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# Do Minorities Misrepresent Their Ethnicity to Avoid Discrimination?\*

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## Abstract

Discrimination against minorities is pervasive in many societies, but little is known about strategies minorities may apply to minimize discrimination. In our trust game with 758 high-school students in the country of Georgia, ethnic Georgian trustors discriminate against the ethnic Armenian minority group. We introduce an initial signaling stage to investigate Armenians' willingness to hide their ethnicity to avoid expected discrimination. 43 percent of Armenian trustees untruthfully signal that they have a Georgian name. Signaling behavior is driven by expected transfers and non-pecuniary motives. This strategic misrepresentation of ethnicity increases Georgian trustors' expected back transfers and eliminates their discriminatory behavior.

Keywords: discrimination, trust game, experiment, signaling, adolescents

JEL classification: C91, C93, D83, J15, D90

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# 1. Introduction

Discrimination against minorities is pervasive in many societies around the world. Over the past decades, an impressive body of research in economics and related fields has documented discrimination in various market- and non-market settings (for surveys of the field-, lab-, and non-experimental literature, see Arrow 1998, Yinger 1998, Altonji and Blank 1999, Riach and Rich 2002, Anderson et al. 2006, List and Rasul 2011, and Bertrand and Duflo 2017). Discrimination can be based on different attributes of the groups discriminated against (e.g., ethnicity, gender, or religion), and materializes in decisions related to hiring, pricing, letting, or allocating attention (e.g., Bartos et al. 2016).<sup>1</sup> The experimental literature to date has mainly focused on majority-group members' decisions to discriminate, e.g., by studying the existence of discrimination, or the effectiveness of anti-discrimination policies.<sup>2</sup> In contrast, minorities' strategic responses to discrimination have received little scholarly attention. In particular, very little is known about what strategies minority-group members apply to circumvent anticipated discrimination, or about the effectiveness of such strategies. This is the research gap that we address in this paper.

We focus on minorities' strategic misrepresentation of their ethnicity to avoid being discriminated against. Existing models of discrimination usually assume that minorities' ethnic affiliation is perfectly observable. In reality, however, many interactions are characterized by asymmetric information, where majority-group members observe only a noisy signal of the ethnicity of minority-group members. Consequently, minority-group members have some discretion over what ethnicity-revealing signals to send. For instance, job applicants can decide whether to include racial cues in their résumés (Kang et al. 2016), students can decide whether to perform rituals which identify their religious affiliation (Lavy et al. 2018), car dealers can decide whether to reveal their ethnic names in advertisements (Zussman 2013), immigrants can decide whether to adopt typical names of the host-country population (Arai and Thoursie 2009, Biavashi et al. 2017), and minority university students can decide whether to use ethnic-

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<sup>1</sup> Victims of discrimination face, for instance, lower likelihood of educational success (Alesina et al. 2018), higher probabilities of being assigned monetary bail (Arnold et al. 2018) and being convicted (Anwar et al. 2012), worse labor- and rental-market outcomes (Bertrand and Mullainathan (004, Ahmed and Hammarstedt 2008), and higher consumer prices (Gneezy et al. 2012).

<sup>2</sup> Potential policies to mitigate discrimination (or its consequences) include enhancing majority-group members' contact to minority-group members (Boisjoly et al. 2006), raising awareness of racial bias or stereotypes (Pope et al. 2018, Alesina et al. 2018), introducing anonymous application procedures (Goldin and Rouse 2000), and implementing affirmative-action programs (Holzer and Neumark 2000).

majority names when emailing their professors (Zhao and Biernat 2017). The previous literature documents that misrepresentation of ethnicity is a common phenomenon among minorities.<sup>3</sup>

We experimentally study the causes and consequences of minorities' strategic signaling behavior in the context of the marginalized Armenian minority in the country of Georgia. Georgia provides an ideal setting for two reasons: First, as in many other societies, names are unambiguous identifiers of ethnicity. Second, recent historical accounts suggest that some Armenians have adopted Georgian-sounding names to avoid discrimination (see section 2 for historical and cultural background information).<sup>4</sup>

We conduct our lab-in-the-field experiment with a total of 758 high school students (aged from 12 to 17) from six high schools in Tbilisi, Georgia.<sup>5</sup> Studying the determinants and consequences of strategic name-signaling behavior with observational data is extremely challenging because credible exogenous variation to identify causal effects and high-quality data on behaviors and beliefs are usually unavailable. To sidestep these identification challenges, we use a modified version of the trust (or "investment") game (Berg et al. 1995) as our vehicle to measure discrimination. The trust game is a two-player game in which the first player ("trustor") is endowed with a fixed number of tokens, and has to decide how many tokens, if any, to transfer to the second player ("trustee"). The experimenter multiplies the transfer and hands it over to the trustee, who then decides how many of the received tokens, if any, to transfer back. Back transfers are not multiplied. A major advantage of the trust game is that it is not a zero-sum game, which allows us to assess the efficiency-consequences of discrimination. We use this experimental paradigm to address the following three research questions: First, do

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<sup>3</sup> For instance, Biavashi et al. (2017) shows that 31 percent of U.S. immigrants in the early twentieth century engaged in name Americanization, Zussman (2013) reports that 30 percent of Arab car dealers in Israel hide their ethnic names in advertisements, and Kang et al. (2017) finds that 31 percent (40 percent) of black (Asian) students conceal racial cues in their résumés.

<sup>4</sup> Names are the most common way to manipulate perceived minority traits in correspondence studies (Bertrand and Duflo 2017). The literature documents various ways individuals can "choose" majority-sounding names strategically: One set of options includes official naming decisions, such as legally binding name changes (e.g., Arai and Thoursie 2009, Biavashi et al. 2017), or parents choosing names for their children (e.g., Abramitzky et al. 2016, 2019). Another set of options concern situations where individuals have the possibility to choose names which do not necessarily correspond to their official names. For instance, Lieberson (2000) lists the original and stage names of entertainers in the U.S., and argues that stage names are often chosen to hide ethnic or religious origins. Similarly, new technologies such as email or social media provide a particularly easy way to manipulate perceived minority status (e.g., Zhao and Biernat 2017). For instance, anecdotal evidence suggests that teenagers of Arabic descent in Germany choose Latino-sounding names on Facebook to improve their mating probabilities (Bayerischer Rundfunk, 8 September 2016, <https://www.br.de/puls/themen/leben/aus-muslim-wird-latino-100.html> [accessed 11 January 2019]).

<sup>5</sup> In Harrison and List's (2004) taxonomy, our study is classified as a "framed field experiment".

Georgians discriminate against the Armenian minority in the trust game? Second, do Armenians expect discrimination and do they misrepresent their ethnicity to avoid being discriminated against? Third, is Armenians' strategic signaling behavior effective in reducing discrimination?

Focusing on Georgians in the role of trustors and Armenians in the role of trustees, we implement four between-subject treatments in which first names serve as indicators for the interaction partners' ethnic affiliation. In the first treatment, the trustor is ethnic Georgian and the trustee is also ethnic Georgian. In the second treatment, the trustor is ethnic Georgian and the trustee is ethnic Armenian. These two treatments do not include a signaling stage and serve as our benchmark to measure Georgians' trust discrimination against Armenians. In the third treatment, instead of our informing the trustor of the ethnicity of the trustee, the trustee had the option to send a message about her ethnicity to the trustor.<sup>6</sup> The trustee can decide between sending (i) a truthful message signaling that her name is ethnic Armenian, (ii) an untruthful message signaling that her name is ethnic Georgian, or (iii) no message. Comparing Georgian trustors' transfers to Armenian trustees across treatments with and without the signaling stage reveals the extent to which Armenian trustees' signaling behavior mitigates discrimination. Finally, the fourth treatment is identical to the third treatment except that the trustor is Armenian. Comparing Armenian trustees' signaling behavior toward Georgian versus Armenian trustors allows us to assess the extent to which signaling behavior is strategic in that it depends on the ethnicity of the trustor.

We have three main findings. First, there is pronounced discrimination by Georgian trustors against Armenian trustees: While Georgian trustors transfer, on average, 5.2 tokens to Georgian trustees in the first treatment, transfers to Armenian trustees are significantly lower, by 1.2 tokens ( $p < 0.01$ ). This discrimination is based on Georgians' correct belief about lower back transfers from Armenian trustees. Second, Armenians anticipate this discrimination, and many react to it by misrepresenting their names: In the third treatment with the signaling stage, 43 percent of trustees send the untruthful message that their name is Georgian. Our data show that signaling behavior is driven by both expected transfers and non-pecuniary considerations, such as the perceived importance of observable markers of ethnicity and ethnic in-group attachment. The fact that none of the Armenian trustees sends a Georgian name signal when the trustor is also Armenian in the fourth treatment shows that minority members use the signaling

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<sup>6</sup> Trustors in the signaling treatments were informed that the message was sent by the trustee (and not by the experimenter). See section 3 for details.

device strategically to avoid discrimination. Third, Armenians' signaling behavior is effective in reducing discrimination: On average, the magnitude of Georgian trustors' discrimination halves when introducing the signaling stage, which increases overall efficiency (and Armenian trustees' profits). Scrutinizing the underlying mechanisms of these effects, we suggest that the signal alters trustors' transfers by raising their expectations about trustees' back transfers.

Our paper is related to several strands of the economic literature. At the most basic level, it complements the large body of experimental studies on ethnic discrimination. While experimental evidence on discrimination is vast, this literature mostly measures discrimination without accounting for potential victims' strategic responses to circumvent anticipated discrimination. Abstracting from minorities' optimizing behaviors is problematic when extrapolating experimental estimates of discrimination to real-world settings. As our results show, adjusting for minority-group members' optimizing behavior (in the form of strategic ethnicity revelation) halves the magnitude of trust discrimination. Of course, the extent to which adjusted or unadjusted discrimination rates are more meaningful is context-specific, but our results highlight that accounting for minorities' strategic behavior has important effects on measured discrimination.<sup>7</sup>

Few papers examine minorities' strategic behavior in response to discrimination. Most prominently, Parsons et al. (2011) investigate pitchers' strategic behavior in Major League Baseball. Pitchers correctly anticipate that strikes are called less often if umpires are of a different ethnicity. Consequently, pitchers throw pitches that allow other-ethnicity umpires fewer subjective judgements, which biases minorities' performance measures downward. Complementing this paper, we show that minorities' strategic behavior to avoid discrimination is also prevalent in decisions to signal their ethnic affiliation.

We are aware of only three papers that study signaling behavior in the presence of possible discrimination. Zussman (2013) provides descriptive evidence that Arab car dealers in Israel are more likely to leave the name fields of their advertisements blank than Israeli dealers are. The author suggests that Arab car dealers obfuscate their ethnic identity to avoid being

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<sup>7</sup> Relatedly, a major criticism against audit- and correspondence studies is that they assume that job seekers apply for positions in a random fashion. In reality, however, real job seekers optimize their behavior during the search process, for instance, by not applying for certain positions, or by strategically highlighting or hiding some of their characteristics in their application material. Thus, these types of studies measure average differences in hiring probabilities, but not discrimination at the margin, i.e. after minority-group members adjusted their behavior strategically to the realities of the specific market (see Heckman 1998, and section 1.5 in Bertrand and Duflo 2017).

discriminated against. Relatedly, Alston's (2018) working paper shows that experimental subjects in the role of workers (mistakenly) assume that managers will discriminate against females in their hiring decisions, and that female workers therefore are willing to give up their earnings for not revealing their gender in their résumé. Finally, Kang et al. (2016) find that black and Asian job applicants engage in "résumé whitening", i.e. concealing racial cues in résumés, to avoid anticipated discrimination. Our experiment extends this small evidence base by studying behavior on both sides of discrimination (trustor and trustees), underlying beliefs, and the efficiency implications of strategic signaling behavior.

On a more general level, our paper provides an experimental micro-foundation for studies investigating the effects of minorities' name changing behavior on their economic success. The first paper to study this phenomenon is Arai and Thoursie (2009), who show for Sweden that immigrants from Asian, African, and Slavic countries experience substantial earnings increases after changing their surnames to Swedish-sounding names. Focusing on U.S. immigrants in the early twentieth century, Biavashi et al. (2017) find that the Americanization of first names is associated with substantial occupational upgrading.<sup>8</sup> These studies speculate that minorities adopt majority-sounding names to avoid name-based discrimination, which implies a trade-off between discrimination costs and identity costs associated with name-changing decisions.<sup>9</sup> Our results support the notions that minority-group members misrepresent their ethnicity strategically to avoid discrimination, and that they face a trade-off between pecuniary and non-pecuniary consequences when taking signaling decisions.<sup>10</sup>

Methodologically, our paper is part of the literature which investigates discrimination using trust games (Berg et al. 1995). In their seminal contribution, Fershtman and Gneezy (2001) study ethnic discrimination between Ashkenazic (Western) and Eastern Jews in Israel. Using typical ethnic names as signals for ethnicity, they detect systematic distrust toward men of Eastern ethnicity. Our experimental design extends Fershtman and Gneezy's (2001) with an initial ethnicity-signaling stage in which trustees can send an (un)truthful message about their name. To our knowledge, the only other paper to introduce such a signaling stage in the trust

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<sup>8</sup> Relatedly, Abramitzky et al. (2016, 2019) investigate immigrants' first-name choices for their children in the U.S., and show that choosing American-sounding names relates to improved economic outcomes, e.g., in terms of educational and labor market success. A related strand of economic research analyzes name choice rather than its effect on outcomes (e.g., Goldin and Shim (2004), Fryer and Levitt (2004), Algan et al. 2013).

