatment variable (more on this below). Copies of the excel sheets were emailed to the Norwegian Defense Research Establishment (FFI) for verification. We only analyze data from companies for whom we could verify the randomization by them sending us the lists from the randomization program. The procedure allows for the construction of a treatment group consisting of soldiers with an ethnic Norwegian background who were randomized into a room with at least one soldier with an ethnic minority background (see definitions of majority and minority backgrounds in Section 4). The control group consists of soldiers who did not share the room with an ethnic minority soldier. A deviation from the randomization

protocol was included so that when possible, women are allocated to rooms in pairs of two. We describe how we handle this in Section 5.

The recruit period is the basic training period, which is known for strict enforcement of military rules and regulations.<sup>5</sup> During the eight weeks, the soldiers are to wear their uniform 24/7 and are not allowed to sleep outside of the base. The first extended leave is normally granted after completion of the basic training period. Because of the remote location of the bases, the soldiers basically spend all their time together. A normal day of boot camp starts with activities within the room, such as cleaning and preparing the room before inspection. Working hours are intense, usually 10-15 hours a day. In addition, soldiers are expected to prepare their individual gear and equipment for the following day after duty ends. This leaves the soldiers with few opportunities for personal chores and socializing outside their own room. The room is also important since it usually constitutes a squad within a platoon in the company. Thus, sharing room during the recruit period constitutes intense treatment in the form of personal contact.

According to contact theory, the positive effects of personal contact are expected to apply when certain criteria are met. The contact should take place in a context with equal status, shared common goals, be cooperative, and take place under some form of authority (Allport, 1954; Pettigrew, 1998). Finally, the setting should have friendship potential, which increases the probability of affective ties and willingness to learn about out-group members (Van Laar et al., 2005). The army context is one where the conditions of contact theory are likely to hold. Soldiers of private rank have equal social status within the army, they share the common goals of their unit, they need to cooperate to solve their tasks, and contact takes place in a context with an explicit, enforcing authority. Moreover, the army explicitly promote views of unity and equality among soldiers of the same rank. We conducted a trust game at the end of the eight weeks recruit period.

---

<sup>5</sup>After the recruit period the selection of soldiers for regular infantry and cavalry companies takes place and the soldiers move. Room composition is no longer random after this point.

### 3 Measuring trust: The trust game

To measure the effect of close contact on trust, we use the trust game developed by Berg, Dickhaut, and McCabe, (1995). In the standard trust game a person chooses how much to send to an anonymous other person, the responder. The amount sent is typically tripled and the responder decides how much to send back. The advantage of the trust game is that the game captures the essence of trust in economic exchange; there is money at stake for the trustor/sender and a substantial surplus is produced if the resources are handed over to the trustee/responder.<sup>6</sup>

In our case, the senders (each soldier) choose between sending 0, 25, 50, 75, or 100 NOK out of a total endowment of 100 NOK (12US\$) to a responder.<sup>7</sup> In turn, the experimenters (we), triple the chosen amount to the responder. The responder then decides how much of the received money to transfer back to the sender.

Sending behavior in the standard trust game is assumed to reflect partly the sender's belief in the receivers trustworthiness, risk aversion, other-regarding preferences such as altruism (Sapienza, Toldra-Simats, and Zingales, 2013), as well as inequality aversion and betrayal aversion (Fehr, 2009). However, sending money to an anonymous other does not allow for a distinction between in-group and out-group trust. We therefore use a modified version of the trust game where the senders either play the trust game with a responder with a typical Norwegian name (Morten), or with a responder with a name indicating a ethnic minority origin (Ali). By randomizing the names, we assure that all other factors that may influence how much a person sends does not vary systematically with the ethnic identity of the responder. Hence, with this design we can estimate to what extent beliefs about responder trustworthiness vary depending on the ethnicity of

---

<sup>6</sup>There is an ongoing discussion about what is captured by general trust questions, see Sapienza, Toldra-Simats, and Zingales, (2013) for an overview. In particular, Glaeser et al., (2000) argue that the measures are correlated with trustworthiness rather than trust, while Thöni, Tyran, and Wengström, (2012) suggest that the standard trust question is a proxy for cooperation preferences rather than beliefs about others' cooperation.

<sup>7</sup>The service allowance for Norwegian recruits normally equals about NOK 170 a day, roughly USD 20 at the exchange rate at the time of the experiment.

the responder, and most importantly, to what extent exogenous exposure to a minority member modifies the assessment of trustworthiness.<sup>8</sup> Fershtman and Gneezy (2001) suggest complementing the trust game with a dictator game to further disentangle the role of beliefs and social preferences. As we did not include a dictator game it should be noted that our results on sending behavior may be affected by changed social preferences and not only changes in beliefs about trustworthiness.

We recruited responders at the University of Oslo before going to the military camps. We announced that we were recruiting participants to an experiment, and then recruited one student with a typical Norwegian name (Morten), and one student with a name indicating ethnic minority origin (Ali). Both responders/trustees were asked to make a back-transfer decision contingent on the amount that they would receive.<sup>9</sup>

In addition to the first name of the responder, the soldiers (senders) are told that the responder (trustee) is a real person living in the eastern part of Norway, that he has been recruited by us to take part in the study and that he received NOK 100 just for participating. The soldiers were also informed that the responder was aware of both the structure of the game and that the sender would be a soldier in the boot camp in Northern Norway. To be clear, the monetary incentives in the trust game are low, especially as there is only one person per session that is drawn. The main reason for choosing this incentive structure is that our collaborators only allowed us to offer limited incentives. Fortunately, we find that the amount sent is not different in different sessions with different numbers of participants (ranging from 46 to 100). Furthermore, it is unlikely to affect the difference in sending to Ali or Morten. A translated version of the instructions is included in the Appendix Section A.

---

<sup>8</sup>The trust game has been used to investigate in-group/ out-group trust across ethnicities/ nationalities in several studies (see for instance Falk and Zehnder, (2013) and Fershtman and Gneezy, (2001)). But exposure to the out-group is not random in these studies and they are therefore not able to identify the effect of ethnic diversity on trust.

<sup>9</sup>We use the strategy method to obtain the back-transfer from the responder (see Stanley et al., 2011, for a similar set-up). There is a discussion in the literature if this method gives different results than the direct response method. In most cases it appears that the choice of method does not matter for the outcomes (Brandts and Charness, 2011). In our study the strategy method was the only viable option, and since we are only interested in the senders decision, the way we extract the responders' return decision should be of second order importance. It is further unlikely that the strategy method induces a differential impact across our treatment and control groups.

The experiment was conducted in September 2015 at two different military bases, Setermoen and Skjold, located 60 km apart in a rural area in the northern part of Norway. The Armed Forces decided when different groups of soldiers would attend our sessions based on the soldiers schedule for the given day. The experiment consists of two main treatments: the minority responder (Ali) and the majority responder (Morten). We randomized treatments within each session, so that about half of the soldiers in each session play the game with Morten, and half with Ali. One sender in each session is drawn randomly to be paid and the experiment was conducted using pen and paper.

We collect information at baseline and after 8 weeks, and at both times the soldiers are informed that any information provided will be treated confidentially, and that no person their platoon, military base, nor in the Armed Forces will be able to track their answers back to them. They are also informed that data collection has been approved by the ethics committee, and that they can contact out co-author Torbjørn Hanson (email address given) if they have any questions.

## 4 Data

### 4.1 Sample and treatment variable

We conducted the experiment on a subset of 656 subjects in 12 sessions in September 2015. The sessions ranged from 46 to 100 individuals. In our analysis sample we only include observations from companies which have confirmed that they followed our randomization protocol. The minority soldiers are not included in the analysis because we want to separate between the ones providing exposure from the ones affected by it (see Angrist 2014). Furthermore, there is no treatment variation at the extensive margin in the field experiment for the minority soldiers as they all live in rooms with majority soldiers. We also exclude soldiers with missing information on parents' birthplace. The analysis sample includes 592 soldiers, spread across 121 rooms.

We define minority background as being born in or having at least one parent being born in South-America, Asia, Oceania, or Africa, as in Finseraas and Kotsadam, (2017). 4.2 percent of the experimental sample have minority background.<sup>10</sup> On average, 18.2 percent of the experimental sample share a room with someone with a minority background.

The rooms vary in size, but the majority of the sample (72 percent) live in 6 person rooms. Of the 108 treated soldiers, 14 share room with two persons of a minority ethnic background, while the remaining 94 share room with one person of minority background. Since the rooms also vary in size, we have variation in the share of minority exposure in the room, ranging from zero to 40 percent (see Figure A.3 in the appendix).

A high dismissal rate is normal during the recruit period. Importantly, we test and confirm that attrition in the panel is unrelated to treatment status (see Appendix Table A.1 and the discussion there).

## 4.2 Control variables and balance

Table 1 presents means on background variables in the four groups which constitute our experiment. To examine balance across treatment status, we regress being treated in the field experiment on pre-determined variables in Table 2. We include company fixed effects (9 in total) in all regressions, since room assignment is randomized within companies. We cluster the standard errors at the room level (121 rooms), since treatment occurs at the room level. Some coefficients in Table 2 are statistically significant, which is not surprising given the number of variables tested, but the F-test of joint significance produces a p-value of 0.49. Thus, we conclude that the background variables do not predict treatment status. In the regressions below we present results both with and without control variables.<sup>11</sup> In addition, we conduct a robustness check where we

---

<sup>10</sup>Only Norwegian citizens are allowed to serve in the Armed Forces and hence our minorities are to a large extent second-generation immigrants. See Table A.5 in the Appendix for details.

<sup>11</sup>In Appendix Tables A.2 and A.3, we report results from regressions of the treatment indicator interacted with responder in the trust game on the pre-determined variables (one-by-one). We again conclude that randomization has achieved balance.

select control variables using a LASSO regularization approach (Belloni, Chernozhukov, and Hansen, 2014).

Table 1: Background variables and balance across treatment.

