

Accents, Group Identity, and Trust Behaviors: Evidence from Singapore*

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Abstract

We studied discrimination on the basis of national origin in Singapore by exploring how the group identity discernible in a speaker's accent affects trust. In the trust game, Singaporean Chinese (SGC) senders were asked to listen to audio clips in which responders with either an SGC or a Mainland Chinese (MLC) accent read a two-sentence script before the senders decided how much money to send. We also used the strategy method to elicit the senders' beliefs about the trustworthiness of responders with an MLC accent versus those with an SGC accent. Contrary to our expectations and the common perception in Singapore, we found that Singaporean senders tended to place more trust in responders with an MLC accent than in responders with an SGC accent. We explained this difference on the basis of the Singaporean senders' beliefs about trustworthiness: they believed that people with an MLC accent would return more money to senders than would the in-group Singaporean counterparts. To bolster our findings, we confirmed in a separate experiment that the difference in response to the accents was not due to the speech rate or vocal pitch.

Keyword: Discrimination; Accents; Group identity; Trust game

JEL Classification: D81, D91, C91, J1

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Abstract

We studied discrimination on the basis of national origin in Singapore by exploring how the group identity discernible in a speaker's accent affects trust. In the trust game, Singaporean Chinese (SGC) senders were asked to listen to audio clips in which responders with either an SGC or a Mainland Chinese (MLC) accent read a two-sentence script before the senders decided how much money to send. We also used the strategy method to elicit the senders' beliefs about the trustworthiness of responders with an MLC accent versus those with an SGC accent. Contrary to our expectations and the common perception in Singapore, we found that Singaporean senders tended to place more trust in responders with an MLC accent than in responders with an SGC accent. We explained this difference on the basis of the Singaporean senders' beliefs about trustworthiness: they believed that people with an MLC accent would return more money to senders than would the in-group Singaporean counterparts. To bolster our findings, we confirmed in a separate experiment that the difference in response to the accents was not due to the speech rate or vocal pitch.

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I. Introduction

Discrimination has been studied extensively in the social sciences. Economics is no exception because discrimination creates market inefficiency (Becker 1971). Early theoretical works in economics categorized discrimination as either taste-based or statistical (Arrow 1973, 1998; Becker 1971; Phelps 1972) since the categories have different policy implications. In empirical studies, economists have documented discrimination based on race and ethnicity in diverse societies around the world (see Altonji and Blank [1999] and List and Rasul [2011] for a comprehensive review). In such societies, names and appearances are obvious markers by which people identify other individuals as part of different groups.

Discrimination may also occur in ethnically homogeneous societies where different group identities exist within a single ethnicity. Although people's names and looks are actually very similar across groups, individuals may use vocal clues (e.g., dialects and accents) to identify the group to which someone else potentially belongs and, in some cases, form prejudice or stereotypes that lead to discrimination. A prominent example of an ethnically homogeneous society with differing internal groups is Singapore, whose highly open economy relies on migrant workers, including those from Mainland China. Despite the Singaporean government's anti-discrimination efforts, evidence that Singaporeans discriminate against Mainland Chinese (MLC) can be found in multiple aspects of daily life, such as apartment listings (Cheung, 2014), public transportation (Wong, 2013), workplaces (Moon, 2018), and classrooms (Yang, 2014). In this paper, we study discrimination against MLC in Singapore, where people's accents can easily convey their specific group identity.

We employed the commonly used trust game from Berg et al. (1995) to quantify the difference in trust among Singaporean Chinese (SGC) subjects (the senders) toward their fellow

SGC versus their MLC counterparts (the responders). To mask the purpose of the study, we did not directly inform senders about the group identity of responders. Instead, we asked senders to listen to an audio clip in which a responder read a standard two-sentence script. Each responder's group could be easily determined from his/her accent. We also used the strategy method to elicit the senders' beliefs about the trustworthiness of responders with an MLC accent versus those with an SGC accent.

Contrary to our expectations and the common perception in Singapore, we did not find negative discrimination against MLC. Instead, we found that the SGC senders sent more money to MLC responders than they did to SGC responders in the trust game. The results from the belief-elicitation task showed that the unexpected finding occurred because the SGC senders perceived the MLC responders to be more trustworthy and generous than the SGC responders. We also conducted additional treatment conditions to refute the possibilities that the observed treatment effect was driven by the difference in SGC and MLC distinct vocal characteristics, including speech rate and vocal pitch.

Our study contributes to the literature in the following ways. First, we uncovered evidence that accent operates as a natural marker that is effectively used to identify participants' nationality among ethnically homogenous groups. Unlike previous studies on discrimination that have used obvious markers (e.g., last name or in-person meetings) where the ethnicity of the opponents can be visually identified, we used a less foolproof marker, a vocal clue, to reduce the experimenter demand effect (Zizzo, 2010).¹ This demand effect is especially pronounced in discrimination studies because discrimination on the grounds of ethnicity, national origin, gender, and religion is considered socially unacceptable, often illegal, behavior. Another advantage of using accent to

¹ Indeed, Lane (2016) noted that sensitive natural identities may reduce subjects' desire to discriminate due to a preference to not engage in socially unacceptable behavior.

convey group identity information is that the anonymity condition can be more tightly maintained than when using names and looks.

Second, the unique environment in Singapore provides a great opportunity to test the statistical theory of discrimination. In statistical discrimination models (Phelps, 1972; Arrow, 1973), decision-makers are utility or profit maximizers; differential treatment across groups is a rational response based on decision-makers' belief about each group's relevant characteristics. Given the aforementioned discrimination toward MLC in Singapore, our SGC subjects were unlikely to exhibit taste-based favoritism toward MLC in our laboratory setting (assuming that subjects brought their real-world attitudes to the lab). In this sense, our results align with the theories of statistical discrimination: in an environment where taste-based out-group favoritism could be ruled out, SGC senders, who held a (qualitatively) correct belief about out-group MLC responders' trustworthiness, acted rationally and displayed favoritism toward out-group members (discrimination against in-group members).

