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Identity change and economic mobility: Experimental evidence

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ABSTRACT

I study the impact identity change (assimilation) has on economic mobility. I experimentally assign people to different group identities, majority or minority, before they interact in a social coordination setting. In equilibrium, minority assimilators achieve economic mobility by integrating with the majority. In the experiment, assimilators are discriminated against and cannot integrate, if majority members encounter conformists (non-assimilators) in the minority. Thus, assimilators fail to attain economic mobility because those who maintain the status quo impose negative externalities on those who risk changing it.

1. Introduction

“Choice of identity may be the most important ‘economic’ decision people make” (Akerlof and Kranton, 2000, p. 717).

Since the seminal work of Akerlof and Kranton (2000), the study of identities in economics has been widespread.² Researchers have found that sharing an identity with others promotes cooperation (Chen and Li, 2009), trust (Alesina and La Ferrara, 2002), and better economic outcomes (Chen and Chen, 2011). However, the core assumption that individuals have agency to change their group identities has not received as much attention, even though identity choice can be central to properly understanding inter-group processes and social change (some exceptions include Shayo, 2009; Bernard et al., 2016; Dasgupta and Goyal, 2019). The mechanism is simple, if someone from the out-group assimilates the identity of the dominant group, the sense of a shared identity would drive those in that dominant group to perceive the assimilator as an in-group member and change the way and consequences of their interactions (Gaertner and Dovidio, 2000; Akerlof, 2016). In other words, the stranger becomes a fellow (Eckel and Grossman, 2005; Charness and Chen, 2020).

Assimilation can be a powerful strategy for individuals whose group identities put them at a disadvantage. For example, assimilation has been found to reduce economic sanctions (Saleh and Tirole, 2021), increase chances of finding a job (Battu and Zenou, 2010), finding a spouse (Bicchieri, 2016), receiving help (Choi et al., 2019), and even leading to economic mobility (Boyd and Richerson, 1992, 2002; Henrich and Boyd, 2001). Aside from the potential benefits for members of the disadvantaged group to

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² For recent surveys of the literature see Charness and Chen (2020) and Li (2020).

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successfully assimilate, we know little about what makes assimilation fail. In this paper, I experimentally study what conditions drive assimilation and under which of them assimilation is more likely to successfully lead to economic mobility.

To address this objective, I create a novel experimental design that allows me to induce group identities that are meaningful but can be changed by individual choices. To induce identities, I use a combination of different tools. First, every individual in the experiment is assigned to one of two groups: majority or minority. These labels are not explicitly used in the experiment, but differences in group size are key to the experimental design (see Section 2). Instead, a unique symbol reflects group membership: a circle for the majority and a triangle for the minority. Members in each group are then tasked to choose a name for their group by voting for their preferred one from a list of 5 options. To do this, in-group members can communicate freely through a chat box. A group name is chosen when all group members vote for the same option. The options are animal names, different for each group: felines for the majority and canines for the minority.

Therefore, I make use of differences in visual markers (symbols) and names between groups, and a joint voting task plus free-form communication within groups, as combined tools to induce in-group identification and out-group differentiation.³

After the group assignment stage, members of the minority and the majority participate together in a social coordination game (Goyal et al., 2021). The game is played by groups of 7 participants: a majority group of 4 and a minority of 3 (see Section 2.1 for a comment on group sizes). Individuals decide with whom to form network connections and then play a coordination game with those in their network, choosing between two actions. Individuals benefit from coordinating with others on one same action, and the gains are additive on the number of connections one coordinates with. As such, it is better to be well integrated with others than to be isolated.

Akerlof and Kranton (2000) suggest that identities are tied to prescriptions regarding appropriate behavior.⁴ Identity-wise, I induce group prescriptions on which action is preferred for each identity through differences in payoffs. Simply put, any player earns more when she coordinates on the action that has been prescribed to her identity, and those in the minority prefer the opposite action to those in the majority. This social coordination game allows inter-group differentiation to be enhanced, as the differences in prescribed actions can drive segregation between the two groups. Economically speaking, segregation is problematic because it leads to lower payoffs for everyone, especially for the minority, as gains increase with network size.

After a series of interactions in the social coordination game with fixed identities (10 periods), a change is introduced and individuals are given the option to either keep their group identity or change it for that of the other group. Then, they interact in this game with flexible identities for another 10 periods. If a minority member changes her identity and assimilates that of the majority, she earns more by coordinating on the majority's action than on the minority's action (which was not the case prior to assimilating). This is meant to symbolize that by assimilating, the prescription of the new identity is also internalized.⁵ Specifically, the game with fixed identities establishes a benchmark in terms of earnings, which can be doubled through identity change, allowing the minority to attain economic mobility.

Consequently, individuals can strategically assimilate to integrate with the dominant group and improve their economic standing, compared to the case where assimilation was not possible. As assimilators and the majority have aligned incentives over which action to play, it is in their interest to form connections between them, so that they can all benefit from their shared behavior. The optimal outcome is one where the entire minority assimilates, as it leads to a completely integrated society where all individuals coordinate on the same action. This reduces inequalities across social groups and allows the minority to attain economic mobility, as all minority members earn more than in the benchmark case of no assimilation (i.e., the status quo).

However, if for some reason those in the majority have doubts as to whether the assimilators will actually act in alignment with their newly adopted identity (i.e., choose the majority's action), they may discriminate against them by not reciprocating connections (Lees and Cikara, 2020). This leaves assimilators in a worse position than if they had conformed to their original group identity, as earnings would be lower than in the status quo. Such is a case where assimilation fails.

To test for the conditions that drive assimilation choices and the likelihood that it successfully leads to economic mobility for the minority, I look at a series of experimental variations. Specifically, I explore different barriers associated with identity change. In one dimension, I look at the effect of having (or not having) an assimilation cost (Austen-Smith and Fryer, 2005; Fryer and Torelli, 2010).⁶ Assimilation costs are usually a result of social sanctions that arise when conformists in a social group punish those who abandon the group. To reflect this, I model the cost of assimilation as increasing on the number of conformists in the minority, so that it is smallest when all minority members assimilate.

In another dimension, I vary whether the assimilation choice is identifiable. If a person who assimilates a new group identity has limited ways to display it, then others may only see in her those external markers of the group she used to belong to (e.g., skin color, accent, height, tattoos, etc). Limited identifiability of one's identity can lead to mistrust from the dominant group and can reduce

³ Charness et al. (2014) shows that performing a group task and knowing others have done so as well, generates a sense of proximity and collaboration, even towards those not in one's same group. In my case, the objective is to generate this sense of proximity only within but not across group members. For this, I make use of salient group labels and visual markers to introduce social distance between the minority and the majority.

⁴ Akerlof and Kranton's work takes a preference-based approach to social identity, emphasizing that a central difference between identities is that they are associated to prescriptions or norms on how to behave. There are also group-contingent social-preference models, see for example Chen and Li (2009) and Chen and Chen (2011), which predict how group identity affects behavior. I make use of the latter approach at the end of my experiment in the Other-Other allocation decision.

⁵ Although strategic lying is not part of this project, in some settings individuals can strategically disguise and signal to someone in power that they share the same identity, without having actually assimilated, see for example Casoria et al. (2022). This is also related to the notion of social free-riding in Bernard et al. (2016).

⁶ A complementary line of research looks at the costs individuals pay to avoid assimilating or acting in misalignment with their identities, see for example Bursztyn et al. (2020).

the chances of assimilators succeeding. I implement this in the experiment by varying whether identities are publicly observable or private.

At the end of the experiment, every individual participates in an other-other allocation decision where they divide a set of resources between a receiver from her in-group and one from the out-group (see e.g., Chen and Li, 2009; Lane, 2016). This happens after having played the social coordination game with fixed identities for 10 periods, and the game with flexible identities for another 10. I use this decision to empirically test the effectiveness of sharing a common identity, emerging from the assimilation choice and from repeatedly solving a coordination problem together, to enhance social preferences among participants originally assigned to different social groups (see Chen et al., 2014).

The main result of the paper is that assimilation does not necessarily lead to economic mobility. Assimilation fails because the majority discriminates against assimilators when they also encounter conformists in the minority. This despite it being in the best interest of the majority to integrate with those who assimilate. That is, two individuals of the same type, *assimilators*, are judged and treated differently depending on what others around them do. This result may be driven by the ambiguity and tension between individual and collective choices. An assimilator makes an individual decision to change her identity, but that does not necessarily coincide with the choices of her fellow minority members. This can make members of the majority pool assimilators and conformists into one single category (for a model of optimal categorization see Fryer and Jackson, 2008). Thus, the meaning of individual decisions can be tainted by the decisions of others in the same social group.

There are three possible outcomes in terms of identity choices. First, an *all-conform outcome*, where no one in the minority assimilates. There is no ambiguity here, as everyone in the minority is choosing to conform to their original group identity. This outcome represents the status quo as it maintains the composition of identities the same way as it was initially determined.⁷ On the other extreme, there is the *all-assimilate outcome*, where everyone in the minority changes her identity for that of the majority. This is also a collective outcome in which the minority group acts in unity and can provide a clear meaning of their assimilation choices. In between, there is the *fractured outcome*, in which there are assimilators but also conformists in the same minority group. This means that when a majority member looks at the minority, she may doubt that those who assimilate will act in alignment with their chosen identity, as the presence of conformists can be a force pulling them back. Thus, the majority may pool assimilators and conformists into a single category and treat them similarly.

I find evidence suggesting that in the case of a fractured minority group, conformists impose negative externalities on assimilators, which hurts the latter's chances to integrate and benefit from assimilating. But, if the minority assimilates collectively (no conformists), then the majority reciprocates to the assimilators' intentions to integrate and economic mobility is attained. This result, that two assimilators are treated differently depending on what others in their social group do, is consistent across experimental conditions. Regardless of whether the minority faces assimilation costs, has no way to publicly signal the assimilated identity, or is not exposed at all to any of these barriers. The majority discriminates against assimilators when the minority is fractured by the presence of conformists.