	(1)		(2)		(3)		(4)	
	Mino base		Majo base		Mino treat		Majo treat	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Dependent variable</i>								
Amount sent in trust game (%)	69.80	(37.27)	71.35	(35.79)	79.41	(31.90)	70.98	(37.17)
<i>Background characteristics</i>								
Mother high education	0.60	(0.49)	0.63	(0.48)	0.63	(0.49)	0.68	(0.47)
Father high education	0.75	(0.43)	0.75	(0.43)	0.76	(0.43)	0.80	(0.40)
Mother works	0.91	(0.28)	0.94	(0.24)	0.94	(0.24)	0.93	(0.26)
Father works	0.99	(0.11)	0.99	(0.09)	0.98	(0.14)	1.00	(0.00)
Parents divorced	0.37	(0.48)	0.32	(0.47)	0.27	(0.45)	0.22	(0.42)
Plans education	0.69	(0.46)	0.67	(0.47)	0.69	(0.47)	0.64	(0.48)
Females	0.12	(0.33)	0.07	(0.26)	0.18	(0.39)	0.11	(0.31)
Females in room	0.24	(0.43)	0.28	(0.45)	0.26	(0.45)	0.26	(0.44)
Share non-west immig muni	0.07	(0.05)	0.07	(0.05)	0.06	(0.04)	0.08	(0.05)
Room size	6.10	(1.35)	5.97	(1.01)	5.98	(1.14)	6.18	(1.43)
<i>Attitudes at base</i>								
Immigration reduces trust	0.16	(0.37)	0.21	(0.41)	0.20	(0.40)	0.20	(0.40)
Immigrants' work ethic	3.84	(0.93)	3.77	(0.96)	3.47	(0.99)	3.61	(0.91)
Immigrants same rights	3.38	(1.10)	3.36	(1.05)	2.96	(1.23)	3.32	(1.16)
Lend money to room mate	0.91	(0.29)	0.91	(0.28)	0.86	(0.35)	0.87	(0.34)
General trust	6.91	(2.02)	6.86	(2.05)	6.45	(2.14)	6.65	(1.99)
Helpfulness	6.46	(1.92)	6.50	(1.79)	5.84	(1.80)	6.44	(1.64)
Fairness	6.95	(1.98)	6.81	(1.97)	6.73	(1.54)	6.76	(1.90)
<i>N</i>	245		240		51		56	

*Note:* *Mino base* denotes soldiers from majority rooms who played the trust game with the minority responder (Ali), *Majo base* denotes soldiers from majority rooms who played the trust game with the majority responder (Morten). *Mino treat* denotes soldiers who did share room with minorities who played the trust game with the minority responder (Ali), *Majo treat* denotes soldiers who did share room with minorities who played the trust game with the majority responder (Morten). Background characteristics: *Female*: Share of female soldiers. *Females in room*: Share of majority soldiers who also share room with female soldier (including female soldiers). *Municipality's imm. share*: Share of population in municipality with a non-western background. *Immigration reduces trust*: "Immigration leads to lower trust between the citizens of a country. Do you agree/ disagree?" [0, 1]? *Immigrants' work ethics*: "In general, immigrants have poorer work ethic than Norwegians. Do you agree/ disagree [1-5]?" *Immigrants same rights*: "During the first years of their stay in Norway, immigrants should receive lower social benefits than Norwegians. Do you agree/ disagree [1-5]?" *Lend money to roommate*: If one of your room mates lost their wallet, would you lend them money? Unwilling/ willing [0,1]. *General trust*: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? distrust/ trust [1-10]." *Helpfulness*: "Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?, not helpful/ helpful [1-10]. *Fairness*: "Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?, unfair/ fair [1-10]."

Table 2: Living in an ethnically mixed room and pre-determined variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat	Treat
Mother high education	0.04																	0.03
	(1.18)																	(0.59)
Father high education		0.04																0.03
		(1.20)																(0.53)
Mother works			0.01															-0.01
			(0.22)															(-0.10)
Father works				-0.01														-0.03
				(-0.06)														(-0.20)
Parents divorced					-0.07*													-0.06*
					(-1.97)													(-1.74)
Plans education						0.00												-0.02
						(0.09)												(-0.55)
Sex of respondent							0.06											0.09*
							(0.86)											(1.97)
Females in room								0.00										-0.02
								(0.01)										(-0.32)
Municipality's immigrant share									-0.00									-0.01
Room size									(-0.33)									(-0.44)
Lend money to roommate										0.01								0.01
										(0.19)								(0.24)
General trust											-0.04							-0.03
											(-0.78)							(-0.62)
Trust: helpfulness												-0.02						-0.00
												(-1.25)						(-0.17)
Trust: fairness													-0.04**					-0.04**
													(-2.56)					(-2.09)
Immigration reduces trust														-0.01				0.01
														(-0.31)				(-0.62)
Immigrants' work ethic															-0.01			-0.05
															(-0.31)			(-0.99)
Immigrants same rights																-0.03**		-0.03
																(-2.02)		(-1.52)
																	-0.03	-0.01
																	(-1.49)	(-0.57)
Observations	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592
R-squared	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.07	0.11
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Share treated	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181

*Note:* Each column presents the results from separate regressions with treated with minority (share room with minorities) as dependent variable and the pre-determined variable as control. Column 18 reports the coefficients when all pre-determined variables are included in one regression. The F-value from an F-test of the joint significance of all the pre-determined variables in the final column is 0.48 ( $p=0.4915$ ). Company and session fixed effects are included in all regressions. t-statistics (adjusted for room clustering) in parentheses, \*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$ . OLS regressions.

### 4.3 Representativeness of the Sample

Norway has military conscription, but the military's demand for soldiers is lower than the size of the age cohorts. The soldiers are therefore positively selected on background characteristics such as grades in high school and physical capacity. Motivation for military service also weigh in when selecting soldiers and a majority of the soldiers are therefore doing military service voluntarily. Nonetheless, according to a previous survey, 34 percent of the soldiers are unsure of whether they would have served in the military if it was completely voluntary.

Finseraas and Kotsadam, (2017) compare the soldiers of the 2014 contingent to a sample of men aged 18-30 years from the general population. They find that the soldiers have more liberal attitudes towards immigrants. With respect to the minority soldiers, we know that most of them are second-generation immigrants, and they are likely to be better integrated than a random sample of second-generation immigrants. For instance, the share having mothers that are working is higher for our soldiers than in the population of second-generation immigrants in general.

To check if our soldier sample differs from the general population with respect to trust we asked three general trust questions at baseline that also appear in the European Social Survey (ESS).<sup>12</sup> We compare the soldiers' answers to those of young Norwegian males aged between 18 and 30. We find that ethnic Norwegian soldiers are similar to the general population with one exception (the soldiers are more inclined to think that people are helpful). As compared to minorities in the ESS data, defined as in the army data, the minority soldiers report trust levels that are higher on both the generalized trust question and the question regarding whether most people try to be helpful. The results are displayed in Figure A.4 in the appendix. Hence, we conclude that our sample of soldiers are slightly more trusting than the sample in the ESS surveys and the

---

<sup>12</sup>The questions are the following: *Generally speaking, would you say that most people can be trusted or that you cannot be too careful in dealing with people?; Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?; Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?*

immigrant soldiers are more selected with respect to beliefs about trustworthiness. We return to the implications of this selection for the external validity of our results in the conclusion.

## 5 Empirical strategy

We estimate the following regression to identify the treatment effect:

$$Sent_{irt2} = \beta_1 Treated_r + \alpha_J + \gamma_S + \beta_1 X_{irt1} + \epsilon_{irt}, \quad (1)$$

where  $i$  indexes individuals,  $r$  rooms,  $t$  is time (either baseline 1 or follow up 2),  $J$  company,  $S$  session,  $Sent_{irt2}$  is the amount sent,  $Treated_r$  is a dummy equal to 1 if this person shares room with a minority soldier (or the share of minority soldiers in some specifications),  $X_{irt1}$  is a set of individual level control variables measured at baseline (described in section 4.2), and the error term,  $\epsilon_{irt}$ , is clustered at the room level as treatment is at this level. The company fixed effects are included as the randomization was conducted within companies and session fixed effects are included to remove the influence of common experiences during the lab session. We add a vector of individual level controls, including demographics and attitudes at baseline. To make the models fully saturated, we partition the covariate space and add these control variables as indicator variables rather than using their multi-valued codings (Athey and Imbens, 2017). As the randomization procedure deviates by adding two women to a room when possible, and as female soldiers are more likely to be Norwegian, we control for having females in the room in all regressions. We show all results with and without the other individual level covariates.<sup>13</sup> The regression is estimated separately for sending to the minority responder (Ali) and to the majority responder (Morten), but we also present results from an interaction model that tests the difference across the models.

---

<sup>13</sup>We create an indicator for missing values in the controls and include the missing indicator in the regressions in order not to lose observations.

## 6 Empirical results

### 6.1 Main results

The main results are presented in Tables 3 and 4. In Table 3 we present regression results of equation (1) using the amount sent in the trust game as the dependent variable and an indicator variable for treatment. The mean amount sent, reported at the bottom of the table, is similar across treatment states and is around 70 NOK, i.e. 70 percent of their endowment. This level of trust is comparable with what has been found in previous trust games in Scandinavia.<sup>14</sup>

In column 1 of Table 3 we see that individuals sharing room with a minority soldier send around 10 NOK more to the minority responder. In terms of magnitude, treatment increases transfers by 0.27 standard deviations (9.92/36.54). The estimate is similar when we add the controls (column 2). In both columns, the estimate is statistically significant at the 10 percent level. In order to investigate what effect magnitudes we can rule out, we use the equivalence testing approach of two one-sided t-tests (TOST).<sup>15</sup> The results indicate that we can rule out any negative effects from treatment on trust in the minority candidate.

In columns 3-4, we present the same regressions but with sending to the majority responder as the dependent variable. The treatment effect is smaller and equal to 0.07 standard deviations (2.65/35.99), but it is not negative, as suggested by Putnam's (2007) constrict theory. However, using the equivalence testing approach we can not reject negative effects.<sup>16</sup>

---

<sup>14</sup>Johnson and Mislin, (2011) conduct a meta study of the trust game literature. They find that there is large variation in how much subjects send on average, ranging from 22 to 96 percent of the total amount, but the average is equal to 50 percent of the endowment. The average fraction sent is 74 percent in the four studies from Sweden that are included in their review. Johnsen and Kvaløy, (2016) find that Norwegian students on average send 71 percent of their endowment.

<sup>15</sup>These tests are equivalent to using a 90 percent confidence interval. We present the results from regressions (without controls) using the standardized trust measure with mean zero and standard deviation of one in Table A.8 in the appendix.

<sup>16</sup>In Appendix Table A.6 we show that we get similar estimates if we i) restrict the control vector to the variables for which we find significant imbalance in Table 2, or ii) estimate robust LASSO mod-

The last two columns show the results of the interaction model. Here we find that the difference between those in the treatment group who played against the minority responder (Treated\*Minority responder) and those in the control group who played against the majority responder (omitted group) is not statistically significant.

Our point estimate indicates that sharing room with a minority soldier increases trust (amount sent) towards an anonymous minority person named Ali with approximately 15%. This effect size is larger, but comparable to the effect of German citizenship on immigrants' trust towards ethnic Germans (Felfe et al., 2018). Kosfeld et al., (2005) find that treating individuals with oxytocin increases the average amount sent by the trustor by 17%. A study that manipulates the image (the attractiveness) of the trustee finds that a person who is rated to be one standard deviation more attractive than the average sent 7.3% more than a person who is rated to be one standard deviation below the average (Wilson and Eckel, 2006). In a slightly different, dichotomous, trust game Burnham, McCabe, and Smith, (2000) show that labelling the receiver in the trust game as partner rather than an opponent, increases the fraction showing trust from 21 to 29%.

