



Do policy instruments that restrict social identity expression increase economic cooperation?

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ABSTRACT

Recent public and corporate policies restricting social identity expression, such as the face-covering restrictions in many European countries, presume that prominent signals of our social identity differences drive division even when inference about social identity is unaffected. Social identity theory predicts that limiting identity expression could positively or negatively affect how groups interact. We use an experiment to test whether a treatment that bans displaying an identity pin affects cooperation in public goods provision. Our subjects are U.K. residents who were in favor of leaving or remaining in the European Union. Each subject is simultaneously in two different yet economically identical environments that are distinguished only by the social identities of the group members. They play two simultaneous one-shot public goods games, one with others who share their identity (in-group public good), and one with a mixture of Leavers and Remainers (mixed-group public good). The political identities of all subjects and the structure of each group are known by everyone. Our treatments vary whether there exists a ban on displaying a Leaver/Remainer identity pin to others and whether Leavers or Remainers are the majority identity in the mixed groups. We find that banning pinning increases contributions to the mixed group when Leavers are the majority. These increases can be explained by changes in beliefs rather than the notion that shared group identity per se affects behavior. These setting- and identity-specific results suggest that policies designed to promote integration should be examined in the context in which they will be applied.

1. Introduction

Recent public and corporate policies restricting social identity expression presume that prominent signals of our social identity differences drive division.¹ One example of this is the French “Law of 2010-1192: Act prohibiting concealment of the face in public space” which makes it illegal to wear face-covering headgear in public places (except under specified circumstances), though other

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¹ Social identity is a person's sense of self derived from perceived membership in social groups (Chen and Li, 2009). There is a large literature on social identity in both social psychology and economics. For foundational papers, see Tajfel et al. (1979) and Akerlof and Kranton (2000). For more recent survey papers, see Li (2020), Shayo (2020), and Charness and Chen (2020).

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clothing signaling religious identity is not affected.² Although several motivations are given for these types of policies (e.g., ensuring security, preserving secularism, fighting sexism, and supporting community), the justifications and public discussions often focus on improving minority and majority population interactions by reducing conspicuous expressions of identity (Bowen, 2007; Erlanger, 2011).³ For example, the European Court of Human Rights upheld the French law and accepted the argument of the French government that the law was based on “a certain idea of living together” (see also McCrea, 2013).⁴ What is interesting about these examples is that justifications for the restrictions suggest that by suppressing particular forms of expression, greater integration is possible even when inference about the social identity is unaffected. Because of the rising role of identity and increased identity-based polarization in political and civic life, it is of great importance to understand how policies that seek to regulate its expression could reduce or exacerbate division.

Social identity theory predicts that a limit on identity expression could positively or negatively affect how groups interact.⁵ If limiting identity displays diminishes the strength of attachment to one’s identity, as some restriction justifications claim, then it is possible that decreasing the strength of attachment could increase or decrease out-group tolerance depending on the identity-dependent norms.⁶ To see why, note that models such as those proposed by Tajfel et al. (1979) or Akerlof and Kranton (2000) emphasize the importance of identity-based norms by assuming direct utility from compliance with these norms. Thus, the effect of diminished attachment would depend on whether the identity-based norms prescribe out-group tolerance or antagonism (Maio et al., 2009; Pechar and Kranton, 2017; Harris et al., 2015). The empirical papers provide evidence for both out-group tolerance and antagonism norms. While there is a large body of evidence that under many different conditions people treat their in-group preferentially at the expense of outsiders (Tajfel et al., 1979; Goette et al., 2006; Charness et al., 2024; McLeish and Oxoby, 2011; Chen and Li, 2009), it is not clear whether this behavior is best explained by a norm to do so. For example, Harris et al. (2015) investigate whether in-group favoritism is considered a norm and find mixed results. On the one hand, their subjects stated support for treating different groups equally but, on the other hand, observed behavior evidenced no agreement on whether or not in-group favoritism was a norm (see also Barr et al., 2018). Tanaka and Camerer (2016) work with subjects who are from a majority group (Vietnamese) and from a minority group (Khmer or Chinese); they play a dictator game and are paired such that all combinations of in- and out-group pairings are represented. They find that the Vietnamese did not exhibit disfavoritism toward the Khmer but did towards the Chinese.⁷

Alternatively, if limiting identity displays alters beliefs by reducing (or increasing) anticipated discrimination, then limiting signaling could improve (worsen) inter-group behavior. However, as Chen and Li (2009) and later Ockenfels and Werner (2014) note, social identity theories are “silent” on the role of beliefs. The empirical literature however, suggests that limiting does adversely affect beliefs. Abdelgadir and Fouka (2020) test whether exposure to the French law limiting facial coverings is associated with greater integration in the French context. They use individual-level data from the French Labor Force Survey, the French census, and a representative survey of immigrants and immigrant-descendants in France and find that exposure to the face-covering restriction reduced socioeconomic integration and increased beliefs about likely discrimination. Experimental studies in other contexts find a similar result: while there may be no actual differences in behavior, identity signaling can also increase anticipated discrimination (Aksoy et al., 2023; Ockenfels and Werner, 2014; Habyarimana et al., 2007).

In this paper, we use an experiment to test whether a restriction on identity signaling affects cooperation in public goods provision. Our subjects are U.K. residents who indicated in a pre-survey whether they were in favor of leaving or remaining in the European Union (i.e. whether they are Leavers or Remainers).⁸ Following a design used by Falk et al. (2013), the same subject is simultaneously in two different yet economically identical environments that are distinguished only by the social identities of the

² We note that several policies in the U.S. limit expression but simultaneously limit knowing about the social identity. For example, the U.S. policy on military service by gay men, bisexuals, and lesbians (known as “don’t ask, don’t tell”) prohibited any homosexual or bisexual person from disclosing, or speaking about, their sexual orientation while serving in the United States armed forces. Other examples include the so-called “bathroom bills” in the U.S. which would require people to use bathrooms that correspond to the sex listed on their birth certificates. Our study looks instead at whether restricting or allowing individuals to increase the salience of their known identity affects behavior. In our study the conditions that limit expression do not affect knowledge of the social identities of those interacting. In this way, our study maps to the “acting white” phenomenon described by Fryer Jr. and Torelli (2010) and Austen-Smith and Fryer (2003). That is, the students described in Austen-Smith and Fryer (2003) have visible racial identities (e.g., black, white) which are known to everyone interacting with them. However, through actions, they can choose to signal their ability type to the outside labor market and to their peer group.

³ Since 2010, many countries have followed suit including Austria, France, Belgium, Denmark, Bulgaria, the Netherlands, Germany, Italy, Spain etc. Currently, about a third of European countries have some type of restrictions though they vary with respect to the form of veiling and where it is prohibited.

⁴ In the Austrian case, political parties on the left and right formed a coalition in 2017 and warned of the dangers of “parallel societies”.

⁵ Carvalho (2013) posits that in environments where multiple identity groups co-exist, limiting identity signaling could reduce integration among majority and minority groups. His model uses identity signaling as a costly commitment device that “psychologically” restricts choice.