This paper is a contribution to the research on cultural assimilation. One of the main goals in this area of research has been to identify conditions that prevent assimilation, especially when the choice of not assimilating puts minority individuals in a position of economic disadvantage (see e.g., Bisin et al., 2016). A common finding in the literature suggests that being in a group that imposes sanctions, as a mechanism to police its boundaries, is one of the most frequent drivers of conformism (Battu et al., 2007; Battu and Zenou, 2010). My work provides experimental evidence that echoes this result by identifying the case with assimilation costs (derived from social sanctions) as the most frequent driver of a *fractured outcome*, where assimilation is not outright prevented but moderated, fracturing the social group into assimilators and conformists.

My work also extends this line of research by looking at what causes assimilation to fail. That is, conditional on assimilating, what could prevent an assimilator from reaping the benefits of her identity choice. I find that not all assimilators are treated equally, but their success is context-dependent. Assimilators in groups where other minority members around them choose to conform end up being discriminated against by the majority, and as such assimilation fails in procuring economic mobility. But, assimilators from a minority that is not fractured are welcomed by the majority, allowing them to earn significantly more than in the case without assimilation (see Charness et al., 2007; Fryer and Jackson, 2008). This results in the minority attaining economic mobility.

The results of this paper contribute to the literature on group identity in two main fronts. First, to research looking at how shared identities can help reduce inter-group conflict (Cikara and Van Bavel, 2014; Gaertner and Dovidio, 2000). As it has been found that individuals are more favorable towards those they share a group identity with and less so to those in other social groups, researchers have been exploring the common sharing of an identity between members of different social groups as a way to increase social cohesion (Mousa, 2020; Lowe, 2021).

Assimilation of identities is a way in which individuals from different groups can end up sharing a common identity. I find that the power of a shared identity is context-dependent. If a person assimilates while the rest of her group members maintain their original identity, those in the other group may be unwilling to see her as an in-group member (a new comer) because of the ambiguity at the group level. This speaks to the tension that can arise due to categorization, where the identity an individual chooses for herself and the identity others impose on her may be at odds. For example, minority assimilators choose to identify with the majority, but those in the majority pool assimilators with conformists together and assign to them an identity of out-group, leading to discrimination.

Second, my work contributes to the growing literature looking at identity choices and the way identification can lead to differential treatment towards others (see an overview in Charness and Chen, 2020). The evidence indicates that two key drivers of

⁷ This is also equivalent to the segregated outcome predicted for a setting with fixed identities.

identification are social distance and social status, as individuals prefer to identify with groups that share similar characteristics to them as well as to groups whose characteristics are considered superior. Consequently, individuals are more favorable towards those they perceive to be more proximal or to be of higher status (see e.g., Klor and Shayo, 2010; Charness et al., 2014; Hett et al., 2020).

The findings in my work complement the literature on identity choices by showing that sharing a common identity does not need to correspond with being socially proximal. Instead, the process of how such identity came to be may matter significantly more. In my experiment, minority members actively assimilate the identity of the majority, while majority members remain passive. I test how these choices impact distributive preferences in an other-other allocation decision. The findings show that minority members in groups that collectively assimilate make more equitable distributions of resources between the two receivers. Thus, discriminate less against the majority (an expression of reduced social distance). However, the effect is asymmetric between social groups, as the passive majority consistently acts biased against the minority receivers. This suggests that social distance from the majority to the minority remains unaffected. Consequently, sharing a common identity may not be enough to reduce inter-group biases, unless members of both groups are active in creating this commonality. Otherwise, members from the passive group will benefit from those who assimilate without adjusting their views or attitudes towards them.

The results of my work suggest that policies targeting assimilation by focusing on publicizing the benefits of assimilation, may not always succeed in helping minorities and members of disadvantaged groups attain economic mobility. Even when the benefits from assimilation are clear and stark, those who assimilate would not reap those benefits when their social group is fractured by conformist, because those in the dominant group may be unwelcoming. As such, policies should not only target those who can assimilate but also those in the dominant group.

A possible way to convey this message effectively is to inform majority members that by welcoming those who want to assimilate, not only social processes may be more fruitful, but also social preferences can transform, which in the end will benefit majority members and not just those in the minority. Consequently, efforts to promote integration and to reduce social distance (e.g., tensions) across groups should not be placed only on the identity changers but also on the dominant group.

The rest of the paper is organized as follows. In Section 2, I present the experimental game of social coordination. Section 3 contains the experimental design and hypotheses. I report the results of the experiment in Section 4. In Section 5, I explore the effect of choosing between social sanctions or unobservable identities. Finally, in Section 6, I conclude with a discussion.⁸

2. Game

In the experiment, I use a social coordination game where individuals are assigned to either a majority or a minority group. Minority and majority members identify with different social categories and as a result have prescriptions to behave in opposing ways. In general, each individual benefits from coordinating her behavior with those around her, and the benefit is larger if she behaves in alignment with what is prescribed by her group identity. As such, the size of the group generates economic differences and inequality. That is, the identity of the majority group is more efficient because more people would want to play its prescribed action.⁹ Minority players can, however, abandon their group's identity and assimilate that of the majority. Identity change has the potential to foster network connections across groups. As earnings increase with network size, assimilators significantly improve their standing compared to the status quo, resulting in economic mobility for the minority.

2.1. The experimental coordination game

In the experimental game, the population is composed of a majority group of size 4 and a minority group of size 3. I focus on a small but meaningful difference in relative size between the two groups, as this has been shown as the setting where inter-group tensions are most salient. Because of it, this is the most interesting case to evaluate the effects of identity change on integration and economic mobility of minority groups.¹⁰

The two groups can be *ex-ante* differentiated by appearance markers and identity markers. Appearance markers symbolize traits, such as skin color, hair, size, etc., which are fixed, exogenous to the individual and initially correlate with group identities (see e.g., Efferson et al., 2008).¹¹ This is displayed by an external symbol: *empty circle* for the majority, \circ , and *empty triangle* for the minority, \triangle . On the other hand, group identities are expressed as prescriptions on how to behave, e.g. preferences, views and values of the group, which can be altered by individual decisions.¹² The group identity is displayed by an internal symbol: *filled circle* for a player

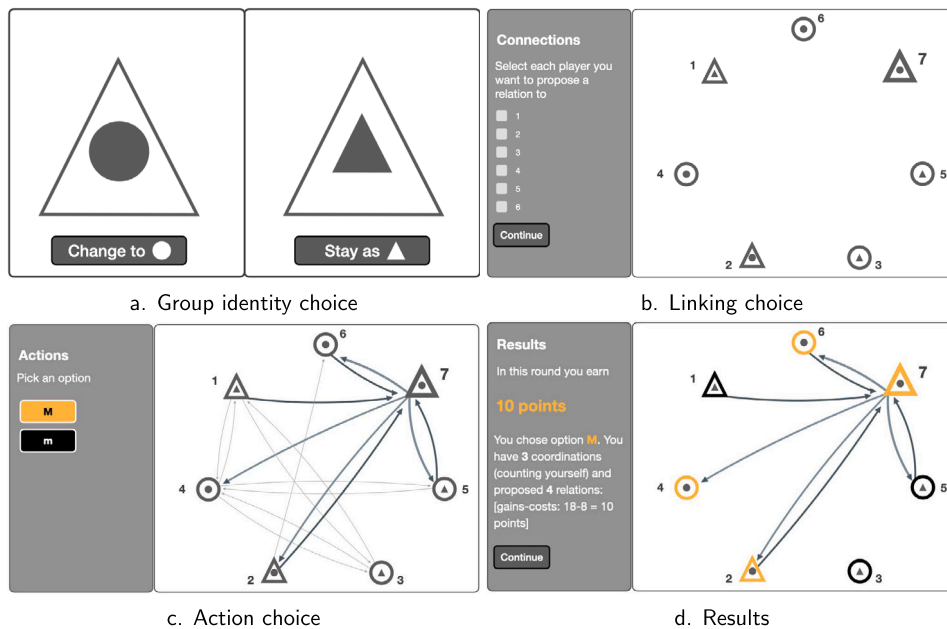
⁸ In addition, I include the experimental instructions in Appendix A. Appendix B contains all regression tables. Appendix C provides a detailed description of the sample and some additional analysis of the results. Finally, in Appendix D I include a formal model of the social coordination game.

⁹ For related models see Hernandez et al. (2013); Ellwardt et al. (2016); Goyal et al. (2021).

¹⁰ For example, Currarini et al. (2010) finds that students in schools show specific patterns of connections depending on group size. Although there is substantial racial homophily (segregation), this “follows a nonlinear and nonmonotone trend with respect to group size, with low levels of homophily for groups that form very large or small fractions of a school and higher levels of homophily for groups that form an intermediate sized fraction of a school” (see page 4857). Similarly, in experiments on social coordination games such as the one in this study, Goyal et al. (2021) finds that inter-group tensions and segregation are most salient when the relative size of the minority is not small (minority of 7 and majority of 8). However, if the relative size is small (minority of 3 and majority of 12), the majority absorbs the minority.

¹¹ Arguably, even markers such as skin color could change over time or across generations. Therefore, fixed markers include features that are permanent as well as those that are not, but cannot be altered in the short term. For a detailed discussion on the endogenous construction of identities and the mutability of traits see Chandra (2012).