In Table 4, we investigate whether the share of minority soldiers among the roommates matters for how much the soldiers send to the minority/ majority responder (Ali/Morten). The share of minority soldiers among the roommates vary from zero to 40 percent and has a standard deviation of 8 percent. We standardize the variable share of minority soldiers (to have a mean of zero and standard deviation of one) in order to simplify interpretation. We see in the first column that the share of minority soldiers in the room is positively associated with trust towards the minority responder. The estimate is similar when we add controls. In terms of magnitude, a one standard deviation increase in the share of minority soldiers increases transfers by 4.23 NOK (0.12 standard deviations, 4.23/36.54).

---

els on a fully saturated model—that is, we include all possible interactions between the covariates in Table 2—and use the post-double selection approach of Belloni et al. (2014) to select covariates. The estimated treatment effects in these models are 10.5 NOK (SE 5.2) and 8.9 NOK (SE 5.3) respectively. Thus, we do not believe that the treatment effect reflects imbalance between the treatment and control groups.

Table 3: Amount sent in the trust game and contact.

	(1)	(2)	(3)	(4)	(5)	(6)
	Mino	Mino	Majo	Majo	All	All
Treated	9.92*	11.48*	2.65	6.33	1.72	4.19
	(5.36)	(5.89)	(7.03)	(6.25)	(6.84)	(5.41)
Treated*Minority responder					7.52	8.78
					(8.21)	(6.72)
Minority responder					-0.66	0.65
					(3.01)	(3.40)
Observations	296	296	296	296	592	592
Company FE	yes	yes	yes	yes	yes	yes
Session FE	yes	yes	yes	yes	yes	yes
Individual controls	no	yes	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28	71.37	71.37
SD trust	36.54	36.54	35.99	35.99	36.23	36.23
Mean treated	0.17	0.17	0.19	0.19	0.18	0.18
SD treated	0.38	0.38	0.39	0.39	0.39	0.39

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Treated* denotes soldiers from mixed rooms. Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. Regressions (5)-(6) include observations from both treatments. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/ father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms (121 rooms), \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

Table 4: Amount sent in the trust game and the extent of contact - share of minority soldiers in the room.

	Sent amount in trust game					
	(1)	(2)	(3)	(4)	(5)	(6)
	Mino	Mino	Majo	Majo	All	All
Share of minority soldiers (std.)	4.23**	4.42**	0.46	1.83	0.24	1.13
	(2.02)	(2.14)	(2.70)	(2.44)	(2.61)	(2.14)
Minority responder					0.70	2.26
					(2.79)	(2.94)
Share of minority (std.)*minority responder					3.64	4.04*
					(3.03)	(2.44)
Observations	296	296	296	296	592	592
Company FE	yes	yes	yes	yes	yes	yes
Session FE	yes	yes	yes	yes	yes	yes
Individual controls	no	yes	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28	71.37	71.37
SD trust	36.54	36.54	35.99	35.99	36.23	36.23
Mean Share of minority soldiers	-0.02	-0.02	0.02	0.02	0.00	0.00
SD Share of minority soldiers	0.98	0.98	1.02	1.02	1.00	1.00

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Share of minority soldiers in room* is the standardized variable of share of minority soldiers within each room (mean 0, sd 1). Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. Regressions (5)-(6) include observations from both treatments. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/ father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms (121 rooms), \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

In columns 3 and 4 we find that intense contact with out-group members does not affect their trust in a stranger from the in-group, as the amount sent to the majority responder is not correlated with share of minority soldiers. In columns 5-6 we present the interaction models. We find that a one standard deviation difference in the share of minority soldiers in the room implies higher trust in an out-group stranger by about NOK 4 (effect size of 0.10, 3.64/36.23). The result is significant at the 10 percent level when the control variables are included.

## 6.2 Integrating the conflict and contact perspectives

Thus far we have found support for contact theory. Next we want to integrate our results with the conflict theory of diversity. Previous research has found a negative relationship between trust and the level of ethnic diversity in the respondents' area of residence (Alesina and La Ferrara, 2000; Dinesen and Sønderskov, 2015; Putnam, 2007). We are particularly interested in whether contact can reduce this negative relationship. Carrell, Hoekstra, and West, (2015) find the largest effect of exposure for whites coming from American states with a low share of African Americans. Burns, Corno, and La Ferrara, (2016), however, find similar effects of exposure for South African students having been exposed to different degrees of racial heterogeneity during their high school education.

Figure 1 shows how trust towards the majority/ minority responder correlate with previous exposure to immigrants, measured by the share of non-western immigrants in the municipalities the soldiers' come from.<sup>17</sup> There are 422 municipalities in Norway at the time of the experiment, and the soldiers in our main sample represent 197 different municipalities. Obviously, people were not randomly assigned to different municipalities or previous exposure, thus we do not interpret this relationship as a causal effect of immigrant share. In the left panel we group all soldiers within each treatment into equal sized bins based on this immigrant share.

Trust in the majority responder (black line/hollow dots) is not correlated with municipality share of immigrants, but the figure shows that soldiers from municipalities with a high share of immigrants send less to the minority responder (gray line/ dots). These results are consistent with the conflict hypothesis. In the right panel of the figure we group the sample into three equal sized bins by treatment. Trust towards the minority responder is still considerably lower for the subjects from the most diverse municipali-

---

<sup>17</sup>Immigrants include immigrants and Norwegian-born to immigrant parents in 2014. Non-western immigration encompass immigrants from countries outside of the EEA/EU, the US, Canada, Australia, and New Zealand.

ties.<sup>18</sup>

---

<sup>18</sup>In Section F we run all the analyzes also at the postcode level. The results are very similar.

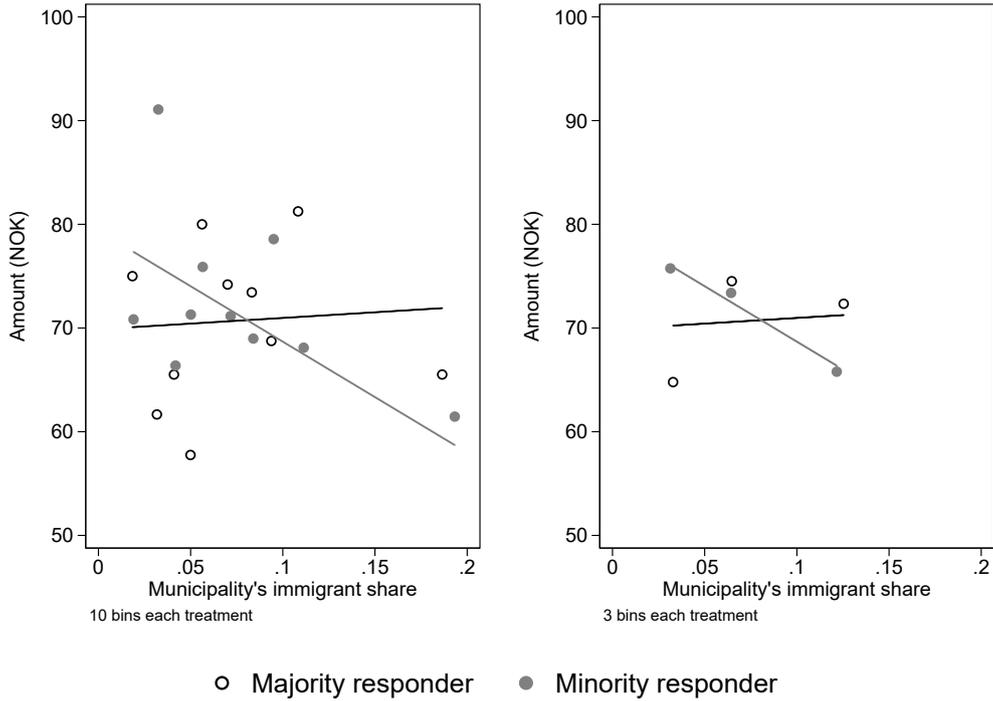


Figure 1: Trust and previous exposure.

*Note:* Amount sent in NOK on vertical axis, share of immigrants in the municipality on the horizontal axis. Trust in the majority responder represented by the black line/hollow dots, trust in the minority responder by the gray line/solid dots. Subjects in the main sample are grouped into equal sized bins within each treatment based on the municipality's immigration share. 10 bins each treatment: Each dot represents the average trust and average immigration share for about 30 soldiers. 3 bins each treatment: Each dot represents the average trust and average immigration share for about 100 soldiers.

We investigate this relationship more formally in Table 5. The dependent variable is as before how much they send to the minority/ majority responder (in NOK). *Municipality's immigrant share* gives the non-western immigration share in each soldier's home-municipality. We have standardized the variable to simplify interpretation. In column 1 we see that an increase in the municipality's immigrant share by one standard deviation reduces trust towards the minority respondent by NOK 5.53, which corresponds to about eight percent reduction from the mean and a standardized effect size of 0.15 (5.53/36.54). The result is similar when we add control variables in column 2. We do not find any significant relationship between trust towards the majority responder and the municipality's immigrant share. In the interaction models we find that the relationship between amount sent to the minority and the majority responder is significantly different as a function of immigrant share. The standardized effect size is equal to 0.19

Table 5: The conflict hypothesis: Amount sent in the trust game and previous exposure.

	(1)	(2)	(3)	(4)	(5)	(6)
	Mino	Mino	Majo	Majo	All	All
Municipality's immigrant share (std.)	-5.53*	-6.48**	1.19	1.62	1.05	1.23
	(2.81)	(2.93)	(2.36)	(2.54)	(2.30)	(2.18)
Minority responder					0.39	1.97
					(2.82)	(2.98)
Municipality's imm.sh.(std.)*Minority responder					-6.77*	-8.00**
					(3.60)	(3.50)
Observations	296	296	296	296	592	592
Company FE	yes	yes	yes	yes	yes	yes
Session FE	yes	yes	yes	yes	yes	yes
Individual controls	no	yes	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28	71.37	71.37
SD trust	36.54	36.54	35.99	35.99	36.23	36.23
Mean ind.var. share	-0.03	-0.03	0.02	0.02	0.00	0.00
SD ind.var. share	1.00	1.00	1.00	1.00	1.00	1.00

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Municipality's immigrant share:* Non-western immigration share in each soldier's home-municipality (standardized, mean 0, sd 1). Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. Regressions (5)-(6) include observations from both treatments. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

(6.77/36.23).

Our design with random assignment to rooms allows us to investigate if close contact with immigrants changes the relationship between the immigrant share in home municipalities and trust. The left panel of Figure 2 depicts how trust in the minority responder varies with immigration share for those who lived in a treated (mixed room) and those who lived in a control room. In the right panel, we show sending to the majority candidate by treatment status. The patterns in the two panels are completely different: Close contact with a minority member breaks the negative association between municipality diversity and trust in out-group individuals. Minority shares in the municipality where one lives is not correlated with trust to an in-group member, and being treated

does not reduce the level of in-group trust, rather the opposite.

