Reducing opinion polarization: Effects of exposure to similar people with differing political views

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In a large-scale, preregistered experiment on informal political communication, we algorithmically matched participants, varying two dimensions: 1) the degree of incidental similarity on nonpolitical features; and 2) their stance agreement on a contentious political topic. Matched participants were first shown a computer-generated social media profile of their match highlighting all the shared nonpolitical features; then, they read a short, personal, but argumentative, essay written by their match about the reduction of inequality via redistribution of wealth by the government. We show that support for redistribution increased and polarization decreased for participants with both mild and strong views, regardless of their political leaning. We further show that feeling close to the match is associated with an 86% increase in the probability of assimilation of political views. Our analysis also uncovers an asymmetry: Interacting with someone with opposite views greatly reduced feelings of closeness; however, interacting with someone with consistent views only moderately increased them. By extending previous work about the effects of incidental similarity and shared identity on affect into the domain of political opinion change, our results bear real-world implications for the (re)-design of social media platforms. Because many people prefer to keep politics outside of their social networks, encouraging cross-cutting political communication based on nonpolitical commonalities is a potential solution for fostering consensus on potentially divisive and partisan topics.

online experiment | incidental similarities | polarization | inequality | social influence

Political theorists have long believed that informal political discussions among peers play an important role in sustaining democracy (1). Civil and respectful exchanges on controversial topics between individuals with diverse points of view are thought to increase trust in democracy, as well as improve understanding of self and others (2–5). Unfortunately, the presumed benefits of political exchanges are limited by the observation that Americans tend to shy away from political discussions in general (6, 7), especially when they anticipate conflict (8, 9). Moreover, when people are exposed to the political opinions of strangers "in the wild," as they are on social media platforms, discussions often degrade into incivility, thereby increasing polarization rather than reducing it (10).

One potential solution to these problems is inspired by recent work on "incidental" political discussions among individuals who are already friends (11). According to the incidental model, friendship networks arise mostly out of some combination of shared social contexts (e.g., school, work, or church) (12) and mutual friendships (13), neither of which are explicitly political in nature. Conversations in these networks are therefore mostly apolitical, but occasionally stray into politics in an incidental manner. Because friendship networks exhibit greater diversity of political views than is apparent even to their members (14, 15), these incidental conversations have the effect of exposing interlocutors to diverse viewpoints. And because they take place between individuals who have other (i.e., nonpolitical) reasons to like, respect, and trust one another, incidental conversations may survive the tension of disagreement better than political conversations that are entered into by strangers and may be more likely to lead to opinion change.

Although promising for reducing polarization, a significant limitation of incidental political discussions is that friendship networks, even while more heterogeneous with respect to political views than people expect (14, 15), still tend to be homogeneous relative to the general population (11). Incidental discussions between friends are therefore unlikely to expose interlocutors to large differences in opinion and hence are limited in how much change they can effect. A second limitation is that by their nature, incidental conversations are initiated in an ad hoc manner and therefore are not well suited to targeted interventions seeking to generate opinion change with respect to particular topics or among particular populations.

In this paper, we build on the idea that incidental similarities between interlocutors can reduce opinion polarization in a large-scale, preregistered experiment in which participants read essays written by other participants who varied in similarity along two dimensions (Fig. 1). First, participants differed with respect to their attitudes about a "focal," political issue: governmental

Significance

Informal political discussions with peers can increase trust in democracy and improve understanding of self and others. However, these benefits do not often materialize because people tend to shy away from political discussions and because friendship networks rarely expose highly divergent political views. In a large-scale experiment, we overcome these limitations by matching participants to peers selected for sharing common interests and demographics and exposing them to a personal message about a divisive political topic: wealth redistribution. As a result, support for redistributive policies increased and polarization decreased. Furthermore, feeling close to a peer greatly increased the assimilation of a political message. Our results suggest that incidental similarities may cold-start cross-cutting political arguments and increase consensus on divisive topics.

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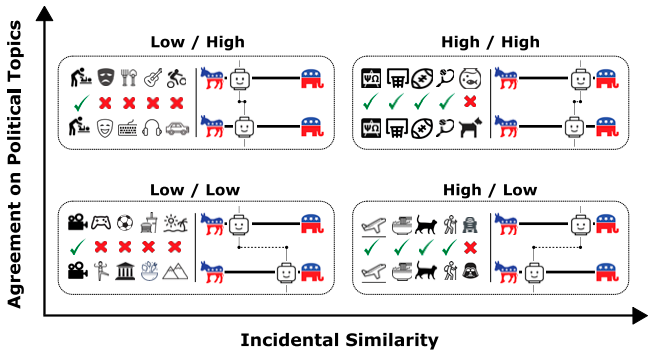

Fig. 1. Conceptual illustration of the matching procedure. Our 2 × 2 experimental design assigned a partner to each participant by systematically varying two dimensions: 1) the degree of incidental similarity over a large set of nonpolitical features, and 2) their agreement on a political issue (i.e., inequality reduction via government redistribution).

redistribution of wealth. Second, they differed on a number of demographic and biographical features, such as age, gender, hometown, university, sports teams, personal interests, and idiosyncratic quirks. By systematically matching people in order to create variation in similarity with respect to personal traits, our experiment captures a key mechanism underlying the efficacy of incidental conversations, namely, that conversations occur between individuals who share experiences, preferences, and attributes that are unrelated to politics. However, the treatment we investigate goes beyond incidental conversations between friends in two respects: first, by exposing people to the views of strangers, and second, by choosing the conversation topic for them. In this way, we can examine if similarity of personal background (e.g., coming from the same city or supporting the same football team) leads to subjective feelings of closeness and, if so, whether these feelings lead to openness to differing viewpoints and ultimately to opinion change. In addition, systematically varying the similarity of viewpoints allows us to sidestep a limitation of incidental conversations and measure the differential and potentially asymmetric effects of disagreement as well as agreement. Do matches who disagree by a wide margin update their stances more than matches who are in close agreement, or the reverse? And does one side of the issue update more than the other when matched with an opposite- or similar-stance partner?

Our hypothesis that sharing biographical characteristics with a stranger should engender feelings of closeness and that these feelings, in turn, could facilitate agreement on some contentious political issue is supported by two related, but distinct, theoretical traditions. First, a long line of research dating back to Heider (16) has examined the effects of incidental similarities on affect and, in turn, behavior. Attitudinal similarity has been found to produce large increases in attraction, as well as higher evaluations of intelligence and morality (17). Sharing biographical features, such as a birthday or letters of one's name, has been found to increase compliance with a request (18), to increase motivation on some achievement-oriented tasks, such as solving a math problem (19), or to improve group performance (20). And sharing idiosyncratic interests (e.g., favorite book, band, or food) has been found to lead to shared emotional stress (21), increased interest in an out-group's culture (22), and greater trust in negotiations (23).