<sup>9</sup> Jia and Persson (2017) discuss the role of discrimination- and identity costs related to mixed ethnicity couples' ethnic choice for their children in China.

<sup>10</sup> While we provide evidence of strategic name-signaling behavior, we do not mean to imply that the observed name changes necessarily reflect strategic motives. It might well be that they arise from minorities' efforts to assimilate into the majority society, or from general preferences for majority-sounding names.



game is Heyes and List (2016). When they allow their subjects to decide whether or not to pay to send a picture of themselves to their opponent, they find that a substantial proportion of players is willing to do so, and this does (does not) increase the tokens sent by the trustee (trustor). We extend Heyes and List's (2016) design in two key dimensions: First, we introduce the possibility to send an incorrect signal. Second, we exogenously vary trustors' ethnicity, which allows us to uncover the strategic motives behind signaling decisions.

Finally, we add to the growing literature on economic behavior of children and adolescents (see Sutter et al. 2019 for an overview), in particular to lab-in-the-field experiments on discrimination in dictator- and cooperation games (e.g., Fehr et al. 2008, 2013, Angerer et al. 2016, List et al. 2017, Bindra et al. 2018). While this literature scrutinized the development of discriminatory behavior early in life, our contribution is to investigate minority adolescents' strategic reactions to anticipated discrimination.

The rest of the paper is organized as follows. In section 2, we provide a brief account of the historical and cultural background of the Armenian minority in Georgia. Section 3 introduces the experimental design and procedure. Section 4 presents the results, and section 5 concludes.

## **2. Brief Historical and Cultural Background**

This section provides a brief description of our study's setting – the country of Georgia – and of the relationship between Georgians and ethnic Armenians in the country (see Appendix B for additional information).

Georgia is a small country in the Caucasus region with a population of 3.7 million and a GDP per capita of \$ 9,702 in 2017 (PPP adjusted)<sup>11</sup>. The capital of Georgia, Tbilisi, is the largest city with a population of over 1 million. Georgia is a multiethnic state with ethnic minorities accounting for about 15 percent of the population. Armenians are the second largest minority group in Georgia (after Azeris) and live mostly in Tbilisi and the Javakheti region in the country's south.<sup>12</sup> Both Georgians and Armenians are typically Christian, though Georgians are usually Orthodox and Armenians generally belong to the Armenian Apostolic Church. The two groups differ somewhat in appearance, but appearance is not an unambigu-

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<sup>11</sup> World Bank, <https://data.worldbank.org/country/georgia> [accessed 5 June 2019].

<sup>12</sup> Armenians accounted for 4.5 percent of the country's population, and for 4.8 percent of Tbilisi's population, in 2014 (see Appendix Table A1).

ous identifier of ethnicity. Monthly average income from paid employment, educational attainment, and unemployment rates are higher among Georgians than among members of the Armenian minority. The Armenian language differs widely from Georgian, but over 96 percent of the Armenian minority in Tbilisi speak Georgian (Osepashvili 2013). The Armenian minority in Tbilisi is concentrated in the central districts of the city, and are not segregated from ethnic Georgians. Tbilisi has a total of 294 schools, which are segregated along ethnic lines. Most schools are Georgian (and cater to Georgian children), and a small minority of ten schools are Armenian or Russian (and cater to Armenian children). Language of instructions in all public schools is Georgian.

The relationship between Georgians and Armenians is characterized by a long history of mistrust and rivalry, which culminated in the Georgian-Armenian war in 1918.<sup>13</sup> After the collapse of the Soviet Union, Georgia saw a rise of nationalism, and minorities in Georgia were increasingly considered a threat to national security (Jones 1996). While the relationship between Georgians and the Armenian minority has improved over the years, negative perceptions of and mistrust toward Armenians still prevail in Georgian society (e.g. Osepashvili 2013). For instance, the 2017 Caucasus Barometer finds that only 68 percent of Georgians approve of members of their ethnicity doing business with Armenians living in Georgia (Caucasus Research Resource Centers 2017).<sup>14</sup> Similarly, only 31 percent of Georgian subjects in our sample state that they trust Armenians “a lot” or “a bit” in our post-experimental questionnaire, while trust toward other Georgians is high at 74 percent (see Appendix Figure A1).<sup>15</sup>

In Georgia, names are unambiguous identifiers of ethnicity. For instance, most Georgian surnames end with the suffix *shvili*, *dze*, *ava*, *ia*, *ua*, or *iani*, while Armenian surnames end with *ian*. Similarly, first names are ethnicity-specific. Reportedly, many Armenians in Georgia have changed their names to Georgian-sounding names to avoid being discriminated against (Public Defender’s Office of Georgia 2008). Name changes peaked in the 1990s, which coincides with the rise of nationalism in Georgia after the fall of the Soviet Union.<sup>16</sup>

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<sup>13</sup> See Rohner et al. (2013a, 2013b) for theory and evidence of the eroding effects of conflict on trust.

<sup>14</sup> The approval rate of doing business with other Georgians is much higher at 94 percent. Similarly, only 40 percent of respondents to the Caucasus Barometer 2017 approve of women of their ethnicity marrying an Armenian living in Georgia (Caucasus Research Resource Centers 2017).

<sup>15</sup> Armenian subjects’ trust toward both Georgians and Armenians is equally high at 75 percent and 74 percent, respectively.

<sup>16</sup> Qualitative evidence suggests that Armenians in Georgia change their names to Georgian names in order to avoid disadvantages, for instance on the labor market Osepashvili 2013). Unfortunately, data on actual name changes in Georgia is not available to researchers.

Today, name changes remain a common phenomenon in Georgia: The webpage of Georgia's Ministry of Justice states that "A citizen of Georgia [...] has the right to change his/her name or/and surname" and offers name changes at low fees from 55 Georgian Lari (app. 20 USD; current exchange rate) (Ministry of Justice, [https://sda.gov.ge/?page\\_id=7429&lang=en](https://sda.gov.ge/?page_id=7429&lang=en) [accessed 7 June 2019]).

### 3. Experimental Design and Procedure

#### 3.1 The Modified Trust Game

Our experimental design is based on Berg et al.'s (1995) standard trust game, which consists of two players (trustor and trustee) and two stages. The trustor is endowed with 10 Experimental Currency Units (ECU). In the first stage, she has to decide what amount  $T \in [0, 10]$  to transfer to the trustee. The experimenter then triples the transferred amount. In the second stage, the trustee observes the trustor's transfer and decides upon  $B \in [0, 3T]$ , i.e., the number of ECUs to transfer back to the trustor. Back transfers are not tripled. Transfers from the trustor ( $T$ ) are usually interpreted as "trust", whereas back transfers from the trustee ( $B$ ) are usually interpreted as "trustworthiness".<sup>17</sup> The Nash equilibrium of the game with self-regarding agents is that the trustor sends nothing ( $T=0$ ) and, consequently, the trustee returns nothing ( $B=0$ ). However, the socially optimal outcome (in terms of the total number of tokens produced) is that the trustor transfers his entire endowment ( $T=10$ ). In contrast to zero-sum games, an important advantage of the trust game is that it enables the researcher to quantify the efficiency implications of discrimination.

As is standard for the trust game, we use the strategy method (Selten 1967) to elicit trustees' decisions, i.e., trustees have to specify their back transfer ( $B$ ) for each possible level of the trustors' transfer ( $T$ ).<sup>18</sup> To scrutinize the motivation behind subjects' choices, we also elicit

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<sup>17</sup> See Houser et al. (2010) and Cox et al. (2016) for detailed discussions of the interpretation of trust and trustworthiness, and Fershtman and Gneezy (2001) for an early application of the trust game to study discrimination.

<sup>18</sup> Casari and Cason (2009) show that the strategy method yields somewhat lower levels of trustworthiness compared to the direct-response method. Brandts and Charness (2000) find no difference in behavior across both elicitation methods in two-person sequential games. Note that we keep the elicitation method constant across treatments, so that it does not affect treatment-effect estimates.

trustors' beliefs about trustees' back transfers (B) and trustees' beliefs about trustors' transfers (T) after experimental decisions are made. We incentivize beliefs to foster truthful reporting.<sup>19</sup>

The goal of this paper is to study trust discrimination by Georgian trustors against Armenian trustees. Therefore, our four treatments (which we describe in detail below) differ with respect to the ethnicity of trustors and trustees. Exploiting the fact that names are unambiguous identifiers of Georgian or Armenian ethnicity, we follow the standard approach from previous experiments and use names to induce perceptions about ethnicity. Specifically we compiled name lists of ten common Georgian/respectively Armenian first names (five male and five female names) from our sample and inform each trustor that her interaction partner's first name is "among the list of names" that we handed out (see Appendix C for the instructions).<sup>20</sup> A major advantage of conducting our experiment in schools is that they provided complete name lists in advance. This allowed us to create individualized name lists for each subject, and to induce perceptions about subjects' ethnicity without deception. This approach, using name lists, as opposed to single names, is similar to the strategy applied in Bauer et al. (2018), and has the advantages that (i) the risk of losing anonymity is much smaller with name lists, (ii) and false attributions of names to ethnicities are less likely.<sup>21</sup> As a manipulation check, we elicited subjects' beliefs about their interaction partners' ethnicity in our post-experimental questionnaire, and we find that the name lists work as intended.<sup>22</sup>

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<sup>19</sup> Subjects receive two extra ECUs if their stated belief is exactly correct, and one extra ECU if it is only one or two units away from the true value. While there are more sophisticated methods to incentivize beliefs (e.g., Trautmann and van de Kuilen 2015), we deliberately opted for a simpler incentive scheme to foster comprehension among our sample of adolescents.

<sup>20</sup> Names are one of the most common ways to manipulate perceived minority traits in experiments on discrimination (e.g., Fershtman and Gneezy 2001, Bertrand and Mullainathan 2004, Cettolin and Suetens 2019, Bertrand and Duflo 2017). While it would also be interesting to investigate gender-specific ethnic discrimination in our setting, our ex-ante power calculations revealed that we were underpowered to split our sample to study gender differences. Therefore, we decided to avoid the possibility of gender-specific ethnic discrimination by using mixed-gender name lists.

<sup>21</sup> One might be concerned that using name lists, as opposed to single names, makes it more obvious for the subjects that the experiment is about ethnicity, which, in turn, might trigger experimenter-demand effects. We consider this concern unlikely for several reasons. First, it is a priori not clear whether the focus on ethnicity is less obvious when ethnicity is signaled through single names. Second, we employ a between-subject design which is less susceptible to experimenter-demand effects when measuring discrimination than within-subject designs (e.g., Angerer et al., 2016). Third, at the most basic level, de Quidt et al. (2018) provide evidence that experimenter demand effects barely affect choices in economic games.

<sup>22</sup> All trustors correctly associate the Georgian (Armenian) name list with trustees' Georgian (Armenian) ethnicity. For the sake of simplicity, we induce trustees' beliefs about trustors' ethnicity by directly informing them that their interaction partner has a Georgian/Armenian first name. Note that this asymmetry between trustors and trustees in how ethnic perception is induced (name lists versus direct information) is kept constant across treatments, and therefore does not affect treatment-effect estimates.

To study whether Armenian trustees strategically misrepresent their ethnicity to avoid being discriminated against, some of our treatments include a pre-play signaling stage. In these signaling treatments, Armenian trustees can send a signal about their ethnicity, and trustors observe the signal before deciding upon their transfers (T). Specifically, an Armenian trustee has to choose one of three options: 1. Sending the truthful message that he or she has an Armenian name. 2. Sending the untruthful message that she has a Georgian name. 3. Sending no message. Importantly, we made it clear in the trustor’s instructions of the signaling treatments that the name list is a message from the trustee, and not information provided by the experimenters.<sup>23</sup> In these treatments, we elicit trustees’ beliefs about trustors’ transfers using the strategy method. Thus, each trustee has to state what transfer (T) she expects upon signaling an Armenian name, a Georgian name, and when sending no signal. To incentivize truthful reporting, we told subjects that we would randomly choose one of their beliefs and compare it to the average transfers of trustors who received the respective signal. These beliefs allow us to investigate the extent to which differences in expected transfers can explain trustees’ signaling behavior.<sup>24</sup> Furthermore, the post-experimental questionnaire elicits trustees’ second-order ethnic beliefs in the signaling treatments, i.e. what beliefs they expect the trustors to hold about their ethnicity.

