Who Discriminates? Evidence From a Trust Game Experiment Across Three Societies

Swee-Hoon Chuah [a] Simon Gächter [b,c,d] Robert Hoffmann [a]
Jonathan H. W. Tan [e]

[a] *Tasmanian School of Business and Economics, University of Tasmania, Hobart, Tasmania 7001, Australia.*

[b] *Nottingham School of Economics, University Park, Nottingham NG7 2RD, United Kingdom.*

[c] *IZA, Schaumburg-Lippe-Straße 5-9, 53113 Bonn, Germany*

[d] *CESifo, Poschingerstraße 5, 81679 Munich, Germany*

[e] *School of Social Sciences, Nanyang Technological University, 48 Nanyang Ave, Singapore 639818.*

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Abstract

What personal characteristics are associated with the extent to which individuals discriminate against particular groups? We introduce an incentive-compatible measure of an individual's tendency to discriminate on others' different social identities that takes into account the costs of discrimination. In particular, we elicit participants' willingness to discriminate (WTD) in their investments to make their decisions dependent on others' social identities using a laboratory trust game experiment with 545 participants in three countries: Malaysia, China and the UK. Analysis of our WTD measure shows that discrimination differs depending on discriminators' cultural group identity and political values. Demographic variables including age and gender are not significant. Overall our results support the psychological distinctiveness of WEIRD participants found in other studies.

Key words: Discrimination; experiment; willingness to discriminate; trust; culture.
JEL-codes: C72, C91, J15, J71, Z13.

1 Introduction

What factors give rise to discrimination, where interaction partners' seemingly irrelevant personal characteristics matter to outcomes? Effective policy making to address discriminatory behaviour for its ill social and economic effects requires an understanding of its antecedents.[1] A key factor explored in the classical psychology literature includes aspects of individuals committing discrimination, such as their cultural identities, attitudes, personality and demographic characteristics that promote this behaviour (e.g. Adorno et al., 1950; Allport, 1954). At the same time, the importance of individual-level factors was acknowledged by Gary Becker, the pioneer of discrimination research in economics:

> Discrimination may vary from country to country, from region to region within a country, from rural to urban areas within a region, and [...] simply because of differences in personality." (Becker, 1957, p. 17).

In this paper we examine which individual characteristics are associated with discrimination. We develop a novel measure of a person's discriminatory tendencies for this purpose. Individual characteristics are important to study as their exclusion leaves explanations of human behaviour incomplete (Lubinski, 2000; Leary and Hoyle, 2009). They have the potential to enrich economic theory specifically (Borghans et al., 2008; Almlund et al., 2011; Heckman, 2011; Cobb-Clark and Schurer, 2012), including explanations of "counter-productive and anti-social behavior" (Ferguson et al., 2011, p. 201) such as discrimination.

Nonetheless, to date economists have paid little attention to individual-level antecedents of discrimination including individual demographic characteristics, social identities, values or psychological traits. A key obstacle is the reliable measurement of an individual's general tendency towards discrimination in a way that can be related to their individual characteristics. Measuring discrimination attitudinally as prejudice, the standard approach in social psychology (Stangor, 2016), is associated with reliability issues especially because social desirability and self-image concerns are involved (Bertrand and Mullainathan, 2001). Instead economists typically measure discrimination as overt behaviour observed experimentally under incentive compatibility, i.e. specific monetary consequences of decisions (Anderson et al., 2006; Lane, 2016; Neumark, 2018). A participant's interaction partner's characteristic (e.g. ethnicity) is systematically varied in the experiment. Discrimination exists when the change in the other's characteristic causes a differential response in the participant.

However, this approach does not provide an appropriate measure of discriminatory tendencies required to study the individual-level antecedents of discrimination. There are three reasons: First, a measure of this kind would ideally reflect the extent to which a person discriminates *generally*, i.e. with regard to different social identities of interaction partners such as gender, ethnicity or age. The reason is that an observed

[1] For example, in the 2016 edition of its Pulse survey, the Public Affairs Council examined the demographic roots of attitudes towards different kinds of discrimination in the U.S. Https://pac.org/pulse/2016/discrimination-and-demographics

act of discrimination based on a single social identity may reflect the discriminator's personal experience with that identity rather than their tendency to discriminate generally. For example, an individual's history can engender perceptions of threat from certain groups that cause prejudice (Stephan et al., 2009). In our experiment, participants have the ability to discriminate on multiple characteristics of others that are simultaneously available, akin to real contexts (Stangor et al., 1992; Hugenberg and Bodenhausen, 2004; Chuah et al., 2014).

Second, economic discrimination experiments often neglect the costs associated with discrimination in realistic contexts, falling short of incentive compatibility. For firms these include higher wages, lower performance (e.g. Gwartney and Haworth, 1974; Pager, 2016), or conflict with employees (Stephan and Stephan, 2001) and customers (Glickman, 2009). For individuals there may be cognitive, information gathering (Richeson and Shelton, 2003; Hugenberg and Bodenhausen, 2003; Chuah et al., 2016) as well as social disapproval (Barr et al., 2018) costs to discrimination. In our experiment, participants need to pay to discriminate, reflecting such costs in real settings (Chuah et al., 2016).

Third, in experiments, observations of discrimination are typically dichotomous (observed/not observed), and therefore lack the desirable psychometric properties of the interval scale that is appropriate for measures of tendencies (e.g. Kline, 2014).

Our new approach addresses these three issues. We measure *willingness to discriminate* (WTD) using a cross-cultural trust game experiment with participants from different cultural backgrounds who can pay to make their trust decisions dependent on any of 11 social identity dimensions of those they are interacting with. WTD is a measure of individuals' general discriminatory tendency that is (1) fractional in nature (i.e. between 0 and 1); (2) based on observed behaviour rather than self-reports; (3) involves compatible incentives including the costs ordinarily associated with discriminatory acts; and (4) general in terms of a range of social identity dimensions typically used to discriminate.

The purpose of this paper is to identify those personal characteristics that are significantly associated with discriminatory behaviour. Our ultimate objective is to use WTD as a measure of an individual's general discrimination tendency to discover the individual-level antecedents of discrimination. We use our WTD data to identify the participant characteristics that are associated with a (varying) tendency to discriminate. They include religious affiliation, ethnic group, nationality and occupation as well as religious and political values. Our results show that the willingness to discriminate subject to cost is a pervasive human tendency that is related to the cultural identities of discriminating participants, suggesting cultural learning as a powerful driver of discriminatory norms. These results support the role of culture shaping economic behaviour found in other studies, e.g. regarding bargaining, cooperation and dishonesty (Henrich et al., 2004; Herrmann et al., 2008; Gächter and Schulz, 2016; Schulz et al., 2019).

We outline the background of our study and previous literature in the next section, followed by a discussion of the design and implementation of the experiment (section

3), its results (section 4) and some of their implications (section 5).

2 Background and literature

Discrimination, when social identity or irrelevant individual attributes of a person influence how they are treated by another, is a prevalent and significant economic phenomenon that has been demonstrated in markets for different products and services (Neumark, 2018). For example, in labour markets, workers' age, gender, ethnicity and religion have all been shown to contribute to significant wage gaps (Weichselbaumer and Winter-Ebmer, 2005). Apart from its odious social and personal effects, discrimination can generate inefficiencies and is commonly subject to intervention (Cavalcanti and Tavares, 2016; Anderson et al., 2006; Neumark, 2018). In order to develop policy responses, empirical research into the explanations for discrimination has focused on either the situational aspects of the interaction where discrimination is practiced, or the individual characteristics of those who practice it (Allport, 1954).

2.1 The experimental economics approach to discrimination

Economic research has focused on the situational approach. Experimental methods have been a popular approach to examine the causes of discrimination empirically (Neumark, 2018; Bertrand and Duflo, 2017; Lane, 2016; Anderson et al., 2006). In such experiments, discriminatory behaviour is observed in lab or field where participant decisions receive outcome-related rewards (see Croson, 2005). In contrast to correlational studies using data on wage or other economic differentials between groups, economic experiments can establish discrimination as the cause. A participant's s discriminating behaviour is observed as a consequence of systematically manipulating one causal variable (such as co-participant gender or ethnicity) while holding other factors constant (Anderson et al., 2006).