¹² Group identities and, consequently, prescriptive norms can arise through multiple channels. Some examples include them being exogenously imposed by a process of inter-generational transmission of traits (see e.g., Bisin and Verdier, 2001). There are exogenous alterations of social and group identities through publicity and



1a: Players choose whether to maintain their group identity or assimilate the other group's identity by clicking on the corresponding button. The image above each button illustrates how they will be displayed on the screen given their choice. The internal symbol, ● or ▲, represents the chosen identity, while the external symbol, ○ or △, displays appearance markers that keep track of the original group a player was assigned to. **1b:** Players see their own and others' numeric labels and symbols, and choose which links to propose by ticking on the boxes on the left. **1c:** Then, they observe the proposals made (outgoing arrows) and the proposals received (incoming arrows) by everyone. Own link proposals are displayed with thicker lines. Players choose an action, M or m, by clicking on the corresponding button on the left. **1d:** Players see the action chosen by everyone else, illustrated as the border-color of each node, and a summary of their payoffs in the current period. For simplicity, only the decision-maker's reference network is displayed in the final screen of each period.

Fig. 1. Screens in the experiment. (For interpretation of the colors in the figure(s), the reader is referred to the web version of this article.)

with the identity of the majority, ●, and filled triangle for one with the identity of the minority, ▲. Therefore, at the beginning of the game each player in the majority displays the pair of symbols (○, ●) and one in the minority displays (△, ▲).

The game has three stages. In Stage 1, every player chooses whether to change their group identity, *assimilate*, or stick with it and maintain the status quo, *conform* (see Fig. 1a). While the external symbol is kept fixed, the internal symbol may change depending on the decisions individuals make. This results in four combinations of symbols that visually display external markers and the chosen group identity. Fig. 1b shows an example where player 7 is assigned to the minority and assimilates the identity of the majority (△, ●), while 1, also from the minority, is a conformist who sticks to her group identity (△, ▲). Similarly, 6 is a majority conformist who keeps her identity (○, ●), while 5 changes it to assimilate to the minority (○, ▲).

In Stage 2, players observe the external markers and chosen identities of everyone in the population and simultaneously make link proposals to any of the other 6 players. Each proposal, whether reciprocated or not, costs $c = 2$ points. Fig. 1b presents the screen players see in the linking stage. Every player is assigned a numeric label to facilitate identification in the current period, and also a node displaying her corresponding pair of symbols (larger for the decision-maker).

In Stage 3, players observe the emerging network. As illustrated in Fig. 1c, players are informed of the proposals made and received, displayed as incoming and outgoing arrows respectively (thicker for the decision-maker). For example, player 7 has links with 2, 5 and 6. She does not reciprocate the proposal from 1, while she makes an unreciprocated proposal to 4. Reciprocated proposals result in the creation of links, which lead to the relation of being *neighbors*.

Then, every player decides between two possible actions M or m, the same for all of her neighbors. Building on Akerlof and Kranton (2000), a group identity specifies prescriptions on how to act. I model this through differences in the gains from choosing alike with others. A player who chooses the identity of the majority, ●, prefers action M to action m, and one who chooses the identity of the minority, ▲, prefers action m to M; in both cases irrespective of her external markers. Players earn $v = 6$ points for each coordination if they choose their prescribed action and $v - r = 4$ points for coordinating on their non-prescribed action, where

marketing (Akerlof and Kranton, 2000), or via organizations, such as universities or the army, which commonly induce identification within its members (see Andreoni et al., 2021). There are also endogenous choices of identities, which are likely driven by perceptions of social distance and social status between groups (see e.g., Hett et al., 2020).

$r = 2$ is the utility loss for acting in misalignment with their group identity.¹³ There are no gains from a connection between two players who do not coordinate their actions.

The total payoff a player gets depends on the number of her neighbors choosing the same action she has chosen, denoted by χ , and on the number of link proposals she makes, denoted by n . If a player behaves in alignment with her chosen identity she earns $v(1 + \chi) - cn = 6(1 + \chi) - 2n$. Otherwise, she earns $(v - r)(1 + \chi) - cn = 4(1 + \chi) - 2n$. The 1 in the parentheses accounts for the choice of the focal player, so that payoffs differ on the alignment of action and identity even when a player does not form any connection in the network and stays isolated, $n = 0$, or when she does not coordinate her actions with anyone else, $\chi = 0$.

At the end of every period, everyone observes the outcome of the game and their net payoffs on the screen, as in Fig. 1d. The figure shows that player 7 coordinates successfully on her *prescribed* action with neighbors 2 and 6, and fails to coordinate with 5. She makes link proposals to 2, 4, 5 and 6. Thus, her net payoff is $(6 \times 3) - (2 \times 4) = 10$ points. At the beginning of any subsequent period, every player is assigned a new numeric label and a new position in the network, to preclude identification across periods.¹⁴

There is a benchmark version of the game with *fixed identities*, as in Goyal et al. (2021). I will use this game as a within-subject variation in the experiment, where identities cannot be changed, and the earnings in this game as a reference to evaluate whether identity change can lead to economic mobility. Therefore, unlike the case with identity choice, markers stay fixed, so that all players are displayed with matching internal and external symbols: (○, ●) for the majority and (△, ▲) for the minority. Given identities are fixed, the first stage in the game is the linking choice (see Fig. 1b). Subsequently, after making their linking proposals and observing the resulting network, players choose one of the two actions: M or m (see Fig. 1c). Payoffs are calculated as in the game with flexible identities described above.

2.2. Equilibrium outcomes

In this section, I provide a brief illustration of equilibrium outcomes. The interested reader can find a formal model of the social coordination game and a more general characterization in Appendix D.

In a Nash equilibrium of the social coordination game, a player only forms links with others choosing the same action. Otherwise, she receives no benefit from the relation but has to pay the cost of establishing it. This holds independently of the player's identity and chosen action. Now, for a given action profile, a player is better off when she forms a link with everyone else choosing the same action and not only with a subset of them, as every coordination increases her payoffs by 6 points (4 points in misalignment). As this is true for all players, it is easy to see that one can Pareto rank all equilibrium outcomes for a given action profile. The case in which every player is connected to all others choosing the same action and to no one else, Pareto dominates any other outcome where at least one pair of players choosing the same action is not connected.

There are equilibrium outcomes where players who choose a group identity also play an action that aligns with it and others where identity and action are misaligned. Here, I focus on a fraction of the equilibrium set in which the former is true. Specifically, I focus on symmetric equilibrium outcomes in which players choose actions in alignment with their identities¹⁵ and in which any pair of players choosing the same action are connected. Among those outcomes, I narrow my attention to cases in which only minority players change their identity, as these are the relevant outcomes for my research question.¹⁶

This points to three types of equilibrium outcomes, which vary depending on the identity choices of the minority, as illustrated in Fig. 2. The sequence of outcomes displays the progression from the case where everyone in the minority is a conformist, so no one assimilates the majority's identity, to one where all minority players assimilate. Fig. 2a illustrates the *all-conform outcome*, where all players are conformists and maintain their original group identity. Thus, the entire minority segregates from the majority. This segregated outcome is also the equilibrium predicted for the game with fixed identities.¹⁷ This represents that the status quo is maintained, as identities remain the way they were originally assigned. This outcome is followed by the *fractured outcome*, where either one of the minority players assimilates the majority's identity while the other two conformists stick to their original identity (Fig. 2b) or where there is only one minority conformist maintaining the status quo, while the other two assimilate (Fig. 2c). Finally, Fig. 2d illustrates the *all-assimilate outcome*, where all minority players abandon their group identity to assimilate that of the majority. Thus, the entire minority integrates with the majority.

As every player earns a net of 4 points for each connection in equilibrium (6 points from coordinating minus 2 points for establishing the connection), it is clear that the more integrated a player is the higher her payoffs will be (see Table 1). Consequently, a fraction of minority conformists sticking to their original identity is socially inefficient in the game. This is so, because while assimilators integrate with the majority, conformists fracture the minority and form a separate community from those who assimilate.

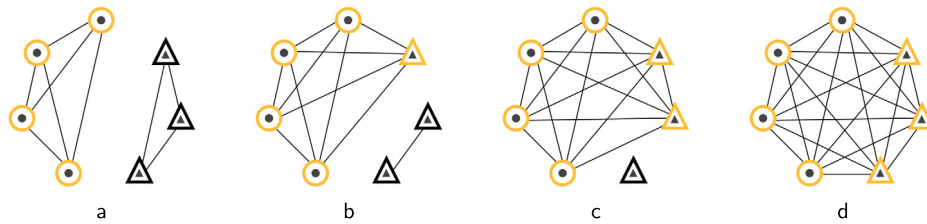
¹³ For consistency and comparability with related studies, I use the same parameters as in Goyal et al. (2021).

¹⁴ By randomly assigning new numeric labels and new positions on the screen, direct identification of individual players across periods is prevented, despite interactions being fixed within each group of 7. This is a crucial feature, necessary for treatment IGNORANCE, as is explained in Section 3.1.

¹⁵ There are other equilibria where players choose an identity in Stage 1 and a behavior in Stage 3 that goes against it. These outcomes are included in the equilibrium characterization, but for simplicity of the description I relegate them to the appendix. Moreover, previewing the findings, behavior in the experiment shows strong correlations between the *chosen* group identity in Stage 1 and the action chosen in Stage 3, for both majority and minority players, so that less than 1% of the cases display misalignment.

¹⁶ Outcomes in which the majority players also change their identity display the same properties, see Appendix D. Previewing the findings in the experiment, at most 1% of the majority changes their identity (see Table 2, as well as regression results in Table B-1 in Appendix B).

¹⁷ Payoffs in the *all-conform outcome* are the same as those for the game with fixed identities, which I use as a benchmark to evaluate the attainment of economic mobility through identity change.