In Table 6 we report the regression results for how the relationship between the share of immigrants in the home municipality and trust is affected by treatment. We find that within the control group, trust in the minority responder decreases in the share of immigrants. The coefficient is significant at the ten percent level in column 1 and the standardized effect size 0.17 (6.05/36.54). In column 2 we add controls and the effect is statistically significant at the 5 percent level. This is not the case for the treatment group - the share variable and the interaction sums to about zero. The coefficient for treated is equal to 10.05, significant at the ten percent level and five percent level when we add controls. The effect size is 0.28, and we can rule out any negative effects. We run the same regressions for those who played against the majority responder. We again see that share of immigration in the home municipality is uncorrelated with in-group trust and that treatment does not lower it. The effect size is very small and precise so that we can rule out positive and negative effects beyond very small ones. If anything, there is a positive interaction also for in-group trust and the coefficient is statistically significant in column 4 where controls are included.<sup>19</sup>

---

<sup>19</sup>The coefficient for immigrant share times treatment changes a lot from column 3 to column 4. This hints to a correlation between immigrant share in the municipality and observables, which is not surprising as immigrant share is not random. In Table A.7 we show correlations between our baseline variables and immigrant share and we note that the latter correlates with parental education and employment as well as with attitudes regarding immigration and trust.

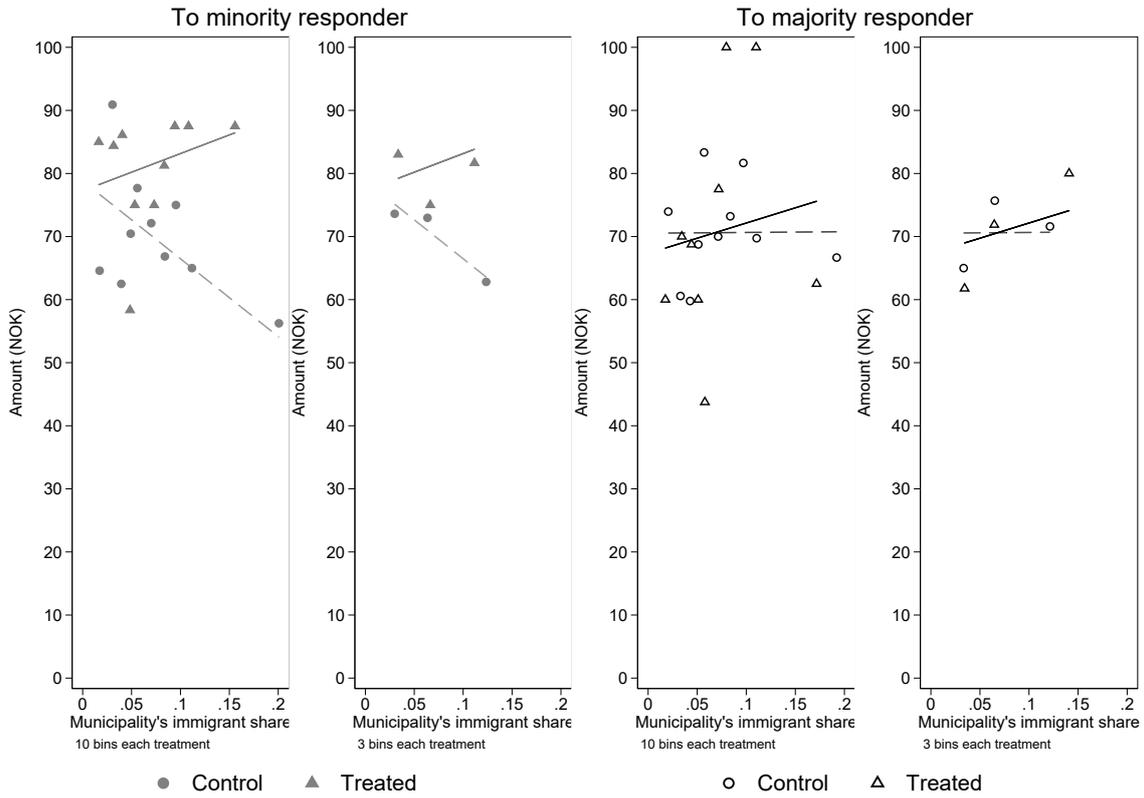


Figure 2: Amount sent in the trust game and share of immigrants

*Note:* Amount sent in NOK on vertical axis, share of immigrants in the municipality on the horizontal axis. Gray solid line captures those who are treated (live in mixed rooms) and are in the minority responder treatment. Gray dashed line captures those who are in the control group (homogenous rooms) and in the minority responder treatment. Black solid line captures those who are treated (mixed room) and in the majority responder treatment. Black dashed line captures those who are in the control group (homogenous rooms) and in the majority responder treatment. Subjects in main sample are grouped into equal sized bins within each treatment based on the postal code immigration share. 10 bins each treatment: Each dot represents the average trust and average immigration share for around 25 subjects in the control group, and around 5 subjects in treatment group. 3 bins each treatment: Each dot represents the average trust and average immigration share for about 80 subjects in control, and 17-19 subjects in treated.

Table 6: Integrating the conflict and contact hypotheses: Amount sent, treatment status, and share of immigrants in the home municipality

	(1)	(2)	(3)	(4)
	Mino	Mino	Majo	Majo
Treated	10.05*	11.91**	3.21	7.40
	(5.16)	(5.67)	(6.96)	(6.00)
Municipality's immigrant share (std.)	-6.05*	-7.72**	0.78	-0.05
	(3.07)	(3.11)	(2.38)	(2.62)
Municipality's immigrant share(std.)*Treated	5.58	12.64*	1.88	10.49*
	(5.61)	(6.82)	(6.66)	(6.05)
Observations	296	296	296	296
Company FE	yes	yes	yes	yes
Session FE	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28
SD trust	36.54	36.54	35.99	35.99
Mean ind.var. share	-0.03	-0.03	0.02	0.02
SD ind.var. share	1.00	1.00	1.00	1.00

*Note:*The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Municipality's immigrant share:* Non-western immigration share in each soldier's home-municipality (standardized, mean 0, sd 1). Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

### 6.3 Heterogeneous effects

In this section, we investigate heterogeneous effects along two additional dimensions: the aptitude of the minority soldiers and the baseline attitudes of the majority soldiers. Do high aptitude minority soldiers affect their fellow roommates in a different manner compared to low-aptitude minority soldiers? Similar to Burns, Corno, and La Ferrara, (2016) and Carrell, Hoekstra, and West, (2015), we use a measure of the soldiers' academic achievement - self-reported average GPA during the last year of upper secondary school.<sup>20</sup>

In Table 7 we test whether the GPA of the minority roommate affects the trust level of the majority soldiers in the trust game. We divide the treated soldiers into two equally sized groups: having a high or low GPA minority roommate (if there is more than one we use the average). We compare these two groups with the control group. We see in columns 1 and 2 that there is a positive and significant association between trust in the minority responder and living and working together with a minority soldier in the upper part of the academic distribution, while there is no treatment effect if the minority soldier has a low GPA. The effect size for high GPA minority room mate is equal to 0.44, and we can rule out negative effect sizes. The effect size for low GPA minority room mate is close to zero, and we cannot rule out negative effect sizes. With controls, the difference between high GPA and low GPA is statistically significant.<sup>21</sup> We see in columns 3 and 4 that the academic achievement of the minority roommate does not affect trust in the majority responder. Effect sizes are close to zero, and the effect of high aptitude minority soldiers on trust in the majority responder is quite imprecisely estimated.

---

<sup>20</sup>This ranges from 1 (fail) to 6 (best). Appendix Figure A.5 shows the distribution for the average GPA for minority and majority soldiers in our sample. There is less spread in the variation of GPA for minority soldiers but otherwise the distributions are very similar.

<sup>21</sup>We show in Appendix Table A.8 that results are similar if we use a continuous measure of minority soldier GPA.

Table 7: Minority roommates' GPA and trust.

	(1)	(2)	(3)	(4)
	Mino	Mino	Majo	Majo
High GPA	15.86** (7.35)	19.66*** (7.02)	3.34 (15.64)	11.64 (13.07)
Low GPA	2.12 (7.17)	-0.89 (8.25)	0.58 (6.26)	1.79 (6.46)
Observations	296	296	296	296
Company FE	yes	yes	yes	yes
Session FE	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28
SD trust	36.54	36.54	35.99	35.99
Mean mino. GPA in room	4.12	4.12	4.13	4.13
SD mino. GPA in room	0.58	0.58	0.51	0.51

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *High GPA* is an indicator variable equal to 1 for those whose minority roommate has a high GPA score (equal to or above sample average), *Low GPA* is an indicator for those whose minority roommate has a low GPA score (below sample average). Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions.

These results are similar to the results of Carrell, Hoekstra, and West, (2015) who find that the effect of sharing a room with a high aptitude black student has a larger positive effect than sharing a room with a low aptitude black student on future cross-racial roommate matches in The United States Air Force Academy. Burns, Corno, and La Ferrara, (2016) study roommate matching of white and black students in South Africa. They use their baseline data to measure pre-existing beliefs about the academic ability of black students and hence, have a more refined measure of belief updating potential based on the actual ability of the roommate. They measure beliefs and prejudice by two different implicit association tests, one regarding academic abilities and one regarding positive and negative attributes in general. They find that only white students who are positively surprised change their implicit bias about the relative academic ability of blacks. For the more general bias, there was a reduction for all exposed white students, irrespective of the academic ability of the roommate. We do not have any measure on initial beliefs about trustworthiness for our soldiers, but we can investigate whether the treatment is affecting different people differently depending on their baseline attitudes towards immigration and immigrants.

In the baseline survey we collected two questions related to attitudes towards immigration: *In general, immigrants have poorer work ethic than Norwegians*; and *During the first years of their stay in Norway, immigrants should receive lower social benefits than Norwegians*. We create an index based on these questions and define those who overall disagree with these statements as liberals (257 individuals). The ones who overall agree with these statements are classified as conservatives (335 individuals). We realize that this labelling is somewhat inaccurate since the index captures a mix of concerns, beliefs and policy positions on immigration, but we use it in lack of better alternatives.<sup>22</sup>

In Table 8 we interact treatment status with the baseline attitudes. In column 1, we see that non-treated conservatives from homogenous rooms do not differ from liberals from homogenous rooms, i.e. those expressing sceptical views in the survey do not send sig-

---

<sup>22</sup>The results are very similar if we also include a third question: *Immigration leads to lower trust between the citizens of a country*. As this question is even further away from any policy or perception of immigrants we choose to keep it out, however.

nificantly less to the minority responder in the trust game (but we can not reject negative effects). Living in a mixed room increases trust in the minority responder significantly for liberals, but not for conservatives, as the interacted effect from being treated and conservative is negative, and of similar magnitude as the coefficient for treated. Hence, treatment affected the liberals, but did not affect those expressing less liberal views at baseline. The effect size for treated is 0.63 (22.92/36.54), and we can rule out that it is negative. The effect size for the interaction between treated and holding conservative views is 0.52 (18.87/36.54), and we can rule out that it is positive.