### 3.2 Treatment Groups

We implement four between-subject treatments to identify the extent of discrimination among majority-group members, and strategic responses of the discriminated minority. In the first treatment, *G-G*, both the trustor and the trustee are ethnic Georgians. In the second treatment, *G-A*, the trustor is ethnic Georgian and the trustee Armenian. The third treatment, *G-A*

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<sup>23</sup> In particular, we told trustors in the signaling treatments “[...] we want to inform you that the student you are matched with had the option to send you a message about his or her first name.” In principle, one might expect that trustors do not believe the trustees and therefore fail to internalize the information provided in the message. In section 4.2 we show that this is not the case. The text of the signal reads “My first name is among the names listed below”. For the truthful message, the list comprises 10 Armenian names, including the real name of the trustee. For the untruthful message, the name list comprises 10 Georgian names. Appendix Table A2 depicts an example of the trustees’ message space. All trustors in these treatments were informed that the trustee had the option to send a message about his or her first name, but we deliberately did not inform the trustor about the trustee’s message space (signaling an Armenian name, a Georgian name, or sending no signal). We took this design choice to resemble real-life interactions with asymmetric information about interaction partners’ ethnicity as closely as possible. In many real-world situations, people are also not explicitly informed that interaction partner might not reveal their true ethnicity. Also note that our experimental design does not involve any deception on the part of the experimenter. Instead, it is similar to the experimental literature on deception in that it allows experimental subjects to deceive each other (e.g., Gneezy 2005).

<sup>24</sup> Note that we do not impose extrinsic costs on sending a signal. However, our results in section 4.2 suggest that sending an untruthful signal is associated with significant intrinsic costs for our subjects.

*Signal*, is identical to the second treatment, with the exception that the Armenian trustee has the possibility to send a signal about his or her name as described above. Finally, the fourth treatment, *A-A Signal*, is identical to treatment *G-A Signal*, except that both the trustor and the trustee are ethnic Armenians. Below, we describe the treatment contrasts we focus on in our analysis.

*Measuring the extent of discrimination without signaling: G-G versus G-A*

We first measure the extent of discrimination by Georgian trustors against Armenian trustees without signaling. To do so, we compare trustors' transfers between treatments *G-G* and *G-A*. Both treatments differ only in the ethnicity of the trustees, so that differences in trustors' transfers can be causally attributed to trustees' ethnicity. The contrast between *G-G* and *G-A* serves as our benchmark to assess how Armenian trustees' strategic signaling behavior affects the extent of discrimination. Further, we compare the amounts of transfers which trustees expect to receive across treatments, to investigate whether subjects hold correct beliefs about the extent to which Georgians trust them.

*Measuring strategic signaling behavior: G-A Signal versus A-A Signal*

The main innovation of our experimental design is to introduce a pre-play signaling stage which allows Armenian trustees to misrepresent their ethnicity. Before trustors decide upon their transfers (T), Armenian trustees in these treatments can decide between truthfully signaling an Armenian name, untruthfully signaling a Georgian name, or sending no signal at all. We are particularly interested in the share of subjects who decide to signal their Armenian name in treatment *G-A Signal*. Note, however, that untruthful name signaling in this treatment cannot be interpreted as direct evidence of *strategic* signaling behavior: It may well be that Armenians do not signal their ethnicity because they have privacy concerns or preferences for mimicking Georgian ethnicity, or because they are indifferent between messages and therefore pick a message at random. Therefore, we implement treatment *A-A Signal*, which is identical to treatment *G-A Signal* except that the trustor is Armenian rather than Georgian. Comparing trustees' signaling behavior across these two treatments enables us to assess the extent to which Armenians choose signals strategically. Finally, we analyze what transfers Armenian trustees expect to receive upon sending different signals. This within-subject comparison reveals whether subjects expect discrimination-reducing effects from not revealing their Armenian ethnicity.

### 3.3 Subject pool and experimental procedure

The experiment was conducted in the fall of 2017 in 41 classes at six high schools (22 classes in three Georgian schools and 19 classes in three Armenian schools) in Tbilisi, Georgia.<sup>25</sup> In total, 758 students aged 12 to 17 (grades 7 to 12) participated. High schools in Georgia are comprehensive up to grade 12, which means that our sample is not selective with respect to educational track choice. Table 1 shows the distribution of participants across treatments and roles.<sup>26</sup> The study was pre-registered in the AEA RCT Registry (trial 2522) and approved by the schools' principals and teachers. The experiments were conducted in classes during regular school hours.

Each session lasted about 60 minutes, including the post-experimental questionnaire. The experiment was explained to the whole class in detail, following a fixed script. We phrased our instructions as simply as possible and used visual support to assure comprehension. Prior to the decision phase, participants answered control questions privately. If a subject failed to answer questions correctly, the instructions were explained again in private until comprehension was achieved. See Appendix C for the instructions and the post-experimental questionnaire.<sup>27</sup> The unit of randomization was at the class level. Therefore, we cluster standard errors at the class level in our analyses. Appendix Table A3 assesses the balance of observable characteristics across experimental groups. Six of 60 comparisons show significant differences, however, our results remain robust when we control for these covariates. Closer inspection reveals that there are in fact no significant differences in observable characteristics across Georgian trustors (see columns 1 to 3) or across Armenian trustees (see columns 5 to 7).<sup>28</sup> Trustors and trustees were matched one-to-one across schools in order to minimize the risk of

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<sup>25</sup> All subjects in Georgian schools had ethnic Georgian first names. In Armenian schools, three students had ethnic Georgian names, and all other students had ethnic Armenian names. We excluded those three students so that first names in our sample are unambiguous identifiers of ethnicity.

<sup>26</sup> Note that the treatment contrast between *G-G* and *G-A Signal* is particularly important for estimating the discrimination-reducing effects of the signaling stage. To maximize statistical power for these groups, we randomly assigned them higher numbers of observations. The remaining small imbalances in the numbers of observations in Table 1 are due to natural class-size fluctuations.

<sup>27</sup> In our post-experimental questionnaire, we asked subjects to rate how well they understood the instructions on an 11-point scale (from 0 = "Did not understand at all" to 10 = "Understood very well"). The median (mean) answer to the question is 10 (9.65), and only four subjects gave an answer of 5 or below. Excluding those subjects from the analysis does not change our qualitative results (results available upon request).

<sup>28</sup> Note that the focus of this paper is on Georgian trustors' discrimination and Armenian trustees' response to anticipated discrimination, where all covariates are balanced. Imbalances prove to be concentrated among Georgian trustees who are, on average, more likely to be male, older, more risk tolerant and to have a better understanding of the instructions. We control for covariates in our regression analysis to account for imbalances.

losing subjects' anonymity. For practical reasons, we first collected all decisions of the trustees using the strategy method and then elicited trustors' decisions.

We incentivized choices using gift vouchers from a well-known office-supplies chain. Each token was worth two Georgian Lari (app. 0.8 USD). In our post-experimental questionnaire, almost all participants (99.5 percent) stated that they liked the gift voucher, which indicates that the incentives were meaningful for them. In addition to the tokens earned during the experiment, participants received a show-up fee of a gift voucher worth two Georgian Lari. While the show-up fee was paid immediately after the experiment, payment for subjects' experimental decisions was delayed one week because the decisions of trustors and trustees had to be matched to calculate earnings. Delayed payments were made in sealed envelopes marked with an anonymized ID. According to our post-experiment questionnaire, almost all subjects (99.5 percent) trusted that they would receive the delayed payment.<sup>29</sup>

## 4. Results

We present our results in three steps. First, we analyze Georgian trustors' transfers, Armenian trustees' back transfers, and beliefs without the signaling stage. Second, we investigate Armenians' strategic name-signaling behavior. Third, we evaluate its effects on Georgian trustors' discrimination.

### 4.1 Discrimination against Armenian Trustees without Signaling

We begin with a depiction of Georgian trustors' transfers and beliefs without signaling. Figure 1 shows their average transfers to Georgian and Armenian trustees in treatments *G-G* and *G-A*, respectively. On average, Georgian trustors transfer 5.2 tokens of their 10-token endowment to Georgian trustees (see bar "Treatment *G-G*"). Transfers to Armenian trustees are significantly lower at 4.0 tokens (about 77 percent of the average transfer to a Georgian trustee; see bar "Treatment *G-A*"). Columns 1 and 2 of Table 2 present OLS regressions of Georgian trustors' transfers on an indicator for treatment *G-A* (omitted category: treatment *G-G*).<sup>30</sup> The coefficient on treatment *G-A* in column 1 shows that the difference in transfers to Georgian versus Armenian trustees of 1.2 tokens is highly statistically significant, and it barely

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<sup>29</sup> Excluding those few subjects who (i) do not like the gift voucher or (ii) do not trust that they will receive the delayed payment does not change our results (results available upon request).

<sup>30</sup> All models in this paper are estimated as linear regression models. (Ordered) probit models yield qualitatively identical results (results available upon request).



changes when we control for standard covariates in column 2 (covariates include gender, age, number of siblings, and self-reported risk tolerance and patience). Thus, we find robust evidence of pronounced discrimination by Georgian trustors against Armenian trustees which, by the nature of the trust game, decreases overall efficiency.

To scrutinize the motivations behind trust discrimination against Armenians, we next investigate trustors' expected back transfers from Georgian and Armenian trustees. In columns 3 and 4 of Table 2, we regress our incentivized measure of expected back transfers on treatment indicator *G-A*, controlling for trustors-transfer dummies. On average, Georgian trustors expect to receive a back transfer of 5.6 tokens from Georgian trustees (see control mean). The significant and negative treatment coefficient in column 3 shows that Georgian trustors' expected back transfers from Armenian trustees are significantly lower, by 0.8 tokens.<sup>31</sup>

When we compare Georgian trustors' beliefs about trustees' back transfers with actual back transfers in columns 1 and 2 of Table 3, we find that the trustors' beliefs are very well-calibrated: While Georgian trustees on average transfer 5.7 tokens back to Georgian trustors, Armenian trustees' back transfers are significantly lower, by more than 0.5 tokens.<sup>32</sup> Figure 2 depicts Armenian and Georgian trustees' back transfers for each possible trustor transfer. The pattern that back transfers strictly increase with trustor transfers shows that both Armenian and Georgian trustees act reciprocally. Most importantly, however, Armenian trustees' back transfers are lower than Georgians' for each possible trustor transfer. Thus, Georgian trustors have accurate beliefs about Georgians' and Armenians' trustworthiness. This finding suggests that trust discrimination against Armenians is (at least partially) driven by statistical discrimination (Becker 1957) in the sense that Georgian trustors correctly expect lower back transfers

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<sup>31</sup> In additional analyses in Appendix Table A4, we regress trustors' beliefs on treatment indicator *G-A*, trustors' transfer, and their interaction. Results show that the gap in expected back transfers from Georgian versus Armenian trustees increases with trustors' transfers (see the significant coefficient on the interaction term and the corresponding Wald tests at the bottom of the table). Note also that, on average, expected back transfers increase with trustors' transfers, which is an intuitive result.

<sup>32</sup> The dependent variable in columns (1) and (2) of Table 3 is the actual back-. Since we used the strategy method to elicit ten back-transfer decisions from each trustee (i.e., one decision for each possible trustor transfer), columns 1 and 2 of Appendix Table A5 instead use each trustee's average back transfer as a dependent variable. The results in Table 3 are robust to this alternative definition of the dependent variable.

from Armenian trustees and therefore transfer less to them.<sup>33, 34</sup>

Finally, we investigate the transfer amounts trustees expect to receive. Comparing Armenian and Georgian trustees' beliefs (see columns 3 and 4 of Table 3) with actual transfers reveals that trustees hold very accurate beliefs about trustors' behavior: On average, Georgian trustees expect that trustors will transfer 5.11 tokens (see control mean). As the negative coefficient on the treatment indicator in column 3 shows, Armenian trustees' expectations are significantly lower, by 1.79 tokens. This effect is robust to controlling for covariates in column 4. The comparison between Armenian and Georgian trustees shows that beliefs are consistent with the actual transfers made by trustors. Note, however, that this descriptive analysis is not informative about whether individual Armenian trustees anticipate discrimination. In the next section, we analyze the extent to which Armenian trustees anticipate discrimination when deciding to send different signals about their ethnicity.

Having established that (i) Georgians discriminate against Armenians in the trust game without signaling, and (ii) that trustors and trustees hold accurate beliefs about each others' transfers, we next investigate Armenian trustees' strategic name-signaling behavior.