Majority players are illustrated as circles and minority players as triangles. The border color illustrates the action chosen, lighter color mustard when the majority's action M was chosen, and darker color black when the action m was chosen. A line connecting two nodes represents an undirected link. Network 2a portrays the *all-conform outcome*, where all minority players stick to their group identity and segregate. This segregated outcome is the equilibrium predicted for the game with fixed identities. Networks 2b and 2c each illustrate a case of the *fractured outcome*, where the minority is divided into a fraction that assimilates and a remaining fraction of conformists. Network 2d illustrates the *all-assimilate outcome*, where all minority players change their identity and integrate with the majority.

Fig. 2. Equilibrium outcomes.

As such, conformists are connected with fewer others and earn less than assimilators, generating inequalities not only between the minority and the majority, but also within the minority group.

The extreme case where all minority players are conformists leaves the minority players earning 14 points and the majority players earning 18 points. The inequality arises due to differences in size between the majority and the minority. Once a minority player changes her identity and assimilates, her payoffs are the same as those of any majority player. Naturally, the payoffs of a conformist decreases linearly on the number of assimilators, given her network shrinks. On the other extreme, where all minority players assimilate, payoffs are 30 points for everyone, maximizing efficiency and eliminating inequality within and between groups. This is the case where the entire minority attains economic mobility, as they earn about twice what they would in the segregated outcome predicted for the setting where identity change (i.e., assimilation) was not possible, and the status quo was maintained.

3. Experimental design

3.1. Treatments

An experimental session consists of a sequence of four parts that build on each other to test the effect of assimilation on economic mobility: (1) Group assignment, (2) Social coordination game with *fixed* identities, (3) Social coordination game with *flexible* identities, and (4) Other-Other allocation. Individuals know the number of parts in the experiment, but only see the instructions for a specific part once the previous one has ended. I introduce experimental variations in the game with flexible identities (PART 3), while PART 1, PART 2 and PART 4 are identical across treatments. I describe each part below, and explain treatments in the description for PART 3.

PART 1. Group assignment: To induce group identities at the beginning of the experiment, I make use of a combination of different tools. Individuals are randomly assigned to groups and informed they will be represented by an internal and an external symbol (see Fig. 1 for an illustration). They are also informed of their group size (4 for the majority and 3 for the minority) and that the symbols identifying those in the other group are different. Subsequently, individuals in each group are connected via a chat box through which they can communicate. The goal is to choose a name for their group out of a list of 5 names. For a name to be chosen, all players in the group must vote for the same option. Those in the majority chose a name between a list of five felines (*Cats, Tigers, Lions, Leopards, Jaguars*) and those in the minority chose between five canines (*Dogs, Jackals, Coyotes, Foxes, Wolves*). I use different symbols and names to prime group identity. In addition, I use chat communication and a group voting task to further induce within-group identification and between-group differentiation (Eckel and Grossman, 2005; Chen and Li, 2009).¹⁸

PART 2. Fixed group identities: Once the group assignment stage concludes, the 7 players play together the social coordination game without identity choice for 10 periods. This is the 2-stage game where players choose links and then actions. The aim of PART 2 is two-fold. First, it further enhances in-group identification and out-group differentiation. This because preferences over outcomes are induced through differences in payoffs between groups, but players cannot abandon their group identity to assimilate that of the other group. Second, this part serves as a benchmark to compare outcomes with the case of flexible identities (PART 3), which allows me to empirically evaluate whether the possibility to assimilate can be used by minority players to attain economic mobility.

Specifically, I test what happens to earnings when identity change is introduced. With fixed identities, when minority players segregate they earn 14 points per period, as they cannot assimilate (the status quo). With flexible identities, minority assimilators can earn about twice that, which is defined as attaining economic mobility.

¹⁸ The group chat takes place at the beginning of the experiment but before the players receive any information about the coordination game they will play. Because of this, there is no room for players to talk about potential strategies for the game. During the experiment, I do not use *majority* and *minority* as labels, and instead use the symbols and chosen names to refer to each group.

Table 1
Experimental treatments and payoffs.

	Fixed identities	Flexible identities		
		BASELINE	SANCTIONS	IGNORANCE
Identity change				
Costly	<i>N/A</i>	×	✓	×
Visible identity	✓	✓	✓	×
Payoffs if All conform (Fig. 2a)				
<i>Min. Assimilate</i>
<i>Min. Conform</i>	14	14	14	14
<i>Majority</i>	18	18	18	18
Payoffs if Fractured #1 (Fig. 2b)				
<i>Min. Assimilate</i>	12	22	12	22
<i>Min. Conform</i>	10	10	10	10
<i>Majority</i>	22	22	22	22
Payoffs if Fractured #2 (Fig. 2c)				
<i>Min. Assimilate</i>	14	26	18	26
<i>Min. Conform</i>	6	6	6	6
<i>Majority</i>	26	26	26	26
Payoffs if All assimilate (Fig. 2d)				
<i>Min. Assimilate</i>	16	30	24	30
<i>Min. Conform</i>
<i>Majority</i>	30	30	30	30

Description of Parts and Treatments, as well as summary of payoffs (in points). Payoffs are displayed separately for minority players who assimilate or conform, as well as for the majority. For the case of fixed identities, a minority player is said to assimilate when choosing the action of the majority and conforms when choosing the action of the minority, as identities cannot be changed.

PART 3. *Flexible* group identities: After the 10 periods of PART 2, players play together the social coordination game with identity choice for 10 periods. This is the 3-stage game where players choose identities, links and actions. In PART 3, it is possible for minority players to assimilate the identity of the majority. Identity change can maximize efficiency and reduce inequality when compared to the case in which identities are fixed.¹⁹ I assign players into one of three main treatments: BASELINE, SANCTIONS, or IGNORANCE, which I use to assess how different settings impact the assimilation choices of the minority and its chances of attaining economic mobility (see Table 1 for details). I explain each treatment as follows²⁰:

- **BASELINE:** In the baseline treatment there are no barriers to assimilation, so that identity change is free and visible. That is, any player can abandon her assigned identity and assimilate that of the other group at no cost, independently of the group identity others choose. Also, assimilators can be clearly identified by everyone else before the linking proposals are made, because the internal symbol is set to display the chosen identity of every player (see Fig. 1b).
- **SANCTIONS:** This treatment explores the effect of social sanctions. Anyone who changes her group identity can be distinguished from those who maintain it, as in the BASELINE, but assimilation is costly. The cost of changing identities for a minority assimilator is $\delta = 6 + 2 \cdot (n_m - \tau)$, where $n_m = 3$ is the size of the minority group and τ is the number of minority members assimilating, including herself.²¹ This means that anyone who changes her group identity pays a fixed cost of 6 points, plus a variable cost that increases by 2 points for every conformist in her group who sticks to the original identity. In this way, I exogenously impose social sanctions from conformist to assimilators.
- **IGNORANCE:** This treatment explores the effect of identities not being observable. There is no cost to assimilate, as in the BASELINE, but the choice is not visible to others. As such, assimilators cannot be differentiated from conformist who stick to their group identity. Players can see each others' external markers, which signal the group they were initially assigned to. However, no one can identify each others' chosen identity. I achieve this by eliminating the internal symbol from all nodes on the screen, irrespective of their identity choice.²²

¹⁹ Note that the aim of a sequence going from fixed to flexible identities is to evaluate the benefits of identity change in solving economic disparities that arise in an environment where assimilation is not possible. Because the interest of this sequence is contingent on its direction, I do not test for order effects by running treatments where the game with flexible identities is played before that with fixed identities.

²⁰ There is an additional treatment REVEAL, which I designed to evaluate the impact of making barriers to identity change endogenous. That is, allowing individuals to choose whether they are exposed either to social sanctions or to unobservability of identity choices. I describe this treatment and how its findings relate to such barriers being imposed exogenously (as in treatments SANCTIONS or IGNORANCE) in Section 5.

²¹ The assimilation cost for a majority player is $\delta = 6 + 2 \cdot (n_M - \tau)$, where $n_M = 4$.

²² In none of the treatments, the vector of identities chosen by the 7 people interacting together was explicitly stated. Naturally, in treatments with complete information (BASELINE or SANCTIONS), participants can infer this from the illustrations on the screen, as internal symbols are observable. When these symbols were removed, as in the IGNORANCE treatment, neither minority nor majority players know who or how many have changed their identity.

PART 4, Other-Other allocation: After the end of the social coordination game with flexible identities (PART 3), every player is asked to allocate 10 points between two anonymous receivers. There is one receiver from the minority and another from the majority, and both are drawn from the same group of 7 as the allocator. No one was allowed to allocate points to herself. The novelty of including this task after the game with flexible identities is to explore if assimilation leads to positive inter-group attitudes, beyond the setting for which the assimilation of an identity was relevant. Specifically, I explore if by sharing a common identity players from the majority and the minority make more equitable allocations between the two receivers.

3.2. Hypotheses

I now present the hypotheses I test in the experiment for PART 2, PART 3, and PART 4.

In PART 2, players play the social coordination game with fixed identities, which replicates Goyal et al. (2021). The main results of their work suggest that when identities are fixed and linking is costly, players only connect with others in their group: minority with minority and majority with majority. Consequently, everyone chooses actions in line with their group identity. Thus, I postulate the following hypothesis:

Hypothesis 1. In a setting with fixed identities, minority and majority players avoid interactions across groups and choose actions in alignment with their assigned group identity.

Payoffs in PART 2 are the benchmark to which I compare what assimilators get in the game with flexible identities. The minority is said to achieve economic mobility when their payoffs are higher than those attained in the segregated outcome predicted for the setting with fixed identities.

In PART 3, players play the social coordination game with flexible identities. As mentioned above, groups are assigned into one of three treatments: BASELINE, SANCTIONS or IGNORANCE. In all three treatments, minority players can assimilate to integrate with the majority and coordinate with a larger number of neighbors than in an outcome with fixed identities. Among all outcomes, the *all-assimilate outcome* is socially efficient, leads to economic mobility and reduces inequality, within and between groups. This is true across all treatments. Thus, I postulate the following *null* hypotheses for PART 3.