⁶ Benjamin et al. (2010) discuss a different mechanism, salience, by which environmental cues could briefly increase norm compliance. The intuition for this mechanism is that environmental cues called “primes” temporarily increase identity salience which then results in a momentary (to use the authors’ phrase) “tilt” towards the norms associated with the salient identity. In our setting, this would suggest that limiting expression could lower salience because environmental cues are absent. However, if the restriction operates to heighten salience then it is not clear which way the policy would affect behavior.

⁷ One can think of punishment as an indirect measure of norms. The “punishment literature” also shows a mixed pattern. Some studies document in-group favoritism (Mussweiler and Ockenfels, 2013) and a greater willingness to punish the outgroup (Winter and Zhang, 2018); yet others show greater punishment of the in-group (Li, 2020); and others show no difference in punishment (Weng and Carlsson, 2015). Further, as Ockenfels and Werner (2014) conclude, at least some in-group favoritism is belief-dependent (see also Restrepo-Plaza and Fatas, 2022).

⁸ These two identities were chosen because they are strong, salient identities and because there is no history of restriction or otherwise regulating display of these identities in a public space. There is also a great deal of polarization between these two groups. While the U.K. voted to leave the European Union in a 52%–48% vote in 2016, opinions on whether the U.K. was right to leave were still quite polarized between June 2020 - January 2021 where YouGov polling on the question “Wrong to Leave” garnered between 45% and 51% (YouGov, 2023).

group members. The in-group consists of three subjects who share the same political identity (e.g., Leaver player #1 plays a public goods game with two other Leavers) and the mixed-group consists of three subjects who do not share the same political identity (e.g., Leaver player #1 plays with two Remainers). The political identities of all subjects and the structure of each group are known by everyone. Each subject has one endowment from which they can decide to contribute to both public goods in a one-shot game.⁹ Our treatments vary whether there exists a ban on displaying a pin to others that expresses their political identity as a Leaver or a Remainer, and whether Leavers or Remainers are the majority identity in the mixed group.¹⁰ Thus, the ban on a display of the pin acts to limit identity expression.

We find partial support for the hypothesis that the restriction increases contributions to the mixed group which can be explained by changes in beliefs; the evidence shows heterogeneous effects that are social identity specific. When Leavers are the majority group, restricting identity expression increases contributions to the mixed group while not affecting contributions to the in-group (that is, they keep less for themselves and give more to the mixed group). We find support for the hypothesis that the restriction affects beliefs about others' contributions; when Leavers are the majority group, restricting identity expression leads to more optimistic beliefs about how much others in their mixed-group will contribute. Consistent with prior findings by [Ockenfels and Werner \(2014\)](#) and [Aksoy et al. \(2023\)](#), the treatment effects we observe on the amount contributed to the mixed-group public good when Leavers are the majority identity can be explained by a change in beliefs and not differences in identity-specific norms (measured separately) or with choosing to pin or with observing how many others pin.

Our main contribution is to provide a causal test of a social identity signaling restriction on behavior. In our design, subjects know the social identities of the others and we only vary whether they can also display a pin. Thus, we isolate the effect of identity expression and find that it is possible that restricting identity expression can increase cooperation. However, our results should be considered carefully as they are tightly connected to the particular context (game, number of players, etc.), the specific identities, and the one-shot setting. Given the wider adoption of face-covering restrictions in Europe and policy instruments in the U.S. that seek to regulate identity expression, it is clear that assessing their impact will continue to be a critical area of research.

We also contribute to a growing literature on social identity and individual beliefs. In most social identity models, beliefs are "captured" in the identity-dependent norms while individual beliefs are largely not yet part of this literature.¹¹ Our separately elicited identity-dependent norms did not vary by identity or majority-minority status. Thus, we were able to isolate the important role that beliefs play in social-identity driven choice. We tentatively offer a response to a question posed by [Charness and Chen \(2020\)](#) who write, "...if a salient identity such as a stereotype is interfering with desired social policies, can one usefully introduce information to people to teach them to overcome or ignore this stereotype?" Our study offers one possible answer to this question: the intervention might best be targeted at beliefs about the out-groups' likely actions.

2. Experimental design

We run two types of sessions: behavior and norms. In all cases, our subjects are U.K. residents who indicated in a pre-survey that they were in favor of leaving or remaining in the European Union (i.e. whether they were Leavers or Remainers).

2.1. Behavior sessions

Subjects in the behavior sessions are first asked the extent to which they feel attached to their Leaver or Remainer identity. They are then informed that they will play a one-shot game, and are provided instructions about that game. They are also told that the tokens which they earn from the game will be exchanged for money. The conversion rate is 1 token = £0.085.

There are nine subjects in each session. In half of the sessions, there are three Leavers and six Remainers (*Remainer Majority*, or *RMajor*), while in the other half, there are three Remainers and six Leavers in each session (*Leaver Majority*, or *LMajor*). [Fig. 1](#) shows the group compositions in both the *RMajor* and *LMajor* treatments. All subjects simultaneously play a game with two different groups: their ingroup, defined by their row in [Fig. 1](#), which comprises only in-group members, and their mixed group, defined by their column in [Fig. 1](#), that contains members with different identities.¹² In the *RMajor* (*LMajor*) group compositions, Remainers (Leavers) are in the majority and Leavers (Remainers) are in the minority in every mixed group. Subjects are told the political identities of all subjects and each group's political composition.

⁹ This experimental setup relates to the papers on multi-level public goods games (e.g. [Blackwell and McKee, 2003](#); [Wang et al., 2011](#); [Güth and Sääksvuori, 2012](#); [Catola et al., 2023](#)). In these games, agents divide their money between themselves, a local public good, and a global public good. In our games, subjects divide money between themselves and two local public goods.

¹⁰ The pinning mechanism is similar to that used in a field experiment by [Kessler \(2017\)](#). Subjects in some treatments were given physical pins which displayed "I support *Charity*". In [Drouvelis and Grosskopf \(2021\)](#), subjects are given the opportunity to send a smiling label or smiling emoji to their match in a public goods game. The label/emoji is hard to interpret, but could be viewed as signaling the subject's intention to cooperate. While [Kessler \(2017\)](#) uses pins that directly reference the public good, and [Drouvelis and Grosskopf \(2021\)](#) use emojis that smile, our pins instead indicate a social identity.

¹¹ In [Bénabou and Tirole \(2011\)](#), the model focuses on the management of beliefs about oneself and the actions taken to manage those beliefs. Here, we are not referring to beliefs about one's moral type.

¹² There are several experimental studies on behavioral spillovers, where subjects play multiple games simultaneously. For example, [Bednar et al. \(2012\)](#) where they play several 2×2 games; [Cason et al. \(2012\)](#) where they play median and minimum effort coordination games; [Savikhin and Sheremeta \(2012\)](#) where there they play a contest and a public goods game; [Engl et al. \(2021\)](#) where they play two public goods games with enforced cooperation in one. In these papers researchers study how decisions in the two games affect each other. Most commonly, it is found that the spillover occurs in one direction, but not the other. [Bednar et al. \(2012\)](#) develop the concept of "entropy" to explain their results.