## 4.2 Strategic Signaling by Armenian Trustees

### *Signals sent to Georgian trustors*

Figure 3 and Table 4 present the distribution of signals sent by Armenian trustees to trustors in treatments *G-A Signal* and *A-A Signal*. In treatment *G-A Signal*, where the trustor is Georgian, 56 percent of trustees send a truthful message that they have an Armenian name. The share of untruthful messages of a Georgian name is 43 percent, and only one single Armenian

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<sup>33</sup> One obvious concern with the analysis of trustors' beliefs is self-serving bias (e.g., Gino et al. 2016): Georgian trustors might cite biased beliefs about Armenian trustees' back transfers to justify own low transfers. The fact that we incentivized the accuracy of beliefs mitigates this concern (see Bullock et al. 2015 and Prior et al. 2015 for evidence that monetary incentives reduce self-serving bias in stated beliefs). It is interesting to note that subjects' incentivized beliefs are uncorrelated with their answers to the general risk question (results available upon request), since subjects' risk preferences have been theorized to affect the ability of incentive schemes to foster truthful reporting (e.g., Trautmann and van de Kuilen 2015).

<sup>34</sup> Our results are in line with Falk and Zehnder (2013), who show that trust discrimination against people from different districts in Zurich is based on accurate beliefs about their relative trustworthiness. This result is in contrast to Fershtman and Gneezy (2001) who argue that discrimination against Eastern Jews in Israel is largely based on downward-biased beliefs about their trustworthiness. As in most of the literature that studies discrimination between natural groups, we note that it might well be that Georgians' discrimination is also based on (perceived) characteristics of Armenians, such as income or education. Bohren et al. (2019) provide a recent careful discussion of the role of (biased) beliefs in explaining discrimination, and advocate distinguishing between *accurate* and *inaccurate* statistical discrimination.

(0.89 percent) chooses to send no signal. Thus, while a sizable share of Armenians misrepresent their ethnicity when interacting with a Georgian trustor, the majority truthfully signals having an Armenian name. It is noteworthy that the option to not send any signal is very unpopular, despite the fact that it represents a middle path in the sense that it (i) conceals Armenian ethnicity but (ii) does not involve untruthful signaling.

To scrutinize the motivations behind Armenian trustees' signaling behavior, we next investigate what transfers they expect to receive upon sending different signals to the Georgian trustor. After experimental decisions were made, we therefore elicited trustees' beliefs about trustors' transfers for the three possible signals using the strategy method. On average, trustees expected a transfer of 3.12 tokens from Georgian trustees when they signaled an Armenian name (see the left panel of Figure 4). When they signaled a Georgian name, expected transfers are significantly higher, at 5.34 tokens ( $p < 0.01$ , Wilcoxon signed rank test). Put differently, 78 percent of Armenian trustees expect a higher transfer when they signal a Georgian rather than an Armenian name, 22 percent expect equal transfers, and not a single one expects that signaling an Armenian name will pay off more. Expected transfers when sending no signal are 3.1 tokens, which is significantly lower than when signaling a Georgian name, and statistically indistinguishable from expected transfers when signaling an Armenian name ( $p < 0.01$  respectively  $p = 0.638$ , Wilcoxon signed rank tests).

The observation that 78 percent of Armenian trustees expect higher transfers when signaling a Georgian name, but only 43 percent actually send a Georgian name signal, raises the question of what drives signaling behavior. The probability of sending a Georgian name is positively correlated with expecting higher transfers from sending this signal (within-person correlation = 0.46,  $p = 0.000$ ), which indicates that pecuniary considerations partly explain signaling behavior. Yet, a sizable share of subjects who expect higher transfers when signaling a Georgian name still signal an Armenian name, which indicates that non-pecuniary considerations – such as identity-based preferences (Akerlof and Kranton 2000) – matter as well. To explore the motivations behind signaling decisions more systematically, Table 5 regresses a dummy variable coded 1 if the trustee in treatment *G-A Signal* signals a Georgian name, and 0 otherwise, on different explanatory variables collected in the post-experiment questionnaire. While column 1 shows that pride in Armenian ethnicity does not affect signaling decisions, those who consider observable markers (such as language or names) important to being “truly

Armenian” are significantly less likely to signal a Georgian name (column 2).<sup>35</sup> Adding expected transfers in column 3 shows that beliefs about trustors’ transfers when signaling a Georgian name are significantly and positively related to sending such a signal. Column 4 adds two measures of attachment to the Armenian ingroup: the share of subjects’ Armenian friends out of total friends, and a hypothetical allocation decision between two strangers, one Armenian and one Georgian. Both measures of Armenian ingroup attachment are positively related to the probability of signaling a Georgian name.<sup>36</sup> Finally, adding further control variables in column 5 shows that risk tolerance is negatively associated with sending a Georgian signal. Of course, this descriptive analysis is not exhaustive since additional unobserved factors - such as intrinsic costs of lying (e.g., Abeler et al. 2014) – may also matter.<sup>37</sup> Our results do indicate that signaling decisions are not driven only by pecuniary considerations, but also by non-pecuniary motivations (which is in line with Hett et al. 2017, for instance).

#### *Signals sent to Armenian trustors*

From the signals sent in treatment *G-A Signal*, it is not entirely clear whether Armenians use the signaling device *strategically* to avoid being discriminated against. For instance, some Armenians might simply prefer to present themselves as Georgian, independent of their interaction partner’s ethnicity. Treatment *A-A Signal*, where the trustor is Armenian, reveals that signaling behavior is in fact strategic: In this treatment, all but one trustee (99 percent) send the truthful signal that they have an Armenian name, and not a single subject sends the untruthful message that they have a Georgian name (see Figure 3 and Table 4). The signaling differences between *G-A Signal* and *A-A Signal* are highly significant (see column 5 of Table 4) and show that Armenian participants condition their signals on the trustors’ ethnicity. Con-

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<sup>35</sup> The variable “importance of ethnic markers” is the mean response to the following questions on how important different markers are to be “truly Armenian”: “How important do you think it is to be able to speak Armenian?” “How important do you think it is to have an Armenian name?” (see footnote of Table 5 and Appendix C for the exact questions) Including both measures separately in the regressions shows that, while both coefficients are negative, only the one on language reaches statistical significance (results available upon request).

<sup>36</sup> One possible explanation for this finding is that other-regarding preferences toward Georgian trustors decrease with in-group attachment, which makes it more acceptable for Armenians to send a signal which might reduce a Georgian trustors’ payoff.

<sup>37</sup> While we did not measure cost of lying directly, the fact that only one subject chose the option not to send any signal – which conceals Armenian ethnicity without explicitly lying to the trustor – suggests that lying costs are unlikely to be a driving factor of signaling behavior in our context. Assessing the exact role of directly measured lying costs is an interesting avenue for future research. Interestingly, self-assessed understanding of the instructions does not correlate with signal choice, which suggests that strategic sophistication is probably not a key determinant of signaling behavior (see Fe and Gill 2018, for evidence on how cognitive skills and strategic sophistication emerge in children).

sistently, Figure 4 and Appendix Table A6 show that trustees' expected transfers when signaling an Armenian (Georgian) name are significantly higher (lower) in treatment *A-A Signal* than in treatment *G-A Signal*.<sup>38</sup>

Having established that Armenian trustees use the signaling device strategically to misrepresent their ethnicity, we now investigate whether trustors believe the signals sent. To this end, our post-experimental questionnaire collected trustors' binary beliefs about trustees' ethnicity (Georgian or Armenian), as well as trustees' second-order beliefs about trustors' beliefs. Appendix Table A7 depict the share of trustors who believe that the trustee's ethnicity is Armenian (column 1) or Georgian (column 2). On average, 56 percent of Georgian trustors in treatment *G-A Signal* believe that the trustee is ethnic Armenian, and 44 percent believe that s/he is Georgian. Inspecting beliefs by the name-signal received, we find that trustors fully believe the signals: Georgian trustors who received the message that the trustee has a Georgian (Armenian) name think that she is ethnic Georgian (Armenian). Similarly, Armenian trustors believe the signal they received. The fact that trustors fully believe trustees is particularly interesting given that we emphasized that the name signal is a *message* from the trustee, and not a piece of factual information provided by the experimenter.<sup>39</sup> Trustees, in turn, hold correct beliefs about the impacts of their signal on trustors' beliefs (see columns 3 and 4): Those who signal an Armenian (Georgian) name correctly expect trustors to believe that they are ethnic Armenians (Georgians).<sup>40</sup>

In sum, this section shows that trustees use the pre-play name-signaling stage to strategically misrepresent their ethnicity, that trustors will believe the messages sent, and that trustees anticipate that trustors believe their messages. In the next section, we investigate the extent to which strategic signaling affects Georgian trustors' transfers, beliefs, and profits.

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<sup>38</sup> In treatment *A-A Signal*, expected transfers are 5.98 tokens when signaling an Armenian ethnicity, 3.69 tokens when signaling a Georgian name ( $p < 0.01$ , Wilcoxon signed rank test), and 3.21 when sending no signal ( $p = 0.108$  and  $p < 0.01$  in comparison to signaling an Armenian or Georgian name, respectively). A natural interpretation of this finding is that Armenian trustees expect that both Armenian and Georgian trustors exhibit endophilia toward interaction partners from their own ethnicity (e.g., Feld et al., 2016).

<sup>39</sup> Given that our instructions and message sheet clearly indicate that the name signal is a message from the interaction partner, it is very unlikely that trustors' lack of understanding can explain their beliefs. Even if some trustors were unaware that the signal stems from the trustee and is therefore potentially subject to untruthful reporting, we consider this a natural reflection of everyday-life interactions, where the possibility that interaction partners will manipulate signals about their ethnicity is often not salient or apparent.

<sup>40</sup> Sutter (2009) shows that a significant percentage of senders in cheap-talk sender-receiver games with asymmetric information try to deceive the receiver by (i) sending a truthful message, and (ii) expecting the receiver not to believe the message. Note that Armenian trustees' second-order beliefs reveal that such considerations do not drive trustees' signaling behavior.

### 4.3 Effects of name-signaling on discrimination against Armenian trustees

Figure 1 shows that Georgian trustors transfer, on average, 4.44 tokens to Armenian trustees in treatment *G-A Signal*. This number falls between transfers to Georgian and Armenian trustees without signaling in treatments *G-G* and *G-A*, respectively. OLS regressions in Table 6 show that differences in Georgian trustors' transfers between treatments *G-G* and *G-A Signal*, and between treatments *G-A* and *G-A Signal* are statistically significant. Thus, allowing Armenian trustees to send a signal about their ethnicity halves the magnitude of trust discrimination in our setting. Going beyond these reduced-form effects, we next investigate the causal effect of receiving a Georgian name signal on trustor behavior.

Figure 1 shows that Georgian trustor transfers vary strongly by the signal received in treatment *G-A Signal*. While trustors who receive a signal that the trustee has a Georgian name transfer 5.19 tokens on average, transfers are much lower, at 3.88, if no such signal is received.<sup>41</sup> Note that these transfers are remarkably similar to those in treatments without signaling (*G-G* and *G-A*, respectively). Columns 1 and 2 of Table 7 show that this difference is highly significant and robust to controlling for standard covariates.

To understand the mechanisms behind the effect of Georgian name signals on trustors' transfers, we next investigate how the signal affects trustors' expected back transfers from the trustee. Columns 3 and 4 of Table 7 regress trustors' expected back transfers from the trustee on a dummy indicating receipt of a Georgian name signal, controlling for trustor-transfer dummies. The significant and positive coefficients show that receiving a Georgian name signal has a strong and positive effect on trustors' expected back transfers. This finding suggests that a Georgian name signal increases trustors' transfers through altering their expected back transfers.

Turning to Armenian trustee transfers, we find that Georgian trustors overestimate actual back transfers: Columns 5 and 6 of Table 7 show that Armenian trustees' actual back transfers

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<sup>41</sup> Note that differences in trustor outcomes by the signal received can be interpreted as the causal effect of the signal, because trustees' actual signals were randomly assigned to trustors. Since random assignment of signals was implemented at the individual level (and not on the class level), we do not cluster standard errors at the class-level in these analyses.

are unrelated to the signal they sent.<sup>42</sup> The same picture emerges when looking at back transfers for each possible trustor transfer in Appendix Figure A2.<sup>43</sup> Thus, Armenian trustees seem to increase Georgian trustors' transfers by inducing an incorrectly high level of expected back transfers.

Finally, we are interested in how Armenian trustees' strategic signaling behavior affects profits. Table 8 presents OLS regressions of Georgian trustors' and Armenian trustees' profits on an indicator on whether a Georgian name was signaled in treatment *G-A Signal*. While receiving a Georgian name signal has no overall effect on Georgian trustors' profits (see columns 1 and 2), signaling Georgian ethnicity significantly increases Armenian trustees' profits: Armenian trustees who signal a Georgian name earn 2.26 tokens, or about 27 percent, more than those who do not (see column 3). This effect is robust to controlling for standard covariates (see column 4). In sum, introducing a pre-play signaling stage increases overall efficiency. This is because Armenian trustees' strategic signals mitigate Georgian trustors' inefficient discriminatory behavior. Since Armenian trustees do not increase their back transfers when sending a Georgian name signal, they are able to capture the extra "pie" produced.