A common experimental task used to study discrimination is the trust game (e.g. Chuah et al., 2013a, 2016; Xu, 2021; El-Bialy et al., 2022; Lenz and Mittlaender, 2022). A sender first chooses which proportion of an endowment to send to a receiver. The amount sent is tripled; the receiver then decides which part of the received amount to send back. Payoff-maximising players would neither send nor return anything, thereby foregoing the joint gain that trust between them would afford. The game can be used to measure discrimination as the extent to which sender and receiver decisions differ with the social identity of the other.

The trust game is the workhorse in discrimination experiments (Lane, 2016) because it allows for the expression of two much-studied motivations behind discrimination: Taste-based and statistical discrimination respectively involve (dis)liking of, and expectations about, others based on their social identity alone. Sending decisions may be motivated by both, whereas receivers do not statistically discriminate as they know the other's decision.

In addition to these two motives, experimental economists are mainly interested in two situational factors behind discrimination: the other person's characteristics on which discrimination is practiced, and the decision environment that promotes

discrimination (Lane, 2016). In this literature discrimination has been detected on a host of social identity dimensions including race, ethnicity, gender, nationality, age, sexual orientation, obesity and disability and even arbitrary characteristics induced in the study (for overviews see Anderson et al., 2006; Lane, 2016; Neumark, 2018). In addition, experiments show that a powerful source of discrimination is the intergroup effect, where people of the same social group are treated favourably compared to out-group members (Xu, 2021; El-Bialy et al., 2022; Lenz and Mittlaender, 2022). However, while economic experiments have shown under what conditions discrimination takes place, few general explanations of these observations have emerged from this literature (Bertrand and Duflo, 2017).

2.2 The individual characteristics approach to discrimination

Experimental economists have paid much less attention to the individual than the situational factors that drive a discriminator's decisions. One reason is that the experimental method was designed to assess the effect of changes in the structure or features of the choice participants face on the decisions they make (Leary and Hoyle, 2009, p. xi). Conversely, individual behaviour change in response to experimental conditions (such as different co-participant characteristics) does not provide an apt measure of individual tendencies to which individual characteristics can be statistically related. For example, in audit and correspondence studies, researchers measure whether bogus applicants with different characteristics are accepted (or not) as trading partners (Rich, 2014; Bertrand and Duflo, 2017). Such measures tend to be dichotomous in nature (hire/not hire) and measure responses to one individual characteristic (such as applicant ethnicity) rather than a general tendency.

However, the individual characteristics of discriminators themselves have been recognised as important since the early days of discrimination research (e.g. Adorno et al., 1950; Allport, 1954; Becker, 1957). Explaining discrimination with reference to the discriminator's characteristics complements situational approaches and offers distinct advantages. In general, understanding differences in behaviour between types of individuals sheds light on the determinants of that behaviour (such as nature vs. nurture) and informs economic policy design (Fréchette, 2016): It allows intervention targeting based on demographics, selection and screening, and anticipating how demographic and economic changes affect individual choice and society-wide economic outcomes in the future (Chapman et al., 2018).

Individual traits have been used fruitfully to explain economic behaviour in many real contexts (e.g. Borghans et al., 2008; Almlund et al., 2011; Heckman, 2011; Ferguson et al., 2011; Cobb-Clark and Schurer, 2012). Demographic variables including gender, age, academic major, culture, ethnicity and socio-economic status have also been found to affect behaviour of experimental participants (Andreoni et al., 2021; Fréchette, 2016; Camerer, 2003, p. 63). The central motivation of our paper is to contribute to an individual characteristics approach to discrimination in economics. Our approach is to combine the focus on important individual characteristics associated with discriminating behaviour with the benefits of the economic experiment.

2.3 Individual characteristics associated with discrimination

The selection of individual characteristics for our study was informed by previous research in psychology. Psychological studies typically use attitudinal and psychometric self-reports to measure different kinds of prejudice, e.g. attitudes people hold against others of a certain age, gender, ethnicity or sexual preference. [2] The responses can then be related to the discriminator's own characteristics.

Demographics

Demographic variables including age and gender have been found to be only equivocally related to prejudice (e.g. Bagley and Boshier, 1975; Maykovich, 1975; Bierly, 1985; Dovidio et al., 2004; Aosved et al., 2009; Rowatt et al., 2009; Anderson, 2018). A small number of studies have used demographics based on social status as potential predictors of prejudice. Some find little evidence for differences based on occupational group (Adorno et al., 1950; Maykovich, 1975), while others suggest higher income, education and non-manual occupations are associated with lower prejudice (Pavlak, 1973).

We examine a further demographic known as a powerful predictor in economics research: Course of study. Using a student sample of participants affords an opportunity to examine behavioural differences by academic major course. Courses reflect values either because individuals with particular values choose certain courses, and/or because studying these courses affects their values. Academic major may also reflect cognitive ability to the extent that academic majors differ by entry requirements, and, as a result, by admissions test results. For instance, according to the Educational Testing Service, economics and the sciences are associated with higher graduate record examination grades compared to the arts, humanities and business majors. [3]

A number of studies have examined whether economics students in particular are less pro-social. Early studies found in favour using both laboratory tasks measuring cooperation (Marwell, 1981), corruption (Frank and Schulze, 2000) and self-reported real-life behaviours such as charitable giving (Frank et al., 1993). Other studies have reported empirical evidence to the contrary (Yezer et al., 1996; Laband and Beil, 1999). Our discrimination study may provide additional evidence for a social behaviour type not previously examined in this literature.

Values

In the psychological literature, attitudes and values are more robust predictors of prejudice than demographics such as gender and age. The two dimensions particularly associated with different types of prejudice are political ideology and religiosity.

[2] Prejudice refers to cognitive evaluations of certain social groups, and discrimination constitutes resulting behaviour towards them. Our experimental approach measures discrimination behaviour but is informed by research on prejudice as as its attitudinal antecedent.

[3] Source: `https://www.ets.org/s/gre/pdf/gre_guide_table4.pdf`

Religiosity is the strength of an individual's attachment to a particular religion. It has been found to be a multi-dimensional construct encompassing strength of religious belief, religious experiences, ritualistic practice and translation into real-life consequences (Rohrbaugh and Jessor, 1975). A connection between religiosity and anti-social behaviour has been found in many studies. It may stem from particular religious doctrines (e.g. regarding homosexuality, gender roles, human sinfulness, predestination) or an emphasis on being chosen people.

However, existing research suggests the associations between religiosity and prejudice are complex (see Altemeyer and Hunsberger, 1992; Altemeyer, 2003; Hunsberger and Jackson, 2005). Prejudice rises with religiosity up to a point but then declines. Further, the relationship differs by the motivation driving one's religiosity: Personal quest and spiritual searching correlates negatively with prejudice. Ritualistic, social and fundamentalist religious motives correlate positively with prejudice.

These latter, fundamentalist religious motives are thought to be based in an underlying right-wing authoritarian personality, i.e. fearful, close-minded submission to conventions and authority (Spilka et al., 2003). In turn, a right-leaning political orientation has been linked to different kinds of prejudice (Bagley and Boshier, 1975; Bierly, 1985; Rowatt et al., 2009; Anderson, 2018; Chambers et al., 2013) as well as to religiosity (Altemeyer and Hunsberger, 1992). The reason for the positive intercorrelation of the three - right-wing ideology, fundamentalist religiosity and prejudice - may reside in the underlying authoritarian personality characteristics they share.

Cultural and ethnic background

Cultural identity has a pronounced association with prejudice and discrimination behaviour. Ethnic differences in self-reported prejudice have been found but depend on a society's particular ethnic composition in that majority ethnic group members tend to express greater prejudice. These effects echo evidence from economic experiments regarding the influence of culture, the socially-transmitted shared values and attitudes of groups, on other types of behaviour such as bargaining (Henrich et al., 2004), cooperation (Herrmann et al., 2008), risk taking (Vieider et al., 2015), dishonesty (Gächter and Schulz, 2016) as well as trust and altruism (Falk et al., 2018).

Recent studies found a distinctive psychology in people from WEIRD (Western, Educated, Industrialised, Rich, and Democratic) compared to non-WEIRD societies (Henrich et al., 2010; Schulz et al., 2019; Henrich, 2020). Empirical evidence from experimental studies using economic games shows these as more individualistic (less group-oriented and conformist) and more prosocial towards strangers (see Schulz et al., 2019; Henrich, 2020). While no direct evidence regarding cultural differences in discrimination exist in this literature, both individualism and pro-sociality would lead us to expect lower levels of discrimination in WEIRD participants.