Hypothesis 2. In a setting with flexible identities, all minority players assimilate the majority's identity and all together form a complete network where everyone chooses the same action M. This leads to economic mobility for the entire minority.

Alternatively, it may be that not all individuals in the minority assimilate, but instead some conformists stick to their original identity, when they are exposed to social SANCTIONS or IGNORANCE. Exposure to such barriers makes identity change riskier than in the BASELINE. If only one minority player assimilates, the entire minority group could end up worse-off than if there was no assimilation at all. Specifically, for the BASELINE treatment, as shown in Table 1, any number of minority players can assimilate and benefit from this choice.²³ For the SANCTIONS treatment, a minority player is worse-off assimilating if she is the only one, as she would earn less than in the case where no one assimilates and the status quo is maintained. But, when two minority players assimilate, each can get more than in the *all-conform outcome*.²⁴ In the IGNORANCE treatment, if a single minority player assimilates, it is not possible for her to be individually identified as the one changing her group identity, even if everyone has correct beliefs on the number of assimilators. This is also true in the case of two assimilators, even though the probability of being identified increases. If all three minority players assimilate, and beliefs are correct, it is as if there was complete information, and all players can maximize their payoffs. As such, when there are barriers to assimilation, the *all-assimilate outcome* is the first-best and the *all-conform outcome* is the second best.

In summary, assimilation is riskier in SANCTIONS and in IGNORANCE than in the BASELINE, because both assimilators and conformists can end-up worse-off in a *fractured outcome* than in the second-best *all-conform outcome*. I postulate the following *alternative* hypothesis for treatments SANCTIONS and IGNORANCE in PART 3:

Hypothesis 3. If the minority is exposed to social sanctions or their identities cannot be observed, not all players assimilate. Players segregate into two communities, one choosing the majority's identity and another conforming to the minority, resulting in either the *all-conform outcome* or a *fractured outcome*. In these cases, not all minority members attain economic mobility.

Finally, in PART 4, I explore how changes in group identities impact social preferences, specifically distribution preferences between the minority and the majority. This is a way to explore if the benefits from assimilating extend beyond the context in which

²³ As displayed in Table 1, if a single minority player assimilates, she gets 22 points per period, compared to 14 points she gets in the *all-conform outcome*. Naturally, if all three assimilate, each minority player gets 30 points, which is more than twice the payoff of conforming.

²⁴ As displayed in Table 1, if only one minority player assimilates, she gets 12 points because she has to pay an assimilation cost of 10 points. Thus, it is only when two assimilate that each would get 18 points and improve compared to conforming, given the cost is reduced to 8 points. If all three minority players assimilate, each gets 24 points and the entire minority achieves economic mobility, because the *all-assimilate outcome* is socially efficiency and Pareto dominant. In SANCTIONS, unless two out of three assimilate, payoffs from a *fractured outcome* are not higher than those in the *all-conform outcome*.

it occurs. The existing experimental evidence on similar types of allocation choices consistently shows that individuals are likely to bias their allocation in favor of the receiver from their same group (Chen and Li, 2009; Cikara and Van Bavel, 2014).

In my experiment, however, after being exogenously assigned an identity, players have the option to endogenously change it (and consequently change their reference group) in the game with flexible identities. I use this choice (which takes place in each of the 10 periods of the game) to evaluate if assimilation leads majority and minority individuals to see each other as sharing a common identity, despite being originally assigned to opposing out-groups. If this were the case, the more the minority collectively assimilates (the fewer conformists there are) the more equitable the allocations between the two receivers will be. Thus, reducing in-group bias. Consequently, I postulate the following hypothesis:

Hypothesis 4. The more the minority collective assimilates the more likely majority and minority players are to make equitable allocations between the two receivers.

3.3. Experimental procedures

The experiment was conducted at the experimental laboratory of the University of Rosario (REBEL). A total of 336 individuals took part in the study.²⁵ Subjects interacted through computer terminals and the experiment was programmed using oTree (Chen et al., 2016). Each session lasted on average 120 minutes, including the time used to read the instructions and to anonymously pay.

From the beginning, subjects were informed that the study consisted of a sequence of four parts played within the same group of 7. Instructions were administered on the screen at the beginning of each part, so subjects did not know anything specific about a subsequent part before it started. After reading the instructions, subjects were presented with a set of comprehension questions and could not advance until all answers were correct. At all times, they could click on a button on the screen and a summary of the instructions for the corresponding part would be displayed (see Appendix A).

With respect to earnings, one of the 10 periods of play was randomly selected for payment from PART 2 (game with fixed identities) and one from PART 3 (game with flexible identities). For PART 4 (the allocation choice) the decision from one of the 7 subjects in a group was randomly selected for payment. In the instructions for each part, subjects received information about the way payment for the current part would be calculated. However, they were only informed about their actual earnings at the end of the experiment. Subjects were paid using the exchange rate of 2 points = 800 Colombian Pesos (COP). On average, players earned 46,000 COP (Approx. 15.5 USD), including a 3.5 USD show-up fee. The standard conditions of anonymity and non-deception were implemented in the experiment, and no one participated in more than one session.

4. Results

In this section, I summarize the main findings of the experiment. The data from the coordination games consist of decisions made in two Parts of 10 periods. There are 12 groups of 7 players in each of the main treatments: BASELINE, SANCTIONS and IGNORANCE, resulting in 252 observations at the group level for each part. To control for any interdependence across periods, I run random effects GLS regressions, clustering standard errors on groups. I report two-sided p-values from this analysis in the text and provide all regression tables in Appendix B.

Table 2 reports summary statistics of the main variables, separate for the majority and the minority. *Identity change* is the fraction of players in either the minority or the majority assimilating the identity of the other group (not applicable when identities are fixed). *Inter-group connectivity* reports the fraction of links formed across the majority and the minority.²⁶ *Action alignment* is the share of players who play an action in alignment with their (chosen) identity. *Efficiency* is the fraction of points an individual attains per period, normalized by the expected earnings in the segregated outcome.²⁷ This is an indication of economic mobility; where anything above 1 means earnings are higher than predicted for the second-best outcome, where the status quo is maintained and no one assimilates. Finally, *in-group bias* is a measure from the Other-Other allocation choice. It refers to the difference between the allocation to the in-group receiver and the out-group receiver, normalized by the total endowment of 10 points.²⁸

The first part of Table 2 summarizes the results for the social coordination game with *fixed* identities. By looking at the sequence of variables described, it becomes clear that the segregated outcome emerges. The first choice is inter-group connectivity, which shows that networks were segregated between minority and majority. On average, 4% of the 12 links that could exist between the two groups were formed; this is practically less than 1 connection across groups. In such segregated networks, both majority and minority players are very consistent in playing the action that aligns to their group identities, 98% for the majority and 89% for the minority. Consequently, they both achieve a level of efficiency below but somewhat close to 1, which is the maximum amount

²⁵ I conducted 3 sessions with 4 groups of 7 subjects for each treatment, including those sessions in the treatment REVEAL discussed in Section 5. All subjects were undergraduate students, out of which 58% were female. See Appendix C for more details on the sample.

²⁶ See Appendix C for a detailed summary of other connectivity variables, such as within-group connectivity and link proposals.

²⁷ The benefit of normalizing efficiency by the payoffs predicted for the status quo case is that the value is the same for the benchmark game with fixed identities and across treatments for the *all-conform outcome* in the game with flexible identities (see Table 1). Note that the *all-assimilate outcome* is the first-best outcome, for which efficiency is 2.1 for the minority in the BASELINE and IGNORANCE treatments and 1.7 in the SANCTIONS treatment.

²⁸ For ease in the exposition, I report the allocation bias under the treatment columns. That is why there is n/a for the fixed identity columns.

Table 2
Summary statistics.

	Fixed identities		Flexible identities					
	Major	Minor	BASELINE		IGNORANCE		SANCTIONS	
			Major	Minor	Major	Minor	Major	Minor
<i>Identity change</i>	n/a	n/a	0.01 (0.09)	0.95 (0.21)	0.01 (0.08)	0.65 (0.48)	0.01 (0.08)	0.59 (0.49)
<i>Inter-group connectivity</i>		0.04 (0.13)		0.77 (0.33)		0.42 (0.44)		0.51 (0.43)
<i>Action alignment</i>	0.98 (0.14)	0.89 (0.31)	0.99 (0.06)	0.98 (0.16)	0.99 (0.09)	0.96 (0.20)	0.99 (0.06)	0.91 (0.28)
<i>Efficiency (mobility)</i>	0.88 (0.25)	0.75 (0.36)	1.42 (0.33)	1.68 (0.57)	1.18 (0.39)	1.15 (0.71)	1.28 (0.35)	0.91 (0.67)
<i>In-group bias</i>	n/a	n/a	0.36 (0.42)	0.22 (0.37)	0.39 (0.43)	0.37 (0.38)	0.31 (0.40)	0.48 (0.45)

The table summarizes the average fractions (percentages) for each of the main variables, with standard deviations in parentheses: *Identity change* is the fraction of players assimilating the identity of the other group. *Inter-group connectivity* is the fraction of links formed across the majority and the minority. *Action alignment* is the share who play an action in alignment with their identity. *Efficiency* is the fraction of points an individual attains per period, normalized by the expected earnings in the segregated outcome (status quo). Observations are disaggregated by majority and minority; pooled for the game with *fixed* identities and separated by treatment for the game with *flexible* identities.

attainable in the segregated outcome. This result is in line with the conjecture from Hypothesis 1, as minority and majority members segregate when identity change is not possible.²⁹

This also gives a clear benchmark to evaluate economic mobility. For 10 consecutive periods, minority players have been getting earnings as predicted for the segregated outcome. Then, identity change is introduced, which would allow them to alter the segregated outcome, by connecting with the those in the dominant majority. If so, they can earn almost twice what they were earning and attain economic mobility.