## 5. Conclusion

Ethnic discrimination is a pervasive phenomenon in many societies. However, while majority-group members' decisions to discriminate have been subjected to close scientific scrutiny in the past decades, evidence of minority-group members' strategic behavior to avoid discrimination is extremely scarce. We address this research gap by running a lab-in-the-field experiment with more than 750 high-school students in the country of Georgia, where the Armenian minority typically experiences discrimination from the ethnic Georgian majority. In our modified trust game, we implement a pre-play signaling stage in some treatments to study whether Armenian trustees misrepresent their ethnicity to avoid being discriminated against.

Our results show that Georgian trustors discriminate against Armenian trustees by transferring significantly less tokens than to Georgian trustees. Allowing Armenian trustees to send an (un)truthful signal about their ethnicity, Armenians' strategic signaling behavior halves

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<sup>42</sup> Again, using average back transfers from our strategy-method elicitation instead of actually implemented back transfers yields the same results (see columns 3 and 4 of Appendix Table A5).

<sup>43</sup> The strictly increasing pattern of the figure reveals that reciprocal motivations for back transfers are prevalent in treatment *G-A Signal*, which is similar to the back-transfer pattern in treatments without signaling (see Figure 2).

Georgians' trust discrimination and thereby increases overall efficiency. Our rich choice-, beliefs- and background data allows us to study pecuniary and non-pecuniary motivations for (strategic) signaling behavior, as well as the channels through which the signaling stage increases Georgians' transfers.

Our results are relevant for situations in which ethnic affiliation is not perfectly observable and minorities have some discretion over what ethnicity-revealing signals to send. Examples abound and include, for instance, written job applications, naming decisions, or decisions on whether to wear typical ethnic markers in everyday-life (e.g., clothes or accessories). Previous literature shows that minorities misrepresenting their ethnicity in such situations is not a marginal phenomenon: For instance, more than 30 percent of minorities misrepresent their ethnicity in Zussman (2013), Biavashi et al. (2017), and Kang et al. (2017). A particularly interesting area for which our results are relevant are new communication technologies. Recent studies show that discrimination can be based on self-reported information on social media (e.g., Tjaden et al. 2018, Acquisti and Fong 2019). It is clearly very easy to manipulate profile information on social media, or to use majority-sounding names in emails, to alter perceived minority status.

Our results have implications for the interpretation of experimental studies on discrimination. While these studies usually abstract from minorities' optimizing behaviors when measuring discrimination (e.g. by sending out fictitious job applications with randomized applicant characteristics), our findings show that minorities' strategic behavior can affect measured discrimination, and therefore the transferability of experimental estimates of discrimination to real-world settings. From a policy perspective, our findings suggest that allowing minority-group members to choose what signals to reveal about their ethnicity (e.g., in the context of job-search activities) might mitigate discrimination and increase efficiency.

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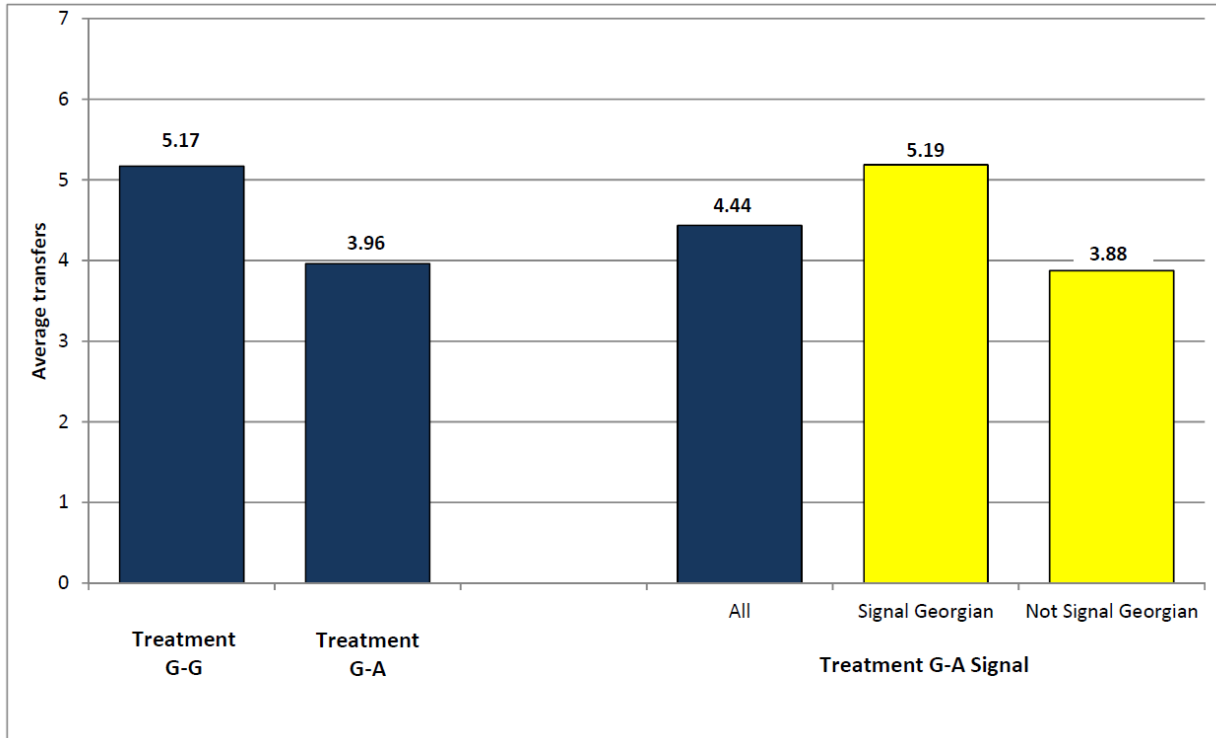
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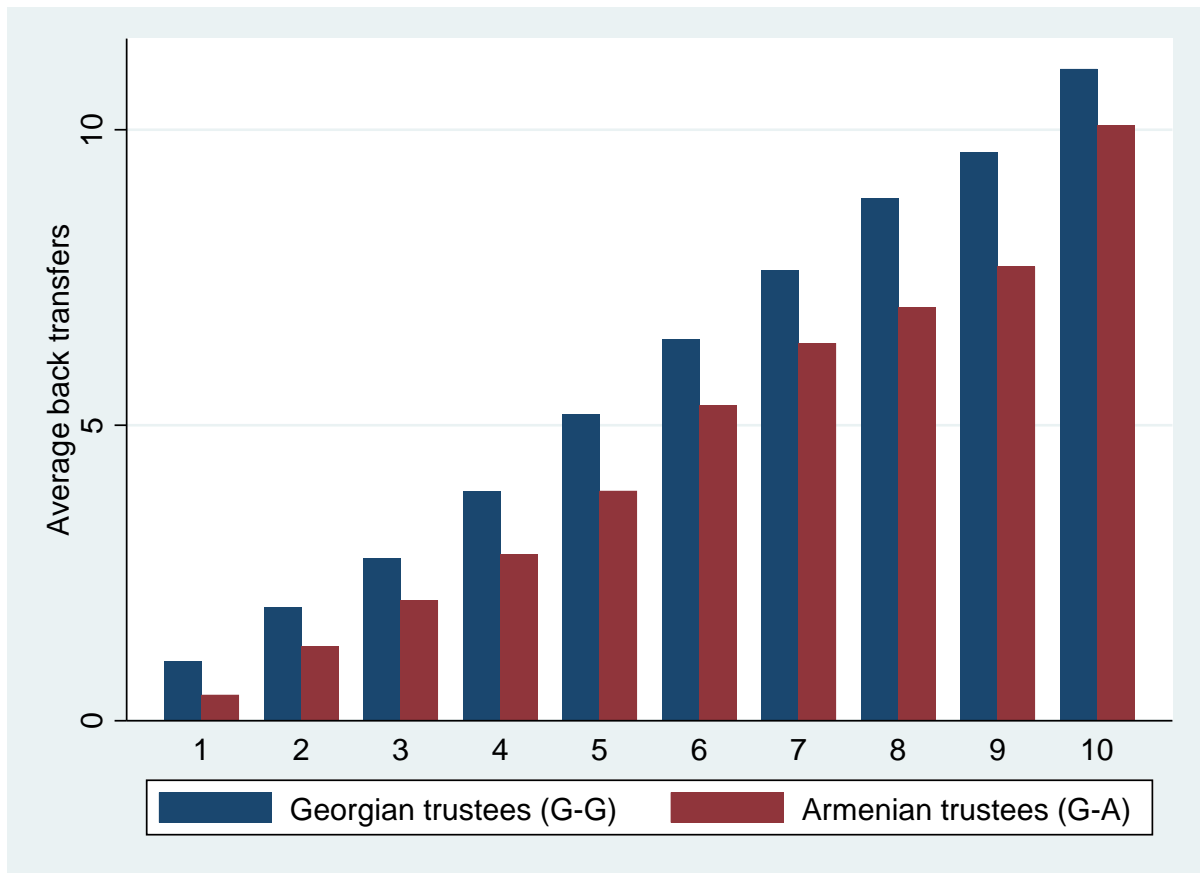
## Figures and Tables

**Figure 1:** Georgian trustor's average transfers



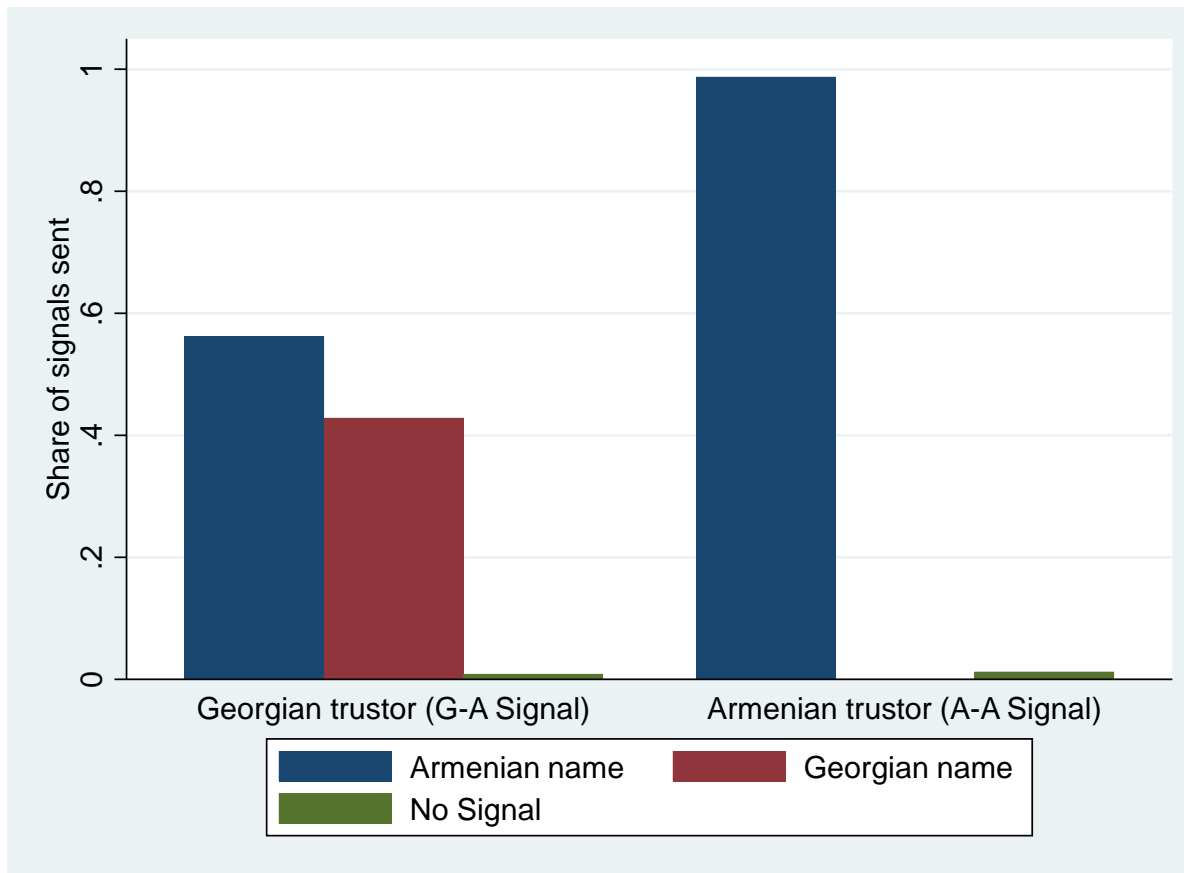
*Notes:* The figure shows transfers by Georgian trustors in treatments *G-G*, *G-A*, and *G-A Signal*. Dark bars represent average transfers per treatment, the light bars represent average transfers of trustors who did and did not receive the signal that the trustee has a Georgian name.