The reason for the effect of different cultures may lie in the distinct values and attitudes they transmit among their members (Chuah et al., 2009). An individual's cultural identity may drive prejudice for several reasons. One is that both the content and strength of stereotypes is transmitted within cultural groups (Allport, 1954).

Motivations for discrimination, such as self-image threat (Thompson et al., 2004), also differ cross-culturally (Cai et al., 2007). Similarly, collectivist cultures are associated with greater differentiation (and therefore discrimination) between in-group and out-group members than individualist ones (Yuki and Brewer, 2014).

3 Experiment

In the present study we examine which of these individual-level characteristics are significantly associated with discrimination. In particular, we examine demographics (age, gender, study major, parental occupation, income), culture (nationality, religious affiliation and ethnicity), and values (political ideology, religiosity). We use data from an experiment that was designed to produce rich observations to answer this but also related research questions we examine in separate studies. One other study from this experimental data set has been previously published, focusing only on religion and religiosity (Chuah et al., 2016). [4]

3.1 Design

Instructions for the experiment as well as a flowchart for the main task can be found in the supplementary materials. Participants played the binary trust game shown in Figure 1, randomly allocated to the role of either sender or receiver. Participants recorded their single game decision (send/not send or return/not return) using the strategy method (Chuah et al., 2013b): They entered one decision for every one of 88 possible conditions of the game. These conditions are the possible combinations of (1) the co-participant's 44 possible social identities and (2) the two payoff sets we used. [5]

To generate the different social identities, we used a total of 12 social identity *dimensions* (e.g. gender), each with different possible *values* (e.g. female) a co-participant could assume within the dimension (see Table 1). The first dimension captures co-participants of unknown social identity. The next 11 dimension represent the different social identities we used. Ten of these dimensions are meaningful in that they reflect how people may self-identify and categorise others in real contexts (e.g. religion, age, gender, politics, ethnicity). The final dimension, whether someone was born on an odd or even day, was included as an arbitrary social identity for the purpose of benchmarking a person's discrimination based on the other's identities. This was included in the analyses of our companion paper (Chuah et al., 2016) but is not relevant to our

[4] The current paper differs from the previous study in terms of both data used and research questions: We previously focussed on only two of the 12 social identities, i.e. religiosity and religious affiliation. Further, we previously used the data to examine the effect of these two identities on trust behaviour specifically. In the current paper we examine the full range of social identity information to obtain a measure of an individual's general tendency to discriminate rather than to test their effect on specific behaviour types.

[5] While other games may have provided suitable measurements of discrimination, the simplicity of the binary trust game made the 88 decisions feasible. Moreover, no other game provides as much experimental evidence of discrimination that we may use for benchmarking purposes.

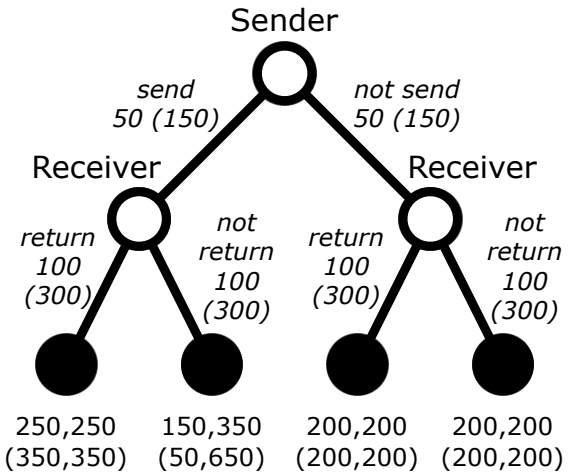

Fig. 1. The binary trust game task. A sender and a receiver are each endowed with 200 points. The sender first chooses whether or not to send a part their endowment to the receiver. The amount sent is tripled; the receiver then decides whether or not to return two thirds of it to the sender. Receivers understood that their decision was not implemented if their sender chose not to send. Payoffs are shown for low and high (payoffs in brackets) payoff variance.

present examination of own characteristics related to discrimination.

Trust game decisions were elicited as follows: On the first decision screen, participants entered their decision for unknown social identity of the co-participant (dimension 1). We call this the *indiscriminate* decision. Next participants made *discriminating* decisions for each of the remaining 11 dimensions, presented on separate screens in random order. On each screen participants recorded their decisions for each value a co-participant could assume within that social identity dimension (see Figure 2). On the same screen, participants then stated how much they were willing to pay to implement their discriminating decisions rather than the indiscriminate one, should that social identity dimension be chosen to determine payoffs. Participants were told that to determine game payoffs, one of the 11 social identities would be randomly selected. Their indiscriminate decision would be used unless they sacrificed points to use their applicable discriminating decision: The one recorded for the particular social identity value of the co-participant.

Participants were able to sacrifice between 0 and 100 points to make their decisions dependent on co-player social identity. The number of points is the probability the discriminating rather than the indiscriminate decision was used in the game with their randomly-matched co-participant. We call this value the *willingness to discriminate* measured as a proportion (WTD). For instance, a WTD of 0.5 means the participant has invested 50 points to make it equally likely that either decisions (the social identity independent or dependent one) was used. A value of 1 (100 points invested) guarantees the discriminating decision is used. [6]

[6] Note that in this design, higher WTD does **not** mean someone of a particular social identity is more likely to be chosen as co-participant. The matching is random, but whether trust decisions are based on actual social identities depends on willingness to pay to discriminate.

	Social Identity Dimension	Possible Values (Number)
1	No information	N/A (1)
2	Political orientation	left wing, right wing (2)
3	Voluntary participation	Low, medium, high (3)
4	Academic Major	Applied science, Arts, Business, Economics, Pure science, Social science, Other (7)
5	Religious denomination	Buddhist, Christian, Hindu, Jewish, Muslim, Other, None (7)
6	Religiosity	Low, medium, high (3)
7	Nationality	Same, different (2)
8	Location	China, Malaysia, UK (3)
9	Ethnicity	Black, Chinese, Indian, Malay, Middle Eastern, White, Other (7)
10	Gender	Male, female (2)
11	Age	$<$ 16, 16-20, 21-25, 26-30, $>$ 30 years (5)
12	Birthday	Odd calendar date, even calendar date (2)
	All	(44)

Table 1
Social identities on which participants' trust game and willingness to discriminate decisions were based. Participants entered decisions for every value (column 3) of every co-participant social identity dimension (column 2), for both high and low payoff vriance.

The 12 decision screens, one for each dimension, were presented twice, first for low payoff variance, followed by high payoff variance as shown in brackets in Figure 1. We used two payoff sets in order to manipulate the risk inherent in the trust game (Chetty et al., 2020). Risk rises as we raise the proportion of the 200-points endowment to be sent from 50 to 150 in the high-variance scenario.

Figure 2 shows the decision interface for one condition (social identity dimension 8 (location) under low payoff variance) as an example. A participant in the role of sender is reminded of their previously-recorded indiscriminate decision, whether to send or not irrespective of the co-participant's characteristics (dark button). The participant is then able to adjust their send/not send decision to each of the co-participant's three different campus locations (centre row of light buttons). Finally, the participant decides the probability of using these discriminating decisions rather than the indiscriminate decision in the game by putting a number between 0 and 100 into the white box.[7] If

[7] On the screen, "paying for information" refers to participants discovering the relevant social identity of their co-participants after their session at the point of payment delivery once all sessions were completed. If a participant's discriminating decision was used, she was