In column 4, we see that non-treated conservatives do not trust the majority responder more or less than liberals. Living in a mixed room does not affect the level of trust of liberals - captured by the *Treated* dummy - and the effect is not statistically significantly different for conservatives - as captured by the interaction term. As individuals from municipalities with many immigrants are on average more liberal, see Table A.9 in the appendix, we also control for the municipality's immigration share in columns 2 and 5. We further add individual level controls in columns 3 and 6. The interpretation of the results remains the same.

The heterogeneity results we uncover are not completely consistent with any single model of prejudice reduction. The original formulation of the contact theory proposes that contact will reduce prejudice because negative stereotypes will be corrected when majority members have contact with representative minority members (Pettigrew, 1998). Thus, a possible prediction is then that those holding negative views will react more strongly to treatment (see Carrell, Hoekstra, and West, (2015, p. 11) for evidence consistent with this mechanism). However, later research in cognitive psychology on how people process new information questions the importance of learning as a mechanism for why contact might reduce prejudice (Pettigrew, 1998, p. 70). According to this line of research, people holding negative predispositions will not react to contact unless the information shock is very large. Pettigrew, (1998) lists three other mechanism, which can explain why contact causes less prejudice. One is a reshaping of the view of the in-group. This mechanism is apparently not at work here, as we find no effect of treatment

Table 8: Attitudes towards immigration/ immigrants and trust.

	(1)	(2)	(3)	(4)	(5)	(6)
	Mino	Mino	Mino	Majo	Majo	Majo
Conservative	4.94 (5.06)	3.58 (5.00)	3.97 (5.22)	-0.15 (4.58)	-0.15 (4.65)	-0.16 (5.91)
Treated*conservative	-18.87* (10.20)	-16.99 (10.41)	-20.17* (11.18)	7.17 (10.81)	6.79 (10.73)	7.69 (12.32)
Treated	22.92*** (8.34)	21.02** (8.42)	24.14*** (8.79)	-1.92 (11.73)	-1.04 (11.53)	2.39 (11.18)
Municipality's immigrant share (std.)		-5.10* (2.77)	-6.47** (3.01)		1.12 (2.41)	1.86 (2.58)
Observations	296	296	296	296	296	296
Company FE	yes	yes	yes	yes	yes	yes
Session FE	yes	yes	yes	yes	yes	yes
Individual controls	no	no	yes	no	no	yes
Mean trust	71.45	71.45	71.45	71.28	71.28	71.28
SD trust	36.54	36.54	36.54	35.99	35.99	35.99
Share conservative	0.57	0.57	0.57	0.56	0.56	0.56

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Treated* denotes soldiers from mixed rooms. *Conservative* is equal to one for the half of the sample who holds more conservative views towards immigration. *Municipality's immigrant share*: Non-western immigration share in each soldier's home-municipality (standardized, mean 0, sd 1). Regressions (1)-(3) only include observations in the minority responder treatment (Ali), (3)-(6) only include observations in the majority responder (Morten) treatment. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

for those playing with Morten. A second mechanism is the generation of affective ties; Contact creates friendships which spill-over to positive views on the out-group. This mechanism is plausibly at play in our case but does not explain why only liberals are affected, unless they are the only ones becoming friends with the minority soldier. The third mechanism is changing behaviour in response to contact (Scacco and Warren, 2018). The claim is that behavioural change happens prior to attitudinal change, and will then cause attitudinal change if there is a dissonance between behaviour and attitude. The trust game measures behaviour, thus this mechanism is clearly in play for the liberal part of the sample. However, contact will not decrease prejudice, since it is those with liberal views that respond to treatment, thus few of those responding to treatment will experience dissonance between behaviour and attitude.

## 7 Concluding remarks

Based on previous literature on the relationship between trust and ethnic diversity, we would expect that increasing diversity leads to lower trust (Alesina and La Ferrara, 2000; Dinesen and Sønderskov, 2015; Putnam, 2007). There are, however, three important limitations to the existing literature that we address using a combined lab and field experiment.

The first limitation concerns biases arising from endogeneity issues. The worry that the correlations between diversity and trust are driven by selection, reverse causality, or both looms large in the previous literature. People self-select into neighborhoods and controlling for selection by including observables is likely to be insufficient. To date, there is no study using exogenous variation to identify the causal effect of diversity on trust. Our research design, involving a randomized field experiment, allows us to make causal inferences.

The second shortcoming of the previous literature is a conceptual conflation of exposure and contact. While living in an area with many immigrants increases exposure,

it does not necessarily increase contact. A consensus has emerged in social psychology that shallow exposure need not produce the same beneficial effects, instead it is likely to cause opposite effects due to competition about jobs, resources, and cultural hegemony (see Pettigrew 1998 for a review). We investigate the correlations between ethnic diversity in soldiers' municipality of upbringing and trust, and replicate the frequently found result that there is less out-group trust among people from more diverse areas. Well identified studies have shown, however, that close personal contact reduces prejudice (e.g. Bauer, Fiala, and Lively, 2017; Boisjoly et al., 2006; Burns, Corno, and La Ferrara, 2016; Carrell, Hoekstra, and West, 2015; Dahl, Kotsadam, and Rooth, 2018; Finseraas and Kotsadam, 2017; Finseraas et al., 2016), illustrating the danger of conflating exposure and contact. Our field experiment takes place in a setting which should produce the beneficial effects of contact, and we show that contact overturns the negative correlation between exposure and trust.

The third limitation regards the measurement of trust. Most previous literature on the effects of diversity on trust relies upon survey questions on general trust. There is a debate about what these questions really measure, and some argue that they correlate with trustworthiness rather than trust (Glaeser et al., 2000; Sapienza, Toldra-Simats, and Zingales, 2013). We instead measure trust by conducting a trust game, which provides us with a behavioral measure of trust. More importantly, the generalized trust questions do not separate between in-group and out-group trust. We focus on majority individuals and let them send money to either Ali (signaling out-group) or Morten (in-group). This allows us to test if the correlations as well as the effects are different for in- and out-group trust.

We find that close contact increases trust in Ali, in particular for those from municipalities with a high share of immigrants. The policy implications of the results depend on subjective opinions on the external validity of the findings. In particular, three factors are important in this respect. Firstly, our sample consists of special representatives of the Norwegian population. While military service was mandatory for men in Norway until 2015 (from 2016, it is mandatory for both men and women), conscription is based

on need, and only about one in six men serve. The military thereby select people based on ability and motivation. When we compare our sample to other young Norwegians they seem relatively similar, but they are somewhat more progressive with respect to their attitudes toward immigrants and they seem somewhat more trusting. Secondly, the soldiers are exposed to a highly selected set of immigrants. They are mostly second-generation immigrants, and even as compared to second-generation immigrants in general, they are likely to be better integrated. For instance, their mothers are more likely to work than the mothers of second-generation immigrants in general. Thirdly, and perhaps most important, the setting under which contact occurred is very special. Although the context of our study is in part a necessity for deriving clear theoretical expectations, and while it assures a strong internal validity, it restricts external validity to contexts with some similarity to ours. The structure of contact at workplaces, in classrooms, and in team sports are weaker and less streamlined which might imply that treatment effects from direct contact might be weaker than what we find. We strongly urge future studies to vary these different components in order to create a more general knowledge.

## References

- Abascal, Maria and Delia Baldassarri (2015). “Love Thy Neighbor? Ethnoracial Diversity and Trust Reexamined”. In: *American Journal of Sociology* 121.3, pp. 722–782.
- Alesina, Alberto, Johann Harnoss, and Hillel Rapoport (2016). “Birthplace diversity and economic prosperity”. In: *Journal of Economic Growth* 21.2, pp. 101–138.
- Alesina, Alberto and Eliana La Ferrara (2000). “Participation in Heterogeneous Communities”. In: *Journal of economic literature* 115.3, pp. 847–904.
- (2002). “Who Trusts Others?” In: *Journal of Public Economics* 85.2, pp. 207–234.
- (2005). “Ethnic diversity and economic performance”. In: *Journal of economic literature* 43.3, pp. 762–800.
- Alesina, Alberto et al. (2003). “Fractionalization”. In: *Journal of Economic growth* 8.2, pp. 155–194.
- Alexander, Marcus and Fotini Christia (2011). “Context modularity of human altruism”. In: *Science* 334.6061, pp. 1392–1394.
- Algan, Yann and Pierre Cahuc (2013). “Trust and Growth”. In: *Annual Review of Economics* 5.1, pp. 521–549.
- Allport, Gordon W. (1954). *The Nature of Prejudice*. Reading: Addison-Wesley.
- Athey, Susan and Guido W Imbens (2017). “The Econometrics of Randomized Experiments”. In: *Handbook of Economic Field Experiments*. Vol. 1. Elsevier, pp. 73–140.
- Bauer, Michal, Nathan Fiala, and Ian Lively (2017). “Trusting Former Rebels: An Experimental Approach to Understanding Reintegration after Civil War”. In: *The Economic Journal*.
- Beach, Brian and Daniel B. Jones (2016). “Gridlock: Ethnic Diversity in Government and the Provision of Public Goods”. In: *American Economic Journal: Economic Policy* forthcoming.
- Belloni, Alexandre, Victor Chernozhukov, and Christian Hansen (2014). “Inference on treatment effects after selection among high-dimensional controls”. In: *The Review of Economic Studies* 81.2, pp. 608–650.

- Berg, Joyce, John Dickhaut, and Kevin McCabe (1995). “Trust, Reciprocity, and Social History”. In: *Games and Economic Behavior* 10.1, pp. 122–142.
- Boisjoly, Johanne et al. (2006). “Empathy or Antipathy? The Impact of Diversity”. In: *American Economic Review* 96.5, pp. 1890–1905.
- Brandts, Jordi and Gary Charness (2011). “The Strategy Versus the Direct-Response Method: A First Survey of Experimental Comparisons”. In: *Experimental Economics* 14.3, pp. 375–398.
- Burnham, Terence, Kevin McCabe, and Vernon L Smith (2000). “Friend-or-foe intentionality priming in an extensive form trust game”. In: *Journal of Economic Behavior & Organization* 43.1, pp. 57–73.
- Burns, Justine, Lucia Corno, and Eliana La Ferrara (2016). *Interaction, prejudice and performance. Evidence from South Africa*. Tech. rep. Working Paper.
- Carrell, Scott E., Mark Hoekstra, and James E. West (2015). *The Impact of Intergroup Contact on Racial Attitudes and Revealed Preferences*. NBER Working Paper No. 20940. <http://www.nber.org/papers/w20940>.
- Dahl, Gordon, Andreas Kotsadam, and Dan-Olof Rooth (2018). *Does integration change gender attitudes? The effect of randomly assigning women to traditionally male teams*. Tech. rep. National Bureau of Economic Research.
- Dinesen, Peter Thisted and Kim Mannemar Sønderskov (2015). “Ethnic diversity and social trust: Evidence from the micro-context”. In: *American Sociological Review* 80.3, pp. 550–573.
- (2017). “Ethnic Diversity and Social Trust: A Critical Review of the Literature and Suggestions for a Research Agenda”. In: *Oxford Handbook on Social and Political Trust*. Oxford University Press, pp. 175–204.
- Enos, Ryan D (2014). “Causal effect of intergroup contact on exclusionary attitudes”. In: *Proceedings of the National Academy of Sciences* 111.10, pp. 3699–3704.
- (2016). “What the demolition of public housing teaches us about the impact of racial threat on political behavior”. In: *American Journal of Political Science* 60.1, pp. 123–142.