**Figure 2:** Trustees' back transfers without signaling



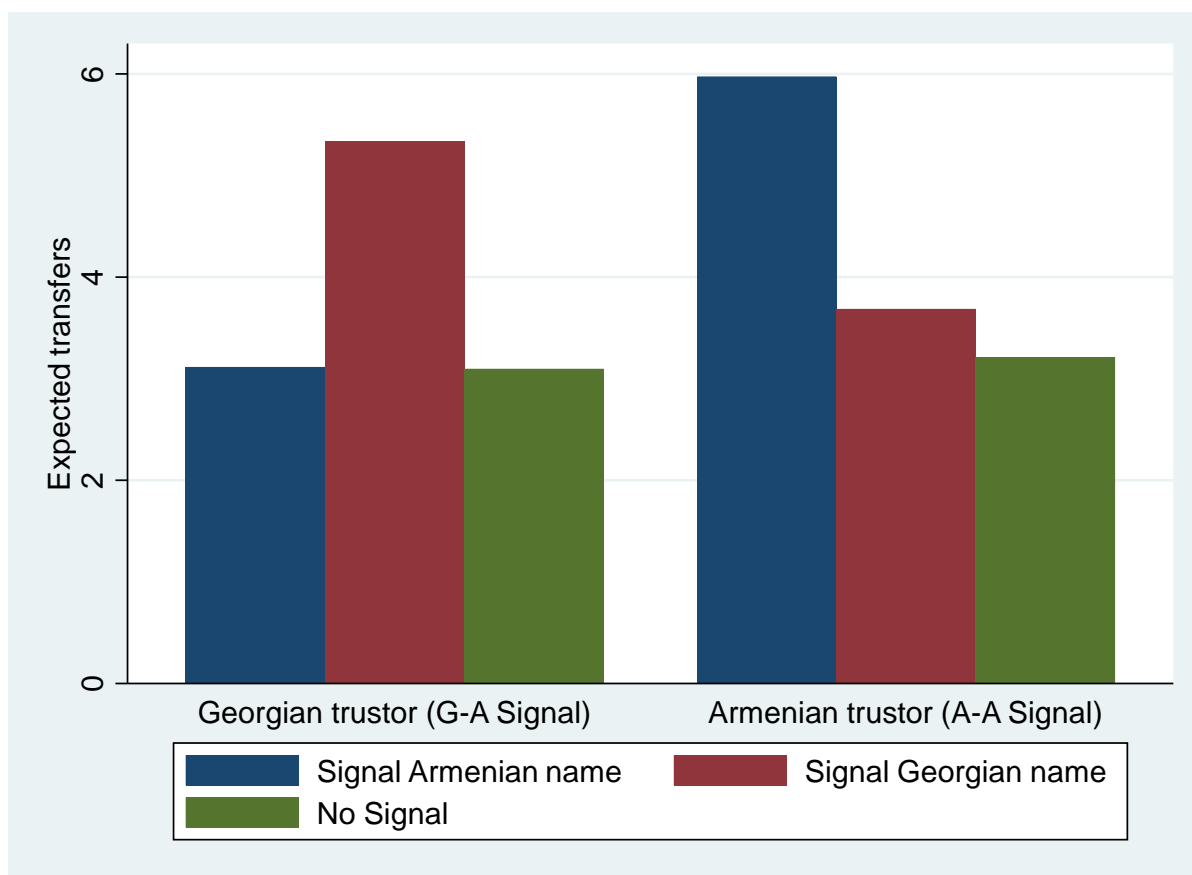
*Notes:* The figure shows actual back transfers by Georgian (blue bars) and Armenian (red bars) trustees to Georgian trustors. Each trustee reported a back-transfer decision for each possible trustor transfer (strategy method).

**Figure 3:** Signals sent from Armenian trustees to Georgian and Armenian trustors



*Notes:* The figure shows the shares of Armenian trustees who signal Armenian names (truthfully), Georgian names (untruthfully), or send no signal to the trustor.

**Figure 4:** Armenian trustees' expected transfers upon sending different signals



*Notes:* The figure shows the amount of transfers Armenian trustees expect to receive from Georgian trustors (left panel) and Armenian trustors (right panel) upon sending a Georgian name signal (blue), an Armenian name signal (red), and no name signal (green).



**Table 1:** Number of participants by treatments

| Treatment  | Role     |          | Total |
|------------|----------|----------|-------|
|            | Trustors | Trustees |       |
| G-G        | 105      | 105      | 210   |
| G-A        | 82       | 82       | 164   |
| G-A Signal | 112      | 112      | 224   |
| A-A Signal | 80       | 80       | 160   |
| Total      | 379      | 379      | 758   |

**Table 2:** Extent of Georgian trustors' discrimination and beliefs without signaling

|                           | Trustors' transfers  |                      | Trustors' beliefs about trustees' back transfers |                     |
|---------------------------|----------------------|----------------------|--|---------------------|
|                           | (1)                  | (2)                  | (3)  | (4)                 |
| <i>Treatment G-A</i>      | -1.208***<br>(0.291) | -1.273***<br>(0.225) | -0.829***<br>(0.205)                             | -0.651**<br>(0.221) |
| Trustors-transfer dummies | n.a.                 | n.a.                 | Yes  | Yes                 |
| Control mean (G-G)        | 5.171                |                      | 5.648  |                     |
| Covariates                | No                   | Yes                  | No   | Yes                 |
| Observations              | 187                  | 186                  | 187  | 186                 |
| $R^2$                     | 0.095                | 0.150                | 0.662  | 0.691               |

*Notes:* OLS regressions. Dependent variable: Col. (1)-(2): Transfers from Georgian trustors; col. (3)-(4): Georgian trustors' beliefs about trustees' transfers. Control mean: mean of the outcome variable in treatment G-G. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 3:** Trustees' back transfers and beliefs without signaling

|                           | Trustees' back transfers |          | Trustees' beliefs about trustors' transfers |          |
|---------------------------|--------------------------|----------|---|----------|
|                           | (1)                      | (2)      | (3)   | (4)      |
| <i>Treatment G-A</i>      | -0.512*                  | -0.773** | -1.785**                                    | -2.279** |
|                           | (0.262)                  | (0.279)  | (0.645)                                     | (0.714)  |
| Trustors-transfer dummies | Yes                      | Yes      | n.a.  | n.a.     |
| Control mean (G-G)        | 5.724                    |          | 5.114                                       |          |
| Covariates                | No                       | Yes      | No  | Yes      |
| Observations              | 187                      | 185      | 187   | 185      |
| $R^2$                     | 0.594                    | 0.621    | 0.106                                       | 0.143    |

*Notes:* OLS regressions. Dependent variable: Col. (1)-(2): Trustees' actual back transfers; col. (3)-(4): trustees' beliefs about trustors' transfers. Control mean: mean of the outcome variable in treatment G-G. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4:** Name signaling behavior

|               | G-A Signal |        | A-A Signal |        | Difference |
|---------------|------------|--------|------------|--------|------------|
|               | (1)        | (2)    | (3)        | (4)    | (5)        |
| Signal        | #          | %      | #          | %      | p-values   |
| Armenian name | 63         | 56.25% | 79         | 98.75% | 0.000      |
| Georgian name | 48         | 42.86% | 0          | 0.00%  | 0.000      |
| No signal     | 1          | 0.89%  | 1          | 1.25%  | 0.810      |
| Total         | 112        | 100%   | 80         | 100%   |            |

*Notes:* The table depicts the signals sent by Armenian trustees to Georgian and Armenian trustors. The figures represent the absolute and relative numbers of Armenian trustees who signal Armenian names (truthfully), Georgian names (untruthfully), or send no signal. Col. (1)-(2): Georgian trustors; col. (3)-(4): Armenian trustors. P-values in column 5 stem from Chi-squared tests.

**Table 5:** What predicts the signaling behavior?

|  | Signaling Georgian name |                     |                     |                     |                     |
|--|-------------------------|---------------------|---------------------|---------------------|---------------------|
|  | (1)                     | (2)                 | (3)                 | (4)                 | (5)                 |
| Pride about Armenian ethnicity <sup>a</sup>                | 0.006<br>(0.076)        | 0.060<br>(0.086)    | 0.062<br>(0.083)    | 0.009<br>(0.062)    | -0.001<br>(0.064)   |
| Importance of ethnic markers <sup>a</sup>                  |                         | -0.203**<br>(0.086) | -0.223**<br>(0.088) | -0.136*<br>(0.077)  | -0.144*<br>(0.076)  |
| Expected transfers when ...<br>... signaling Georgian name |                         |                     | 0.055*<br>(0.031)   | 0.056**<br>(0.024)  | 0.062**<br>(0.025)  |
| ... signaling Armenian name                                |                         |                     | -0.032<br>(0.030)   | -0.006<br>(0.025)   | -0.026<br>(0.028)   |
| ... sending no signal                                      |                         |                     | -0.029<br>(0.025)   | -0.040*<br>(0.021)  | -0.037*<br>(0.022)  |
| Ingroup attachment   |                         |                     |                     |                     |                     |
| Share of Armenian friends                                  |                         |                     |                     | 0.553***<br>(0.150) | 0.513***<br>(0.151) |
| Hypothetical ingroup allocation <sup>c</sup>               |                         |                     |                     | 0.105***<br>(0.018) | 0.102***<br>(0.019) |
| Female   |                         |                     |                     |                     | -0.003<br>(0.081)   |
| Age  |                         |                     |                     |                     | 0.038<br>(0.027)    |
| Siblings   |                         |                     |                     |                     | -0.013<br>(0.055)   |
| Risk tolerance   |                         |                     |                     |                     | -0.030**<br>(0.012) |
| Patience   |                         |                     |                     |                     | -0.012<br>(0.009)   |
| Constant   | 0.399<br>(0.359)        | 1.046**<br>(0.492)  | 1.017*<br>(0.522)   | -0.257<br>(0.471)   | -0.342<br>(0.559)   |
| Observations   | 112                     | 112                 | 112                 | 111                 | 111                 |
| $R^2$  | 0.000                   | 0.046               | 0.078               | 0.374               | 0.434               |

Notes: Linear probability models. Sample: Armenian trustees in treatment *G-A Signal*. Dependent variable: categorical variable coded 1 if subject signals a Georgian name, 0 otherwise. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

<sup>a</sup> Pride about Armenian ethnicity: response to the following question: “How proud are you to be Armenian?” Answer categories ranged from 1=“not at all proud” to 5=“very proud”.

<sup>b</sup> Importance of ethnic markers: average response to the following two questions: “Some people say that the following things are important for being truly Armenian. Others say they are not important. How important do you think it is to be able to speak Armenian? How important do you think it is to have an Armenian name?” Answer categories ranged from 1=“very unimportant” to 5=“very important”.

<sup>c</sup> Hypothetical ingroup allocation: “Please consider the following situation: You have to decide how to split 10 Lari between two strangers. One stranger is Georgian, the other is Armenian. How would you split the money?”