The second part of Table 2, summarizes the results of the game with *flexible* identities, by treatment. It is evident that when given the option to change identities, majority members chose to keep theirs 99% of the times, with no differences between treatments. In terms of inter-group connectivity, it dramatically increases from fixed to flexible identities. Although, there are still some challenges for the minority and the majority to properly integrate, especially when there are barriers to assimilation. As with fixed identities, action alignment is high for both majority and minority. Specifically, for the minority players, who are the ones assimilating, they play the action that aligns with their identity 98% in the BASELINE, 96% in IGNORANCE, or 91% in SANCTIONS.³⁰ Thus, resulting in levels of efficiency above 1 in almost all cases (except for the minority in SANCTIONS). This suggests that, on average, the possibility to assimilate allows the minority to significantly increase earnings, compared to the case with fixed identities, and attain economic mobility. I explore this in detail in the next section.

4.1. Assimilation and economic mobility

In this section, I look at how identity choices affect inter-group connectivity and economic mobility. I explore this effect in settings where players are exposed to either social SANCTIONS or IGNORANCE, and compare it to the BASELINE without barriers to assimilation.³¹

With respect to the minority, Fig. 3A shows that in the BASELINE the average level of assimilation is 95%, which drops to 65% in IGNORANCE ($p = 0.007$) and to 60% in SANCTIONS ($p < 0.001$), where the effect of SANCTIONS and IGNORANCE is not statistically distinguishable ($p = 0.684$). Thus, at the individual level, both social sanctions and unobservable identities reduce but do not outright prevent assimilation from the minority.³²

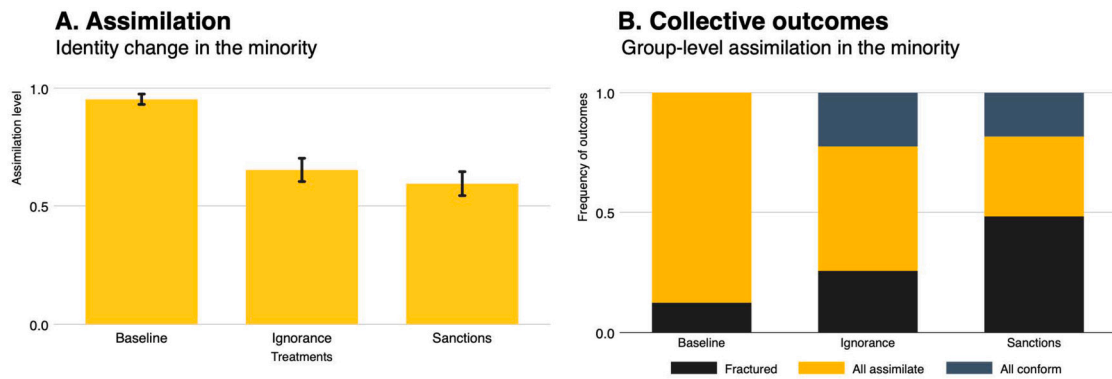
I take a deeper look at the data, evaluating the extent to which assimilators and conformists co-exist in the same group. I also explore which barrier to assimilation is more conducive of fracturing the minority in that way. Fig. 3B shows that minority groups exposed to social sanctions are less likely to avert the *fractured outcome* when compared to groups in which identities could not be observed or to groups for which assimilation was costless (see the black fraction of the bars): about 50% of the groups in SANCTIONS

²⁹ These results replicate findings in Goyal et al. (2021), where 90% of inter-group connections are missing and players choose actions aligned with their induced identities: 93% for the minority and 99% for the majority.

³⁰ The analysis on action alignment shows there are no significant differences between treatments, neither for the minority nor for the majority (see regressions in Table B-1 of Appendix B).

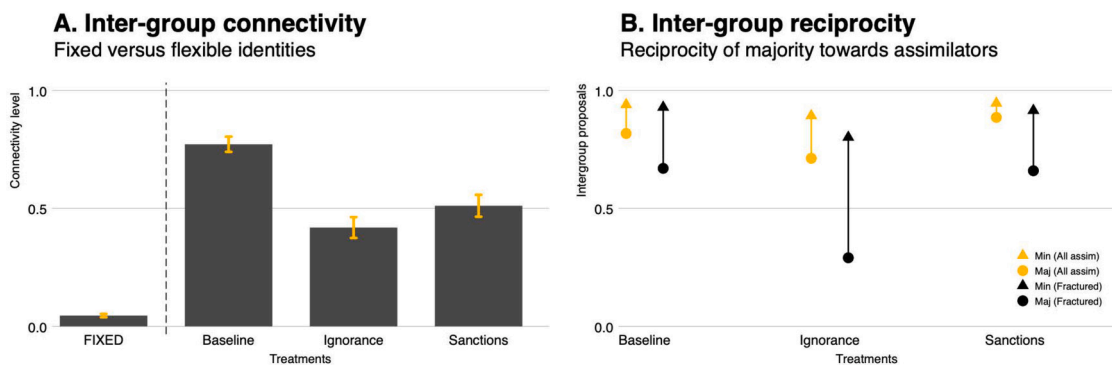
³¹ In Section 5, I explore how exogenously imposing barriers in SANCTIONS or in IGNORANCE compares to a condition where individuals endogenously choose which barrier to face: treatment REVEAL.

³² Assimilation choices vary by groups and treatments: a large share of the minority assimilates and this is most frequent in the BASELINE, while less than 1% of the majority players ever change identities, irrespective of the treatment (see regressions in Table B-1 of Appendix B).



Panel A illustrates the average level of assimilation of the minority. Lines represent 95% confidence intervals. Panel B illustrates the frequency of each outcome (*fractured outcome*, *all-assimilate outcome*, and *all-conform outcome*). Results in both panels are disaggregated by treatment.

Fig. 3. Individual and collective assimilation.



Panel A illustrates the average level of connectivity between the minority and the majority for the game with *fixed* identities, as well as for the main treatments with *flexible* identities. Panel B illustrates the level of reciprocity from the majority towards assimilators. The top of each line (triangle) indicates the fraction of link proposals made by the assimilator to the four players in the majority. The bottom of each line (circle) is the fraction of proposals from the majority to the assimilator. The length of the line indicates the fraction of unreciprocated proposals by the majority, separate for the *all-assimilate outcome* (light color) and the *fractured outcome* (dark color). Results in both panels are disaggregated by treatment.

Fig. 4. Inter-group connectivity and reciprocity.

are fractured, which is twice more than the 25% in IGNORANCE ($p = 0.052$) and four times more than the 12% in the BASELINE ($p = 0.001$).³³

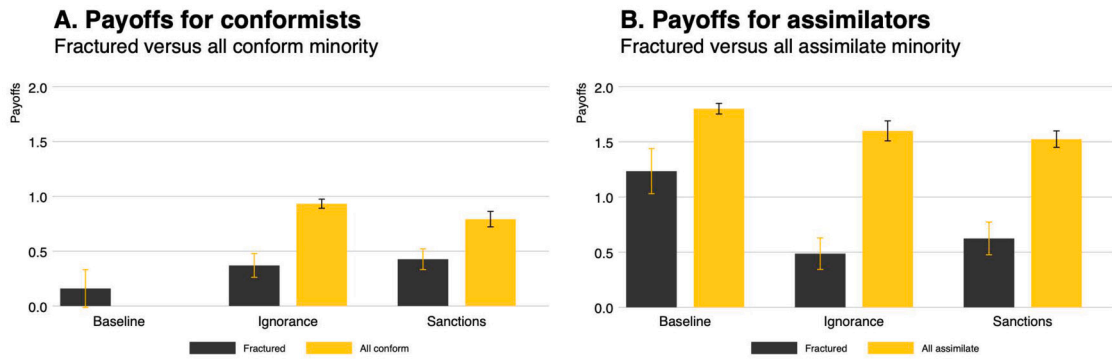
On the other hand, the setting without barriers is most fertile to promote the *all-assimilate outcome* (88%). This is also the most frequent outcome with unobservable identities (55%) and the second most frequent with social sanctions (35%). This indicates that when a minority player assimilates, she is most likely to be surrounded by other assimilators in the BASELINE, and most likely to be in a fractured minority, surrounded by conformists in SANCTIONS.

The natural question to follow is how the difference in assimilation patterns and collective outcomes impacts the chances of the minority to integrate with the majority. Fig. 4A illustrates inter-group connectivity. For the fixed-identity stage, as shown before, connectivity is close to null, such that players create incomplete networks where they segregate by majority and minority: 96% of the links across groups are missing. Compared to fixed identities, inter-group connectivity significantly increases to 77% ($p < 0.001$) in the BASELINE. The increment is evident but not as large in IGNORANCE (44%, $p < 0.001$) or in SANCTIONS (51%, $p = 0.004$).³⁴

Next, I focus exclusively on the minority members that assimilate. It is efficient that any assimilator proposes a connection to each of the four majority members and all proposals should be reciprocated. This because assimilators and majority players share the same identity and thus, have aligned incentives over which action they would prefer to coordinate on. In this case, the four majority players and the assimilator benefit the most if they connect, independently of whether the other minority members are conforming

³³ Table B-3 of Appendix B reports regressions on collective outcomes by treatment.