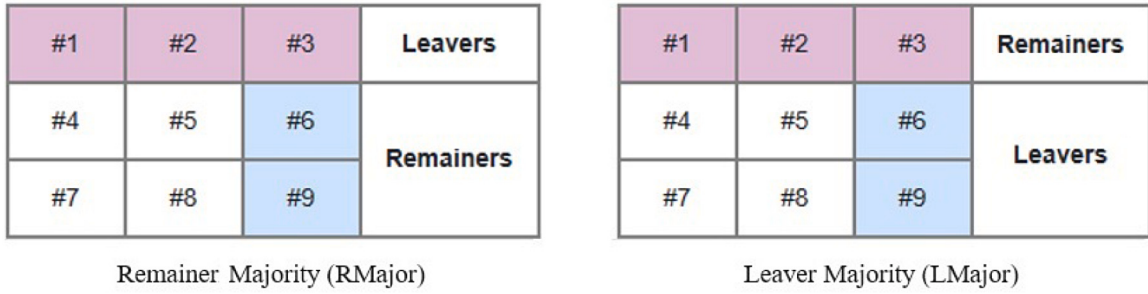


Fig. 1. Group matching in the public goods games. Each row is an “ingroup” and each column is a “mixed group”. For example, subject #3 in the left panel is in an ingroup of other Leavers (subjects #1, #2, and #3) and in a mixed group with two Remainers (subjects #3, #6, and #9)

After groups are formed, subjects play the public goods games for one round.¹³ Subjects start with an endowment of 20 tokens and must split that endowment between themselves, their ingroup, and their mixed group.¹⁴

The payoffs in the public goods game are as follows. Suppose that Subject i contributes x_i^g tokens to their in-group public good and x_i^m tokens to their mixed-group public good. The other two in-group members contribute $x_{j_1}^g$ and $x_{j_2}^g$ tokens to their in-group public good, and the other two mixed-group members contribute $x_{k_1}^m$ and $x_{k_2}^m$ tokens to their mixed-group public good. Subject i 's payoff π_i in this round can be expressed as:

$$\pi_i = (20 - x_i^g - x_i^m) + 0.6(x_i^g + x_{j_1}^g + x_{j_2}^g) + 0.6(x_i^m + x_{k_1}^m + x_{k_2}^m)$$

In both public goods games, because the marginal per capita return (MPCR) is less than 1, full free riding is the unique equilibrium in material payoffs. Thus, deviations from that equilibrium will be indicative that other social payoffs are at play. Since the MPCR in each case is above $1/n = 1/3$, social welfare is maximized when all subjects contribute all of their endowment to the in-group or mixed-group public good.¹⁵

In addition, subjects are asked whether they would like the opportunity to display a pin consistent with their identity; the pin is a small icon next to their ID number. In the *NoBan* treatment, if they decide to pin, the pin will be visible to the other in-group and mixed-group members as shown in Fig. 2(a). However, in the *Ban* treatment, after they make their decision to pin or not, it is announced that pin displays are banned. The pin display is replaced with the word “BANNED” for all subjects, as seen in Fig. 2(b).

We also elicit subjects' beliefs by asking them to predict the total number of tokens the other members of their in-group and mixed-group will contribute to the in-group and mixed-group public goods, respectively. Subjects receive a reward of 2 tokens for each prediction that is within 2 tokens of the actual contribution by their in-group or mixed-group members. We perform this elicitation twice. The first belief elicitation, “beliefs before”, occurs after subjects decide whether or not to pin but before subjects are notified about whether the pin display is banned. The second belief elicitation, of “beliefs after”, occurs immediately after all subjects submit their decisions for the public goods game. For the elicitation of “beliefs after”, subjects will have had different experiences. In the *NoBan* treatment, they will have seen the pin displays of other subjects and their own pinning choice will have been observed by others. Subjects in the *Ban* treatment, on the other hand, will not have seen the pin displays. The experiment concludes with an unincentivized set of demographic and beliefs questions.¹⁶ Table 1 summarizes the experimental procedure.

2.2. Norms sessions

We follow the (Krupka and Weber, 2013) norm elicitation protocol to obtain an empirical estimate of norms for the public goods games we study. This protocol entails eliciting norms from *different* subjects than those who played the games in the behavior sessions. We shall call them “rater subjects”. The method relies on coordination games to generate an empirical proxy for the norm. Subjects play a “pure matching” coordination game on whether an action is socially appropriate or inappropriate; the incentives of the game reward them for matching their appropriateness ratings to those provided by other respondents. Krupka and Weber (2013) show that norms act as focal points in these coordination games and aggregated responses can be used to empirically estimate norms (see also Kölle and Quercia, 2021; Kimbrough and Vostroknutov, 2016, who use this protocol to elicit norms in public goods

¹³ See Ledyard (1994), Fischbacher et al. (2001), Andreoni and Croson (2008). The public goods game is frequently used in economics to study patterns of interpersonal exchanges and social interactions (e.g. pro-sociality and altruism). For a recent publication that introduces the public goods game in more detail, see pp. 49–80 of Drouvelis (2021).

¹⁴ This design was first introduced by Falk et al. (2013), except that subjects in their experiment had two separate endowments for the two public goods games. In our design, in which subjects have one endowment for both public goods games, subjects reveal which group “attracts” them more by their contribution choices. See Charness et al. (2014) and Chen (2017) for experiments where subjects join one of multiple groups before playing with that group.

¹⁵ We use the same MPCR for both games, 0.6, since this aligns with the closest prior work in this area (Falk et al., 2013). In addition, Isaac et al. (1984) and Holt and Laury (2008) note that for small group sizes, contributions change by a large amount for different MPCRs and van den Berg et al. (2020) find that once the MPCR goes above roughly 0.7, the standard deviation in contributions increases even when the average does not change much.

¹⁶ The full instructions are included in Appendix B.

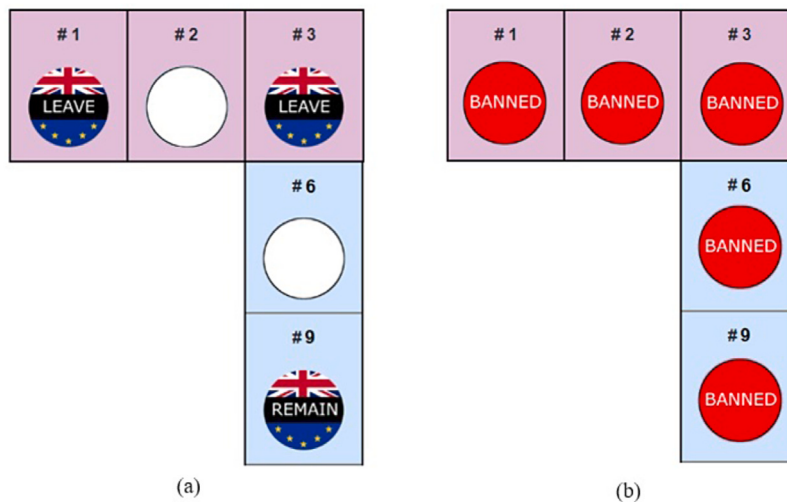


Fig. 2. Pin display seen by subject #3 in *Ban* and *NoBan* treatment. Panel (a) shows what subjects saw in the *NoBan* treatment if, for example, subjects #1, #3 and #9 chose to **Pin** while subjects #2 and #6 chose to **Not Pin**; Panel (b) shows what subjects saw in the *Ban* treatment.