Finally, our study also relates to the broader literature investigating how vocal characteristics impact people's perception and decisions.² Accents often affect people's perceptions of others and, subsequently, the decisions people make in the workplace (Deprez-Sims et al. 2010; Rakic et al. 2011) and criminal cases (Dixen et al. 2002; Frumkin 2007). Accents can even influence people's decisions about the credibility of speakers (Lev-Ari and Keysar 2010). Beyond accents, vocal pitch and speech rate can change how people perceive the trustworthiness of a speaker: McAleer et al. (2014) and Tigue et al. (2012) found that males with lower-pitched voices are perceived as dominant, attractive, and more trustworthy than males with higher-pitched

² In a similar vein, Li (2017) investigated how the language used to instruct subjects influenced their decisions in a series of incentivized economic games. Using Chinese-English bilingual subjects, he found that subjects were more pro-social in trust games when the experiments were conducted in Chinese than in English.

voices. Chen et al. (2016) showed that the vocal pitch and speech rate of lawyers presenting in front of U.S. Supreme Court justices affect the outcome of cases. Relatedly, Chua et al. (2020) showed that a higher-pitched voice increased risk aversion, while a lower-pitched voice raised risk tolerance. To the best of our knowledge, our study is the first economics research to highlight the role of accent in conveying group identity information and examine how vocal pitch and speech rate affect trust behavior in a controlled laboratory environment. Our results indicate that, while the accent is an obvious marker for group identification, the vocal pitches and speech rates associated with the accent do not explain the trust differences in the laboratory setting.

II. Experimental Design and Procedures

2.1 The Trust Game

We measured trust and trustworthiness using the trust game developed by Berg et al. (1995). Senders interacted with 12 different responders in each of 12 periods throughout the entire task. In each period, a sender was initially endowed with S\$10. Then, s/he was asked to listen to a pre-recorded audio clip in which a responder read the following two-sentence script: “Please be generous to me. I will return your generosity.” Finally, the sender decided the amount of money (any integer between 0 and 10) that s/he wished to transfer to the responder. The experimenter tripled this amount and then sent it to the responder. Upon receiving the tripled transfer amount, the responder decided what percentage of that money s/he wished to return to the sender—between 0% and 100% of the total received, in increments of 10%. The payoff in a given period was determined by both the sender’s on-the-spot decision and the responder’s previous decision elicited using the strategy method.

After senders completed the trust game, they were asked to re-listen to the 12 audio clips and guess each responder’s decision. The senders’ responses in this task would allow us to assess

not only whether senders overestimated or underestimated the trustworthiness of responders in the two different groups, but also the extent to which the senders did so. We incentivized senders' responses by paying S\$0.1 for each correct answer. Because the responders' decisions had been elicited using the strategy method, each audio clip prompted 10 decisions.³ Thus, each sender made his/her guesses on the basis of a total of $10 * 12 = 120$ decisions and could earn up to S\$12 in this belief-elicitation stage.

2.2 Manipulation

To examine how SGC senders' trust behavior was influenced by information about a responder's in-group, we systematically exposed senders to either SGC or MLC responders in the trust game. In order to conceal the purpose of the study, we adopted a between-subject design: A sender was unaware of the other treatment and only exposed to one treatment. In other words, if a sender was randomly assigned to the SGC (or MLC) treatment condition, s/he would interact with 12 SGC (or MLC) responders throughout the entire task.

The responders' group identity was conveyed naturally to the senders when they listened to the pre-recorded audio clips because each responder's accent easily identified his/her national group.⁴ Although less explored in the economics literature, this speech-based group identification strategy is prevalent in the real world and has been well-documented in psychological research (e.g., Nesdale and Rooney [1996 and Rakić, Steffens, and Mummendey [2011]). More importantly,

³ Previous studies that used the trust game to investigate discrimination either did not elicit beliefs (Willinger and Keser, 2003; Fershtman et al. 2005; Netzer and Sutter, 2009; Ahmed 2010) or only elicited a partial set of beliefs, making it difficult to explain differences in behavior (Guillen and Ji, 2011; Chuah et al. 2013; Delavande and Zafar, 2015). To elicit the complete set of senders' beliefs about responders' trustworthiness in all possible scenarios, we adopted the strategy method. Notably, compared to the direct-response method, it has been criticized that the hypothetical character of the strategy method makes it too "psychologically cold" to be realistic as an abstraction of the natural setting.

⁴ Specifically, the SGC accent differentiates from the MLC accent in the habitual particle at sentence-end. The former typically uses "lah" (啦), while the latter uses "er" (儿).

from a methodological perspective, indirectly conveying information to a sender about a responder's group identity via a short recorded-speech, as opposed to directly specifying the information, creates a more natural scenario for subjects and can further mask the purpose of the study to avoid the undesirable demand effect.

2.3 Procedures and Participants

Our experimental design called for a two-stage data collection process. In the first stage, we conducted the responder's experiment with 24 participants. We then coded the responders' decisions and voice recordings into the sender's experiment. In the second stage, we conducted the sender's experiment with 160 participants.

2.3.1 The Responder's Experiment

In April 2018, we hired 12 SGC and 12 MLC responders, with an equal number of males and females in each group. The responders' sessions proceeded as follows (see online Appendix I for experimental instructions): Informed consent was obtained from all participants before the study began. After the instruction stage was complete, the responders were told they would play the role of "responder." Then, we elicited their return decisions using the strategy method. Responders were asked to report their return decisions in each of 10 scenarios described, which were described as follows: "If player 1 (sender) transfers S\$X ($x=1, \dots, 10$) to you and thus you receive S\$3X, how much, as a percentage of the amount, would you return to him?" Upon completing all 10 decisions, the responders were then asked to read the two-sentence script while a lab assistant recorded the speech using Speakpipe,⁵ an online voice recorder application.⁶

⁵ Available at <https://www.speakpipe.com/voice-recorder>.

⁶ Alternatively, we could alter the order of the two tasks by asking responders to make the voice recording before they made the decisions in the trust game. However, we were concerned responders' decisions could be biased based on the content of the script, which (hypothetically) promised that they would return a substantial amount to the sender.

Responders were paid a S\$10 participation fee on the day of the experiment, and they had to return to receive their earnings from the trust game after the senders' sessions concluded. Responders were instructed that they would be paired with subsequent senders and that one decision would be randomly drawn to implement the payment.

To ensure that a responder's accent and its corresponding in-group could be easily identified by our target subject pool of senders, we hired 36 SGC participants to be third-party judges. They were asked to listen to all 24 voice recordings made by the responders and guess each speaker's group—either SGC or MLC. The average correct rate across the 24 audio clips was 95.5%.