A second line of work dating back to Allport et al. (24) has examined the effects of positive intergroup contact on prejudice and affective polarization. For example, the Common Ingroup Identity Model (25) contends that cooperative interactions between out-group members leads to recategorization as members of a larger, more inclusive in-group, which, in turn, can reduce out-group prejudice. Although our design does not induce actual contact between individuals, recent work has found that similar effects can be generated through imagined contact or via priming with unifying themes. For example, asking survey respondents to imagine having positive or cooperative interaction with a member of the other party reduces affective polarization (26–28). Alternatively, reminding survey respondents of their common identity as Americans has been found to increase liking across partisan lines (29), where a similar effect was also observed in the immediate temporal vicinity of external events, such as US Independence Day and the Beijing Olympics, that arouse feelings of national identity.

Although this work offers general theoretical motivation for our hypothesis, our contribution builds upon previous studies in some important respects. First, whereas prior studies on incidental similarity have generally studied the effect of sharing a single characteristic or some fixed number of characteristics, here, we construct a numerical similarity score from a large basket of demographic and biographical items and then systematically vary the level of pairwise similarity along a range. Second, whereas in prior work, differences in political orientation were fixed, here, we vary them also, allowing us to measure the interaction between focal and nonfocal (dis)similarity on opinion change. Third, whereas in previous work, the manipulation was generally artificial (e.g., imagined contact, confederates, etc.), in our case, all people are real, and all the information is truthful and accurate. Fourth, whereas prior work on polarization has focused on affect directly, here, we are interested in changes in opinion with regard to some focal political issue. Finally, in addition to studying the effect of incidental similarity on perceived closeness and opinion change, we also study the converse effect, namely, that of exposure to similar or opposing views on perceptions of closeness.

Focal Issue: Reducing Inequality

The specific context for our study is motivated by a persistent puzzle in the literature on inequality. On the one hand, decades of surveys and experiments have found that Americans across all demographic groups, including political conservatives and the wealthy, consistently report a preference for a more equal distribution of wealth (30, 31). On the other hand, over the same time period, Americans have remained consistently divided on the role of government interventions like increasing taxes on the wealthy or increasing the minimum wage. Liberals and the poorer members of society are generally in favor of such measures, while conservatives and the wealthy generally oppose them (32, 33). In part, these (largely) partisan differences in opinion may be attributed to systematic underestimation of existing levels of inequality (34–36); in part, they may be attributed to differences in beliefs about individual opportunity and intergenerational social mobility (34, 37); and in part, they can be attributed to differing levels of trust in government in general (32). If one believes that inequality is not as bad as it actually is, say, then one might feel less strongly that anything needs to be done about it. Alternatively, if one believes that everyone has ample opportunity to improve their standing, then high levels of inequality might be tolerable or even desirable. And if one believes that government-led interventions are generally ineffective or counterproductive, then one might oppose redistribution programs, even if one believes inequality is higher than it should be.

Regardless of the specific explanation, a similar challenge arises for proredistribution advocates—namely, how to persuade someone who is currently opposed to redistribution to rethink their position and hopefully moderate it. Here, the evidence from prior work is not encouraging: Attempts to change policy preferences by providing respondents with corrective information tend

to have little effect and may even increase disagreement. For example, Kuziemko et al. (32) found that while exposure to information about inequality increased respondents' perceptions of inequality as a problem, it had little effect on their policy preferences (with the estate tax being the one exception). Subsequently, Alesina et al. (38) found that providing pessimistic information about social mobility increased support for redistribution among liberal respondents, but it had no effect on conservatives, thereby effectively increasing polarization. Moreover, similar results have also been observed for other politically polarized topics. For example, Sunstein et al. (39) found that when conservatives were presented with information that suggested climate change would be less severe than existing models predict, they updated their opinions in that direction, but were not influenced by information suggesting that the effects would be more severe. Liberals did no better and also updated in the direction of their prior beliefs. Similarly, Nyhan and Reifler (40) found that adding corrections to mock news articles that contained misleading claims about political figures failed to reduce misperceptions among ideological opposites and could even increase them. Finally, Bail et al. (41) found that exposing Twitter users to bots espousing opposite-side ideology increased polarization rather than decreasing it.

A sobering conclusion follows from these results: When experimenters present both conservatives and liberals with novel information about a controversial topic, polarization may not decrease and can even increase. We wondered if the cause of this backfiring might be participants exhibiting reactance (42) to the fact that the novel information is coming from professional authors or the experimenters themselves. What if the information presented to participants was instead generated by actual peers, whose profiles feature veridical biographical information? In this respect, our design resembles a prior study of moral rhetoric, in which either liberals or conservatives wrote similar-length essays intended to persuade a member of the other side to change their views about a controversial topic, such as same-sex marriage (43). Whereas this work focused on how interlocutors constructed arguments, ours focuses on the effect of these arguments on the readers. Finally, our work also has similarities to recent work on exposure to opposing views on Twitter (41); however, our approach differs by using peer essays instead of short tweets rebroadcast from various opposition accounts (i.e., elected officials, opinion leaders, media organizations, and nonprofit groups) and content written with the intent of persuading others.

Our results complement prior findings on reducing the polarization of opinions with respect to controversial political topics in three ways. First, we found that peer-generated arguments had an overall tendency to shift readers' views toward those of the writers, regardless of their initial differences, but that proredistribution arguments had larger effects than antiredistribution arguments. The result was an overall increase in support for redistribution and a lessening of opinion polarization. Second, we found that similarity on nonfocal attributes predicted subjective feelings of closeness between people. These feelings, in turn, were associated with larger stance updates when people agreed compared to when they disagreed, also with proredistribution effects being larger. Third, we found that encounters between people with similar views increased feelings of closeness, while encounters between people with dissimilar views reduced them, with disagreement having larger effects than agreement. Together, these results help predict the nuanced ways that attitudes change when people listen to the political arguments of others.

Materials and Methods

The experiment was approved by the Microsoft Research Institutional Review Board (no. IRB430). Participants accepted the Microsoft Research consent form and agreed to participate in the study in exchange for a cash payment. The studies were preregistered at AsPredicted.org.* The text for the stance and closeness questions is reported in *SI Appendix*, section 1.A, and the full experimental protocol, including informed-consent procedures, is available in *SI Appendix*, section 1.C. Participants were recruited from Amazon Mechanical Turk (44–46), and the experiment was carried out by using the nodeGame experimental platform (47). The experiment consisted of two phases, illustrated in Fig. 2, which we now describe in detail.

Phase 1: Essay Generation. Phase 1 comprised four distinct steps. First, we conducted a survey of nonfocal attributes (Step 1). This survey consisted of 75 to 92 questions covering several topics, including demographics, finances, hobbies, and personality (some questions were optional, and others depended on previous answers). Example questions are: "If you dislike food in a restaurant, do you usually send it back?"; "Do you consider yourself a perfectionist?"; "Who is your favorite music artist?"; and "How many foreign countries have you visited?" (see *SI Appendix*, section 3.A for a complete list of questions). We used the answers to these questions to create profiles of each participant that would be shown to participants in Phase 2 and to create an index of nonfocal similarity.