- Enos, Ryan D (2017). *The space between us: Social geography and politics*. Cambridge University Press.
- Enos, Ryan D and Christopher Celaya (2018). “The Effect of Segregation on Intergroup Relations”. In: *Journal of Experimental Political Science*, pp. 1–13.
- Falk, Armin and Christian Zehnder (2013). “A city-wide experiment on trust discrimination”. In: *Journal of Public Economics* 100, pp. 15–27.
- Fehr, Ernst (2009). “On the economics and biology of trust”. In: *Journal of the European Economic Association* 7.2-3, pp. 235–266.
- Felfe, Christina et al. (2018). *More opportunity, more cooperation? The behavioral effects of birthright citizenship on immigrant youth*. Working paper.
- Fershtman, Chaim and Uri Gneezy (2001). “Discrimination in a segmented society: An experimental approach”. In: *Quarterly Journal of Economics*, pp. 351–377.
- Finseraas, Henning and Andreas Kotsadam (2017). “Does personal contact with ethnic minorities affect anti-immigrant sentiments? Evidence from a field experiment”. In: *European Journal of Political Research* 56.3, pp. 703 –722.
- Finseraas, Henning et al. (2016). “Exposure to female colleagues breaks the glass ceiling: Evidence from a combined vignette and field experiment”. In: *European Economic Review* 90, pp. 363–374.
- Glaeser, Edward L. et al. (2000). “Measuring Trust”. In: *Quarterly Journal of Economics* 115.3, pp. 811–846.
- Goette, Lorenz, David Huffman, and Stephan Meier (2006). “The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups”. In: *The American Economic Review* 96.2, pp. 212–216.
- Guiso, L, P Sapienza, and L Zingales (2011). “Civic Capital as the Missing Link, Handbook of Social Economics, Volume 1A, Jess Benhabib, Alberto Bisin, and Matthew O”. In: *Jackson, eds*.

- Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2008a). “Alfred marshall lecture social capital as good culture”. In: *Journal of the European Economic Association* 6.2-3, pp. 295–320.
- (2008b). “Trusting the stock market”. In: *the Journal of Finance* 63.6, pp. 2557–2600.
- Hjort, Jonas (2014). “Ethnic divisions and production in firms”. In: *The Quarterly Journal of Economics* 129.4, pp. 1899–1946.
- Hunt, Jennifer and Marjolaine Gauthier-Loiselle (2010). “How much does immigration boost innovation?” In: *American Economic Journal: Macroeconomics* 2.2, pp. 31–56.
- Johnsen, Åshild A. and Ola Kvaløy (2016). “Does strategic kindness crowd out prosocial behavior?” In: *Journal of Economic Behavior & Organization* 132.Part A, pp. 1–11.
- Johnson, Noel D and Alexandra A Mislin (2011). “Trust games: A meta-analysis”. In: *Journal of Economic Psychology* 32.5, pp. 865–889.
- Johnston, Christopher D, Benjamin J Newman, and Yamil Velez (2015). “Ethnic change, personality, and polarization over immigration in the American public”. In: *Public Opinion Quarterly* 79.3, pp. 662–686.
- Kaufmann, E and M Goodwin (2016). “The Diversity Wave: A meta-analysis of ethnic diversity, perceived threat and native white backlash”. In: *The Diversity Wave: A meta-analysis of ethnic diversity, perceived threat and native white backlash*.
- Kosfeld, Michael et al. (2005). “Oxytocin increases trust in humans”. In: *Nature* 435.7042, p. 673.
- Lyons, Elizabeth (2016). “Team Production in International Labor Markets: Experimental Evidence from the Field”. In: *American Economic Journal: Applied Economics* forthcoming.
- Meer, Tom van der and Jochem Tolsma (2014). “Ethnic diversity and its effects on social cohesion”. In: *Annual Review of Sociology* 40, pp. 459–478.
- Ottaviano, Gianmarco IP and Giovanni Peri (2006). “The economic value of cultural diversity: evidence from US cities”. In: *Journal of Economic geography* 6.1, pp. 9–44.

- Peri, Giovanni (2012). “The effect of immigration on productivity: Evidence from US states”. In: *Review of Economics and Statistics* 94.1, pp. 348–358.
- Pettigrew, Thomas F (1998). “Intergroup contact theory”. In: *Annual review of psychology* 49.1, pp. 65–85.
- Putnam, Robert D. (2007). “E pluribus unum: Diversity and community in the twenty-first century”. In: *Scandinavian Political Studies* 30.2, pp. 137–174.
- Rao, Gautam (2018). “Familiarity does not breed contempt: Generosity, discrimination and diversity in Delhi schools”. In: *American Economic Review* Forthcoming.
- Sapienza, Paola, Anna Toldra-Simats, and Luigi Zingales (2013). “Understanding trust”. In: *The Economic Journal* 123.573, pp. 1313–1332.
- Scacco, Alexandra and Shana S Warren (2018). “Can social contact reduce prejudice and discrimination? Evidence from a field experiment in Nigeria”. In: *American Political Science Review*, pp. 1–24.
- Schaeffer, Merlin (2014). *Ethnic diversity and social cohesion: Immigration, ethnic fractionalization and potentials for civic action*. Ashgate Publishing, Ltd.
- Shore, Lynn M et al. (2009). “Diversity in organizations: Where are we now and where are we going?” In: *Human Resource Management Review* 19.2, pp. 117–133.
- Stanley, Damian A. et al. (2011). “Implicit race attitudes predict trustworthiness judgments and economic trust decisions”. In: *Proceedings of the National Academy of Sciences* 108.19, pp. 7710–7715.
- Thöni, Christian, Jean-Robert Tyran, and Erik Wengström (2012). “Microfoundations of social capital”. In: *Journal of Public Economics* 96.7-8, pp. 635–643.
- Van Laar, Colette et al. (2005). “The Effect of University Roommate Contact on Ethnic Attitudes and Behavior”. In: *Journal of Experimental Social Psychology* 41.4, pp. 329–345.
- Wilson, Rick and Catherine Eckel (2006). “Judging a book by its cover: Beauty and expectations in the trust game”. In: *Political Research Quarterly* 59.2, pp. 189–202.

## A The trust game: Instructions

In this task, you can make money in the form of a gift certificate. Below we explain how the sum of the gift card is determined. We randomly draw one participant from each session to receive gift cards. The amount on the gift card is determined by two choices: Your choice and **Ali/Morten's** choice.

**Ali/Morten** is a real person, living in Eastern Norway, who has signed up as a volunteer to participate in tasks of this sort. **Ali/Morten** gets 100 NOK to participate. You do not know his full name or age, and he knows only that he is playing against a recruit in Northern Norway. We write more about his role later. First, we will explain you what to do.

You get 100 NOK. You can choose whether to send all, or part of the amount to **Ali/Morten**. We who conduct the survey will then triple the amount you send to **Ali/Morten**. He thus receives three times what you choose to send. If you send the whole amount, 100 NOK, **Ali/Morten** receives 300 NOK. If you send 50 NOK, Ali gets 150 NOK. If you send 0 NOK, Ali gets 0 NOK.

For each amount sent, **Ali/Morten** has selected how much of the money he will return. The amount **Ali/Morten** returns to you will not be tripled, and it is up to him how much to return to you: If you choose not to send anything, you get 100 kroner and **Ali/Morten** gets 100 kroner. If you send 100 NOK and **Ali/Morten** returns 150 NOK, you get 150 NOK and **Ali/Morten** gets 250 NOK. If you send 50 NOK and **Ali/Morten** returns 25 NOK, you get 75 NOK and **Ali/Morten** gets 225 NOK. If you send 100 NOK and **Ali/Morten** does not return anything, he gets 400 and you get 0.

How much do you send to **Ali/Morten**? Circle the amount of your choice: 0, 25, 50, 75, 100.

## B Attrition

We have two sources of attrition. One source is due to people leaving the population because they are discharged from the military. We use these observations to calculate

room characteristics, but they are otherwise discarded. The second is due to missing data.

We check whether attrition is related to treatment status by regressing attrition on the treatment dummy variable. We can see in column 1 in Table A.1 that there is no significant relationship between treatment and attrition. In column 2 we add the set of controls used in the main analysis in the paper and the results do not change.

Table A.1: Attrition and exposure

	(1) Attrition	(2) Attrition
Treated	-0.00 (0.03)	0.02 (0.02)
Observations	658	658
R-squared	0.01	0.68
Company FE	Yes	Yes
Individual controls	No	Yes
Mean dep.var.	0.10	0.10
SD dep.var.	0.30	0.30
Mean ind.var.	0.18	0.18
SD ind.var.	0.39	0.39

*Note:* Robust standard errors clustered on rooms in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . *Treated* denotes soldiers who share room with minority soldiers. Control variables are the same as in main analysis.

## C More on balance

Table A.2: Balance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Females in room	Mother high edu	Sex	Father high edu	Mother works	Father works	Parents divorced	Plans edu
Treated	0.01 (0.12)	0.06 (0.08)	0.05 (0.05)	0.06 (0.07)	-0.01 (0.04)	0.01 (0.01)	-0.09 (0.07)	-0.02 (0.07)
Minority responder	0.02 (0.04)	-0.03 (0.04)	0.06*** (0.02)	-0.00 (0.04)	-0.03 (0.02)	-0.00 (0.01)	0.05 (0.05)	0.03 (0.04)
Treated*Minority responder	-0.02 (0.10)	-0.00 (0.12)	-0.01 (0.08)	-0.01 (0.10)	0.04 (0.05)	-0.02 (0.02)	-0.02 (0.11)	0.05 (0.10)
Observations	592	592	592	592	592	592	592	592
R-squared	0.15	0.06	0.04	0.06	0.10	0.27	0.03	0.05
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	No	No	No	No	No	No	No
Mean dep.var.	0.34	0.62	0.10	0.76	0.93	0.99	0.33	0.68
SD dep.var.	0.47	0.49	0.31	0.43	0.26	0.10	0.47	0.47

Note: Robust standard errors clustered on rooms in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. See Table 1 for a detailed description of variables.