Table 1
Experiment procedures for the behavior sessions (between subjects design)

Stage	Procedure	<i>NoBan</i>	<i>Ban</i>
1	Experiment instructions	✓	✓
2	Pinning decision	✓	✓
3	"Beliefs before" elicitation	✓	✓
4	Pins display banned		✓
5	Public goods games	✓	✓
6	"Beliefs after" elicitation	✓	✓
7	Other unincentivized questions + demographics	✓	✓
8	Game result report	✓	✓

games). We now describe the norm sessions; all rater subjects referred to in this description did not participate in the behavior sessions.

There are four treatments in the norms sessions: *NormLMinor*, *NormLMajor*, *NormRMinor* and *NormRMajor*. Only Leavers rate actions in *NormLMinor* and *NormLMajor* while only Remainers rate actions in *NormRMinor* and *NormRMajor*. If a rater subject is a Leaver, then they will be randomized to read and rate one of two situations: *NormLMinor* or *NormLMajor*. In the *NormLMinor* situation, the rater subject is thinking about how to rate the actions of a Leaver who is in the minority in their mixed group (that is, they are reading about the situation faced by others in the *RMajor* treatment). In the *NormLMajor* situation, the rater subject is thinking about how to rate the actions of a Leaver who is in the majority in their mixed group (that is, they are reading about the situation faced by others in the *LMajor* treatment). Similarly, if a rater subject is a Remainder, then they will either be in the *NormRMinor* or *NormRMajor* treatment reading and thinking about how to rate the actions of a Remainder.

Subjects in all treatments are asked to coordinate their ratings of appropriateness for 31 different allocation decisions that could have been made in the public goods game they are reading about. They are incentivized to coordinate their ratings with other rater subjects who *share* their social identity and are also reading about that situation (e.g., in the *NormLMajor* treatment, Leaver rater subjects coordinate with other Leaver rater subjects). There are 6 possible appropriateness ratings for each action: Very socially appropriate, socially appropriate, somewhat socially appropriate, somewhat socially inappropriate, socially inappropriate and very socially inappropriate.¹⁷ Subjects are paid £1 if their appropriateness rating for a randomly drawn action matches the modal rating for that action in the same treatment.¹⁸

¹⁷ Some examples of these 31 allocation decisions are a perfectly selfish decision (20 tokens kept for oneself and 0 tokens to the in-group or mixed-group public goods), a purely in-group-favoring decision (0 tokens kept for oneself or allocated to the mixed-group public good and 20 tokens allocated to the in-group public good), and a purely mixed-group-favoring decision (0 tokens kept for oneself or allocated to the in-group public good and 20 tokens allocated to the mixed-group public good). Note that this is a subset of the total number of possible actions that can be taken by the subjects in the behavior sessions (there are 231 possible actions). This is to prevent subjects in the norms sessions from having to rate too many actions during the experiment. See Section 3 for the actions used in this exercise.

¹⁸ For example, a Leaver is paid if their norm rating for the action matches the modal rating among the other Leavers in the treatment.

Table 2
Number of subjects by treatment.

	Behavior		Norms			
	Ban	NoBan	Norm-LMinor	Norm-LMajor	Norm-RMinor	Norm-RMajor
Leavers	55	52	50	49	–	–
Remainers	57	53	–	–	48	52
Total	112	105	50	49	48	52

2.3. Experiment procedures

The subjects are all from the U.K. and have voluntarily signed up to be in the Prolific subject pool. Prolific is an online subject recruitment system, similar to Amazon Mechanical Turk, where the largest category of subjects reside within the U.K. (43%). Subjects are grouped based on whether they support the withdrawal of the U.K. from the European Union (Leavers or Remainers).

Subjects first fill out a survey in which we ask whether they are Leavers, Remainers, Neither, or they preferred not to state an affiliation. From these responders, we invited Leavers and Remainers to the behavioral and norms sessions. From this, we have 217 subjects in the behavioral sessions and 199 subjects in the norms sessions.¹⁹ The average total payment is £5.54 for the behavior sessions (including a £3 show-up fee) and £1.83 for the norms sessions (including a £1.5 show-up fee). Table 2 summarizes the number of subjects in the experiment.

3. Results

3.1. Behavior: The effect of a ban on public goods contributions

We begin by examining whether behavior is affected by banning pinning or by the identity of the majority group. We expect banning pinning to affect behavior; however, the direction of the effect is unclear *ex ante*. For this reason, we motivate two competing hypotheses related to how banning will affect contributions to the public good.

Hypothesis 1a. Banning pinning leads to an increase in contributions to the in-group public good and a decrease in contributions to the mixed-group public good.

Hypothesis 1a can be motivated from several different literatures (though each posits a different mechanism). In a social identity based model proposed by Carvalho (2013), pinning acts as a commitment device which reduces agents' temptation to undertake behavior that is prohibited by their identity. In using the commitment device, agents are then more free to interact with other social groups, which would otherwise have increased those temptations. Thus, banning pinning would cause agents with different social identities to interact less; in our setting this would reduce contributions to the mixed-group. The hypothesis can also be motivated from prior empirical results obtained from research on the French face-covering law. McCrea (2013) and Abdelgadir and Fouka (2020) find that bans cause members of the affected groups to anticipate discrimination. If bans increase anticipated discrimination, then in our setting this would predict decreased contributions to the mixed group.

Hypothesis 1b. Banning pinning leads to a decrease in contributions to the in-group public good and an increase in contributions to the mixed-group public good.

Alternatively, Hypothesis 1b is motivated by studies showing that attachment to identities can affect behavior, increasing cooperation with the in-group and decreasing cooperation with the out-group (e.g. Eckel and Grossman, 2005; Chen and Li, 2009; Chen and Chen, 2011). If banning pinning causes a decrease in attachment to the social identity, then it is possible that this could cause an increase in contributions to the mixed-group (depending on the identity-dependent norms). Benjamin et al. (2010) suggest a different mechanism, salience, that pinning could also affect. If banning lowers salience (because environmental cues are absent), then this could cause subjects to contribute less to the in-group and/or shift contributions to the mixed-group.

We test these hypotheses by running OLS regressions of the number of tokens contributed to each public good on the treatments. These regressions are displayed in Table 3. This gives us the following results:

Result 1 (Effect of Banning on Contributions). When Leavers are the majority group, banning pinning increases contributions to the mixed-group public good while not affecting contributions to the ingroup public good. When Remainers are the majority group, banning pinning has no effect on contributions. This result is partial support for Hypothesis 1b.

Support: Table 3 shows that in the mixed-group public good regression, when Leavers are the majority identity, subjects in the Ban treatment give significantly more to their mixed-group public good than those in the NoBan treatment ("Ban" = 1.13, $p = 0.02$).