Immediately after, we asked a set of 16 questions covering participants' political leaning and their perceptions of inequality in the United States (Step 2). Example questions here are: "Do you think inequality is a serious problem in America?"; "On a scale from 1 to 7, where 1 means 'not at all' and 7 means 'very closely,' how closely do you follow US politics?"; and "Which candidate did you support in the 2016 election?" (see *SI Appendix*, section 3.B for a complete list of questions). Answers to the questions in this step were not included in the similarity index; instead, we used them as a consistency check for stance and party affiliation, as well as a control in our regression analysis.

Next, we measured participants' stance on redistribution with a set of nine questions (Step 3). We first asked a general question adapted from the General Social Survey† eliciting how the respondent felt about government redistribution on a seven-point Likert scale. We then asked eight follow-up questions about reducing or increasing support for specific policies to fight socioeconomic inequalities, six of which were adapted from Kuziemko et al. (32); see *SI Appendix*, section 1.A for details. This step ended with an attention-confirmation check, aimed to raise attention and awareness for the part of the survey that came immediately after it (48); see *SI Appendix*, section 1.C.2 for details.

Finally, we asked participants to describe their views in their own words (Step 4). Specifically, we asked them:

> Imagine that you are talking to a friend about wealth redistribution by the government. Why is your view correct? Why should your friend believe you? Try to explain the costs and benefits of wealth redistribution on the whole of society and also how it might impact your life or the life of somebody you know.

We collected 166 essays between April 22, 2019, and August 8, 2019, and removed 8 that appeared to be copied from other online sources or were not coherent, leaving 158 valid essays. Phase 1 participants seem to have taken the essay-writing task seriously. The median number of words per essay was 273, and the median time to complete it was 11.5 min (see *SI Appendix*, section 1.C.3 and Fig. S5 for more details).

The median English level is "conversational," according to several readability measures; English quality does not vary significantly with the stance toward redistribution of the essay writer. Natural language processing analysis reveals that essays against redistribution tend to be slightly more negative in sentiment, although not consistently (full analysis is in *SI Appendix*, section 2).

We provide here a sample of three essays that roughly cover the whole opinion spectrum. We report in parentheses the numerical stance toward redistribution that we computed using their answers to the Step 3 of the survey (positive values mean in favor of redistribution; more details are in *SI Appendix*, section 1.A). To represent the participants faithfully, we did not correct any of the participants' typographical or grammatical errors here or in the experiment.

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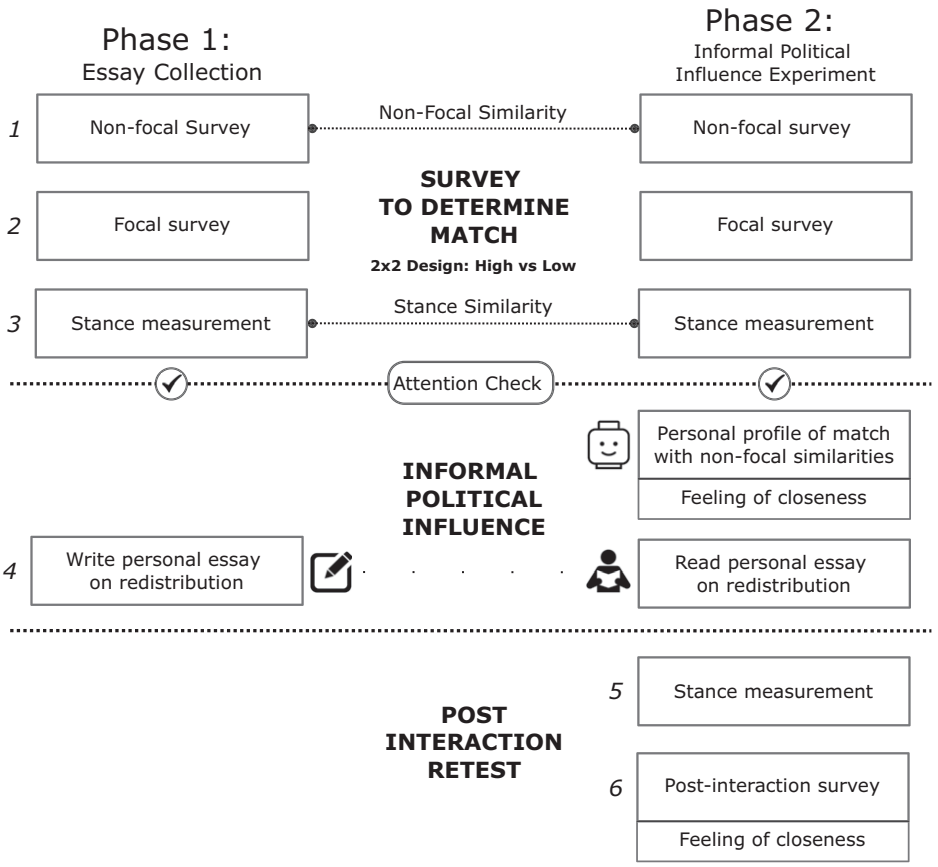

Fig. 2. Diagram illustrating the two-phased experimental flow. Phase 1 was completed entirely before starting Phase 2; by using Steps 1 and 3, we determined the best match available for Phase 2 participants; Step 2 is used for controls and for consistency checks; in both phases after Step 3, participants take one "attention check" question to increase their awareness in Step 4; Steps 5 and 6 retest the participant after the political interaction.

Essay 1. Self-identified Republican, classified as strongly against of redistribution (stance: –21 $\in [-27; +27]$):

> All forms of wealth redistribution and coercive in nature as the government is by definition a monopoly on the use of force within a certain geographic region. Many people tie themselves into knots to deny the basic reality that taxation is outright theft and any state-sponsored redistribution of wealth is nothing more than threatening people with violence if they don't forfeit their earned property.
>
> Wealth inequality will always exist as human beings have a wide variance in intelligence (strongly genetic), personality traits (also strongly genetic), personal preferences and many additional attributes. The state has predictably been cooped by large business interests who tend to erect protective barriers around their respective industries which make it difficult for new completion to emerge let alone compete. If we truly cares about unearned wreath inequality - we would remove these barriers to entry in business and let true competition occur - driving down prices and providing better goods/services in the process.
>
> It is in our nature as human beings to want as much as we can possibly get with as little expended effort as humanly possible. While those factors which drove our evolution brought us to the dance, the implementation of 'take from the productive and give to the unproductive' will and does destroy societies. The productive produce the goods, services and innovations which allow the standard of living to raise for everybody - and continually villainizing those who move society forward. Politicians and the unproductive who cater to them will always need a scapegoat to explain away the personal failures of the masses - and blaming those who have 'more' will always be one of their tactics.