Table A.3: Balance continued

	Balance								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Immig red trust	Lend money roommate	General trust	Trust: helpf	Trust: fair	Immigrants' work ethic	Immigrants same rights	Room size	Muni in sh std
Treated	-0.03 (0.07)	-0.01 (0.06)	-0.06 (0.15)	-0.10 (0.11)	-0.03 (0.15)	-0.18 (0.13)	-0.04 (0.15)	0.18 (0.31)	0.10 (0.16)
Minority responder	-0.04 (0.04)	0.00 (0.03)	0.02 (0.08)	-0.03 (0.09)	0.07 (0.09)	0.04 (0.09)	0.01 (0.09)	0.12 (0.13)	-0.01 (0.09)
Treated*Minority responder	0.03 (0.09)	-0.03 (0.08)	-0.16 (0.21)	-0.34* (0.20)	-0.10 (0.19)	-0.12 (0.22)	-0.30 (0.21)	-0.28 (0.24)	-0.27 (0.22)
Observations	592	592	592	592	592	592	592	592	592
R-squared	0.02	0.08	0.03	0.05	0.02	0.04	0.03	0.15	0.04
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	No	No	No	No	No	No	No	No
Mean dep.var.	0.19	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SD dep.var.	0.39	0.30	1.00	1.00	1.00	1.00	1.00	1.00	1.00

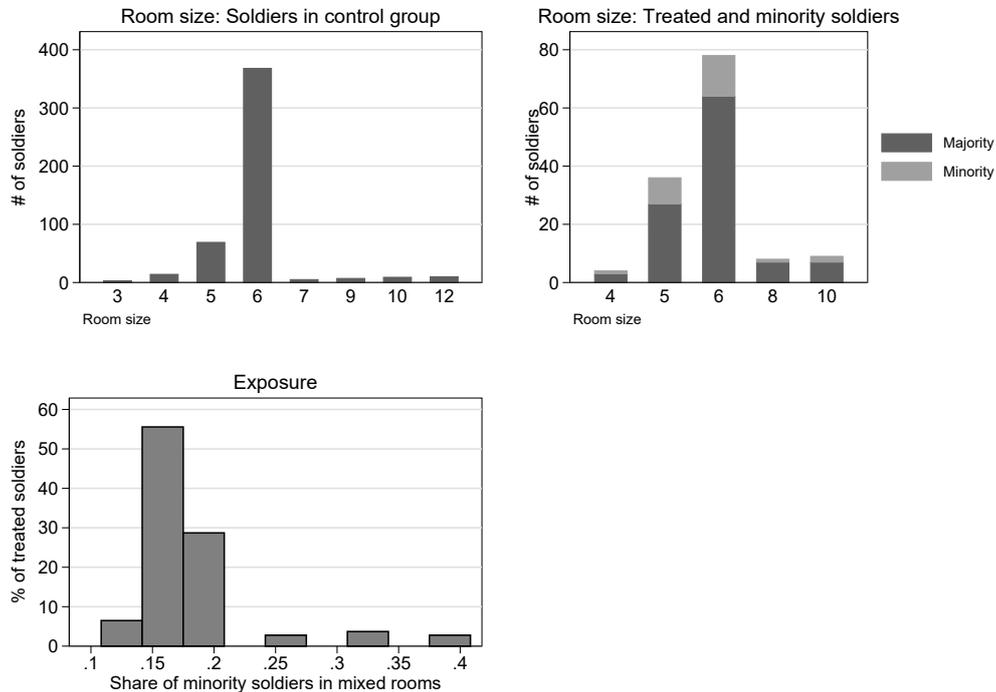
Note: Robust standard errors clustered on rooms in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. See Table 1 for a detailed description of variables.

## D Descriptive statistics

Table A.4: Session characteristics

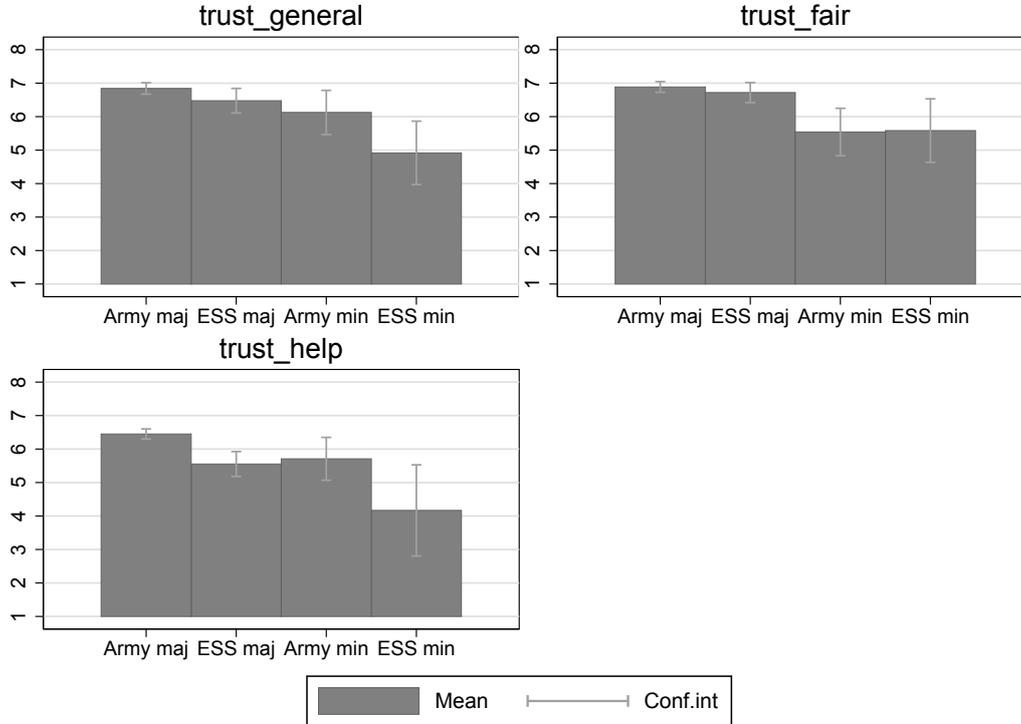
Session	Subjects	No. Minority soldiers	Treatment Ali	Treated (mixed room)
1	48	3	0.54	0.20
2	51	1	0.51	0.20
3	46	2	0.54	0.12
4	55	0	0.47	0.00
5	52	1	0.48	0.15
6	57	1	0.53	0.06
7	48	2	0.52	0.23
8	47	2	0.47	0.21
9	46	3	0.46	0.28
10	100	8	0.52	0.31
11	47	1	0.47	0.18
12	59	2	0.54	0.17
	656	26	Mean 0.50	Mean 0.18

Figure A.3: Room size and exposure



*Note:* Upper left panel: Room size and the distribution of soldiers the control group (not mixed rooms). Upper right panel: Room size and the distribution of soldiers in treatment group (mixed rooms), as well as minority soldiers. Lower panel: Exposure is defined as the share of minority soldiers within rooms. 56 percent of the treated soldiers live in rooms where the share of minority soldiers is equal to 0.17.

Figure A.4: Comparing answers to general trust questions to a sample of young Norwegian men the European Social Survey (ESS).



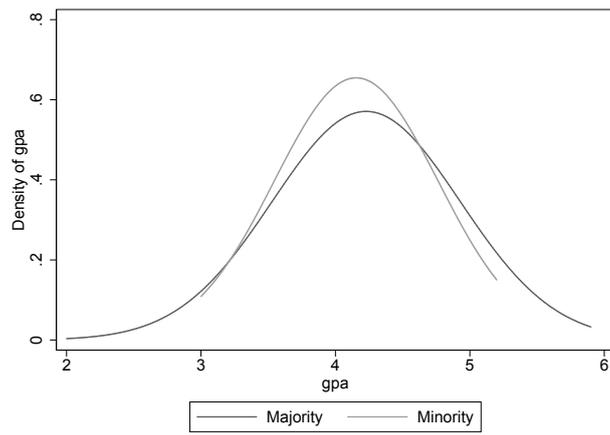
*Note:* Mean and 95 percent confidence interval, scale 1-10. *trust\_general*: "Generally speaking, would you say that most people can be trusted or that you cannot be too careful in dealing with people?" *trust\_fair*: "Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?" *trust\_help*: "Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?" *Army maj*: Male majority soldiers. *ESS maj*: Male majorities aged 18-30. *Army min*: Male minority soldiers. *ESS min*: Male majorities aged 18-30.

Table A.5: Minority soldiers: Parental background

Mother born in	Father born in					Total
	Norway	Europe	S-America	Asia	Africa	
Norway	0	0	2	0	2	4
S-America	1	0	1	0	0	2
Asia	8	0	0	10	0	18
Africa	1	1	0	0	0	2
Total	10	1	3	10	2	26

*Note:* This table displays the birthplace of both mother and father of the 26 minority soldiers in our experimental sample. *Europe* excludes the Nordic countries.

Figure A.5: GPA distribution, by majority/ minority.



## E Other regression tables discussed in the text

Table A.6: Amount sent in the trust game and contact.

	(1)	(2)	(3)	(4)
	Mino	Mino	Majo	Majo
Treated	10.48* (5.22)	8.94* (5.34)	2.42 (6.95)	2.73 (5.33)
Observations	296	296	296	296
Company FE	yes	yes	yes	yes
Session FE	yes	yes	yes	yes
Individual controls	yes	yes	yes	yes
Selection of controls	Imbalance	PDS LASSO	Imbalance	PDS LASSO
Mean trust	71.45	71.45	71.28	71.28
SD trust	36.54	36.54	35.99	35.99
Mean treated	0.17	0.17	0.19	0.19
SD treated	0.38	0.38	0.39	0.39

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Treated* denotes soldiers from mixed rooms. Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. All regressions include a dummy for whether the living quarters include female soldiers. Columns (1) and (3) include controls for which we find imbalance at baseline, while columns (2) and (3) include controls selected using Belloni et al.'s (2014) post-double-selection LASSO approach. Robust standard errors in parentheses clustered on rooms (121 rooms), \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A.7: Baseline characteristics and municipality's immigration share

	(1) Municipality's immigrant share (std.)
Mother has high education	0.01 (0.13)
Father has high education	0.30** (0.15)
Mother works	-0.00 (0.19)
Father works	0.65** (0.27)
Sex of respondent	-0.07 (0.16)
Parents divorced	0.11 (0.09)
Plans higher education	0.02 (0.10)
Females in room	0.03 (0.10)
Lend money to roommate	0.02 (0.15)
Trust: helpfulness	-0.05* (0.03)
Trust: fairness	0.04* (0.02)
General trust	0.02 (0.02)
Immigrants' work ethic	-0.06 (0.06)
Immigrants same rights	0.09* (0.05)
Immigration reduces trust	-0.07 (0.12)
Observations	578
R-squared	0.05
Company FE	No
Session FE	No
Mean dep.var.	0.00
SD dep.var.	1.00

*Note:* The dependent variable is *Municipality's immigrant share*, standardized with mean zero and standard deviation of one. Robust standard errors in parentheses clustered on rooms, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A.8: Minority roommates' GPA and trust.