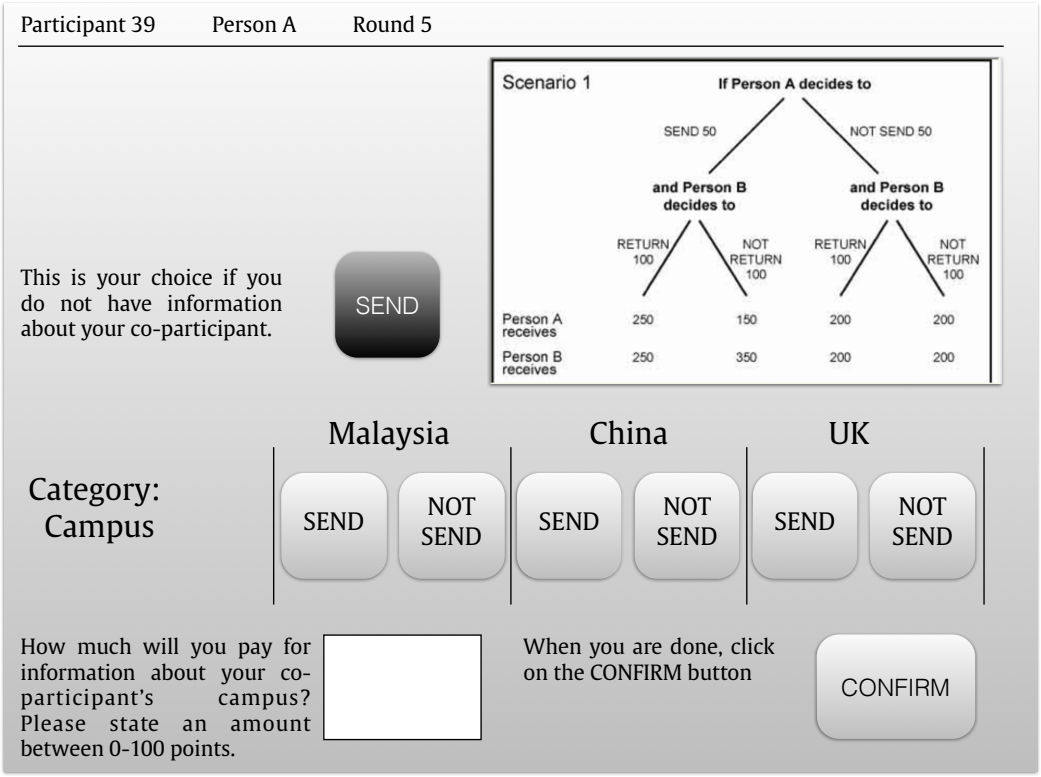

Fig. 2. Experimental interface for the elicitation of trust game decisions for different social identity values and willingness to discriminate (WTD). Campus location is used as the sample identity dimension. The decisions based on the co-participant's possible social identity values are recorded using the six buttons appearing as a row. The indiscriminate decision was recorded on a previous screen and is shown again to the participant in the dark square. The white box elicits the WTD on this identity as the probability the decision of the dark box is overridden by the discriminating decision recorded here based on the co-participant's actual value.

the participant enters 75, this number is equal to the probability the discriminating decisions are used rather than the indiscriminate one. If social identity dimension 8 under low payoff variance is randomly chosen to be this participant's condition, then one of the three discriminating decisions (rather than the indiscriminate one) is implemented according to the randomly-chosen co-participant's real identity with probability 75% and this number is deducted from the participant's points account. [8]

We also elicited participant beliefs about co-participants' actions for every condition of trust game decisions (i.e. for every social identity under both low and high payoff

told the actual value the co-participant had in the social identity dimension chosen for the game.

[8] All participants were categorised into one of the possible values for every social identity dimension, based on the responses they gave. Where a social identity dimension is a continuous variable, i.e. political orientation and religiosity, we assigned participants to even-sized categories that we generated on the basis of all responses.

variance and when nothing was known about the other) as the estimated probability that the co-participant in a particular condition would send.

3.2 Implementation

The experiment was conducted as a laboratory study with 545 university students (45% female, average age 20.5 years) in three campuses of the University of Nottingham, in the UK (194 participants), the PR China (162) and Malaysia (186). The latter two are satellite campuses of this UK institution located at purpose-built, self-contained campuses in peripheral locations. The current proportion of foreign students at the three campuses is 16% (UK), 12% (China) and 36% (Malaysia).

We choose these sites to vary cultural social identities (such as nationality, ethnicity and religion) while holding socio-economic factors (and English language of instruction) relatively constant, rather than based on particular characteristics of the three countries involved. These identities and their representation in the sample are shown in Table S1 in the supplementary materials. [9]

Sessions took place in computer laboratories with between 20 and 40 subjects seated randomly and so as to ensure privacy. Sessions lasted approximately 90 minutes on average. At the start of each session, participants were given paper instructions and proceeded to the trust game task on an English language computerised interface after successful completion of a paper comprehension quiz. The trust game was followed by the elicitation of individual demographics to allow decisions based on social identities to be implemented. In addition to the demographic characteristics shown in Table S1 we elicited age, gender, occupation of main family breadwinner, [10] income (10 deciles from poorest to richest 10%), social class (lower, working, middle, upper middle or upper) and population of hometown (8 size bands from < 2000 to $> 500,000$ people).We also administered a separate paper questionnaire to elicit responses to the attitudinal dimensions.

We measured political spectrum using the left-right scale by Evans et al. (1996), which uses a 5-point Likert scale to measure agreement with 5 items (see supplementary materials). In the following we refer to a right-wing orientation interchangeably as conservatism. Religiosity was measured using the 8-item instrument by Rohrbaugh and Jessor (1975), which combines four dimensions of religiosity into overall scores ranging from 0 to 32 (see supplementary materials). [11] Finally, voluntary civic participation

[9] Missing data reduced observations in some of the summary statistics and analyses from the sample size of 545.

[10] *Employer* includes employers or managers; *professional* includes teachers, lawyers, accountants and similar professions; *clerical* are supervisory and non-supervisory office workers; *manual* includes supervisors, skilled, semi-skilled and unskilled manual and farmworkers as well as armed forces personnel.

[11] Caution is warranted to the extent that both constructs are associated with the general reliability issues associated with self-reports, including stability when used across cultures. However both scales are suitable for use in cross-cultural research. The left-right scale has been used in post-communist transitional countries (Matějů and Vlachová, 1998), a relevant

was measured as the average of a 3-point rating scale (active member, inactive member, not a member) for each of 9 types of political, religious, recreational and professional voluntary organisation. We also used the form to elicit the beliefs about co-participant decisions with rewards calculated using the quadratic scoring rule (Selten, 1998). We paid participants based on the accuracy of their beliefs in terms of actual, observed participant behaviour. The paper-based part of the experiment was in the respective local languages, Chinese, Malay and English. English versions were given out on demand in China and Malaysia. All Chinese and Malay-language materials were translated from English and checked through back translation.

Participants were paid a show up fee upon completion as asked to collect the experimental earnings about a week after the experiment from an administrative office. The show up fees in China, Malaysia and UK were respectively Yuan Renminbi (RMB) 25, Ringgit Malaysia (RM) 10 and £5. After the completion of all experimental sessions, every participant was randomly matched with a co-participant from any session (i.e. in any of our three study locations) to determine trust game payoffs. The game condition was determined as a random choice within social identity dimensions 2-12 (see Table 1) and one payoff setting. Participants received points based on their and their co-participant's recorded decision applicable to that condition. The payoff points earned in the trust game task were paid out in at the rates of RMB 0.20, RM 0.08 and £0.04 per point. Average subject earnings from the task were RMB 63.68, RM 28.66 and £14.65 in the three locations respectively. We used the *Economist*'s Big Mac Index to determine exchange rates from points to local currencies. Participants received feedback about the outcome of the game including whether their applicable discriminating decision was used, and, if so, what the relevant social identity value of their co-participant was. [12]

4 Results

4.1 Preliminaries

WTD is the proportion ($0 \leq \text{WTD} \leq 1$) of the 100 points participants could spend on making their trust game decisions based on the co-participant's characteristic in question. Because participants indicated WTD for 11 social identity dimensions in high and low payoff variance and entered multiple decisions, we analyse WTD at two levels, the level of each individual decision and the level of the participant, i.e. the unweighted average of her 22 individual WTD investments.

Across all decisions, WTD has an overall average of 0.217 with a standard deviation of 0.289. The histogram in Figure 3 shows a non-normal distribution skewed towards the low end of the range. At the level of participants' individual WTD decisions, the response 0 is the mode.

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consideration given our sample's large PR China cohort. Rohrbaugh and Jessor's religiosity instrument has been shown to be reliable across different religions (Hill and Hood, 1999, p. 307).

[12] Note that because each participant's decisions were implemented for only one trust game, there is no scope for decisions being subject to learning based on previous game outcomes.