Essay 2. Self-identified Republican, classified as mildly in favor of redistribution (stance: +4 $\in [-27; +27]$):

> Wealth redistribution would be a positive thing in society because it would allow individuals who dont have much to have more. Inequality is a concern, yet, if we were all equal what fun would that be. We would have nothing to dream about or wish for. Wealth redistribution would be nice to allow people whom are at the bottom to give rise for a better opportunity. However not precede to many others. But make it fair for those who cant get out from the bottom. People work hard for there money and to allow a tiny amount to be given to others to help them would be fair but not to rely to heavy on this as actual income. Because once they become comfortable to having that extra cash they become depended on it, which it shouldn't be like. It should be a small portion of individuals wealth to help others in need. And once they become successful or reach a certain amount of income than they should stop receiving payments and start giving into it. But again this should only be a small portion of individuals check. Cause to much would infirate people and they would not want to participate not let it pass. But this also has the potential to have a positive effect on individual knowing there money is helping homeless or less fortunate to get out from the bottom and make humanity equal to some assort. If this is something that happens it would only affect us a little bit, we would barely notice the change in our pay if the percent was very very low.

Essay 3. Self-identified Democrat, classified as strongly in favor of redistribution (stance: +27 $\in [-27; +27]$):

> The richest 1% of Americans own 40% of the wealth. That means the bottom 90% of people in the United States have 60% of the wealth. That's quite a stark difference.

When a body develops cancer, tumors grow out of control. In a healthy body, when a mass of cells start growing out of control, the body will attack it and destroy the tumor before it spreads. Cancer happens when that mass of cells is allowed to keep growing and growing, taking resources away from the healthy body. The same thing can be said for income equality in the United States. The 1% are that mass of cells that disproportionately keeps hording resources the rest of the country could be using.

Wealth redistribution through taxes or other means is a way of shrinking those tumors and providing those resources to the rest of the country. Relative to events in the past, such as the French Revolution, taxing the rich is a mild form of wealth distribution. I'm sure higher taxes would be much more preferable to the rich than a more surgical option.

Redistributing wealth would ensure that all citizens of the United States have the resources they need to lead happy, healthy, productive lives. When people are happy and healthy, they are more productive. When people are more productive, the economy improves which is better for everyone, the 99% and the 1%.

It is of great importance to the future of the country that no citizen is deprived of the resources they need to be successful.

Phase 2: Survey Experiment. In Phase 2 of the experiment, launched roughly 6 mo after Phase 1, participants completed the same Steps 1 to 3 (survey of nonfocal attributes, focal survey, and stance-measurement survey) as in Phase 1. Based on their responses, we computed two numeric similarity scores—one for agreement on the focal issue and one for nonfocal attributes—between each participant and every Phase 1 participant. We then randomly assigned to each participant a match with either high or low nonpolitical similarity and high or low agreement on the focal issue (see *SI Appendix*, section 1.C.5 for details of the matching protocol). Throughout the experiment, we maintained a strict no-deception policy: Both the essay and the profile with the common answers to the nonpolitical survey belonged to a real participant from Phase 1. The similarity index was computed in real time, comparing all possible matches in our database. To make sure our treatment was perceived as truthful, we highlighted our no-deception policy to the participants on several occasions.

In this phase, we replaced Step 4 of Phase 1 with the social influence treatment. Participants saw a profile page of their match highlighting all the common answers to the nonfocal survey (Step 1) and their similarity rank, along with a sentence explaining the meaning of the rank (see *SI Appendix*, section 1.C.6 for more details). After reviewing the nonpolitical profile of their match, respondents answered the following question: "On a scale from 1 to 7, where 1 means 'not connected at all' and 7 means 'very connected,' how much of a connection do you think you will feel with your match?" Respondents then read the essay written by their match on the topic of wealth redistribution by the government, which revealed the political views of their match.

After the political interaction, participants' stance was measured again (Step 5), repeating the same questions as in Step 3. Finally, a postinteraction survey took place (Step 6). Respondents answered a final set of four questions eliciting how respondents perceived their match. Precisely: 1) how close they felt to the match; 2) the perceived stance and 3) political leaning of the match; and 4) whether they believed their match was a real participant (i.e., believed our no-deception pledge); see *SI Appendix*, section 3.C for details.

Results

We collected 1,252 observations between February 3, 2020, and February 20, 2020, and removed 184 following our preregistered exclusion criteria, leaving 1,068 valid observations for our analysis. The respondents were, on average, slightly older, slightly Whiter, and slightly less wealthy than the US population, but were still very diverse, representing 48 states and the District of Columbia (see *SI Appendix*, section 1.D for details of the sample). Respondents revealed their views about redistribution by answering nine questions on a seven-point Likert scale (as per the workflow described in *Materials and Methods*). We centered their answers to a relative scale ranging from –3 (strongly against) to +3 (strongly in favor) and computed a respondent's "stance toward redistribution" as the sum of all these centered answers; thus, the resulting stance in support of redistribution ranged from –27 (strongly against) to +27 (strongly in favor). Reassuringly, all nine stance questions were strongly correlated with each other ($P < 0.001$; average correlation +0.64), and principal component analysis showed that the first component captured most of the variance (see *SI Appendix*, section 1.A.3 for details). Moreover, participants' answers in the focal survey were generally consistent with their political ideology (full analysis is in *SI Appendix*, section 1.B).

As shown in Fig. 3*A*, participants expressed a wide range of views with respect to the focal issue. Self-identified Democrats were overwhelmingly in support of redistribution, while self-identified Republicans were, on average, against it, but displayed more heterogeneity; independents were, on average, mildly in favor of redistribution, but their views were also heterogeneous. Consistent with previous findings (38), the majority of Republicans saw inequality as a small problem or not a problem at all, while the vast majority of Democrats saw it a serious or a very serious problem. Democrats and Republicans also disagreed starkly about the factors causing socioeconomic inequality in the United States, respectively, stressing the role of politics (e.g.,