	(1)	(2)	(3)	(4)
	Mino	Mino	Majo	Majo
Std. Minority GPA	6.11 (3.73)	8.09** (3.27)	-2.87 (9.30)	2.34 (7.51)
Treated	9.12* (5.37)	9.48 (5.86)	1.64 (7.23)	5.55 (6.79)
Observations	296	296	296	296
R-squared	0.07	0.27	0.09	0.24
Company FE	yes	yes	yes	yes
Session FE	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28
SD trust	36.54	36.54	35.99	35.99
Mean std mino GPA	0.00	0.00	0.00	0.00
SD std mino GPA	1.07	1.07	0.94	0.94

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). The independent variable is the standardized version of the minority GPA score in treated rooms, with mean zero and standard deviation equal to one. Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions.

Table A.9: Attitudes and municipality's immigration share

	(1)	(2)
	Conservative	Conservative
Municipality's immigrant share(std)	-0.05** (0.02)	-0.05** (0.02)
Observations	592	592
R-squared	0.04	0.13
Company FE	yes	yes
Session FE	yes	yes
Individual controls	no	yes
Mean	0.57	0.57

*Note:* The dependent variable is a dummy variable equal to one for the conservative half of the sample. *Municipality's immigrant share:* Non-western immigration share in each soldier's home-municipality (standardized, mean 0, sd 1). In (2) we add the standard controls used throughout the paper, excluding attitudes towards immigrants/ immigration. Robust standard errors in parentheses clustered on rooms, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions. Individual controls do not include attitudes towards immigration.

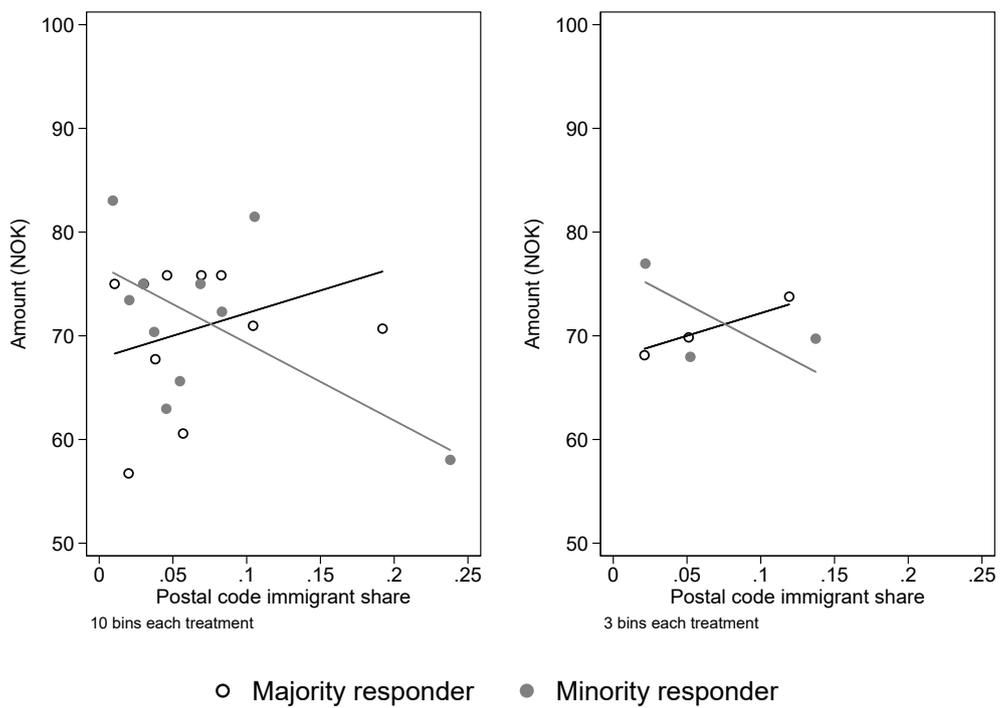
## F Finer level of aggregation: Postal codes

Table A.10: The conflict hypothesis: Amount sent in the trust game and previous exposure.

	(1)	(2)	(3)	(4)	(5)	(6)
	Mino	Mino	Majo	Majo	All	All
Postal code immigrant share(std)	-5.27**	-6.10**	3.67	3.34	3.41	2.67
	(2.36)	(2.45)	(2.22)	(2.71)	(2.06)	(2.29)
Minority responder					0.44	2.02
					(2.79)	(2.96)
Postal code immigrant share(std)*minority responder					-8.74***	-8.46**
					(3.14)	(3.36)
Observations	296	296	296	296	592	592
Company FE	yes	yes	yes	yes	yes	yes
Session FE	yes	yes	yes	yes	yes	yes
Individual controls	no	yes	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28	71.37	71.37
SD trust	36.54	36.54	35.99	35.99	36.23	36.23
Mean ind.var. share	0.02	0.02	-0.02	-0.02	0.00	0.00
SD ind.var. share	1.13	1.13	0.85	0.85	1.00	1.00

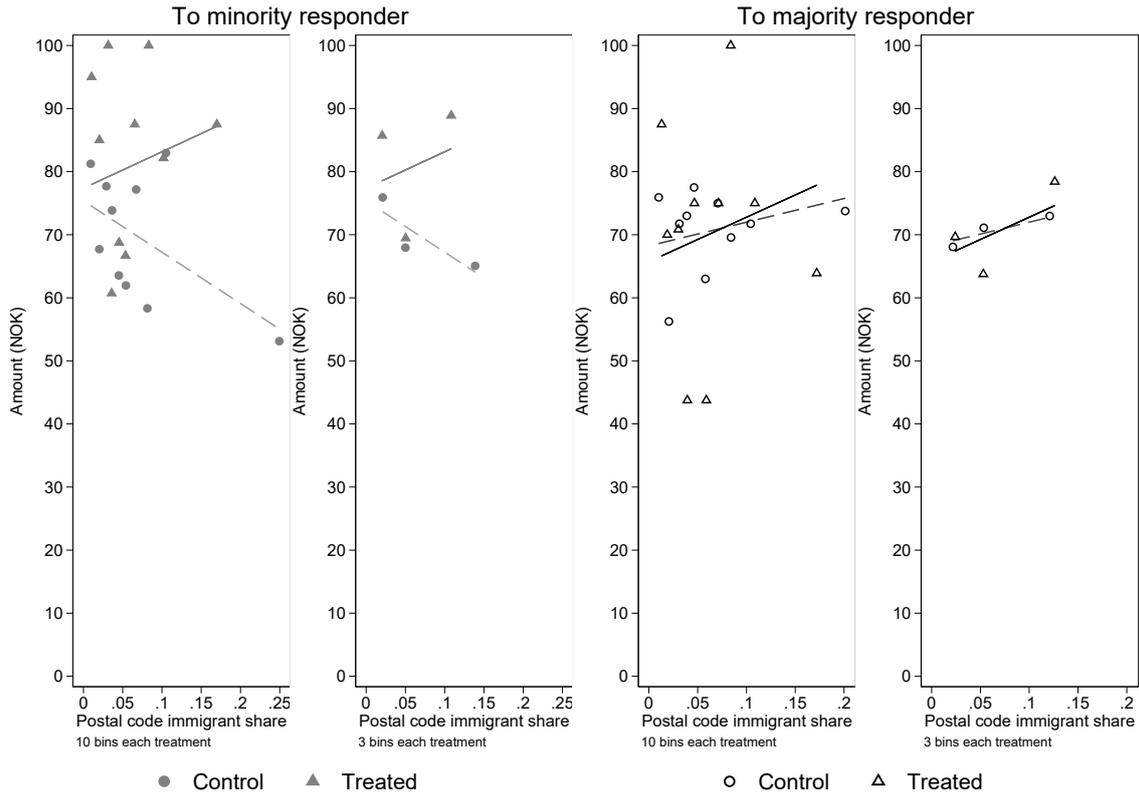
*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Treated* denotes soldiers from mixed rooms. Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. Regressions (5)-(6) include observations from both treatments. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/ father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms (121 rooms), \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

Figure A.6: Trust and previous exposure (postal code).



*Note:* Amount sent in NOK on vertical axis, share of immigrants on the postal code level on the horizontal axis. Trust in the majority responder represented by black line/hollow dots, trust in the minority responder by gray line/solid dots. Subjects in the main sample are grouped into equal sized bins within each treatment based on the immigration share. 10 bins each treatment: Each dot represents the average trust and average immigration share for about 30 soldiers. 3 bins each treatment: Each dot represents the average trust and average immigration share for about 100 soldiers.

Figure A.7: Amount sent in the trust game and share of immigrants (postal code)



*Note:* Amount sent in NOK on vertical axis, share of immigrants on the postal code level on the horizontal axis. Gray solid line captures those who are treated (live in mixed rooms) and are in the minority responder treatment. Gray dashed line captures those who are in the control group (homogenous rooms) and in the minority responder treatment. Black solid line captures those who are treated (mixed room) and in the majority responder treatment. Black dashed line captures those who are in the control group (homogenous rooms) and in the majority responder treatment. Subjects in main sample are grouped into equal sized bins within each treatment based on the postal code immigration share. 10 bins each treatment: Each dot represents the average trust and average immigration share for around 25 subjects in the control group, and around 5 subjects in treatment group. 3 bins each treatment: Each dot represents the average trust and average immigration share for about 80 subjects in control, and 17-19 subjects in treated.

Table A.11: Integrating the conflict and contact hypotheses: Amount sent, treatment status, and share of immigrants on the postal code level

	(1)	(2)	(3)	(4)
	Mino	Mino	Majo	Majo
Treated	9.80*	10.77*	2.72	6.42
	(5.27)	(5.56)	(7.03)	(6.14)
Postal code immigrant share(std)	-5.63**	-6.32**	3.09	2.15
	(2.35)	(2.42)	(2.23)	(2.74)
Postal code immigrant share(std)*Treated	7.05	6.68	2.73	5.75
	(6.07)	(8.19)	(4.97)	(6.33)
Observations	296	296	296	296
Company FE	yes	yes	yes	yes
Session FE	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Mean trust	71.45	71.45	71.28	71.28
SD trust	36.54	36.54	35.99	35.99
Mean ind.var. share	0.02	0.02	-0.02	-0.02
SD ind.var. share	1.13	1.13	0.85	0.85

*Note:* The dependent variable is amount in NOK sent to the minority/ majority responder in the trust game, which ranges from NOK 0-100 (about USD 12). *Treated* denotes soldiers from mixed rooms. *Postal code immigrant share*: Non-western immigration share on postal code level for each soldier (standardized, mean 0, sd 1). Regressions (1)-(2) only include observations in treatment with the minority responder, regressions (3)-(4) only include observations in treatment with the majority responder. All regressions include a dummy for whether the living quarters include female soldiers. Individual controls include whether mother/ father work, mother's/father's education, whether parents are divorced, the soldier's educational plans, attitudes towards immigration, response to questions regarding trust, dummy variables for room size, and gender. Mean and standard deviation of dependent and independent variables below. Robust standard errors in parentheses clustered on rooms (121 rooms), \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions.

Figure A.8: Effect sizes and magnitudes