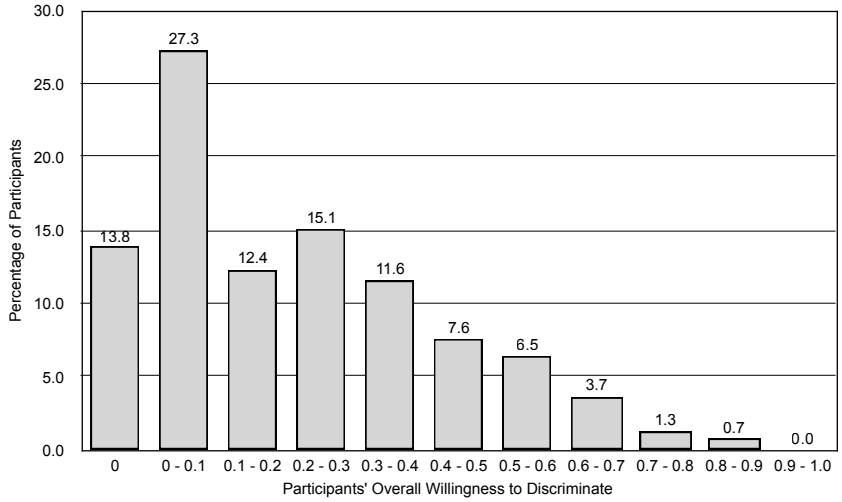

Fig. 3. Histogram for participants' average willingness to discriminate (WTD). Bins shown as WTD range between (but excluding) first and second value indicated.

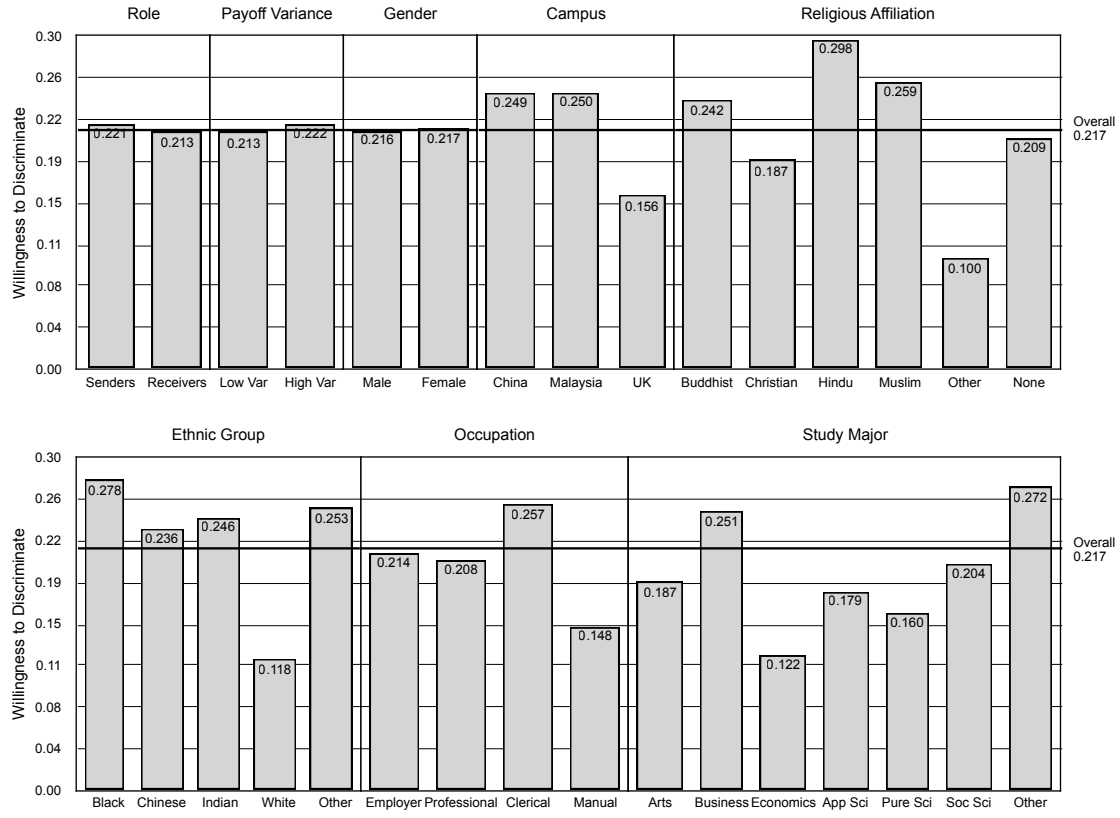

Fig. 4. Average willingness to discriminate by discriminator's different choice-situational and individual factors.

4.2 Main effects: individual characteristics and discrimination

Our study examines which individual characteristics of a person are significantly associated with their discriminatory behaviour. Figure 4 shows participant-level WTD

by discriminator characteristics. For each social identity dimension, size differentials between the bars for its possible values suggest potential effects that we test in the following.

We examined the influence of these individual characteristics as independent variables with WTD as the dependent variable in a multivariate framework. We control for two choice-situational factors in the trust game. Senders act under social risk in that their payoff depends on the action the receiver takes subsequently. We control for trust game role (receiver=0 or 1). Senders may be motivated by an aversion of betrayal by the receiver (Bohnet et al., 2008) because of the attendant negative emotions (Aimone and Houser, 2012). In contrast, receivers act under certainty as their decision results in a known outcome. We also control for trust game payoff variance, i.e. the relative size of payoffs between the different outcomes (high variance=0 or 1).

Table 2 shows the results for regressions using both the participant (models 1-2) and decision level (models 3-8) data (as explained in section 4.1). We use a panel specification with participant-level random effects for all decision-level regressions as the data contain multiple observations for each participant. Every model with all independent variables entered is followed by a reduced version of the model according to the general-to-specific approach where all insignificant explanators are iteratively removed (Campos et al., 2005). The table shows the situational controls (payoff variance and game role) in the top panel, followed by groups of individual characteristics (demographics, culture and values) in the next three panels. The columns show the models we estimated.

The dummy variable for trust game role is insignificant in all models. Similarly, gender, class, age and income are insignificant throughout. Model 1 shows that when entered simultaneously, white ethnicity and economics major are significant negative influences, and a dummy for clerical occupation as well as conservatism are positive factors.

The decision-level regression results for WTD mostly mirror the results for both variables obtained from the participant-level dataset. This level of analysis permits adding payoff variance as an explanator. This variable is significant in models 3 to 6, suggesting that the greater risk associated induced greater discrimination. In reduced model 4, economics major and conservatism are removed as they marginally lose their significance at 5%.

The insignificance of the cultural identity variables other that white ethnicity (UK nationality, UK campus location) suggests a shared underlying effect of Western culture that is best captured by white ethnicity. This is supported by further regressions we do not report here: When we replace white ethnicity with either UK campus or UK nationality in reduced models 2 and 4, both as well all other independent variables are significant at 5%.

Similarly, both religiosity and right-wing political orientation may share a common underlying attitude that is associated with higher discrimination and is best expressed in the latter explanatory variable. Both religiosity and conservative outlook are significantly lower in UK nationals and white participants ($p < 0.05$ for all tests).

Demographic factors such as age, gender, social class, income and hometown population fail to achieve significance in all models. All these results are confirmed by the reduced model 2.

Model 5 looks only at sender decisions. Clerical occupation is not significant for senders, and white only attains significance in the reduced model 6. Models 7 and 8 consider only receivers. Clerical is significant, while economics major is not. Comparing models 6 and 8 thus reveals that the overall effects for clerical occupation and economics major as well as payoff variance are down to receivers and senders respectively.

4.3 Robustness checks

Because of the multiple tests we perform, we obtained adjusted p-values for the coefficients in all the regression models reported in Table 2 using the Bonferroni approach. The following coefficients no longer attain statistical significance at the 5%-level in the final, reduced models reported in that table: Conservatism (model 2), economics major (models 4 and 6). All other significant findings remain unchanged as a result of the correction.

We performed additional regressions to assess the robustness of the results reported in Table 2. We first control for two potential confounding influences on WTD: Participants' underlying tendency to trust others (trust), and their expectation of the trustworthiness of others (belief). Both may differ between participants of different types and affect their willingness to discriminate: Greater general belief in others' trust and resulting trust decisions leaves a sender open to risks of lower payoffs and betrayal by others (e.g. Sofianos, 2022) that may be managed by directing trust at particular social identities. We measured trust as the average of participants' indiscriminate trust decisions (when nothing was known about the co-participant) over both the low and high variance conditions (mean=0.41). Belief is the estimated probability that an unidentified co-participant would send, also averaged over low and high variance (mean=0.42). Both trust and belief are positively correlated with WTD (Pearson r=0.114 and 0.232 respectively).