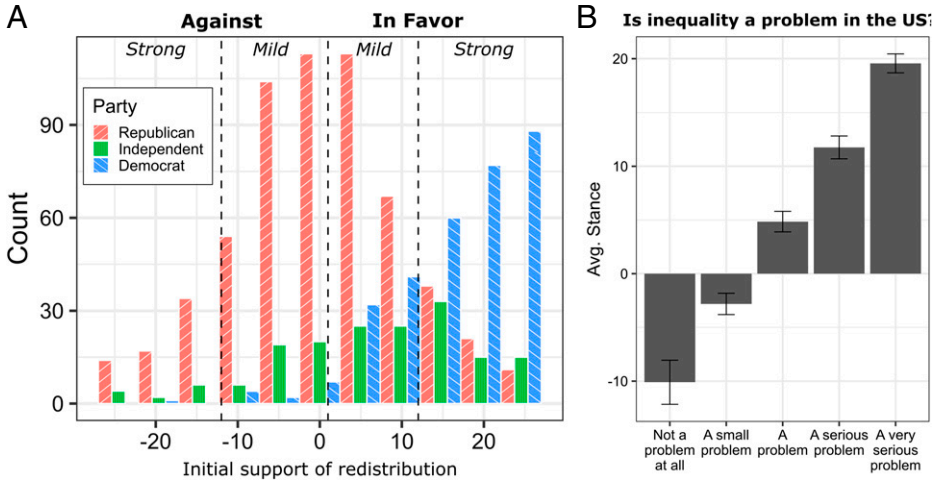

Fig. 3. Initial support of redistribution and associated concern for inequality. (*A*) Initial stance distribution by party. Black vertical lines show demarcation of stance categories (i.e., strongly against, mildly against, mildly in favor, or strongly in favor). (*B*) Average (avg.) stance associated with concern for inequality in the United States, as self-reported in the focal survey; higher stance levels correspond to higher concern for inequality. Error bars represent 95% CIs.

lobbying) vs. personal traits (e.g., work attitude). Overall, participants' level of concern for inequality in the United States (e.g., "Not a problem at all," "A very serious problem," etc.) was strongly associated with their attitudes toward redistribution (Fig. 3*B*). The high correlation across all individual stance (in support of redistribution) questions, and fact that all the answers in the focal survey portray a consistent picture across multiple questions is a confirmation that our process of selection worked as intended.

Informal Political Communication Increases Support for Redistribution and Reduces Opinion Polarization. Turning first to the overall effect of our manipulation, we found a small, but significant, increase in support of redistribution ($+0.47$, $T = 4.86$, $P < 0.001$). Because our design balanced same-stance and cross-stance interactions (i.e., participants were equally likely to read an essay by someone who agreed with them as disagreed with them), the observed shift in favor of redistribution implies that respondents updated their stances asymmetrically. As Fig. 4 shows, regardless of their initial stance (against or in favor), respondents matched with someone in favor of redistribution increased their support for redistribution much more than respondents matched with an opponent of redistribution decreased their support (positive-stance update values indicate someone becoming more in favor of redistribution after the treatment). Moreover, respondents who were matched with a partner in favor of redistribution increased their support in all stance questions and significantly so in eight out of nine of them (*SI Appendix*, Fig. S1). The only exception was the minimum wage policy, for which support was already relatively high. The results of the estate-tax question were also notable in that respondents from both sides of the political spectrum increased their support for this tax regardless of their match, in line with a previous study that also found greater sensitivity to this policy question (32).

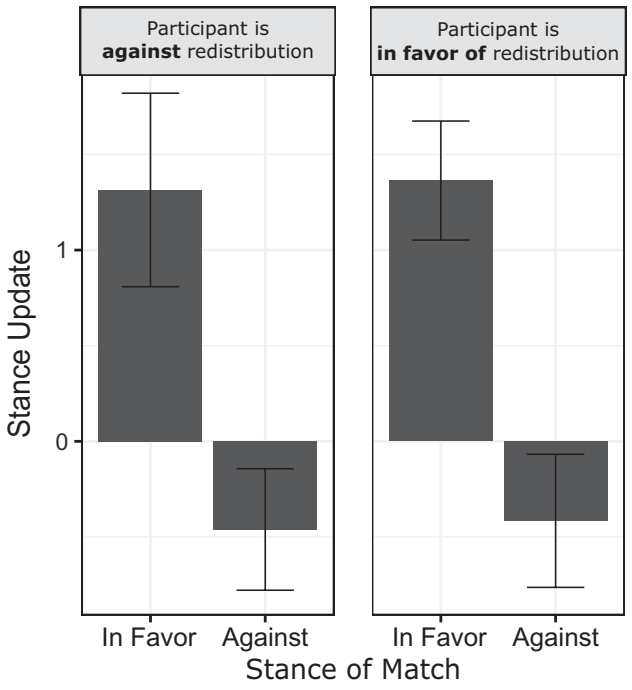

Fig. 4. Informal political communication increases support for redistribution. Participants update their stance conforming with the stance of their match: If the match is In Favor, support for redistribution increases (positive values), and vice versa it decreases (negative values). However, the update is asymmetric: if the match is In Favor, support for redistribution increases more than what it decreases if the match is Against. Error bars are 95% CIs.

What effect did this aggregate shift in participants' stances have on opinion polarization? Opposite-stance pairs who move toward each other's views will tend to reduce polarization, whereas same-stance pairs who reinforce each other's views will tend to increase it. Thus, polarization could either increase or decrease, depending on the relative size of the shifts for prodistribution and antiredistribution participants who were exposed to same-stance and different-stance matches. To answer this question, we conducted a difference-in-differences (DiD) analysis of the consensus gap G between individuals i and j holding stances s_i and s_j. Specifically, if $G^1 = s_i^1 - s_j^1$ is the consensus gap prior to interaction and $G^2 = s_i^2 - s_j^2$ is the corresponding consensus gap after, then the DiD preinteraction and postinteraction is $\mathrm{DiD}(s_{ij}) = G^2 - G^1$, where $\mathrm{DiD}(s_{ij}) < 0$ implies that polarization has decreased. Fig. 5*A* shows that overall matches slightly, but significantly, reduced polarization: On average, the consensus gap G^2 measured after the political interaction was smaller than it was before, where we note that the gap was reduced similarly for both proponents and opponents of redistribution.

Unpacking this result further, Fig. 5*B* shows that those with mild views reduced their consensus gap regardless of the stance of their match, while those with strong views became more extreme when matched with same-stance others, a finding that is consistent with previous research (49, 50). Surprisingly, however, we found that cross-stance interactions depolarized strong views of both supporters and opponents of redistribution alike. The contrast between strongly and weakly held views also sheds more light on the overall shift toward support for redistribution noted in Result 1. As shown in Fig. 5*C*, whereas participants with strong views updated their stances similarly, regardless of their initial position (i.e., they became more extreme when exposed to same-stance matches and more moderate when exposed to opposite-stance matches), those with mild views updated their stance asymmetrically in favor of redistribution. Those initially against redistribution reduced the stance difference more in cross-stance interactions than those in favor, and, reciprocally, those initially in favor performed a larger update in same-stance interactions (this is the only same-stance interaction that is polarization-reducing; see also *SI Appendix*, Fig. S10*B*). Finally, the interplay of view strength and match type seems to create a nonmonotonic effect for polarization reduction (Fig. 5*D*). When the stance of a participant was neither too close nor too far away from the stance of the match—i.e., in the interval $((15, 20))$—the reduction in polarization was largest. In this interval, there was a high proportion of cross-stance interactions (although not the highest) and a rather small share of same-stance interactions involving participants with strong views (although not the smallest). For a similar reason, the only bin in which polarization was increased—i.e., $[0, 5]$—was almost entirely composed of same-stance interactions (see *SI Appendix*, section 1.F for more details).