2.3.2 The Sender's Experiment

After the responder's experiment was completed, via ORSEE, we recruited a total of 160 local SGC students at Nanyang Technological University to be senders.⁷ Eighty-one subjects participated in the SGC condition and 79 in the MLC condition. Among the 160 participants, 56.3% were female, 60.2% were majoring in economics or business, and 95.0% reported at least adequate proficiency in Mandarin Chinese. All sessions were conducted in an individual format with only one participant per session. Each session lasted for roughly 30 minutes and proceeded in the following manner (see Online Appendix II for the experimental instructions): Once subjects arrived at the computer lab, a lab assistant guided them to an assigned seat. Informed consent was obtained from all participants before the study began. The main experiment consisted of four stages: instructions and comprehension, trust game, belief elicitation, and post-experiment questionnaire. Upon completing all four stages, the senders received their earnings in cash before leaving the lab.

⁷ Two waves of data collection were conducted at Nanyang Technological University, with 121 subjects recruited during August–September 2018 and 39 subjects recruited in February–March 2021. We note that our results were robust to including the wave dummy in the regression analysis.

Their total earnings included a S\$5 participation fee, the earnings from one randomly chosen period in the trust game (up to S\$30), and the earnings from the belief-elicitation task (up to S\$12). We programmed and administered the experiment using Qualtrics.

III. Results

We examined not only whether SGC senders would discriminate against MLC responders as opposed to their fellow SGC in the trust game but also the extent to which senders would do so. Contrary to our expectations, the senders exhibited a significantly higher level of trust toward MLC responders than toward the SGC responders. This result was our main finding. As shown in Figure 1, from the S\$10 endowment, the senders sent an average of S\$4.14 and S\$4.96, respectively, to SGC and MLC responders (p-value = 0.013 using the two-sided t-test).

[Insert Figure 1 around here.]

Table 1 presents the regression results, with additional controls for demographic characteristics. In Column (1), we regressed the average amount of money sent to the 12 responders on the treatment dummy, *MLC Treatment*, using an OLS estimation. We further controlled for a set of demographic variables, including gender, academic major, number of years living in Singapore, and self-reported proficiency in Mandarin Chinese, as shown in Column (2). As each sender interacted with 12 responders, we performed the regression analysis using a panel data model in Columns (3) and (4), with standard errors clustered at the individual level. Because the dependent variable was censored, we also performed a Tobit estimation, and marginal effects results are reported in Columns (5) and (6). The coefficient of the *MLC Treatment* was positive and statistically significant at the traditional levels in all specifications, while none of the coefficients of the demographic controls were significant, reconfirming our main finding.

Result 1: SGC senders exhibited a higher level of trust toward MLC responders than toward SGC responders.

[Insert Table 1 around here.]

To explore why senders exhibited this intriguing out-group favoritism, we delved into the data on what they believed about responders' trustworthiness. In the belief-elicitation stage of the experiment, we asked the senders how much of the tripled transfer amount, in increments of 10%, they believed the responder would return. Figure 2 presents a visual comparison of the senders' beliefs about the SGC's and MLC's trustworthiness. The senders appeared to believe that MLC responders would return more transferred money than SGC responders would when the amount originally transmitted by the senders was more than half of the S\$10 endowment. (The differences were at least marginally significant in the scenarios where senders sent S\$7 or more.) These results provide an evidence-based explanation for why the SGC senders sent more money to MLC responders than to the in-group SGC responders. The senders evidently believed that the MLC responders were more trustworthy, based on a conviction that the MLC would return more of the transferred money.

[Insert Figure 2 around here.]

In Table 2, we show the results of a regression analysis used to estimate the MLC effect on a sender's belief about the amount the responders would return while controlling for a set of demographic variables. The dependent variable was the average amount (as a percentage of the tripled amount) a sender believed the responders would return. Columns (1)–(10) report the regression results for each scenario, in which the sender transferred anywhere from S\$1 to S\$10. The results show that, for those scenarios where senders sent no more than half of their initial endowment, the coefficient of the *MLC Treatment* was insignificant. For those scenarios where

senders exhibited greater trust in the responders by sending more than S\$6, however, the coefficient of the *MLC Treatment* turned significantly positive. Notably, the effect became more pronounced as the sender's transfer amount increased.

Result 2: Senders believed MLC responders would return trust more generously than SGC responders would.

[Insert Table 2 around here.]

We wanted to know whether the senders' beliefs about responders were accurate. Did MLC responders indeed warrant more trust than SGC responders? Figure 3 compares the SGC and MLC responders' actual responses, which we elicited using the strategy method in the responder's experiment. The MLC responders did in fact return the transferred money in a more reciprocal manner than the SGC responders. Within our sample of 12 MLC and 12 SGC responders, MLC responders returned a higher amount than the SGC responders in each of the 10 scenarios. And the differences were statistically significant in those scenarios where senders sent no less than half of their initial endowment.

[Insert Figure 3 around here.]

Result 3: MLC responders were more trustworthy than SGC responders. MLC responders returned significantly higher amounts of the originally transferred sum than SGC responders.

Combining the data in Figures 2 and 3, we illustrate that, although senders accurately predicted that MLC responders would return more transferred money than SGC responders, senders still greatly underestimated the extent of this trustworthiness gap—especially in those scenarios where the transferred amount was more than S\$5. To estimate the treatment effect on

this misprediction among the senders, we created a new variable, *sender's over-trust*, calculated as the difference between the amount a sender *believed* would be returned (as a percentage of the tripled transfer amount) and the amount the responder *actually* returned (as a percentage of the tripled transfer amount). We then regressed the *sender's over-trust* on the same set of independent variables, as shown in Table 2. These regression results are summarized in Table 3. The coefficient of the *MLC Treatment* is significantly negative, confirming that SGC senders over-trusted SGC responders' level of trustworthiness considerably more than MLC responders' level.

Result 4: Although SGC senders accurately predicted this behavioral difference qualitatively, they still underestimated the width of the gap between the SGC and MLC responders.

[Insert Table 3 around here.]

Overall, we found that the SGC senders trusted the MLC more than the SGC, and this gap was due to the fact that the SGC believed the MLC to be more trustworthy and generous in the trust game. In other words, we did not find, contrary to our expectations and the common perception in Singapore, discrimination among Singaporeans against MLC in this case. The broader implications of our main results are discussed in the implications and conclusion section.