¹⁹ We drop 8 subjects who timed out during the experiment (these 8 timeouts are in 8 different sessions).

Table 3
OLS regressions of public goods contributions on treatment.

	Give In-Group	Give Mixed-Group
Ban	−0.27 (0.75)	1.13** (0.49)
RMajor	−0.37 (0.75)	0.45 (0.44)
Ban*RMajor	0.34 (1.01)	−0.96 (0.69)
Constant	6.62*** (0.56)	3.38*** (0.28)
<u>Linear Combinations</u>		
Ban + Ban*RMajor	0.07 (0.69)	0.17 (0.48)
RMajor + Ban*RMajor	−0.03 (0.69)	−0.52 (0.53)
Observations	217	217

Notes: Robust standard errors in parentheses. Significant at the 1% (***), 5% (**), or 10% (*) levels.

When Remainers are the majority identity, this difference is not significant at the 10% level (“Ban + Ban*RMajor” = 0.17, $p = 0.73$). By contrast, in the in-group public good regression, subjects do not show a significant change in behavior when identity expression is banned, regardless of the majority identity (Leaver Majority: “Ban” = −0.27, $p = 0.72$; Remainder Majority: “Ban + Ban*RMajor” = 0.07, $p = 0.92$).

We can also check whether this result is different depending on whether the Leaver or Remainder social identity is in the majority in the mixed group.

Result 2 (Effect of Majority on Contributions). *The identity of the majority group does not affect contributions to the public goods.*

Support: Table 3 shows that behavior does not differ significantly based on the identity of the majority group. This is true for both the contributions to the in-group public good (No Ban: “RMajor” = −0.37, $p = 0.62$; Ban: “RMajor + Ban*RMajor” = −0.03, $p = 0.97$) and to the mixed-group public good (No Ban: “RMajor” = 0.45, $p = 0.31$; Ban: “RMajor + Ban*RMajor” = −0.52, $p = 0.33$).

These results show that banning pinning can increase contributions to the mixed-public good. Subjects increased their contributions to the mixed-group public good by 33% when Leavers were the majority identity. These results are consistent with Hypothesis 1b and inconsistent with 1a. When we run the same OLS regressions on Leaver and Remainder subjects separately (Appendix Table A.1), we find that neither identity shows an effect significant at the 5% level by itself. Rather, both identities contribute to the overall effect.

Next, we examine the possible causes of the increase in contributions to the mixed-group public good due to the banning of pin displays.

3.2. Beliefs: The effect of a ban on beliefs

We elicit beliefs about what subjects think others will contribute to the public goods before and after the ban on pinning is announced. We first check whether the “before” and “after” beliefs differ by treatment. While we do not expect “beliefs before” to differ between the Ban and NoBan (since the two treatments are identical up to that point), beliefs could differ after the pin displays are or are not banned. As described earlier, McCrea (2013) and Abdelgadir and Fouka (2020) show that people anticipate more discrimination after the ban is implemented,²⁰ which gives us the following hypothesis:

Hypothesis 2. The implemented ban causes subjects to believe that others will contribute less to the mixed group.

We test this hypothesis in Table 4, which shows OLS regressions of beliefs on treatments. As expected, there is no treatment difference between “beliefs before” by treatment. There are differences in “beliefs after” between treatments, giving us the following result:

Result 3 (Effect of Banning on “Beliefs After”). *When Leavers are the majority group, banning pinning increases the amounts that subjects believe people in their mixed-group will contribute while not affecting their beliefs about their in-group. When Remainers are the majority group, banning pinning has no effect on beliefs. This result does not support Hypothesis 2.*

Support: Table 4 shows that in the mixed-group regression when Leavers are the majority identity, subjects in the Ban treatment believe the others in the mixed group will give significantly more to the public good than those in the NoBan treatment (“Ban” = 5.06, $p = 0.007$). When Remainers are the majority identity, this difference is not significant at the 10% level (“Ban + Ban*RMajor” = 1.72,

²⁰ See also the related work and findings in Aksoy et al. (2023), Ockenfels and Werner (2014), Habyarimana et al. (2007).

Table 4
OLS regressions of beliefs on treatment.

	Beliefs Before		Beliefs After	
	In-Group	Mixed-Group	In-Group	Mixed-Group
Ban	0.46 (1.84)	2.12 (1.97)	1.92 (1.92)	5.06*** (1.85)
RMajor	-1.90 (1.65)	-1.44 (1.68)	-1.44 (1.74)	0.16 (1.55)
Ban*RMajor	1.07 (2.54)	-1.36 (2.53)	-0.31 (2.54)	-3.34 (2.49)
Constant	18.50*** (1.20)	13.52*** (1.30)	16.31*** (1.33)	10.37*** (1.09)
<u>Linear Combinations</u>				
Ban + Ban*RMajor	1.53 (1.75)	0.76 (1.59)	1.62 (1.67)	1.72 (1.66)
RMajor + Ban*RMajor	-0.83 (1.93)	-2.80 (1.90)	-1.75 (1.86)	-3.17 (1.94)
Observations	217	217	217	217

Table 5
OLS regressions of contribution behavior on beliefs.

	Give In-Group	Give Mixed-Group
Ban	-0.56 (0.69)	0.61 (0.48)
RMajor	-0.13 (0.72)	0.41 (0.41)
Ban*RMajor	0.37 (0.94)	-0.61 (0.65)
BeliefsAfterIn	0.17*** (0.05)	-0.01 (0.02)
BeliefsAfterMixed	-0.01 (0.05)	0.11*** (0.02)
Constant	3.95*** (0.61)	2.47*** (0.37)
<u>Linear Combinations</u>		
Ban + Ban*RMajor	-0.19 (0.64)	0.00 (0.44)
RMajor + Ban*RMajor	0.24 (0.58)	-0.20 (0.49)
Observations	217	217

$p = 0.30$). In the in-group public good regression, subjects do not have significantly different “beliefs after” the identity pinning is banned, regardless of the majority identity (Leaver Majority: “Ban” = 1.92, $p = 0.32$; Remainer Majority: “Ban + Ban*RMajor” = 1.62, $p = 0.33$).

Result 4 (Majority Identity and “Beliefs After”). *The identity of the majority group does not affect beliefs.*

Support: Table 4 shows beliefs after the treatment do not differ significantly based on the identity of the majority group. This is true for both the contributions to the in-group public good (No Ban: “RMajor” = -1.44, $p = 0.41$; Ban: “RMajor + Ban*RMajor” = -1.75, $p = 0.35$) and to the mixed-group public good (No Ban: “RMajor” = 0.16, $p = 0.92$; Ban: “RMajor + Ban*RMajor” = -3.17, $p = 0.104$).

These results show that beliefs seem to be affected in the same way as contributions. This goes against Hypothesis 2. In the Discussion section we explore one possible explanation for this result.