Increased Closeness Leads to Larger Stance Updates. Turning now to our focal questions, does incidental similarity engender feelings of closeness, and, if so, does feeling closer to others increase receptivity to their political views? In answer to the first question, we conducted a preregistered analysis of the relationship between similarity on the one hand and two measures of closeness: "expected closeness" (how close a participant felt toward their match before reading the essay) and "experienced closeness" (how close they felt after reading the essay). As shown in *SI Appendix*, Fig. S14*A*, the two measures are correlated with each other ($P < 0.0001$), but also differ substantially. The most likely reason for this difference is that expected closeness was based solely on the similarity information provided before reading the essay, whereas experienced closeness was also a product

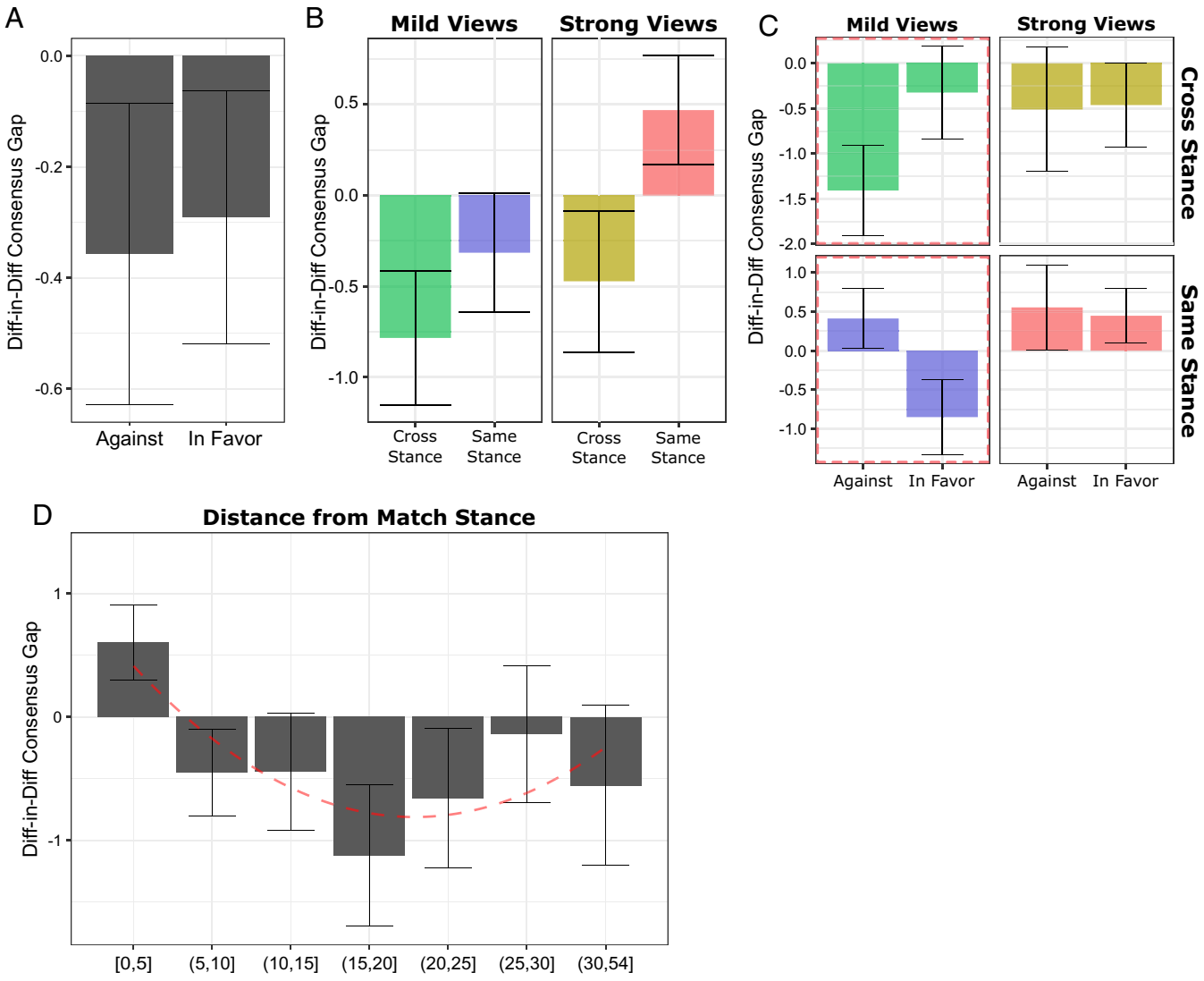

Fig. 5. Informal political communication reduces polarization. Shown is DiD analysis (diff-in-diff) for consensus gap, i.e., the distance between a participant's stance in support of redistribution and the match before and after the interaction. Negative values indicate polarization reduction: The distance after the interaction is smaller. (*A*) DiD for all participants (1), and disaggregated by: initial stance toward redistribution (2), when the match holds the same stance toward redistribution of the participant or not (3), and when the participant holds strong views about redistribution or not (4). (*B*) DiD for the interaction match type and belief type. (*C*) Same as *B*, disaggregated by initial stance toward redistribution; the dotted boxes highlight the interactions originating the increase in support for redistribution. (*D*) Diff-in-diff by the absolute stance distance from match; red dashed line is a quadratic polynomial fit. Error bars are 95% CIs.

of the reader's reaction to the essay. If true, we would expect the correlation between similarity and expected closeness to be stronger than with experienced closeness, as was indeed the case (*SI Appendix*, Fig. S14*B*).

Addressing the second question, in another preregistered analysis, we used a linear mixed model to predict the stance update of a respondent using expected and experienced closeness, respectively (as per the experimental design in *Materials and Methods*). Fig. 6 shows that both measures strongly moderated the effect of social influence: the interactions between closeness and match stance and match-stance distance are positive and significant ($P < 0.001$) for predicting the stance update (*SI Appendix*, Tables S9 and S11). In other words, higher levels of closeness were likely to be associated with larger updates in either direction. *SI Appendix*, Table S7 confirms this result, showing that both closeness measures are strong predictors of the absolute value of the stance update ($P < 0.001$). Importantly, the asymmetry outlined in Results 1 and 2 continues to hold here: The moderating effect of closeness is stronger in the direction of increasing support of redistribution. We also performed a logistic regression analysis to determine how feeling more or less close to the source of social influence changes the odds of reducing the consensus gap. Every unit increase in closeness corresponds with an increase in the odds of reducing the consensus gap by 16.3%; this, in turn, leads to an average increase of about 86% (an absolute difference of 19 percentage points) in the associated probability of consensus convergence between a person who develops a strong feeling of closeness and one who does not develop it at all (*SI Appendix*, section 1.F.4).