VI. Discussion

4.1 A Culture-Based Explanation

We showed that SGC senders did not discriminate against but instead exhibited favoritism toward MLC responders. The results from the belief-elicitation task further revealed that the out-group favoritism was driven by SGC senders believing that MLC responders would send back more than their fellow SGC responders (and the subjects actually behaved in this manner). However, why did SGC hold this belief? One culture-based interpretation is that, while both

subject groups are of Chinese ethnicity, meritocracy has been a fundamental principle in Singapore's socio-political and educational systems⁸ (Tan 2008; Bellows 2009; Talib and Fitzgerald 2015). This institutional factor may negatively impact generosity or related social preference dimensions (Riyanto and Zhang 2014). In fact, some ongoing public concerns and debates in Singapore target the negative societal effect arising from meritocracy (Goh, 2019). On the other hand, MLC are more influenced than SGC by the traditional Chinese *Li Shang Wang Lai* (礼尚往来) social norms—a favor given must be returned. This cultural trait may manifest as a higher level of trustworthiness (i.e., return more) in the context of the trust game.⁹ We conjecture that the Singaporean senders, who were well-aware of the cultural difference between the two groups, brought this real-world belief to the laboratory setting and acted accordingly. As a result, the senders exhibited out-group favoritism toward MLC.

4.2 Alternative Explanations

In addition to the culture-based explanation, we acknowledge at least three other interpretations of our findings. First, the estimated treatment effect could have included an attribute correlated with the nationality of the responders in our sample, which then drove the main effect. Prominent candidates that could have correlated with responders' nationality are characteristics of a person's speaking voice—such as vocal pitch and speech rate. Indeed, when we analyzed the responders' voice recordings, the MLC spoke at a faster pace and a higher pitch than their SGC counterparts—the average length of audio clips was 4.17 seconds in the SGC condition versus

⁸ According to the Ministry of Education of Singapore, one of the six National Education messages is “we must uphold meritocracy and incorruptibility.”

⁹ Indeed, Croson and Buchan (1999) and Buchan, Johnson, and Croson (2006) also documented that Chinese subjects were more trustworthy than non-Chinese subjects in the trust game. Hemesath and Pomponio (1998) found that Chinese subjects were more cooperative than American subjects in the prisoner's dilemma game. More recently, according to the Global Preferences Survey (Falk et al., 2018), out of 76 countries globally, China ranked second in the trust measure and fifth in the positive reciprocity measure.

3.68 seconds in the MLC condition (p -value = 0.13 using the two-sided t -test), and the average pitch was 164.95 Hz in the SGC condition versus 167.35 Hz in the MLC condition (p -value = 0.89 using the two-sided t -test).

For this reason, we conducted an additional experiment to examine how these two vocal characteristics affect trust. We used Sound Studio, a voice modifier software program, to increase the pitch and the speed of the original 12 SGC voice recordings in the corresponding Pitch (+) and Speed (+) treatment conditions—increasing the pitch by 50 Hz and the speed by 20%.¹⁰ Recruiting from the same responder subject pool, we had 69 responders participate in the Pitch (+) condition and 59 responders in the Speed (+) condition. Except for the manipulated vocal dimensions, all other design details were identical to those in the SGC treatment condition. Figure 4 compares the relative level of trust between the Pitch (+), the Speed (+), and the SGC (control) conditions. The average transfer amount was not significantly different between any two pairs of the three conditions (p -value = 0.173 between the control and Speed (+) conditions, and p -value = 0.961 between the control and Pitch (+) conditions using the two-sided t -test).¹¹ Consequently, we can conclude the evidence from this additional experiment refutes the possibility that the observed treatment effect was driven by the vocal differences between the SGC and MLC responders, rather than the group identity information conveyed by their accents.

[Insert Figure 4 around here.]

The second alternative explanation focuses on the sample selection bias. The MLC student subjects could have been drastically different from the general MLC population in Singapore. If SGC student subjects believed the MLC responders were fellow NTU students, the SGC subjects

¹⁰ These voice recordings still sounded natural and were unlikely to be regarded as modified recordings.

¹¹ Under the power of 0.8 and the 95% two-sided confidence interval, our sample size is large enough to detect treatment differences of roughly 1 for the vocal pitch and speech rate manipulations.

would have been more likely to exhibit a higher level of trust toward fellow students compared to a typical MLC in Singapore. However, if correct, this alternative explanation would offer proof that Singaporean subjects still use statistical information, such as MLC's student status, to discriminate against certain groups. Similarly, the SGC subjects may also differ from the general SGC population in that college students have more positive daily interactions than the general Singaporean population. Either of these sample bias issues would lead to reduced discrimination against or increased favoritism toward MLC as subjects based on statistical beliefs, not taste. Finally, as discrimination is a sensitive social (and sometimes legal) issue, subjects may consciously or unconsciously conceal or reverse their negative attitudes, especially when aware that decisions will be recorded and analyzed by subsequent researchers. We employed a between-subject design and used a natural marker to mask the purpose of the study to mitigate this demand effect. Overall, among the three alternative explanations, we plausibly refute the first one, but the other two remain open. We encourage future research to replicate our findings using more representative samples and more natural field settings to better tease out the main factor driving our central findings.

V. Implications and Conclusion

In closing, we investigated whether Singaporeans discriminate against MLC speakers in a trust game by conveying their counterparts' national origin via accents in a laboratory experiment. Contrary to the local common perception that MLC speakers often experience targeted discrimination in Singapore, we found that Singaporeans showed out-group favoritism toward MLC speakers and trusted them more than fellow Singaporeans. Our experiment suggests that the favoritism stemmed from the belief that MLC speakers would return more than the in-group members. In fact, based on the behaviors of the responders in our sample, MLC responders did

return more generously than SGC responders. Notably, although SGC senders accurately predicted this behavioral difference qualitatively, they still underestimated the width of the gap between the SGC and MLC responders. Lastly, in a separate experiment, we showed that our results cannot be explained by differences in the pitch or speed of a speaker's voice, as opposed to the accent, as has been suggested in previous literature. Instead, we provided a culture-based explanation to interpret the results while acknowledging several alternative explanations and limitations.

Before we extrapolate broader implications from our results, the generalizability concern must be discussed. As our investigation focuses solely on two Chinese-speaking groups in Singapore, it remains unknown the extent to which the observed patterns reported in the present study can be generalized in other countries/regions, to subjects of other ethnicities, and among people with other accents. Further research targeting these areas is therefore necessary to confirm the robustness of the findings.

These complications aside, the present study has several implications for research on group identity and discrimination. First, we uncovered evidence that accent operates as a natural marker that is effectively used to identify participants' nationality among ethnically homogenous groups.