3.3. Beliefs: Can beliefs explain contributions?

We next examine whether the change in beliefs can account for the difference in contributions between treatments. We therefore run the original regression of behavior on treatments, accounting for beliefs after the treatment, as shown in Table 5. This gives us the following result:

Result 5 (Beliefs Explain Treatment Effect). *The treatment effect observed in the amount contributed to the mixed-group public good when Leavers are the majority identity can be explained by a difference in beliefs about what members of the mixed group will do.*

Table 6
OLS regressions of contribution behavior on pinning (col. 1 & 2) and on observed pins (col. 3 & 4)

	Ban and NoBan		NoBan Only	
	Give In-Group	Give Mixed-Group	Give In-group	Give Mixed-group
Ban	-0.27 (0.75)	1.15** (0.49)		
RMajor	-0.37 (0.75)	0.48 (0.43)	-0.36 (0.78)	0.46 (0.44)
Ban*RMajor	0.34 (1.02)	-0.97 (0.69)		
Pin	-0.03 (0.52)	-0.33 (0.34)		
# Pins displayed by In-group			0.45 (0.65)	-0.13 (0.35)
# Pins displayed by Mixed-group			-0.44 (0.49)	-0.03 (0.31)
Constant	6.62*** (0.58)	3.49*** (0.32)	6.60*** (0.67)	3.49*** (0.40)
<u>Linear Combinations</u>				
Ban + Ban*RMajor	0.07 (0.69)	0.18 (0.48)		
RMajor + Ban*RMajor	-0.03 (0.68)	-0.50 (0.54)		
Observations	217	217	105	105

Support: When we did not control for beliefs, “Ban” had a significant and positive effect on contributions to the mixed group public good (Table 3 Column 2, “Ban” = 1.13, $p = 0.02$). When we include beliefs in the regression, “Ban” is no longer significant (“Ban” = 0.61, $p = 0.20$), while “BeliefsAfterMixed”, the beliefs about what the others in the mixed group will do, is significant (“BeliefsAfterMixed” = 0.11, $p < 0.0001$).²¹

This result indicates that the banning treatment significantly affects beliefs about the mixed group when Leavers are the majority identity. When pin displays are banned, beliefs about others’ contributions to the mixed-group increase. These beliefs in turn affect contributions to the mixed-group public good, with more contributions occurring when subject believe that others in the mixed group will contribute more.

3.4. Pinning: The effect of a ban on pinning

We next examine how the decision to pin is affected by the treatments. We first check that there are no differences in the decision to pin by treatment, as the treatments are identical up to the point where subjects make these decisions. Table A.3 displays regressions of pinning on the treatments, both overall and by identity, showing that pinning is not significantly different between treatments.

3.5. Pinning: Can pinning explain contributions?

While pinning behavior is not affected by the treatments, it could explain contribution behavior. We run the regressions displayed in Columns 1 and 2 of Table 6 to examine this. In addition, we check if the number of displayed pins that subjects observed in the “NoBan” treatment affected their contributions. Regressions to test this are displayed in Columns 3 and 4 of Table 6. These regressions lead to the following result:

Result 6 (Pinning or Observed Pins Do Not Explain Behavior). *Subjects’ own pinning choices do not explain behavior differences observed in contributions to the public goods. When pinning displays are shown to subjects, the number of pins they observe from others also does not affect contributions.*

Support: Accounting for pinning does not show any significant effect of pinning on the amount contributed to the mixed-group public good (Table 6 Column 2, “Pin” = 0.33, $p = 0.34$), and the effect of banning remains significant at the 5% level (Table 6 Column 2, “Ban” = 1.15, $p = 0.02$). The number of pins displayed by either the ingroup or the mixed group also has no significant effect on contributions to either the in-group public good (Table 6 Column 3, in-group pins: 0.45, $p = 0.49$; mixed-group pins: -0.44, $p = 0.37$) or the mixed-group public good (Table 6 Column 4, in-group pins: -0.13, $p = 0.71$; mixed-group pins: -0.03, $p = 0.91$).

²¹ In mediation analysis, this shows *full mediation*. See Baron and Kenny (1986), Carpena and Zia (2020), and Celli (2022) for details.

Table 7
Multiple-Hypothesis-Testing (MHT) adjusted tests of treatment differences between norms.

Action Give to (In-Group, Mixed-Group)	(Avg. in RMajor) - (Avg. in LMajor)	MHT-adjusted <i>p</i>
(0,0)	-0.44	0.626
(4,0)	-0.17	0.988
(2,2)	-0.13	0.996
(0,4)	-0.22	0.878
(8,0)	-0.05	1.000
(6,2)	-0.08	0.999
(4,4)	-0.21	0.919
(2,6)	0.09	0.999
(0,8)	-0.03	1.000
(10,0)	0.21	0.968
(8,2)	0.17	0.963
(5,5)	-0.03	1.000
(2,8)	0.09	0.996
(0,10)	-0.01	1.000
(12,0)	0.12	0.999
(9,3)	0.17	0.978
(6,6)	0.06	0.999
(3,9)	0.39	0.365
(0,12)	0.30	0.790
(16,0)	0.30	0.877
(12,4)	0.21	0.961
(8,8)	0.03	1.000
(4,12)	0.40	0.482
(0,16)	0.26	0.923
(20,0)	0.28	0.961
(16,4)	0.11	0.999
(12,8)	0.14	0.996
(10,10)	0.22	0.981
(8,12)	0.40	0.512
(4,16)	0.17	0.991
(0,20)	0.20	0.978

3.6. Norms: Do norms for contributions vary by social identity?

Kölle and Quercia (2021) and Kimbrough and Vostroknutov (2016) use the Krupka and Weber (2013) norm elicitation task to identify norms for a one-shot 2-person public goods game. Subjects rate the appropriateness of making various contributions to the public good in the situation where they do not yet know what the other person has contributed. They find that subjects view high(er) contributions to the public good as (more) socially appropriate but they also find evidence that suggests people place importance on the equal split. Thus, we might first inspect whether the norms we elicit evidence a similar pattern.

We find that our norms data do show a similar pattern with respect to the equal split which we can show graphically. For this purpose, we first take the average of all norm ratings we elicited (displayed in Fig. 3(a)), and then interpolate the norm ratings that we did not elicit in the experiment (displayed in Fig. 3(b)). We can see in both visualizations that the most appropriate action is to keep 10 tokens for oneself and to divide the remaining 10 tokens equally between the in- and mixed-group. Appropriateness does not increase linearly for either public good, but rather peaks at the equal split of the 10 tokens between each public good.

Social identity models such as those proposed by Tajfel et al. (1979) or Akerlof and Kranton (2000) emphasize the importance of identity-based norms which may proscribe out-group tolerance or antagonism (Maio et al., 2009; Pechar and Kranton, 2017; Harris et al., 2015). While prior work consistently shows that people treat their ingroup preferentially at the expense of outsiders (Tajfel et al., 1979; Goette et al., 2006; Charness et al., 2024; McLeish and Oxoby, 2011; Chen and Li, 2009), it is not clear whether this behavior is best explained by a norm to do so. In fact, as noted in the introduction, several papers suggest that, if anything, there is a norm for equal division regardless of majority/minority or in/out-group status (Harris et al., 2015; Barr et al., 2018; Tanaka and Camerer, 2016). A separate study also suggests that it might not matter if the rater subject is a stakeholder or not (Erkut and Reuben, 2019).