Finally, it is important to highlight that closeness moderates the assimilation of political views for both participants with strong views and participants with mild views. In a preregistered regression analysis, we found that the respondent's stance did not significantly interact with either experienced or expected closeness (*SI Appendix*, Table S13); however, after adding the controls (*SI Appendix*, Table S14), the interaction with experienced

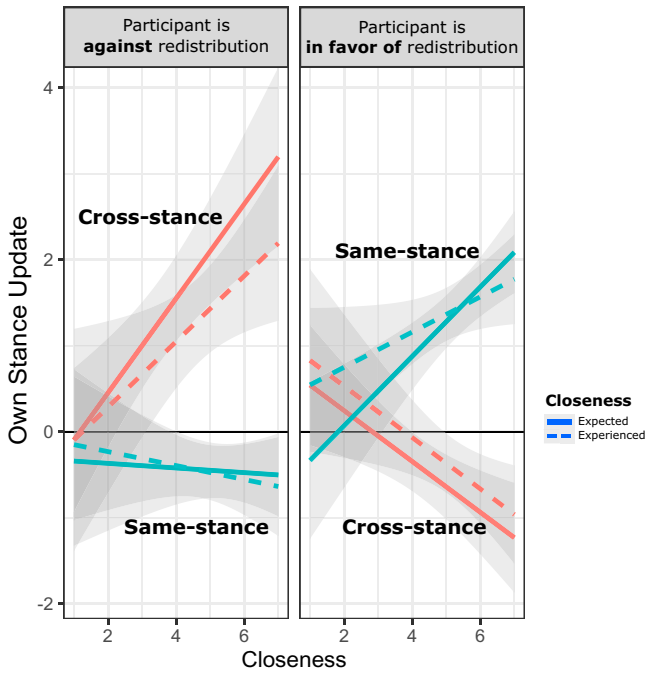

Fig. 6. The feeling of closeness moderates assimilation of political views. Regression slopes predict stance update after the political interaction using expected (dashed lines) and experienced (solid lines) closeness. Positive values indicate that the person has become more in favor of redistribution. Shaded areas are 95% CIs.

closeness becomes significant ($P < 0.001$), suggesting that the moderating effect of closeness is smaller for respondents with extreme stances. Overall, these findings are important because they show that, contrary to previous research (51, 52), persuasion can happen also in participants holding strong political views.

Exposure to Political Views Influences Feelings of Closeness. Thus far, we have demonstrated that exposure to political views of others influences respondents' views on a polarizing political issue and that perceived closeness increases openness to differences of opinion. Here, we quantify the effect in the opposite direction, namely, how exposure to political views changes perceptions of closeness. As noted above, while our measures of expected and experienced closeness were significantly correlated with each other (*SI Appendix*, Fig. S14*A*), the correlation with nonpolitical similarity was higher for expected closeness (*SI Appendix*, Fig. S14B), where the difference was likely caused by the interaction with the match. The direction of the update was as predicted by balance theory (16) and cognitive dissonance theory (53): If respondent and match share consistent views, the respondent feels closer to the match after the political interaction. Conversely, the psychological discomfort of encountering someone holding inconsistent views demands a prompt correction (as in ref. 54), causing respondents to feel less close.

Fig. 7*A* shows that, consistent with the theory, reading an essay from a like-minded person increased feelings of closeness, while reading one from someone with opposite views led to deceased feelings. Interestingly, Fig. 7*A* also shows that the effect was asymmetric: Closeness decreased much more after interacting with someone with opposite views (cross-stance) than it increased after interacting with someone with consistent views (same-stance). Moreover, these results held both for readers who were in favor of and against redistribution (Fig. 7*B*). Finally, Fig. 7*C* shows that participants with strong views in either direction showed larger shifts in perceived closeness, consistent with prior work (55).

Discussion

This paper investigates how opinion polarization changes when people are exposed to views of peers of varying levels of incidental similarity to themselves. In a large, preregistered experiment, we algorithmically matched participants along two dimensions: 1) their degree of incidental similarity and 2) their stance agreement on their attitudes toward government redistribution of wealth.

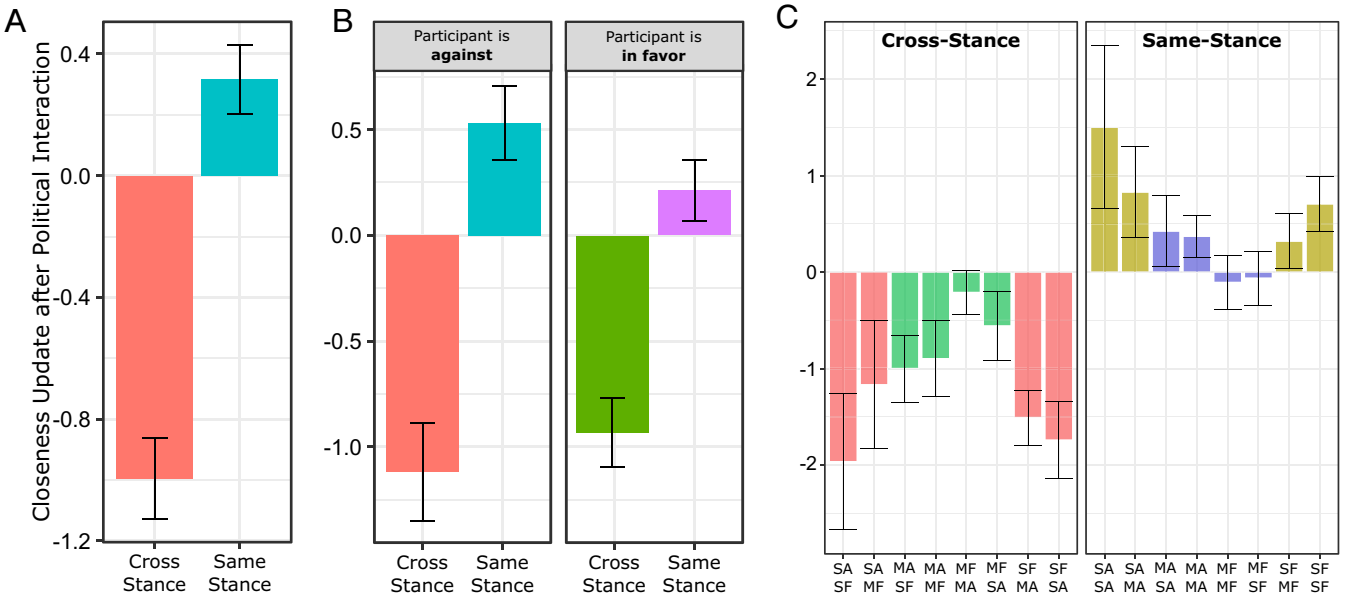

Fig. 7. Informal political communication changes the feeling of closeness. Difference in closeness before and after the political interaction (experienced minus expected closeness) is shown; negative values indicate a reduction in closeness. (*A*) Average closeness update for cross- and same-stance political interactions. (*B*) Disaggregated by the initial stance of the respondent. (*C*) Disaggregated by stance type of the respondent and of the match; color codes are as in Fig. 5*B*. MA, Mild Against; MF, Mild in Favor; SA, Strong Against; SF, Strong in Favor. Error bars are 95% CIs.