The full regression results when trust is entered as a control are contained in the supplementary materials (Table S2). Trust is positive and significant in models 1 to 4. None of the previous results in terms of coefficient significance are changed except that conservatism becomes significant in model (7). We conclude our results are robust with respect to differential trust of different participant types. Conversely, there is no evidence that differential trust between participant types explains their WTD differences.

Regressions with belief added as a control variables are contained in Table S3 in the supplementary materials. Belief is positive and significant throughout, including regressions for only senders and only receivers. The previous significant coefficients for clerical workers and white participants are not affected. However, economics is no longer a significant explanator. Similarly, conservatism loses its previous significance throughout. These results suggest that the low (high) WTD for economists (conservatives) was mostly driven by statistical discrimination motives. In contrast, clerical

workers and white participants' seem to have taste-based discrimination motives because their significantly higher WTD remains when beliefs are controlled for.

We next perform checks to address the non-normal distribution of WTD. The skew stems from a significant proportion (13.8%) of participants who registered zero willingness to discriminate throughout. We created a dummy variable to denote these participants. Results are robust to using this alternative measure of discrimination as the dependent variable. We do not report these tests here.

Finally we examined whether the results are sensitive to excluding irrational decisions or participants who made them, potentially betraying poor comprehension of the experimental instructions. In particular, if, for a specific social identity, a participant records a positive WTD but (1) does not discriminate in their identity-specific trust game decisions thus invoked, and (2) these decisions are the same as the default decision that would otherwise be used, that WTD investment is strictly payoff-reducing. All results are robust to excluding irrationality, i.e. either participants who made at least one irrational decision (participant-level dataset) or excluding all irrational decisions (decision-level dataset). Again, the relevant regressions are contained in the supplementary materials (Table S4).

4.4 External validity

Our main result is that willingness to discriminate differs most by our participants' cultural backgrounds. We examined the external validity of our specific findings regarding the lower relative WTD of our UK compared to Malaysian and Chinese participants by examining comparable measures available from other research. For this purpose we use data not collected as part of this study but available from the World Values Survey (WVS, Inglehart, 1997), a worldwide poll of socio-economic and political values and attitudes that has been conducted since the early 1980s consisting of over 200 items.

The WVS contains self-reported discrimination attitudes. One group of items measures discrimination using the following question: "On this list are various groups of people. Could you please mention any that you would not like to have as neighbors?" Participants respond along a binary scale (mentioned/not mentioned) for different groups of people including drug addicts, people of a different race, religion, who have AIDS, speak a foreign language, immigrants/foreign workers, homosexuals and unmarried couples living together.

We can use the WVS data to examine external validity as each of our three experimental locations (China, UK and Malaysia) is covered in the WVS, albeit never in the same wave. We use data from the UK (2005 wave, 1041 responses), China (2010-2014, 2300), Malaysia (2010-2014, 1300). We also use WVS data for the nation of India (2010-2014, 4078). While we did not conduct experimental sessions in this country, our sample contains a large number of ethnic Indians from Malaysia and Indian nationals studying abroad (especially at the UK and Malaysian campuses). These participants self-reported Indian ethnicity. We use the WVS data for the country of India as a benchmark to compare to our ethnic Indians. We note that our participant sample and

the sample of WVS respondents differ. The WVS data are collected as representative of the countries concerned, while our participants are university students.

Figure 5 shows the results from the WVS questions regarding ethnic and religious group discrimination for the four nations. It also shows the WTD from the present study based on the same two social identities, by the same four participant nationalities. WVS data refer to the proportion of participants who mentioned different ethnicity or religion as an undesirable neighbour characteristic. For both data sources all values are mean centred to allow comparison between them.

In the WVS, respondents from Malaysia and India self-report the highest levels of discrimination with China in the middle and the UK at the lowest end of the scale. These comparative levels are reflected in our own data with the exception that Chinese participants' WTD is much closer to the other two Asian nations. Overall we interpret these findings as support for the external validity of our main finding.

5 Discussion

Evidence of substantial behavioural variation between individuals increasingly challenges the notion of "psychological universals"(Henrich et al., 2010, p. 62). In this study we examined whether such individual differences extend to discriminatory behaviour. We sought to identify the individual-level antecedents of discrimination by measuring willingness to discriminate and relating this measure to a host of individual variables from our trust game experiment conducted in three countries. We now discuss the findings. It should be noted that our results are subject to the specific characteristics of our student sample in three countries, each with their own historical and institutional contexts. Further work across more countries, using participants that better represent local populations, would be desirable.

We identified several individual-level variables that are significantly related to an individual's willingness to discriminate measured in an incentive compatible way across different social identities of others available for discrimination. In particular, we find that our participants' own cultural identity is associated with their discrimination. We found lower discrimination in participants self-identifying as WEIRD in terms of white ethnicity, UK nationality or campus location. These results are in line with the lower group identification and greater pro-sociality towards strangers of WEIRD participants observed in other studies (Schulz et al., 2019). For example, Henrich (2020) claims that

> paradoxically, and despite our strong individualism and self-obsession, WEIRD people tend to stick to impartial rules or principles and can be quite trusting, honest, fair, and cooperative toward strangers or anonymous others. In fact, relative to most populations, we WEIRD people show relatively less favoritism toward our friends, families, co-ethnics, and local communities than other populations do. We think nepotism is wrong, and fetishize abstract principles over context, practicality, relationships, and expediency. (Henrich, 2020)

We note that while our results are consistent with the hypothesis of WEIRD distinctiveness, the correlational nature and scope of our study does not generate conclusions

regarding this larger issue. Furthermore, our results do not identify the reasons behind the lower WTD of WEIRD participants, and therefore do not imply any kind of moral superiority. A plausible alternative reason lies in Western social norms against the expression if prejudice.

Age and gender were insignificant throughout. While these demographics confer social identity, they are not associated with the enculturation of identity-specific norms to the same degree as the other identities we examined: religion, ethnicity and nationality, much studied conduits of culture. Individually each of these were seen to be significant influences on WTD; when examined within the same model some of their effects cancelled out suggesting shared underlying factors behind their respective influences. We interpret this as cultural antecedents, akin to those found driving several other kinds of economic behaviour. The particular finding we made about different cultural groups also conforms to similar findings in WVS data based on self-reports.

The value factors of political orientation and religiosity also had modest individual effects that diminished when other factors were also present in the multivariate analyses. Again this points to discrimination residing in attitudinal and value dimensions that are transmitted within cultural groups. We also note that an alternative measure of religiosity, such as fundamentalism, may have provided stronger associations with WTD (e.g. Altemeyer, 2003; Chuah et al., 2014).

The effect for clerical occupation is unexpected not least because the group with the highest WTD is in the middle of the income scale and not, as in some previous work, associated with low income and education (e.g. Pavlak, 1973). Further afield however, political sociologists have associated the lower middle class with right-wing extremism (e.g. Lipset, 1960). We note that because our participants are university students, our occupation measure relates to their parents while their own level of education does not sufficiently vary to for us to use this variable.

We also found differing discrimination by study major. Our study was not designed to examine different potential reasons in self-selection into courses or indoctrination. Differential cognitive ability is an alternative explanation which chimes with the findings for political orientation and religiosity, to the extent that all three are correlated with each other and with prejudice (see section 2.3). Again, we did not measure intelligence directly to provide definitive answers here. Similarly, whether the lesser WTD of economists is based on pro-sociality, frugality or intelligence is an open question. We did however find that, among study majors, economists have the lowest beliefs in others' trust, a variable that is positively associated with discrimination. We note that our economists' dim view of others is consistent with the tenets of traditional economics.

Our work is also intended as a methodological contribution. Experimental methods in economics are increasingly developing to apply incentive-compatible mechanisms to elicit the kind of psychological measure that is valuable for behavioural research in economics. Measures such as ours could potentially enrich the experimental economics toolbox in this way, similar to the incentive-compatible elicitation method for social norms introduced by Krupka and Weber (2013).