Thus, in order for identity-based norms to affect contribution decisions, they must differ by identity. We test whether norms for how to divide the endowment between oneself, the ingroup and the mixed group might differ depending on whether the treatment is *RMajor* or *LMajor*. Based on the prior empirical papers, we hypothesize that norms will not differ by whether the rater subject is a Leaver or Remainer reading about a situation where someone who shares their social identity is in the minority or majority in the mixed-group. Formally, we have the following hypothesis:

Hypothesis 3. There will be no difference in norms ratings for the *RMajor* and the *LMajor* decision contexts.

Following a similar approach to Kimbrough et al. (2024) and Chang et al. (2019), we compare the norm ratings given by subjects in our norm experiment by treatment. The results of these tests are displayed in Table 7. These give us the following result:

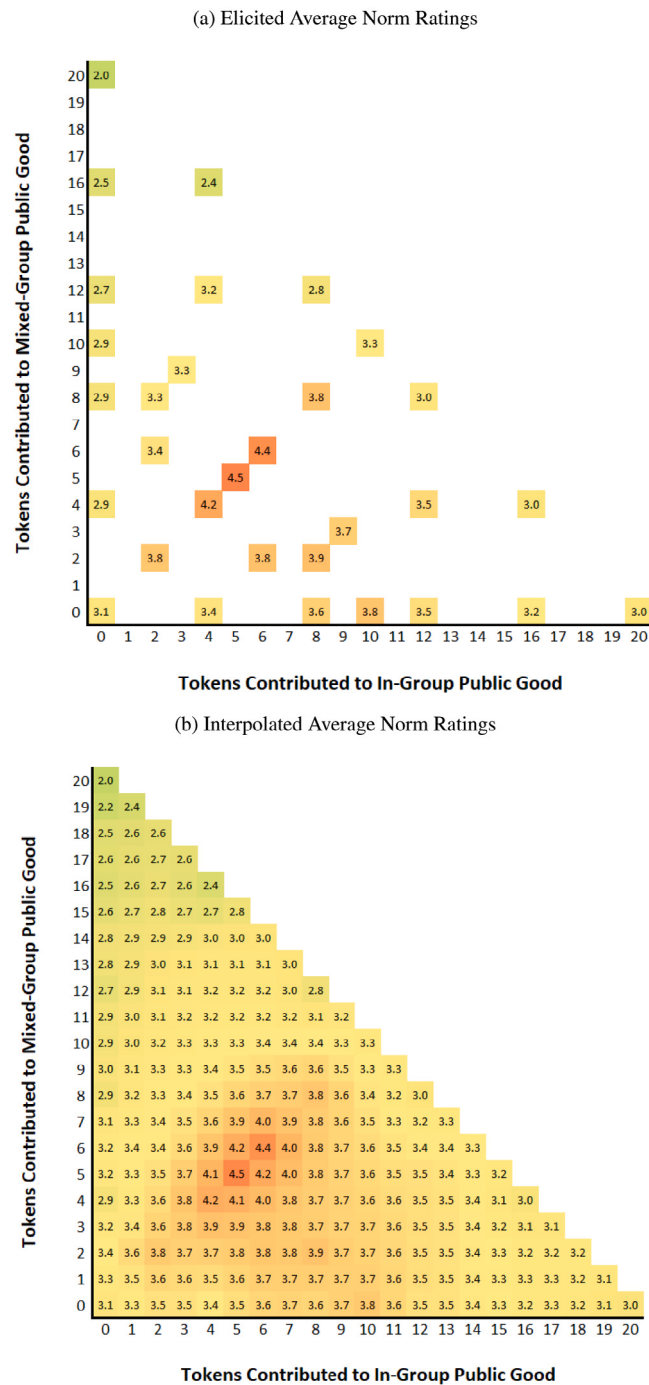


Fig. 3. Average Norm Ratings.

Note: Top panel: Averages of elicited appropriateness ratings have scores which range from 1=Very inappropriate to 6=Very appropriate. Bottom panel: Interpolated appropriateness ratings.

Result 7 (Effect of Treatment on Norms). Norms do not differ by the identity of the majority group. This is consistent with [Hypothesis 3](#).

Support: [Table 7](#) shows that when we run many regressions of the different norm ratings on the identity of the majority group, and adjust the p -values for multiple hypothesis testing ([Westfall and Young, 1993](#)), none of the comparisons are significant at the 10% level. The lowest p -value is 0.37.

The results are the same if we restrict our attention to either identity, as shown in Appendix Table A.4. This is also consistent with Hypothesis 3, indicating that norms are not affected by whether a group is in the majority or the minority. Thus, while social identity models center the role that identity-dependent norms play in affecting behavior, we do not find that these norms differ. Our results reject that in our context differences in identity-dependent norms would explain contribution differences.

4. Discussion

Social identity theory predicts that a restriction on identity signaling could positively or negatively affect how groups interact. Our results find partial support for the hypothesis that a restriction increases contributions to the mixed group which can be explained by changes in beliefs. However, our results should be interpreted conservatively within the particular context we study: the particular identities, the game and number of players interacting, and the one-shot setting.

It is, for example, possible that our findings that restrictions can, in some cases, lead to more contributions to the mixed-group may be importantly connected to the particular identities that we study. Recall that we reported in Table 4 that beliefs elicited after the banning of pin displays was imposed did not differ significantly based on the identity of the majority group. In Appendix Table A.2 we report on an additional regression which indicates that this finding is primarily caused by differences in beliefs among Leavers when they are in the majority. Yet, the empirical work done by Abdelgadir and Fouka (2020) shows that Muslim women anticipated more discrimination after exposure to the French law restricting face-coverings. In the setting studied by Abdelgadir and Fouka (2020), these groups were the *minority* while our findings are driven by perceptions among those who are in the *majority*. Thus, it is possible that a restriction on identity signaling can cut both ways: Members of a minority group may become more pessimistic while members of a majority group may become more optimistic.

Further, the one-shot nature of our setting may have important consequences for what conclusions we can draw. Our decision to use a one-shot setting was motivated by the numerous complexities associated with inference when we allow for multiple rounds of play.²² However, there is an important long-run argument for allowing expression of identity that comes from the majority group having exposure to minorities.²³ While our results suggest that there can be short-run positives to restrictions, there is little we can say about the long-run effects (though (Abdelgadir and Fouka, 2020) find long-run negative effects).

5. Conclusion

There has been a concerted effort in many places to limit an individual's ability to express their social identity. A key motivation for these restrictions is to encourage greater social integration and to reduce polarization due to identity. In this study we test this hypothesis in one setting where subjects play public goods games with both an ingroup comprising individuals who are members of their identity, and with a mixed group consisting of both members of their identity and members of another identity.

We find evidence that restricting identity expression (through the use of a pin display) increases contributions to the mixed group from both Leavers and Remainers. This increase in contributions to the mixed group also does not significantly affect contributions to the ingroup, but is rather drawn mainly from the amount they were keeping for themselves. The evidence shows that the change in beliefs when pinning is banned accounts for the difference in contributions between the two treatments.