After seeing a stylized social media profile that highlighted nonpolitical information about their match, participants read a personal, argumentative political essay written by their match on the topic of inequality reduction. In this environment, we measured updates to views about redistribution, as well as how feelings of closeness toward the creator of an essay changed from before to after reading what they had to say.

Our experiment yielded three main results. First, we found that informal communication generally increased support for redistributive policies and reduced overall opinion polarization, where this reduction was mostly attributable to cross-stance interactions. Second, we showed that matching people based on nonpolitical similarity led to increased feelings of closeness toward the source of a political message and that these feelings of closeness, in turn, predicted openness toward opposing views. Third, we found that respondents felt closer to people with similar political views and less close to people with more distant views. In addition, we provided two quantitative insights: 1) The closeness update is asymmetric—interacting with someone with opposite political views decreases closeness much more than interacting with someone with the same political views increases it; and 2) the magnitude of closeness updates scales with how strongly one holds his or her views and with the distance from the views of the match.

Overall, our findings are consistent with recent work showing how incidental processes based on shared relationships and other characteristics may play a powerful role in shaping political discussions (11). What is more, they also extend previous work regarding the effects of incidental similarity (16, 17, 19, 23) and shared identity (24, 25, 29) on affect into the domain of opinion change.

However, our results also paint a more complex picture. While informal political communication increases support for redistribution and reduces polarization, it also reduces the feeling of closeness of participants toward their match, due to the asymmetric nature of the closeness update. These findings have implications that resonate with some of the concerns raised in recent years about the potentially polarizing effects of social media platforms (56, 57). In our controlled settings, social influence was a one-way process—participants could not reply to the political message—and all the political essays used in our experiment, while argumentative, were civil. In the much less constrained settings of online social media in the wild, the strong emotional response that prompts a reduction in closeness upon exposure to disconforming views might derail civil discussions and exacerbate the perception of political polarization (58). Considering also the broad use of unauthorized political advertising in the recent past (59), our results may relate to the recent rise of affective polarization in the face of apparently reconcilable issue positions (60, 61).

Interestingly, our results also contrast with previous research that has identified partisan asymmetries in response to confirming or disconfirming information (32, 38, 39, 62). In contrast with this work, which has generally found that partisans are not responsive to disconfirming information and may even become more extreme in their views, we found that cross-stance interactions consistently reduced polarization. Also, regardless of the initial stance, participants holding mild views asymmetrically shifted their views in favor of redistribution after an interaction with someone in favor of redistribution. Although an explanation for these differences is beyond the scope of this study, one possibility is that peer-generated content has some desirable properties not found in the professionally produced content (i.e., expert analyses, news articles, or tweets) that is common in such studies (39–41, 63). Specifically, while expertise has sometimes been found to increase the effectiveness of political persuasion (64), it can also be undermined by populist or antiestablishment sentiments, as well as reactance (42, 65, 66). Essays written by peers that invoke a mixture of reasoned arguments and personal experiences may be perceived as more genuine or relatable and hence more credible and less threatening. More research in this area will be needed to assess differences in persuasive strength of peers vs. experts, especially in relation to the usage of moral arguments and shared experiences vs. facts (67).

In the introduction, we mentioned two limitations of incidental discussions as a means to reduce polarization: Because they occur between existing friends rather than strangers, the range of differences in opinion is likely to be smaller than in the full population; and because they arise spontaneously, the topic is not subject to control. By matching strangers and choosing the topic, our design sought to address both limitations; however, it also had some important limitations. First, we only studied one topic; thus, future work should consider whether a similar intervention can reduce polarization on other topics of likely partisan disagreement. Second, while we have reason to believe that our participants took their roles seriously—potentially more seriously than many interlocutors on social media—the particular form of interaction we chose (one person writing an essay and another reading it) was artificial and departs in important ways from a real conversation; thus, future work should attempt more realistic interactions. Third, we also did not measure participants' political knowledge or control for it in assigning essays to readers; hence, it is possible that some of what we have attributed to persuasion was, in reality, a learning effect (low-knowledge participants learning from high-knowledge participants). Whether our participants had higher or lower political knowledge than typical Americans is unclear; however, a full replication with a representative population, which also included explicit measures of political knowledge, would be desirable. Finally, future research is needed to study the composition and the properties of the similarity index, i.e., to understand which features carry more weight and whether the index operates monotonically. For example, our design assigned participants to discrete treatments of high and low similarity, rather than on a continuous scale; however, our results hint at a larger impact from low to moderate similarity than from moderate to high, partly because highly similar partners may be perceived as more artificial (for details, see *SI Appendix*, section 1.G).

In closing, our work suggests that, with some redesign, online media platforms could also reduce polarization (68). Because many people prefer to keep politics outside of their personal social networks (4) and to consume attitude-consistent news (69), fostering the creation of cross-partisan bridges with strangers based on targeted nonpolitical affiliations could combat polarization. Unlike other interventions that focus on fostering one common *hard* group identity (e.g., national identity framing, as in ref. 29), which may increase hostility toward outgroups (e.g., immigrants, as in ref. 70), matching via multiple *soft* common features could prevent the creation of us-versus-them dualisms; as these soft groups often overlap, this should lead to a pluralistic network of groups interconnected via shared identities (71–73). In fact, there already exist initiatives like "My Country Talks" (Europe/United States; https://www.mycountrytalks.org/), "Discuss with Me" (Germany, https://www.diskutiermitmir.de/), "Living Room Conversations" (United States; https://livingroomconversations.org/), and "Braver Angels" (United States; https://braverangels.org/) that bring together strangers to have a political argument (for more initiatives, see also ref. 74). These initiatives have yielded encouraging results in terms of polarization reduction and now face the challenge of scaling up to global proportions. For instance, what if your next "sponsored" post would be a counterattitudinal, argumentative, fact-checked, and civil composition by a relatable, but yet-unfriended, peer? Comparing this scenario with the misinformation campaigns targeted toward right-wing groups and Black voters in the 2016 election (59, 75) strikingly highlights the importance of investigating which governance policies to

apply to technology for the social good. More basic and applied research will be needed in the future to weigh the risk and benefits of these interventions.

Data Availability. R code and data about focal survey, opinion shift, matching scores, and preregistered focal survey variables have been deposited in the Open Science Framework (https://osf.io/7ghnj/files/?view_only=4f59af9f5bfb4e29aff2262dfa8aa66d) (76).

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