Second, our results align with statistical discrimination models (Phelps, 1972; Arrow, 1973), in which decision-makers are utility or profit maximizers; differential treatment across groups is a rational response based on decision-makers' belief about each group's relevant characteristics. In particular, our results revealed that, in an environment where positive prejudice toward out-group members was unlikely, SGC senders, who held (qualitatively) correct beliefs about out-group MLC responders' trustworthiness, acted rationally and displayed favoritism toward out-group members.

Finally, our results also speak to the literature investigating the effect of culture on social preferences. Several cross-country studies documented large variations in social preferences among subjects from different countries and cultures (Roth et al., 1991; Oosterbeek, Sloof, and van de Kuilen, 2004; Falk et al., 2018). Among other factors, the individualism–collectivism orientation has been used extensively to explain this behavioral difference (e.g. Henrich, 2000). For example, similar to our study, Buchan, Johnson, and Croson (2006) conducted the trust game with subjects from China, Japan, Korea, and the US, finding that Chinese subjects sent and returned more than the US subjects. The researchers attributed the behavioral difference to the subjects’ individualism–collectivism orientation. According to Hofstede’s cultural dimensions index, however, Singapore and China are classified as collectivistic with an equal score of 20 on the individualism scale. Thus, our result that MLC responders returned significantly higher amounts than SGC responders cannot be satisfactorily explained by these two groups’ individualism–collectivism orientation. We encourage future researchers to explore other potential cultural variables to gain a fuller understanding of what cultural dimensions collectively shape social preference.

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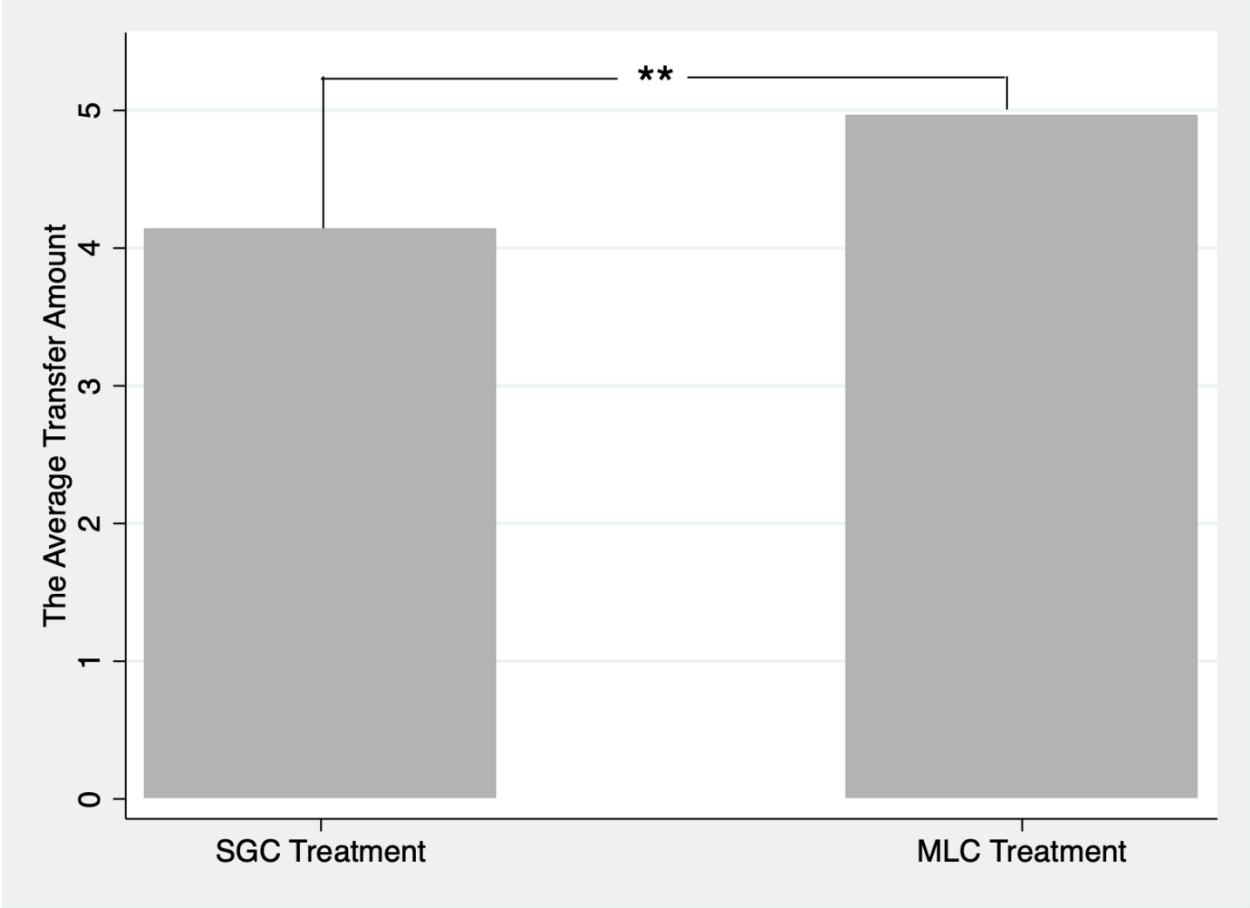
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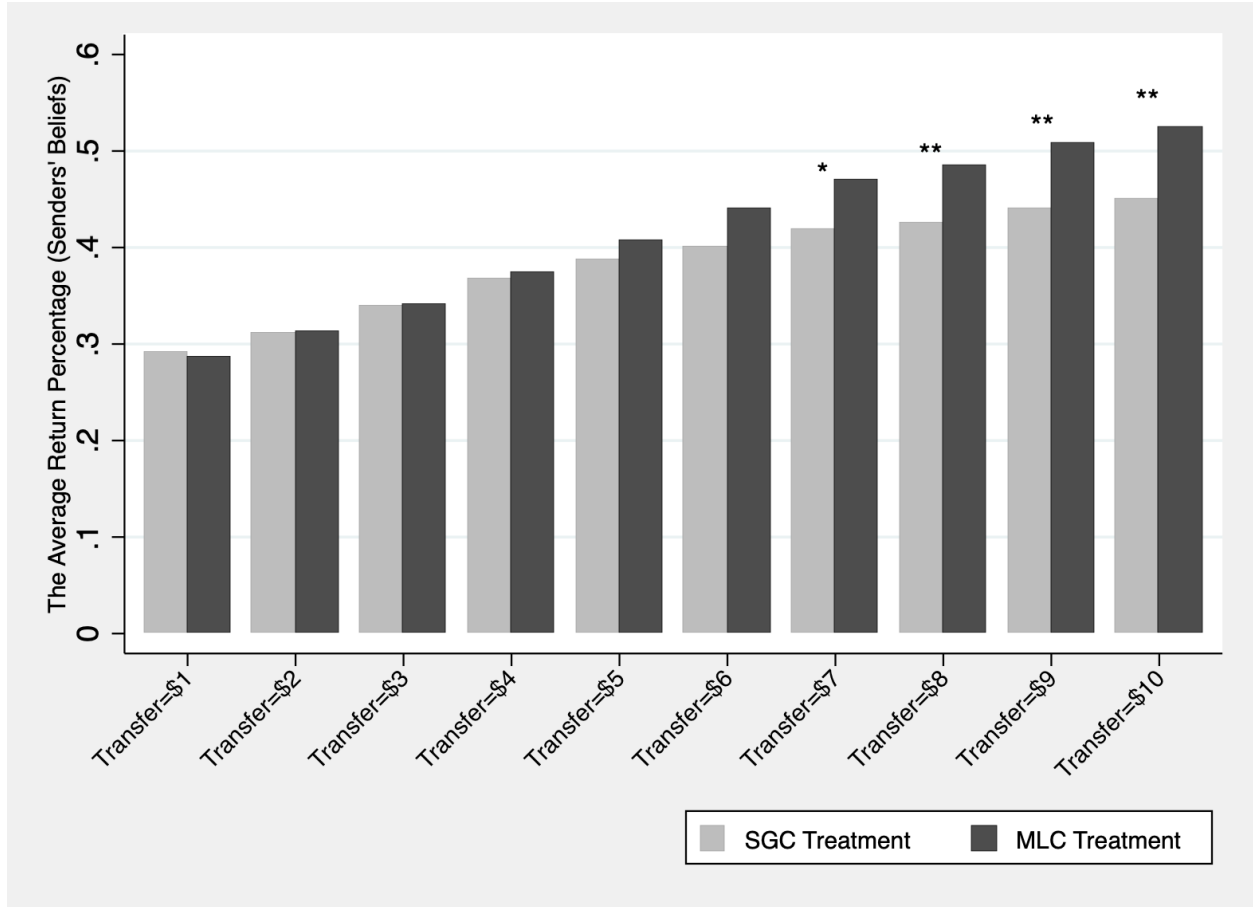
Figures and Tables