Given the wider adoption of face-covering restrictions in Europe and policy instruments in the U.S. that seek to regulate identity expression, it is clear that assessing their impact will continue to be a critical area of research. What our result offers to this complex conversation is that the effect of a restriction is likely highly context and social identity specific and that conclusions about the efficacy of a policy designed to minimize polarization or to increase integration or cooperation needs to be assessed and studied in its context.

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Appendix A. Additional analyses

See Tables A.1–A.4.

Appendix B. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.euroecorev.2024.104847>.

²² Indeed, our initial data collection and design had multiple rounds of play but, as referees noted, this has drawbacks for interpretation. For example, in *NoBan* subjects see other members' choices to display their identities in each round and may thus learn who is a pinner and who is not. However, this may have the unintended consequence of making identity signaling either irrelevant or causing the signal to take on additional/different meaning in subsequent rounds.

²³ We thank a referee for pointing this out and urging us to consider this limitation of our findings.

Table A.1

OLS regression of public goods contributions on treatment, by identity.

	Leavers		Remainers	
	Give In-Group	Give Mixed-Group	Give In-Group	Give Mixed-Group
Ban	0.31 (0.99)	1.14* (0.59)	-1.47 (1.03)	1.12 (0.89)
RMajor	-0.61 (0.98)	0.10 (0.68)	-0.74 (0.95)	0.68 (0.67)
Ban*RMajor	-0.77 (1.32)	-0.52 (0.98)	1.82 (1.38)	-1.16 (1.08)
Constant	6.31*** (0.76)	3.43*** (0.34)	7.24*** (0.67)	3.29*** (0.53)
<u>Linear Combinations</u>				
Ban + Ban*RMajor	-0.46 (0.87)	0.62 (0.78)	0.35 (0.92)	-0.05 (0.62)
RMajor + Ban*RMajor	-1.38 (0.89)	-0.42 (0.71)	1.09 (1.00)	-0.49 (0.85)
Observations	107	107	110	110

Notes: Robust standard errors in parentheses. Significant at the 1% (***), 5% (**), or 10% (*) levels.

Table A.2

OLS regression of beliefs on treatment, by identity.

	Leavers			
	Beliefs Before		Beliefs After	
	In-Group	Mixed-Group	In-Group	Mixed-Group
Ban	2.31 (2.23)	3.89 (2.44)	4.80** (2.32)	7.40*** (2.28)
RMajor	-0.99 (2.50)	-0.61 (2.48)	-1.17 (2.54)	-0.81 (2.31)
Ban*RMajor	-3.22 (3.74)	-3.61 (3.68)	-4.19 (3.71)	-3.96 (3.64)
Constant	17.34*** (1.50)	13.43*** (1.68)	15.11*** (1.67)	10.51*** (1.41)
<u>Linear Combinations</u>				
Ban + Ban*RMajor	-0.90 (3.01)	0.28 (2.76)	0.61 (2.89)	3.44 (2.83)
RMajor + Ban*RMajor	-4.21 (2.78)	-4.21 (2.72)	-5.36** (2.70)	-4.76* (2.81)
Observations	107	107	107	107
	Remainers			
	Beliefs Before		Beliefs After	
	In-Group	Mixed-Group	In-Group	Mixed-Group
Ban	-3.35 (3.25)	-1.53 (3.28)	-4.00 (3.27)	0.24 (2.86)
RMajor	-4.16* (2.35)	-1.98 (2.44)	-3.46 (2.55)	0.86 (2.20)
Ban*RMajor	6.11 (3.89)	2.51 (3.83)	6.14 (3.85)	0.65 (3.53)
Constant	20.89*** (1.89)	13.71*** (2.06)	18.76*** (2.15)	10.06*** (1.70)
<u>Linear Combinations</u>				
Ban + Ban*RMajor	2.75 (2.15)	0.98 (1.98)	2.14 (2.04)	0.88 (2.07)
RMajor + Ban*RMajor	1.95 (3.10)	0.52 (2.95)	2.69 (2.89)	1.51 (2.76)
Observations	110	110	110	110

Table A.3
OLS regressions of pinning on treatment.

	All Pin	Leavers Pin	Remainers Pin
Ban	0.06 (0.09)	−0.03 (0.12)	0.24 (0.16)
RemMaj	0.09 (0.09)	0.10 (0.15)	0.15 (0.13)
Ban*RemMaj	−0.02 (0.13)	−0.09 (0.20)	−0.12 (0.20)
Constant	0.33*** (0.07)	0.37*** (0.08)	0.24** (0.10)
<u>Linear Combinations</u>			
Ban + Ban*RemMaj	0.03 (0.09)	−0.12 (0.16)	0.11 (0.12)
RemMaj + Ban*RemMaj	0.07 (0.09)	0.01 (0.14)	0.03 (0.15)
Observations	217	107	110

Note: In the *Ban* condition, subjects still had the option of selecting to pin but then were notified that the pin was banned in 9 out of 10 rounds (they were banned for 1 out of 10 rounds in the *NoBan*).

Table A.4
Multiple-Hypothesis-Test (MHT) adjusted tests of treatment differences between norms, by identity.

Action Give to (In-Group, Mixed-Group)	Leaver (Avg. in Rmajor) - (Avg. in Lmajor)	MHT-adjusted <i>p</i>	Remainer (Avg. in Rmajor) - (Avg. in Lmajor)	MHT-adjusted <i>p</i>
(0,0)	−0.02	1.000	−0.84	0.310
(4,0)	−0.07	1.000	−0.27	1.000
(2,2)	−0.02	0.988	−0.24	1.000
(0,4)	−0.24	1.000	−0.19	1.000
(8,0)	−0.11	1.000	0.01	1.000
(6,2)	−0.08	0.940	−0.09	1.000
(4,4)	−0.29	1.000	−0.13	1.000
(2,6)	−0.01	1.000	0.19	1.000
(0,8)	−0.02	1.000	−0.05	1.000
(10,0)	0.15	0.976	0.27	1.000
(8,2)	0.27	1.000	0.07	1.000
(5,5)	0.05	1.000	−0.11	1.000
(2,8)	0.13	1.000	0.05	1.000
(0,10)	−0.08	1.000	0.05	1.000
(12,0)	−0.11	1.000	0.34	0.994
(9,3)	0.01	1.000	0.32	0.986
(6,6)	−0.13	0.882	0.25	1.000
(3,9)	0.36	1.000	0.42	0.932
(0,12)	0.23	1.000	0.37	0.979
(16,0)	0.10	0.940	0.50	0.958
(12,4)	0.33	1.000	0.10	1.000
(8,8)	−0.04	1.000	0.10	1.000
(4,12)	0.22	1.000	0.59	0.662
(0,16)	−0.01	1.000	0.52	0.741
(20,0)	0.22	1.000	0.34	1.000
(16,4)	0.14	1.000	0.08	1.000
(12,8)	0.14	1.000	0.14	1.000
(10,10)	0.01	0.993	0.43	0.974
(8,12)	0.28	1.000	0.52	0.842
(4,16)	0.09	1.000	0.25	1.000
(0,20)	0.14	0.000	0.27	1.000

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