³⁴ Regressions on the comparison of intergroup connectivity between Part 1 (fixed identities) and Part 2 (flexible identities) are reported in Table B-2 of Appendix B. In complement, Table B-3 reports regressions on inter-group connectivity between treatments (in Part 2), and shows that with respect to the BASELINE, the levels of integration are significantly lower in IGNORANCE ($p = 0.002$) and in SANCTIONS ($p = 0.013$), while the difference is not significant between the two latter treatments ($p = 0.494$).



Panel A illustrates the level of payoffs minority players got when they conformed and the rest of the minority acted in unity (*all-conform outcome*) or was fractured. Panel B illustrates payoffs for minority assimilators, also when the rest assimilated as well or when it was fractured. Results in both panels are disaggregated by treatment.

Fig. 5. Payoffs (efficiency) and economic mobility.

or assimilating. The results show, however, that reciprocity is significantly lower for assimilators when the minority is fractured by conformists, even if the assimilation choices were observable (i.e., the effect is not exclusive to identities being unobservable in IGNORANCE).

Fig. 4B shows the level of inter-group connectivity of minority assimilators, separate for the *all-assimilate outcome* (light color) and the *fractured outcome* (dark color). The top of each connected line (triangle symbol) shows the level of proposals made by an assimilator to those in the majority (1 means she made a proposal to all 4 majority members), the bottom is the level of proposals made by the majority members to the assimilators (circle symbol), and a line's height is the fraction of unreciprocated proposals from the majority to the assimilators.

When the minority acts as a collective unit and all members assimilate, individuals form on average 82% of the links in the BASELINE, 71% in IGNORANCE ($p = 0.194$), and 88% in SANCTIONS ($p = 0.608$).³⁵ The fact that treatment differences disappear indicates that unity facilitates individual connectivity. However, when the minority is fractured, average inter-group connectivity is 67% in BASELINE, 29% in IGNORANCE ($p < 0.001$) and 66% in SANCTIONS ($p = 0.590$).³⁶ This suggests that integration is harder for assimilators when others in the minority are conformists, not because they make fewer proposals to the majority, but because the majority proposes back fewer times. That is, assimilators behave in the same way towards the majority regardless of what others do.³⁷ But, the majority reciprocates differently to the same number of proposals received from those who assimilate, depending on what they see others choose.³⁸

The next step is to look at the effect of assimilation on payoffs, and consequently on economic mobility. Fig. 5A shows the payoffs minority players got when they chose to conform. If the entire minority conformed in unity and maintained the status quo (lighter bars) their payoffs were close to the maximum level of efficiency of 1, while if the minority was fractured payoffs for conformists were reduced to almost half. This is the natural effect of sticking to their group identity when others in the minority assimilate, as their networks shrink.

Fig. 5B shows the case for assimilators. Naturally, assimilating when others also assimilate (lighter bars) gives the highest payoffs, as minority assimilators integrate much better if there are no conformists fracturing their group. In contrast, assimilating within a fractured minority gives lower payoffs than those of assimilators in a united minority (compare dark versus light bars in Panel B). Furthermore, if one compares the dark bars on Panel B with the light bars on Panel A, for each treatment, it is notable that an assimilator in a fractured minority would have been better off staying a conformist, and persisting on the inefficient group identity, in an all-conformist minority. For instance, a conformist in SANCTIONS, would get an average payoff of 0.79 points if the minority is united (all conform), while she would receive a payoff of 0.63 if she assimilates but some minority players conform. The same effect is observed when comparing the payoffs for the IGNORANCE treatment ($0.93 > 0.48$).³⁹

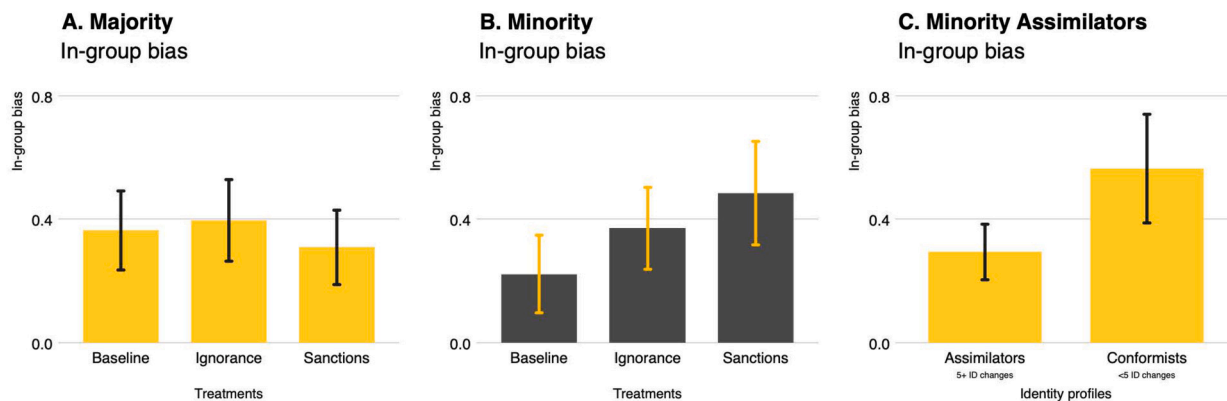
³⁵ Results of the regression on intergroup connectivity in the *all-assimilate outcome* are reported in Table B-3 (column III) of Appendix B, which also shows there are no significant differences between IGNORANCE and SANCTIONS, ($p = 0.110$).

³⁶ Regressions on intergroup connectivity in the *fractured outcomes* are reported in Table B-3 (column IV) of Appendix B, which shows that the difference is also significant between IGNORANCE and SANCTIONS ($p < 0.001$). Thus, suggesting that incomplete information plus a fractured minority create a much harsher environment for assimilators.

³⁷ This is reported in Table B-4 of Appendix B, which shows that inter-group proposals from the minority to the majority do not differ on whether the outcome is fractured or not, and this is true in the BASELINE ($p = 0.461$), in IGNORANCE ($p = 0.793$) or in SANCTIONS ($p = 0.102$).

³⁸ Inter-group links are a consequence of bilateral proposals between players from the minority and from the majority. Table B-5 of Appendix B summarizes regressions reporting that there are significant differences in connectivity when the minority is fractured, and this is true in the BASELINE ($p < 0.001$), in IGNORANCE ($p = 0.010$), and in SANCTIONS ($p < 0.01$). This indicates that the reciprocity of the majority is lower when outcomes are fractured.

³⁹ In Appendix B, I report regressions showing that a setting with flexible identities significantly increases the average earnings for both minority (see Table B-6) and the majority (see Table B-7). Subsequently, in Table B-8, I report results showing that assimilators earn less if they are in a fractured minority than if they are not ($p < 0.001$).



The graph shows the magnitude of allocation bias towards in-group members for the majority (Panel A) and the minority (Panel B), by treatment. Also, the magnitude of the bias between assimilators (players who changed identity at least half of the times) and conformist (players that never changed identity or did it four times or fewer) in Panel C.

Fig. 6. In-group bias in allocations.

In summary, the main findings of the experiment indicate that minority players can strategically assimilate the group identity of the majority to achieve economic mobility. However, the success of their choice is dependent on whether their social group (the minority) acts in unity, so that all others assimilate as well, or is fractured by conformists.

The presence of conformists imposes negative externalities on assimilators. These are observed in the way the majority reciprocates to their intentions to integrate. Majority players significantly reduce reciprocity towards assimilators when they also encounter conformists in the minority group. Lowering reciprocity reduces inter-group connectivity and directly impacts payoffs. Assimilators in a fractured minority not only get a lower payoff than assimilators in a united minority, but also get less than if they had not assimilated and stayed in a united minority of only conformists. However, economic mobility is achieved if the minority assimilates in unity, irrespective of the barriers faced.

The results give support to the null Hypothesis 2, but only for the BASELINE treatment, as it predicts that minority players will assimilate and properly integrate. This is not the case for the SANCTIONS and the IGNORANCE treatments. For these conditions, the results support the alternative Hypothesis 3, which predicts lower levels of assimilation and more frequent fractured minorities when there are barriers to assimilate. That is, lower than in the BASELINE treatment. In addition, the findings suggest that social sanctions are more likely to produce fractures in the minority, even more than incomplete information (i.e., IGNORANCE). I explore this further in Section 5, in a novel treatment labeled REVEAL.

In what follows, and to close the results section, I look at whether assimilation and collective unity within the minority have positive spillovers on social (distributive) preferences between groups, in a setting that goes beyond the social coordination game.

4.2. Identity change and social preferences

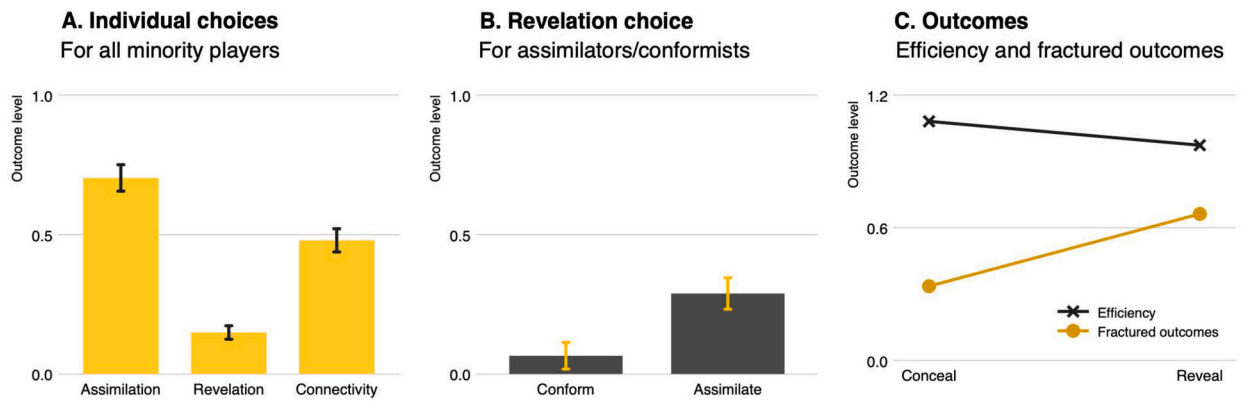
In this section, I measure differences in the allocation players make to a receiver from their in-group and to a receiver from their out-group, at the end of the experiment. The difference between the allocations represents the magnitude of the *in-group bias*. Following Hypothesis 4, equitable allocations (no bias) are expected to occur the more a player perceives the out-group receiver as someone she identifies with.