Figure 1. Main Treatment Effect on Trust



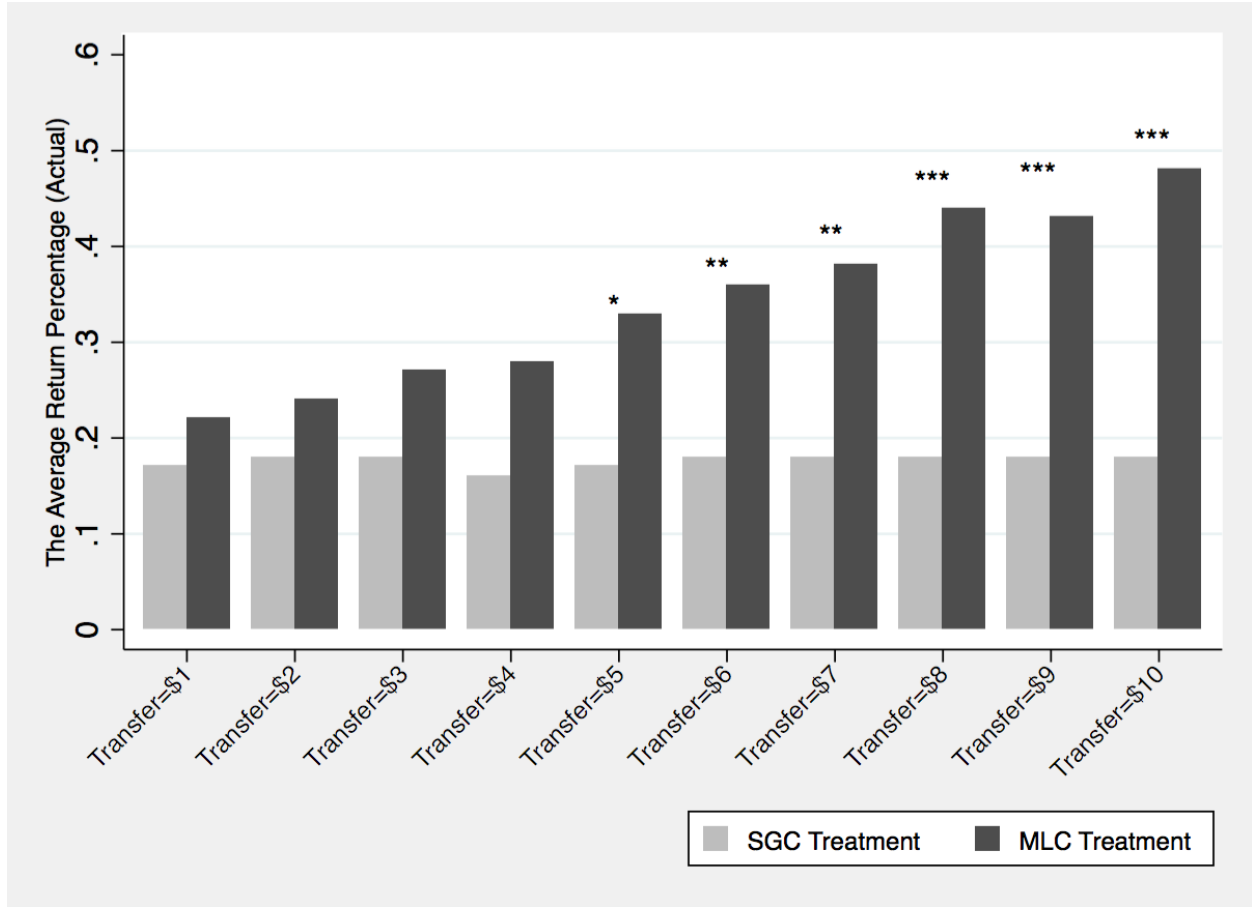
Note: Figure 1 illustrates the average amount our SGC senders sent to the SGC and MLC responders. Senders exhibited significantly higher trust toward the MLC responders than toward fellow SGC responders.