**Table 6:** Georgian trustors' transfers with and without signaling

|   | Trustors' transfers  |                      |
|---|----------------------|----------------------|
|   | (1)                  | (2)                  |
| <i>Treatment G-A</i>                              | -1.208***<br>(0.285) | -1.271***<br>(0.229) |
| <i>Treatment G-A Signal</i>                       | -0.734***<br>(0.233) | -0.766***<br>(0.218) |
| Control mean (G-G)                                | 5.171                |                      |
| Covariates  | No                   | Yes                  |
| Observations                                      | 299                  | 297                  |
| $R^2$   | 0.063                | 0.110                |
| <i>Wald-Test</i>                                  |                      |                      |
| $H_0: \beta_{G-A} - \beta_{G-A \text{ Signal}}=0$ | -0.474*              | -0.505**             |

*Notes:* OLS regressions. Dependent variable: Transfers from Georgian trustors to trustees. Control mean: mean of the outcome variable in treatment G-G. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 7:** Georgian trustors' transfers, expected back transfers and Armenian trustees' actual back transfers with signaling (treatment *G-A Signal*)

|                                    | Trustors' transfers |                     | Trustors' beliefs about trustees' back transfers |                     | Trustees' back transfers |                   |
|------------------------------------|---------------------|---------------------|--|---------------------|--------------------------|-------------------|
|                                    | (1)                 | (2)                 | (3)  | (4)                 | (5)                      | (6)               |
| <i>Signal Georgian name (=1)</i>   | 1.312***<br>(0.346) | 1.197***<br>(0.357) | 1.033***<br>(0.347)                              | 1.095***<br>(0.368) | 0.108<br>(0.473)         | 0.0210<br>(0.470) |
| Trustors-transfer dummies          | n.a.                | n.a.                | Yes  | Yes                 | Yes                      | Yes               |
| Control mean (not signal Georgian) | 3.875               |                     | 3.656  |                     | 3.272                    |                   |
| Covariates                         | No                  | Yes                 | No   | Yes                 | No                       | Yes               |
| Observations                       | 112                 | 111                 | 112  | 111                 | 112                      | 112               |
| $R^2$                              | 0.116               | 0.140               | 0.678  | 0.683               | 0.615                    | 0.652             |

*Notes:* OLS regressions. Sample: treatment *G-A Signal*. Dependent variable: Col. (1)-(2): Transfers from Georgian trustors to trustees; col. (3)-(4): Georgian trustors' beliefs about trustees' transfers; col. (5)-(6): trustees' actual back transfers. Independent variable: coded 1 if Armenian trustee signals a Georgian name, 0 otherwise. Control mean: mean of the outcome variable without signaling a Georgian name. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 8:** Effects of signals on Georgian trustors' and Armenian trustees' profits

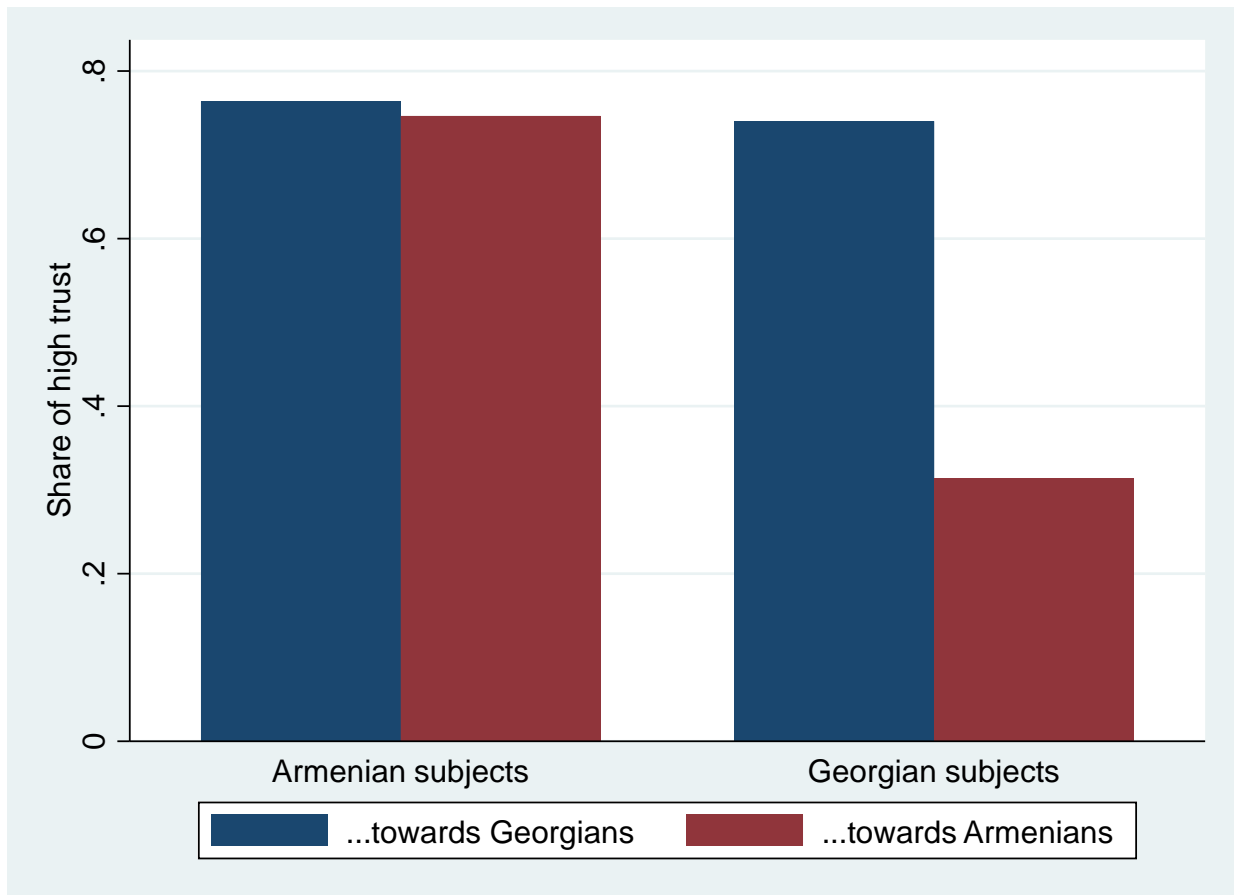
|                                    | Georgian trustors' profits |                  | Armenian trustees' profit |                     |
|------------------------------------|----------------------------|------------------|---------------------------|---------------------|
|                                    | (1)                        | (2)              | (3)                       | (4)                 |
| <i>Signal Georgian name (=1)</i>   | 0.365<br>(0.436)           | 0.358<br>(0.449) | 2.260***<br>(0.741)       | 2.287***<br>(0.779) |
| Control mean (not signal Georgian) | 9.531                      |                  | 8.219                     |                     |
| Covariates                         | No                         | Yes              | No                        | Yes                 |
| Observations                       | 112                        | 111              | 112                       | 111                 |
| $R^2$                              | 0.006                      | 0.047            | 0.078                     | 0.112               |

*Notes:* OLS regressions. Sample: treatment *G-A Signal*. Dependent variable: Col. (1)-(2): Georgian trustors' profits; col. (3)-(4): Armenian trustees' profits. Independent variable: coded 1 if Armenian trustee signals a Georgian name, 0 otherwise. Control mean: mean profits without signaling a Georgian name. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix (For Online Publication)

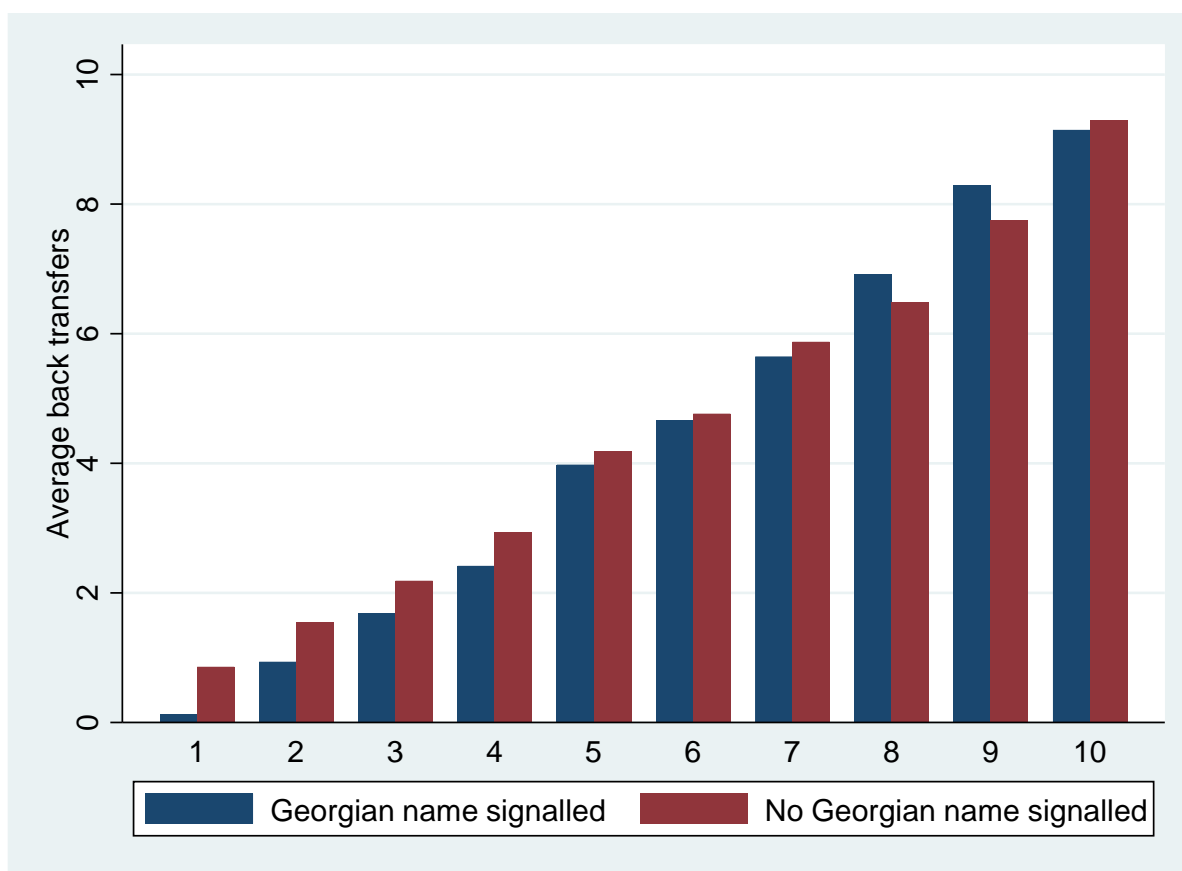
### Appendix A: Supplementary figures and tables

**Figure A1:** General trust within and between ethnicities in our sample



*Notes:* Survey questions: „Generally speaking, how much do you trust [Georgians/Armenians]“ Answer categories: „No trust at all“, „Little trust“ „Quite a bit of trust“ „A lot of trust“. The figure depicts the share of subjects who trust a lot or a bit.

**Figure A2:** Armenian' trustees' back transfers with signaling



*Notes:* The figure shows actual back transfers by Armenian trustees who did and did not signal a Georgian name (blue bars and red bars, respectively) in treatment *G-A Signal*. Each trustee reported a back-transfer decision for each possible trustor transfer (strategy method).



**Table A1:** Ethnic groups in the country of Georgia (1989-2014)

|         | Census | Total pop. | Armenians |           | Azeris  |           |
|---------|--------|------------|-----------|-----------|---------|-----------|
|         |        |            | Total     | % of pop. | Total   | % of pop. |
|         | (1)    | (2)        | (3)       | (4)       | (5)     | (6)       |
| Georgia | 1989   | 5,400,841  | 437,211   | 8,1%      | 307,512 | 5,69%     |
|         | 2002   | 4,371,535  | 248,929   | 5,69%     | 284,761 | 6,51%     |
|         | 2014   | 3,713,804  | 168,102   | 4,53%     | 233,024 | 6,27%     |
| Tbilisi | 1989   | 1,246,936  | 150,138   | 12,04%    | 17,986  | 1,44%     |
|         | 2002   | 1,081,679  | 82,586    | 7,63%     | 10,942  | 1,01%     |
|         | 2014   | 1,108,717  | 53,409    | 4,82%     | 15,187  | 1,37%     |

Notes: Data source: National Statistics Office of Georgia, <https://www.geostat.ge/en/modules/categories/316/population-and-demography> [accessed 5 June 2019].

**Table A2:** Sample message space of Armenian trustee (treatments *G-A signal* and *A-A signal*)

| Option 1  | Option 2   | Option 3        |
|---|--|-----------------|
| “My first name is among the names listed below<br>Armen<br>Samvel<br>Artur<br>Karen<br>Levon<br>Armine<br>Susanna<br>Gaiane<br>Ruzanna<br>Karine” | “My first name is among the names listed below<br>Daviti<br>Giorgi<br>Leqso<br>Nikoloz<br>Luka<br>Mariam<br>Nino<br>Salome<br>Kato<br>Tamar” | Send no message |

Notes: “Option 1” represents the truthful (untruthful) message of signaling Armenian (Georgian) ethnicity. “Option 1” contains the subjects’ true name. The names in the lists were selected with respect to their frequency in our subject pool.