Fig. 6A illustrates the magnitude of in-group bias for the majority, and shows that there are no differences in bias in the BASELINE (36%) with respect to IGNORANCE (39%, $p = 0.728$) or to SANCTIONS (31%, $p = 0.528$). On the contrary, Fig. 6B provides support to the predictions in Hypothesis 4, that allocations to the out-group are expected to be positively related to the minority collectively assimilating. Allocations in the BASELINE are biased by 22%, the bias in IGNORANCE is higher but not significantly different to the BASELINE (37%, $p = 0.101$), while the bias in SANCTIONS is significantly larger than in the BASELINE (48%, $p = 0.012$).

The more minority players assimilate collectively as a unit, the more equitable are their preferences towards the out-group. This is not the case for the majority, so that even when the minority assimilates and acts the way the passive majority prefers, the majority seems unaffected by it. Thus, collective assimilation can transform social (distributive) preferences for the active group (the minority), but not for the passive group that maintains the status quo (the majority).⁴⁰

I further explore this result as illustrated in Fig. 6C, by testing how biased are assimilators compared to conformists. I define a minority player as an assimilator if she changes her identity in at least half of the 10 periods of the game with flexible identities. Consequently, a conformist is a player that never changes her identities or that changes it four or fewer times. The figure shows

⁴⁰ Table B-9 of Appendix B reports all regressions comparing biases between treatments, separately for the minority and for the majority.



Panel A illustrates the average level of assimilation, identity revelation, and inter-group connectivity. Lines represent 95% confidence intervals. Panel B illustrates the share of conformists and assimilators that reveal their chosen identities. Panel C illustrates the level of efficiency (line with X) and the frequency of *fractured outcome* players are in, conditional on revealing or concealing their chosen identities.

Fig. 7. Behavior in treatment Reveal.

that the bias for conformists is almost twice that of assimilators (56% vs. 29%, $p = 0.006$).⁴¹ Thus, confirming the finding that by assimilating, minority players generate a sense of shared identity with the majority that transforms distributive preferences and, consequently reduces in-group biases in allocations.

5. Revealing identity choices

In this section, I report results on treatment REVEAL, where I allow individual players to endogenously select whether to conceal or to reveal their chosen identities. This is a way to endogenize which barriers individuals face. I do not conduct a treatment combining social sanctions and unobservability of identities, because as argued by Fryer and Torelli (2010) and Bisin et al. (2011), these two barriers are mutually exclusive. An individual can either signal her assimilation of a new group identity or conceal it. Making the assimilation choice visible guarantees integrating with the out-group but exposes the assimilator to social sanctions from her in-group. Keeping it hidden impedes sanctions but puts the assimilator in a setting of unobservability, where her choice is not observed by either the out-group or other assimilators in her in-group. I impose each barrier exogenously and separately in the main treatments (SANCTIONS and IGNORANCE) to better understand the way social groups confront them. To complement this choice in design, I conduct the REVEAL treatment where I make barriers endogenous.

In the REVEAL treatment, players can assimilate at no cost but their chosen identity will not be observable to others (as in IGNORANCE). Then, players choose whether to *reveal* their identity, which exposes them to sanctions that increase on the number of conformists (as in SANCTIONS). This is implemented for the minority through a *revelation cost* that has the same form as the assimilation cost in SANCTIONS: $\delta_{\text{REVEAL}} = 6 + 2(n_m - \tau)$, where $n_m = 3$ and τ is the number of in-group members who assimilate.⁴²

The main question with endogenous barriers is whether the choice individuals make of which barrier to expose themselves to, leads to outcomes that reflect similar patterns to those observed with exogenous barriers. Fig. 7A shows that minority players assimilate 70% of the times. This is not distinguishable from either IGNORANCE ($p = 0.726$) or SANCTIONS ($p = 0.393$).⁴³ Once players choose their identities, less than a quarter (22%) revealed them. Instead, most players (78%) kept their identities concealed. Consequently, less than half of all possible inter-group connections were formed (48%).

Fig. 7B illustrates how assimilators and conformists decide between revealing their identity choices or keeping them concealed. Although less than one quarter of the players ever reveal their identity choices, assimilators choose to expose themselves and assume the revelation cost 29% of the times, while conformists only do it 6% of the times ($p < 0.001$). This works in favor of assimilators who reveal their choices as they integrate much better with the majority than those who conceal (77% > 39%, $p < 0.001$). Concealing only gives the minority a slightly, although not significantly different, level of efficiency when compared to revealing (1.1 versus 0.97, $p = 0.196$), as illustrated in Fig. 7C.⁴⁴

But, the most notable outcome, which resonates with the effects observed between IGNORANCE and SANCTIONS, is that individuals revealing their chosen identities end up in a *fractured outcome* significantly more often than those who conceal them.⁴⁵ In fact, when

⁴¹ The analysis comparing the level of in-group bias of assimilators and conformists for the minority and for the majority shows that there is a significant impact of assimilating for the minority, as they reduce in-group bias by almost half, while there is no effect for the majority, as no majority player ever changes identity more than twice (see Table B-10 of Appendix B).

⁴² For the majority the revelation cost is $\delta_{\text{REVEAL}} = 6 + 2(n_M - \tau)$ given $n_M = 4$.

⁴³ The comparison between treatment REVEAL and the two main treatments with barriers, IGNORANCE and SANCTIONS, show that there are no differential effects on whether barriers are exogenously imposed or chosen endogenously, neither for the minority nor for the majority (see Table B-11 of Appendix B).

⁴⁴ This is reported in the results summarized in Table B-12 of Appendix B.

⁴⁵ The frequency of the *fractured outcome* is 40%, which is lower but neither significantly different from SANCTIONS ($p = 0.606$) nor from IGNORANCE ($p = 0.209$).

all three minority players assimilate, there is significantly less revelation of chosen identities than when some assimilate and others conform ($p < 0.001$), which is indicative that being exposed to social sanctions is likely to be related to a fractured minority.⁴⁶ Thus suggesting that by endogenously avoiding social sanctions, the minority is able to act cohesively and attain economic mobility, even though their chosen identities are concealed.

6. Conclusions

In this paper, I show that two minority assimilators will be treated differently, either welcomed or discriminated against by those in the majority they want to join, depending on the choices of other minority members around them. This means that even in a setting where the benefits of assimilation are stark and sizeable, assimilators may fail to benefit from their choices when their social group is fractured into assimilators and conformists. Those who persist on maintaining the status quo impose negative externalities on those who risk to change it.

The different experimental variations of my design allow me to identify the robustness of this result. No matter how hard it was for a minority player to assimilate, whether she had to overcome social sanctions or risk assimilating in a setting where her identity choices would not be observable, the outcomes are consistent and assimilation fails when the minority fractures. This is a strong indication that the success of assimilation cannot be placed on the individual alone, but must involve the awareness and participation of those in the dominant group.

A limitation of my work is that individuals may be less attached to their induced identities compared to natural or real-world identities (Tajfel and Turner, 1979; Eckel and Grossman, 2005; Charness et al., 2007). If the induced identities make it easier for individuals to abandon them and assimilate, then the observed levels of assimilation in the real world would be more modest than those in my study. However, if anything, this provides stronger support to the main finding that assimilation fails when the minority group is fractured. If in my setting, where interactions may be thought of as purely transactional, the majority discriminates against assimilators because of what other minority members do, it is likely this will become harsher when individuals are more attached to their group identities.

Arguably, the other-other allocation decision (Chen and Li, 2009) at the end of the experiment is a complementary dimension that shows how individuals (to a certain extent) identified and attached meaning to the group they were assigned to. The findings show that across treatments there is an in-group bias in allocations, suggesting that by making more equitable allocations between majority and minority receivers, assimilators internalize the other group's identity as well. Thus, providing support to the idea, already persistently observed in multiple studies, that experimentally induced identities can be a strong and useful approach to understand group processes and social change (Chen and Chen, 2011).

A challenging result from the other-other allocation decision is, however, that those in the majority do not change their social preferences towards the minority, irrespective of how much effort assimilators put into changing their group identities and integrating. Arguably, the passivity of the majority prevents the creation of a common identity for them, although it is not precluded for the minority. This inability to see others as part of one's group because of not having to do anything to make it happen, can be an important source of discrimination in real world settings.

My work suggests two avenues for further research. One is to directly evaluate how likely are individuals to change identities in settings where group identities were formed outside the laboratory. This can help calibrate the impact of identity attachment on assimilation choices and outcomes. A second direction is to evaluate the alternative setting of a third social category, so that instead of the minority assimilating the identity of the majority, both minority and majority can create a new group identity together. Possibly, by eliminating the focality of the majority, this would prevent them from being passive. If members from the majority and the minority work together to create a new social category, they could perceive each other as sharing a common identity, which would reduce discrimination and benefit both groups.

Declaration of competing interest

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Data availability

Data will be made available on request.

Appendix A. Supplementary material

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.geb.2024.04.004>.

⁴⁶ Table B-13 of Appendix B reports regressions on the decision of revealing the chosen identity as a function of the number of assimilators in the group. While there is no significant effect on revelation choices when an assimilator is part of a fractured outcome, individuals are significantly less likely to reveal their identity change when they are in an *all-assimilate outcome*.

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