Figure 2. Senders' Beliefs about Responders' Trustworthiness by Treatment



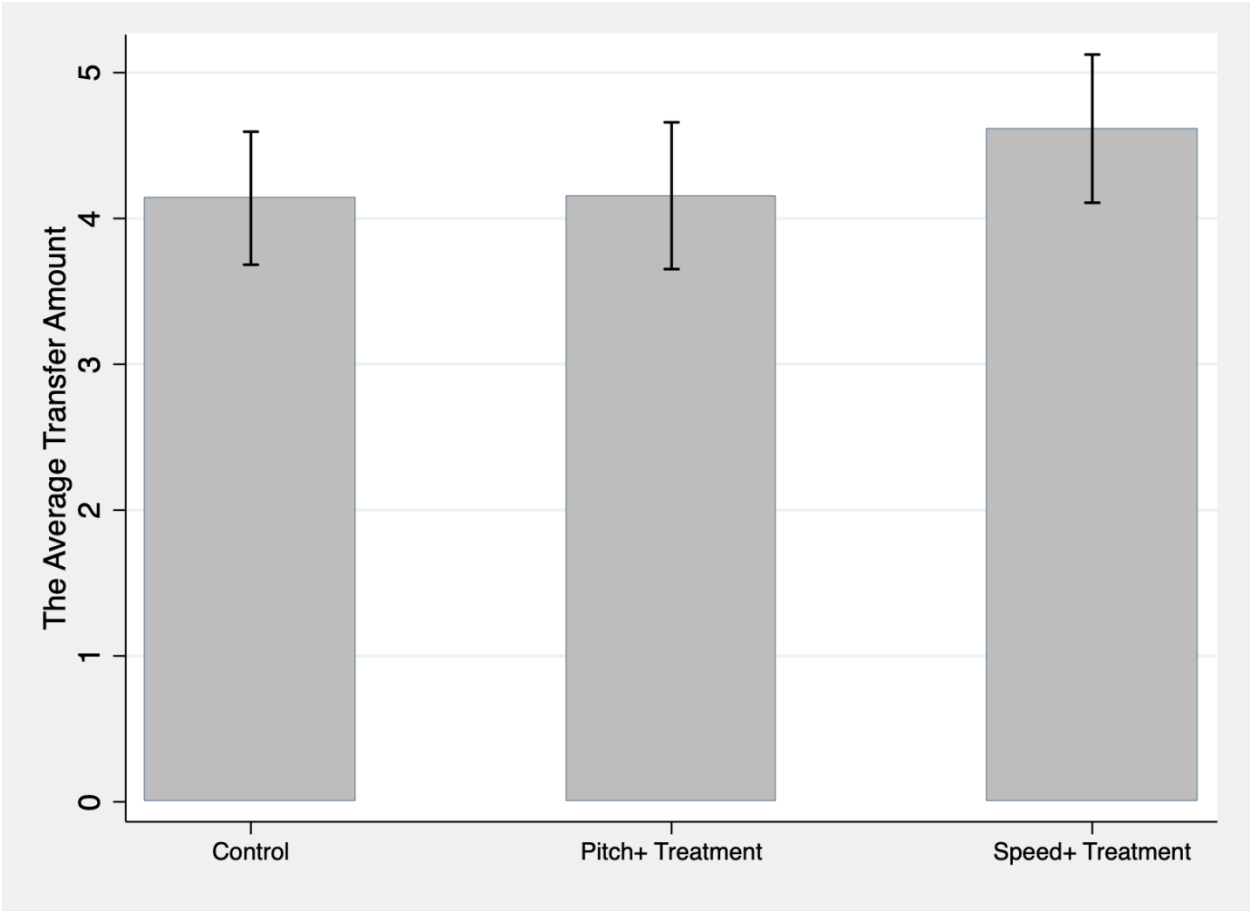
Note: This figure displays the percentage of the tripled amount the senders believed the responders would return under each scenario (Transfer=\$1, \$2,, \$10) by treatment. Apparently, the senders believed that MLC responders would return a significantly higher amount than SGC responders under the scenarios in which senders sent more than \$6. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 3. Responders' Actual Returned Amount by Treatment



Note: This figure shows the percentage of the tripled amount the SGC and MLC responders actually returned under each scenario; figures were elicited using the strategy method. Based on our sample of 12 SGC and 12 MLC responders, MLC responders returned a significantly higher portion of the tripled amount than SGC responders under the scenarios in which senders sent no less than half of the S\$10 endowment. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 4. Effects of a Higher Pitch and a Higher Speed on Trust



Note: This figure compares the average amount senders sent to the responders in the control, higher pitch, and higher speed conditions, respectively. Error bars indicate standard errors of the mean.

Table 1. Treatment Effects on Senders' Trust

	(1)	(2)	(3)	(4)	(5)	(6)
<i>MLC Treatment</i>	0.825** (0.329)	0.876*** (0.337)	0.825** (0.328)	0.876*** (0.327)	0.842** (0.371)	0.906** (0.375)
<i>Female</i>		-0.081 (0.336)		-0.081 (0.352)		-0.128 (0.374)
<i>Years in Singapore</i>		-0.014 (0.137)		-0.014 (0.186)		-0.028 (0.153)
<i>Econ Major</i>		0.479 (0.343)		0.479 (0.322)		0.569 (0.382)
<i>Proficiency_Mandarin</i>		-0.053 (0.189)		-0.053 (0.196)		-0.073 (0.211)
<i>Constant</i>	4.139***	3.974***	4.139***	3.974***	4.114***	3.992***
R ²	0.038	0.051	0.026	0.035	-	-
No. of clusters	-	-	160	160	160	160
No. of obs.	160	160	1920	1920	1920	1920

Notes: Robust standard errors are reported in parentheses. Columns (1) and (2) report OLS estimates. The dependent variable is the average amount of money a sender sent to the 12 responders. Columns (3) and (4) report estimates from the panel data random effects model. The dependent variable is the amount of money a sender sent to a responder in a period. Standard errors are clustered at the individual level. Columns (5) and (6) report Tobit estimates from the panel data random effects model. The dependent variable is the amount of money a sender sent to a responder in a period. Standard errors are clustered at the individual level. *MLC Treatment* is the treatment dummy, which equals 1 if the subject is the MLC condition and 0 otherwise. *Female* is a dummy that equals 1 if the subject is female and 0 otherwise. *Years in Singapore* captures the number of years the subject has lived in Singapore since birth, which takes the value of 0 (below 1 year), 1 (1–5 years), 2 (5–10 years), 3 (10–15 years), 4 (15–20 years), or 5 (above 20 years). *Econ Major* is a dummy that equals 1 if the subject is an economics or business-related major and 0 otherwise. *Proficiency_Mandarin* is the subject's self-reported proficiency in Mandarin Chinese on a scale from 0 to 3: 0 (Native), 1 (Fluent), 2 (Adequate), and 3 (Basic). *** p<0.01, ** p<0.05, * p<0.1.