**Table A3:** Summary statistics and balancing tests

|                              | Georgian subjects  |                    |                           |                    | Armenian subjects  |                           |                           |                           |
|------------------------------|--------------------|--------------------|---------------------------|--------------------|--------------------|---------------------------|---------------------------|---------------------------|
|                              | Mean               | Difference         |                           |                    | Mean               | Difference                |                           |                           |
|                              | <u>G</u> -G<br>(1) | <u>G</u> -A<br>(2) | <u>G</u> -A Signal<br>(3) | G- <u>G</u><br>(4) | G- <u>A</u><br>(5) | G- <u>A</u> Signal<br>(6) | A- <u>A</u> Signal<br>(7) | <u>A</u> -A Signal<br>(8) |
|                              | TRUSTORS           |                    |                           | TRUSTEES           | TRUSTEES           |                           |                           | TRUSTORS                  |
| Female                       | 0.429              | -0.051             | -0.009                    | -0.190***          | 0.500              | 0.054                     | 0.062                     | -0.025                    |
| Age                          | 13.733             | -0.050             | -0.211                    | -0.848***          | 13.829             | -0.017                    | -0.017                    | 0.614***                  |
| Siblings                     | 1.533              | 0.076              | -0.060                    | -0.067             | 1.439              | -0.037                    | -0.039                    | 0.048                     |
| % of Georgian friends        | 0.945              | 0.003              | -0.004                    | -0.020             | 0.212              | 0.002                     | -0.046                    | -0.048                    |
| % of Armenian friends        | 0.005              | 0.005              | 0.004                     | 0.011              | 0.727              | 0.029                     | 0.031                     | 0.002                     |
| Risk tolerance               | 6.952              | 0.157              | 0.021                     | -1.362***          | 7.200              | -0.352                    | -0.275                    | -0.150                    |
| Patience                     | 6.192              | 0.503              | 0.584                     | 0.008              | 5.232              | -0.357                    | -0.119                    | 1.381**                   |
| Understood instructions      | 9.419              | 0.203              | 0.135                     | 0.286**            | 9.646              | 0.059                     | 0.166                     | 0.129                     |
| Trusts in receiving presents | 0.990              | 0.010              | 0.010                     | 0.010              | 1.000              | 0.000                     | 0.000                     | 0.000                     |
| Likes incentives             | 1.000              | 0.000              | 0.000                     | 0.000              | 1.000              | 0.000                     | 0.000                     | 0.000                     |
| Observations                 | 105                | 82                 | 112                       | 105                | 82                 | 112                       | 80                        | 80                        |

*Notes:* “Difference” displays the difference in means between the reference groups (trustors in treatment *G-G* for Georgian subjects, see column 1; trustees in treatment *G-A* for Armenian subjects, see column 5) and the groups. **Highlighted** letters indicate the role (trustor or trustee) which is represented in the respective column. Significance levels of “Difference” stem from linear regressions of the respective background variable on treatment dummies. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A4:** Georgian trustors' beliefs without signaling, by trustor's transfers

|                                    | Trustors' beliefs about trustees' back transfers |                      |
|------------------------------------|--|----------------------|
|                                    | (1)  | (2)                  |
| <i>Treatment G-A</i>               | 0.747<br>(0.553)                                 | 1.034<br>(0.583)     |
| <i>Transfer</i>                    | 1.281***<br>(0.0711)                             | 1.323***<br>(0.0631) |
| <i>Treatment G-A*Transfer</i>      | -0.364**<br>(0.150)                              | -0.402**<br>(0.156)  |
| Covariates                         | No   | Yes                  |
| Observations                       | 187  | 186                  |
| $R^2$                              | 0.651  | 0.674                |
| Treatment effect for (Wald tests): |  |                      |
| Trustor's transfer = 0             | 0.747  | 1.034                |
| Trustor's transfer = 1             | 0.383  | 0.632                |
| Trustor's transfer = 2             | 0.019  | 0.23                 |
| Trustor's transfer = 3             | -0.345*  | -0.172               |
| Trustor's transfer = 4             | -0.709***  | -0.574**             |
| Trustor's transfer = 5             | -1.073***  | -0.976***            |
| Trustor's transfer = 6             | -1.437***  | -1.378***            |
| Trustor's transfer = 7             | -1.801***  | -1.78**              |
| Trustor's transfer = 8             | -2.165**   | -2.182**             |
| Trustor's transfer = 9             | -2.529**   | -2.584**             |
| Trustor's transfer = 10            | -2.893**   | -2.986**             |

*Notes:* OLS regressions. Dependent variable: Georgian trustors' beliefs about trustees' transfers. The Wald tests test  $H_0: \beta_{\text{Treatment G-A}} + \beta_{\text{Treatment G-A*Transfer}} = 0$ . Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A5:** Trustees' back transfers (strategy-method averages)

|                                    | Trustees' back-transfers  |                      |                             |                   |
|------------------------------------|---------------------------|----------------------|-----------------------------|-------------------|
|                                    | Treatments <i>G-G/G-A</i> |                      | Treatment <i>G-A Signal</i> |                   |
|                                    | (1)                       | (2)                  | (3)                         | (4)               |
| <i>Treatment G-A</i>               | -1.137**<br>(0.398)       | -1.223***<br>(0.319) |                             |                   |
| <i>Signal Georgian name (=1)</i>   |                           |                      | -0.208<br>(0.432)           | -0.309<br>(0.445) |
| Control mean ( <i>G-G</i> )        | 5.829                     |                      | n.a.                        |                   |
| Control mean (Not signal Georgian) | n.a.                      |                      | 4.589                       |                   |
| Covariates                         | No                        | Yes                  | No                          | Yes               |
| Observations                       | 187                       | 185                  | 112                         | 112               |
| $R^2$                              | 0.055                     | 0.118                | 0.002                       | 0.074             |

*Notes:* OLS regressions. Dependent variable: Trustees' back transfers, averaged across each possible trustor's transfer (strategy-method elicitation). Control mean: Col. (1)-(2): mean back-transfer in treatment *G-G*; col. (3)-(4): mean back-transfer without signaling a Georgian name. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A6:** Armenian trustees' expected transfers, by signal

|                                    | Expected transfers after sending ... |                     |                      |                      |                  |                  |
|------------------------------------|--------------------------------------|---------------------|----------------------|----------------------|------------------|------------------|
|                                    | Armenian name                        |                     | Georgian name        |                      | No signal        |                  |
|                                    | (1)                                  | (2)                 | (3)                  | (4)                  | (5)              | (6)              |
| <i>Treatment A-A Signal</i>        | 2.859***<br>(0.393)                  | 2.868***<br>(0.187) | -1.652***<br>(0.357) | -1.640***<br>(0.335) | 0.114<br>(0.232) | 0.110<br>(0.216) |
| Control mean ( <i>G-A Signal</i> ) | 3.116                                |                     | 5.339                |                      | 3.098            |                  |
| Covariates                         | No                                   | Yes                 | No                   | Yes                  | No               | Yes              |
| Observations                       | 192                                  | 192                 | 192                  | 192                  | 192              | 192              |
| $R^2$                              | 0.290                                | 0.356               | 0.133                | 0.148                | 0.001            | 0.043            |

*Notes:* OLS regressions. Dependent variable: Col. (1)-(2): trustees' beliefs about trustors' transfers when signaling an Armenian name; col. (3)-(4): trustees' belief about trustors' transfers when signaling a Georgian name; col. (5)-(6): trustees' belief about trustors' transfers when sending no signal. Control mean: mean of the outcome variables in treatment *G-G Signal*. Covariates: gender, age, number of siblings, risk tolerance, and patience. Robust standard errors clustered at the class-level in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A7: Beliefs about Armenian trustees' ethnicity with signaling**

| Treatment              | Beliefs about trustees' ethnicity |                 |   |                 |
|------------------------|-----------------------------------|-----------------|---|-----------------|
|                        | Georgian trustors' beliefs        |                 | Armenian trustees' second-order beliefs |                 |
|                        | Armenian<br>(1)                   | Georgian<br>(2) | Armenian<br>(3)                         | Georgian<br>(4) |
| G-A Signal             | 56.25%                            | 43.75%          | 58.33%                                  | 41.67%          |
| Armenian name signaled | 100.00%                           | 0.00%           | 100.00%                                 | 0.00%           |
| Georgian name signaled | 0.00%                             | 100.00%         | 0.00%                                   | 100.00%         |
| A-A Signal             | 100.00%                           | 0.00%           | 100.00%                                 | 0.00%           |
| Armenian name signaled | 100.00%                           | 0.00%           | 100.00%                                 | 0.00%           |

*Notes:* Col. (1)-(2): Trustors' beliefs about Armenian trustees' ethnicity, by treatment and name signal received; col (3)-(4): Armenian trustees' second-order beliefs about trustors' beliefs about their ethnicity. Note that the following categories are not shown because of their very low numbers of observations: no signal in treatment *G-A Signal* (N=1), Georgian name signal in treatment *A-A Signal* (N=0), and no signal in Treatment *A-A Signal* (N=1).

## **Appendix B: Additional background information on the country of Georgia**

Armenians and Azeris are the largest ethnic minority groups in Georgia. As Appendix Table A1 shows, they accounted for 4.5 percent and 6.3 percent of the entire country's population in the 2014 census, and for 4.8 percent and 1.4 percent of the population in Tbilisi. Note that the number of Armenians in the country, and the city, has been decreasing sharply since 1989 (see Appendix Table A1).

There were two major waves of Armenian immigration to Georgia in the past two millennia. The first wave was initiated by Georgian kings who encouraged Armenians to populate remote areas and towns in Georgia in the fifth, eleventh and eighteenth century to increase the Christian population after periods of Arab and Persian dominance. The second wave was a result of the Russo-Turkish wars, when Armenians migrated to Georgia's southern region of Meskhet-Javakheti and Tbilisi between 1828 and 1915. As a result, the Armenian population in Tbilisi increased to 125,000 in the beginning of the twentieth century (see Jones 1996). After the collapse of the Ottoman and Russian empires in the wake of World War I, Armenia and Georgia were independent states before becoming part of the Soviet Union from 1921 to 1991. The period of independence was not peaceful for either country. Conflicts between them culminated in the Armenian-Georgian war in December 1918 when Armenia tried to capture Georgian territories populated by an Armenian majority. The current phase of the Georgian-Armenian relationship started in 1991, when both countries declared independence from the Soviet Union. The collapse of the Soviet Union was generally followed by rising nationalism in the post-soviet countries, exemplified, for instance, by the election of the nationalist party in Georgia in 1990. Reportedly, in the wake of rising nationalism, minorities in Georgia were increasingly considered a threat to national security (Jones 1996).

Today, Armenians in Georgia live mostly in Tbilisi and the Javakheti region in the country's south. Georgians and Armenians are both Christians, though Georgians are Orthodox, while Armenians generally belong to the Armenian Apostolic Church. They often differ in appearance, although this is not always apparent. Monthly average income from hired full-time employment is 747 Georgian Lari (app. 311 USD; 2015 exchange rate) among Georgians and 560 Georgian Lari (app. 233 USD; 2015 exchange rate) among Armenians living in Georgia. The university completion rate is 39 percent among Georgians and 31 percent

among Armenians (bachelor or master degree), and the unemployment rate is 11.6 percent among Georgians and 10 percent among Armenians.<sup>44</sup> The Armenian language differs widely from the Georgian language, but over 96 percent of the Armenian minority in Tbilisi are fluent in Georgian. This is in contrast to the Armenian minority in the Javakheti region, where only 25 percent know Georgian well (Osepashvili, 2013). The Armenian minority in Tbilisi is concentrated in the central districts of the city, but they are not segregated from ethnic Georgians. Tbilisi has a total of 294 schools, which are segregated along ethnic lines. Most of the schools are Georgian (and cater to Georgian children), and a small minority of ten schools are Armenian or Russian (and cater to Armenian children). The number of Armenian schools in Tbilisi declined markedly from 60 schools in 2005 to only 10 in 2019 (Ministry of Education, Science, Culture and Sports of Georgia, <http://mes.gov.ge/> [accessed 5 June, 2019]). In Georgia, each school provides primary, lower secondary and upper secondary education. Except for a small set of private schools (where the language of instruction is English or German, for instance), the language of instruction in all public schools is Georgian.

The relationship between Georgians and the Armenian minority has improved over the past years. In 1995, the Georgian government gradually began to build democratic institutions and promote equal rights for all citizens irrespective of their ethnicity. Still, minorities remain underrepresented in Georgia's political life, and Georgian politicians are often discredited by allegations that they have Armenian origins (Democracy & Freedom Watch, 18 October 2015, <https://dfwatch.net/unchallenged-stereotypes-blight-georgian-armenian-relations-38678> [accessed 7 June 2019]). Negative perceptions and mistrust towards Armenians still prevail in Georgian society today (e.g, Osepashvili 2013).

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<sup>44</sup> The State Department for Statistics of Georgia. Integrated Household Survey Databases 2015. Dataset downloaded from <https://www.geostat.ge/en/modules/categories/128/databases-of-2009-2016-integrated-household-survey-and-2017-households-income-and-expenditure-survey> on 2 April 2019.

## **Abstrakt**

Diskriminace vůči menšinám je přítomna v mnoha společenských skupinách, ale málo se ví o strategiích, které mohou menšiny použít k minimalizaci diskriminace. Využíváme experiment typu trust game se 758 žáky středních škol z Gruzie, kde etničtí Gruzínci diskriminují etnické Armény. Zavádíme úvodní fázi signalizace k prozkoumání ochoty Arménů skrýt svůj etnický původ a vyhnout se tak očekávané diskriminaci. 43 procent arménských účastníků falešně signalizovalo, že mají gruzínské jméno. Falešná signalizace je motivována očekávanými transfery a nefinančními důvody. Strategické klamání o etnické příslušnosti zvyšuje gruzínským účastníkům očekávané zpětné transfery a eliminuje diskriminující chování.



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