Table 2
Regression results for WTD. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
Constant	.16	.16***	.2	.24***	.35	.25***	.18	.22***
	(.11)	(.039)	(.12)	(.0098)	(.19)	(.014)	(.15)	(.015)
High Variance			.0098***	.0088***	.021***	.019***	-.0014	
			(.0019)	(.0019)	(.0028)	(.0027)	(.0027)	
Receiver	.0011		.0025					
	(.018)		(.018)					
Female	.023		.02		.032		.02	
	(.018)		(.018)		(.025)		(.027)	
Age	-.0017		-.0016		-.005		-.0017	
	(.0044)		(.0051)		(.0082)		(.0066)	
Class	.008		.0023		-.0027		.0032	
	(.015)		(.014)		(.02)		(.019)	
Income	.0056		.0047		-.0055		.011	
	(.0063)		(.0066)		(.0095)		(.0095)	
Hometown	-.0052		-.0068		-.0027		-.012	
	(.0046)		(.0046)		(.0065)		(.0066)	
Clerical	.049*	.041*	.045*		-.021		.1**	.083**
	(.023)	(.021)	(.022)		(.031)		(.032)	(.029)
Economics Major	-.075**	-.071*	-.075*	-.071*	-.1*	-.1*	-.058	
	(.027)	(.032)	(.032)	(.031)	(.046)	(.045)	(.044)	
UK Campus	-.03		-.034		-.052		-.031	
	(.026)		(.028)		(.041)		(.039)	
UK National	-.033		-.032		-.046		-.025	
	(.03)		(.038)		(.054)		(.053)	
White	-.064*	-.11***	-.067	-.12***	-.042	-.12***	-.079	-.11***
	(.031)	(.021)	(.038)	(.021)	(.056)	(.029)	(.053)	(.03)
Christian	.01		.015		.016		.012	
	(.028)		(.027)		(.04)		(.038)	
Conservatism	.0014*	.0013*	.0013		.00089		.0014	
	(.00066)	(.00062)	(.00065)		(.00089)		(.00096)	
Religiosity	-.0011		-.0022		.0069		-.01	
	(.014)		(.013)		(.018)		(.018)	
R^2	.1	.084	.053	.037	.062	.046	.065	.043
Observations	512	540	44376	46870	22360	23478	22016	23392

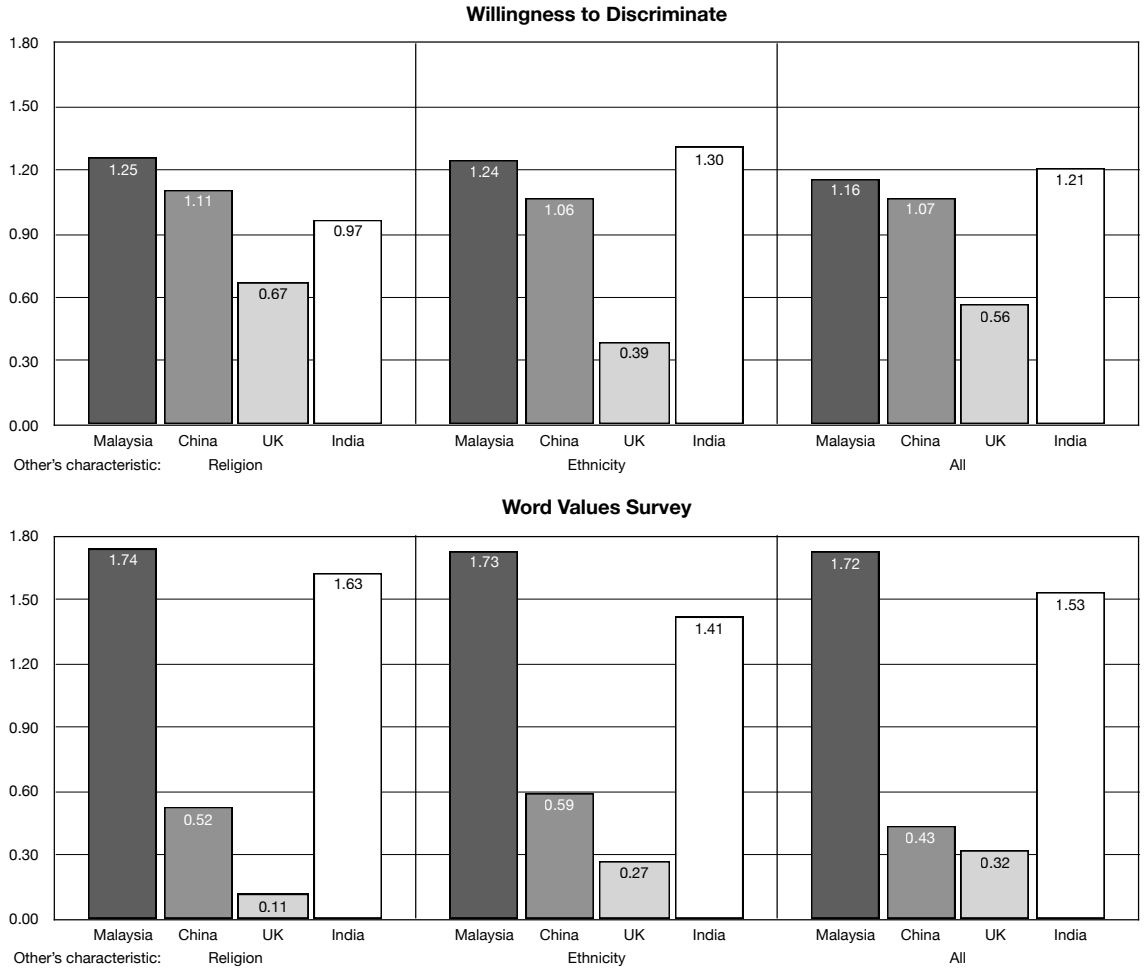

Fig. 5. Average individual scores for discrimination based on the other's religious affiliation (left panel), ethnicity (middle panel) as well as over all characteristics of the other (right panel) by four respondent nationalities. Top panel: Discrimination as willingness to discriminate in the current study. Bottom panel: Discrimination as undesirable social identities of neighbours in the World Values Survey. Averages for each nationality are centered by the mean over all four nationalities to allow comparison between the two datasets.

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Acknowledgements

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Supplementary materials

Table S1
Number (percentage) of participants by religious and ethnic identity and campus location.

		Religion						
Campus	Ethnicity	Buddhist	Christian	Hindu	Muslim	Other	None	Total
UK	Chinese	8 (1.48)	4 (0.74)	0 (0.00)	0 (0.00)	0 (0.00)	20 (3.69)	32 (5.90)
	Indian	1 (0.18)	0 (0.00)	10 (1.85)	2 (0.37)	0 (0.00)	3 (0.55)	16 (2.95)
	White	1 (0.18)	45 (8.30)	0 (0.00)	0 (0.00)	8 (1.48)	61 (11.25)	115 (21.22)
	Other	5 (0.92)	7 (1.29)	2 (0.37)	1 (0.18)	0 (0.00)	16 (2.95)	31 (5.72)
	Total	15 (2.77)	56 (10.33)	12 (2.21)	3 (0.55)	8 (1.48)	100 (18.45)	194 (35.79)
China	Chinese	25 (4.61)	4 (0.74)	0 (0.00)	0 (0.00)	0 (0.00)	131 (24.17)	160 (29.52)
	Indian	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	White	0 (0.00)	1 (0.18)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.18)	2 (0.37)
	Other	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	Total	25 (4.61)	5 (0.92)	0 (0.00)	0 (0.00)	0 (0.00)	132 (24.35)	162 (29.89)
Malaysia	Chinese	51 (9.41)	24 (4.43)	0 (0.00)	0 (0.00)	1 (0.18)	29 (5.35)	105 (19.37)
	Indian	1 (0.18)	1 (0.18)	14 (2.58)	4 (0.74)	1 (0.18)	1 (0.18)	22 (4.06)
	White	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.18)	1 (0.18)
	Other	9 (1.66)	11 (2.03)	1 (0.18)	22 (4.06)	4 (0.74)	11 (2.03)	58 (10.70)
	Total	61 (11.25)	36 (6.64)	15 (2.77)	26 (4.80)	6 (1.11)	42 (7.75)	186 (34.32)
Grand Total		101 (18.63)	97 (17.90)	27 (4.98)	29 (5.35)	14 (2.58)	274 (50.55)	542 (100.00)

Value Scales

Left-Right Values Scale (Evans et al., 1996)

(1) Government should redistribute income from the better off to those who are less well off.
(2) Big business benefits owners at the expense of workers.
(3) Ordinary working people do not get their fair share of the nation's wealth.
(4) There is one law for the rich and one for the poor.
(5) Management will always try to get the better of employees if it gets the chance.