Table 2. Treatment Effects on Senders' Beliefs in Responders' Trustworthiness

	Transfer=\$1	Transfer=\$2	Transfer=\$3	Transfer=\$4	Transfer=\$5	Transfer=\$6	Transfer=\$7	Transfer=\$8	Transfer=\$9	Transfer=\$10
<i>MLC Treatment</i>	-0.013 (0.037)	-0.003 (0.035)	-0.0003 (0.032)	0.005 (0.029)	0.021 (0.028)	0.043 (0.027)	0.057** (0.028)	0.064** (0.028)	0.074** (0.029)	0.081*** (0.031)
<i>Female</i>	-0.057 (0.037)	-0.041 (0.035)	-0.028 (0.032)	-0.013 (0.029)	-0.0003 (0.028)	0.014 (0.027)	0.040 (0.028)	0.045 (0.028)	0.051* (0.029)	0.061** (0.031)
<i>Years in Singapore</i>	0.020 (0.015)	0.016 (0.014)	0.012 (0.013)	0.011 (0.012)	0.003 (0.011)	0.004 (0.011)	0.001 (0.011)	-0.00002 (0.011)	0.003 (0.012)	0.003 (0.013)
<i>Econ Major</i>	0.023 (0.038)	0.026 (0.036)	0.027 (0.033)	0.034 (0.030)	0.036 (0.028)	0.039 (0.027)	0.040 (0.028)	0.030 (0.028)	0.023 (0.030)	0.010 (0.031)
<i>Proficiency_Mandarin</i>	0.024 (0.083)	0.016 (0.020)	0.010 (0.018)	0.005 (0.016)	-0.002 (0.016)	-0.004 (0.015)	-0.008 (0.016)	-0.008 (0.016)	-0.015 (0.016)	-0.015 (0.017)
<i>Constant</i>	0.203**	0.238***	0.278***	0.300***	0.352***	0.352***	0.372***	0.386***	0.393***	0.407***
R ²	0.037	0.024	0.016	0.015	0.013	0.030	0.051	0.055	0.066	0.069
No. of obs.	160	160	160	160	160	160	160	160	160	160

Notes: OLS estimates. Robust standard errors are reported in parentheses. The dependent variable is the average amount (as a percentage of the tripled amount) a sender believed the 12 responders would return in each scenario (Transfer=\$1, \$2,, \$10). *MLC Treatment* is the treatment dummy, which equals 1 if the subject is the MLC condition and 0 otherwise. *Female* is a dummy that equals 1 if the subject is female and 0 otherwise. *Years in Singapore* captures the number of years the subject has lived in Singapore since birth, which takes the value of 0 (below 1 year), 1 (1–5 years), 2 (5–10 years), 3 (10–15 years), 4 (15–20 years), or 5 (above 20 years). *Econ Major* is a dummy that equals 1 if the subject is an economics or business-related major and 0 otherwise. *Proficiency_Mandarin* is the subject's self-reported proficiency in Mandarin Chinese on a scale from 0 to 3: 0 (Native), 1 (Fluent), 2 (Adequate), and 3 (Basic). *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Treatment Effects on Senders' Misprediction about Responders' Trustworthiness

	Transfer=\$1	Transfer=\$2	Transfer=\$3	Transfer=\$4	Transfer=\$5	Transfer=\$6	Transfer=\$7	Transfer=\$8	Transfer=\$9	Transfer=\$10
<i>MLC Treatment</i>	-0.063*	-0.062*	-0.084***	-0.112***	-0.137***	-0.141***	-0.135***	-0.202***	-0.184***	-0.211***
	(0.037)	(0.035)	(0.032)	(0.029)	(0.028)	(0.027)	(0.028)	(0.028)	(0.029)	(0.031)
<i>Female</i>	-0.057	-0.041	-0.028	-0.013	-0.0003	0.014	0.040	0.045	0.051*	0.061**
	(0.037)	(0.035)	(0.032)	(0.029)	(0.028)	(0.026)	(0.028)	(0.028)	(0.029)	(0.031)
<i>Years in Singapore</i>	0.020	0.016	0.012	0.011	0.003	0.004	0.001	-0.00002	0.003	0.003
	(0.015)	(0.014)	(0.013)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.013)
<i>Econ Major</i>	0.023	0.026	0.027	0.034	0.036	0.039	0.040	0.030	0.023	0.010
	(0.038)	(0.036)	(0.033)	(0.030)	(0.028)	(0.027)	(0.028)	(0.028)	(0.030)	(0.031)
<i>Proficiency_Mandarin</i>	0.024	0.016	0.010	0.005	-0.002	-0.004	-0.008	-0.008	-0.015	-0.015
	(0.021)	(0.020)	(0.018)	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)
<i>Constant</i>	0.037	0.055	0.095	0.141**	0.185***	0.177***	0.189***	0.211***	0.218***	0.224***
R ²	0.050	0.040	0.056	0.101	0.152	0.176	0.170	0.285	0.244	0.266
No. of obs.	160	160	160	160	160	160	160	160	160	160

Notes: OLS estimates. Robust standard errors are reported in parentheses. The dependent variable is sender's overestimation, calculated as the amount a sender believed the responders would return minus the amount the actually returned in each scenario (Transfer=\$1, \$2, ..., \$10). Notably, the amounts are both presented as a percentage of the tripled transfer amount and take the values of 10%, 20%, ..., 100%. *MLC Treatment* is the treatment dummy, which equals 1 if the subject is the MLC condition and 0 otherwise. *Female* is a dummy that equals 1 if the subject is female and 0 otherwise. *Years in Singapore* captures the number of years the subject has lived in Singapore since birth, which takes the value of 0 (below 1 year), 1 (1–5 years), 2 (5–10 years), 3 (10–15 years), 4 (15–20 years), or 5 (above 20 years). *Econ Major* is a dummy that equals 1 if the subject is an economics or business-related major and 0 otherwise. *Proficiency_Mandarin* is the subject's self-reported proficiency in Mandarin Chinese on a scale from 0 to 3: 0 (Native), 1 (Fluent), 2 (Adequate), and 3 (Basic). *** p<0.01, ** p<0.05, * p<0.1.