Religiosity Scale (Rohrbaugh and Jessor, 1975)

(1) How many times did you attended religious services in the past year?
(2) Which best describes your practice of prayer or religious meditation?
(3) When you have a serious problem, how often do you take religious teaching into consideration?
(4) How much does religion influence how you act and spend your time?
(5) Which one of the following comes closest to your belief about God?
(6) Which of the following comes closest to your belief about life after death?
(7) During the past year, how often have you experienced a feeling of religious reverence or devotion?
(8) Do you agree? "Religion gives me a great comfort and security in life".

Table S2
Regression results for WTD controlling for tendency to trust. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
Constant	.14	.14***	.13	.13***	.33	.21***	.061	.2***
	(.1)	(.038)	(.12)	(.04)	(.19)	(.022)	(.16)	(.019)
High Variance			.01***	.0089***	.021***	.019***	-.00025	
			(.0019)	(.0019)	(.0028)	(.0027)	(.0027)	
Receiver	.0072		.0068					
	(.018)		(.018)					
Trust	.051*	.053*	.052*	.053*	.057	.065	.044	.038
	(.024)	(.024)	(.024)	(.023)	(.036)	(.035)	(.034)	(.032)
Female	.02		.02		.028		.026	
	(.018)		(.018)		(.025)		(.027)	
Age	-.002		-.002		-.0057		-.0022	
	(.0043)		(.005)		(.0082)		(.0065)	
Class	.011		.011		-.0019		.019	
	(.015)		(.014)		(.02)		(.02)	
Income	.0051		.0058		-.0052		.013	
	(.0063)		(.0066)		(.0095)		(.0096)	
Hometown	-.0056		-.0058		-.0032		-.0088	
	(.0046)		(.0046)		(.0065)		(.0068)	
Clerical	.048*	.038	.047*	.038	-.022		.11***	.083**
	(.023)	(.022)	(.022)	(.021)	(.031)		(.032)	(.029)
Economics Major	-.067*	-.063*	-.067*	-.063*	-.086	-.086	-.056	
	(.027)	(.026)	(.032)	(.032)	(.047)	(.046)	(.045)	
UK Campus	-.024		-.024		-.048		-.016	
	(.025)		(.028)		(.041)		(.039)	
UK National	-.039		-.04		-.049		-.039	
	(.03)		(.038)		(.054)		(.053)	
White	-.063*	-.11***	-.063	-.11***	-.041	-.12***	-.072	-.11***
	(.031)	(.018)	(.038)	(.021)	(.056)	(.029)	(.053)	(.03)
Christian	.011		.011		.014		.0066	
	(.028)		(.027)		(.04)		(.038)	
Conservatism	.0014*	.0013*	.0014*	.0013*	.0009		.0017	
	(.00065)	(.00062)	(.00065)	(.00062)	(.00089)		(.00096)	
Religiosity	-.00037		-.00031		.0069		-.0064	
	(.014)		(.013)		(.018)		(.018)	
R^2	.11	.093	.058	.048	.066	.052	.075	.048
Observations	512	540	44118	46440	22360	23478	21758	23134

Table S3
Regression results for WTD controlling for belief in the trustworthiness of others. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
Constant	.061	.11**	.093	.11**	.23	.14***	.096	.17***
	(.11)	(.041)	(.12)	(.041)	(.19)	(.027)	(.15)	(.028)
High Variance			.0099***	.009***	.021***	.019***	-.0013	
			(.002)	(.0019)	(.0028)	(.0027)	(.0028)	
Receiver	-.012		-.01					
	(.017)		(.017)					
Belief	.19***	.17***	.2***	.18***	.25***	.25***	.13*	.11*
	(.041)	(.04)	(.039)	(.038)	(.055)	(.052)	(.057)	(.053)
Female	.01		.0082		.02		.0072	
	(.018)		(.018)		(.024)		(.027)	
Age	.0012		.0013		-.0034		.0016	
	(.0043)		(.0049)		(.008)		(.0064)	
Class	.0097		.0049		.00072		.004	
	(.014)		(.013)		(.019)		(.019)	
Income	.0055		.0043		-.0027		.0095	
	(.0061)		(.0064)		(.0093)		(.0092)	
Hometown	-.0064		-.0079		-.0051		-.012	
	(.0047)		(.0046)		(.0066)		(.0066)	
Clerical	.052*	.042	.049*	.04	-.017		.11***	.087**
	(.023)	(.022)	(.021)	(.021)	(.031)		(.031)	(.029)
Economics Major	-.043	-.044	-.044	-.045	-.062	-.061	-.037	
	(.028)	(.026)	(.032)	(.031)	(.048)	(.046)	(.043)	
UK Campus	-.013		-.017		-.028		-.015	
	(.026)		(.027)		(.04)		(.038)	
UK National	-.025		-.024		-.038		-.016	
	(.031)		(.037)		(.052)		(.053)	
White	-.067*	-.098***	-.07	-.1***	-.053	-.1***	-.078	-.11***
	(.033)	(.019)	(.038)	(.021)	(.054)	(.028)	(.054)	(.029)
Christian	.0012		.0058		.0071		-.0037	
	(.027)		(.027)		(.039)		(.038)	
Conservatism	.00074	.00085	.00064	.00074	.00032		.00068	
	(.00066)	(.00062)	(.00064)	(.00061)	(.00088)		(.00097)	
Religiosity	.0054		.0043		.0065		.002	
	(.013)		(.013)		(.018)		(.018)	
R^2	.14	.12	.071	.061	.094	.082	.072	.055
Observations	493	515	42742	44548	21586	22618	21156	22102

Table S4
Regression results for WTD excluding irrational participants and decisions. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
Constant	-.011	.1*	.2	.16***	.35	.24***	.18	.22***
	(.14)	(.043)	(.12)	(.039)	(.19)	(.014)	(.15)	(.015)
High Variance			.011***	.01***	.024***	.022***	-.0011	
			(.002)	(.0019)	(.0028)	(.0027)	(.0028)	
Receiver	.029		.0047					
	(.02)		(.018)					
Female	.016		.016		.027		.018	
	(.021)		(.018)		(.025)		(.027)	
Age	.0022		-.002		-.0058		-.002	
	(.0061)		(.0051)		(.0082)		(.0066)	
Class	.015		.0035		-.00081		.0039	
	(.016)		(.014)		(.02)		(.02)	
Income	.006		.0047		-.0053		.011	
	(.0063)		(.0066)		(.0095)		(.0095)	
Hometown	-.0059		-.0065		-.0023		-.012	
	(.0051)		(.0046)		(.0065)		(.0066)	
Clerical	.067*	.059*	.046*	.042*	-.02		.11**	.086**
	(.028)	(.027)	(.022)	(.021)	(.031)		(.032)	(.029)
Economics Major	-.057*	-.051	-.072*	-.069*	-.095*	-.096*	-.056	
	(.028)	(.027)	(.032)	(.031)	(.046)	(.045)	(.044)	
UK Campus	-.047		-.033		-.051		-.031	
	(.029)		(.028)		(.041)		(.039)	
UK National	-.056*		-.035		-.05		-.027	
	(.028)		(.038)		(.054)		(.054)	
White	-.037	-.12***	-.066	-.11***	-.041	-.12***	-.077	-.11***
	(.032)	(.019)	(.038)	(.021)	(.056)	(.029)	(.054)	(.03)
Christian	-.011		.015		.015		.011	
	(.028)		(.027)		(.04)		(.038)	
Conservatism	.002**	.0017*	.0012	.0011	.00084		.0015	
	(.00075)	(.00072)	(.00065)	(.00062)	(.00089)		(.00096)	
Religiosity	-.0018		-.0018		.007		-.0093	
	(.015)		(.013)		(.018)		(.018)	
R^2	.16	.12	.053	.044	.061	.048	.065	.043
Observations	357	379	42765	45020	21369	22445	21396	22734

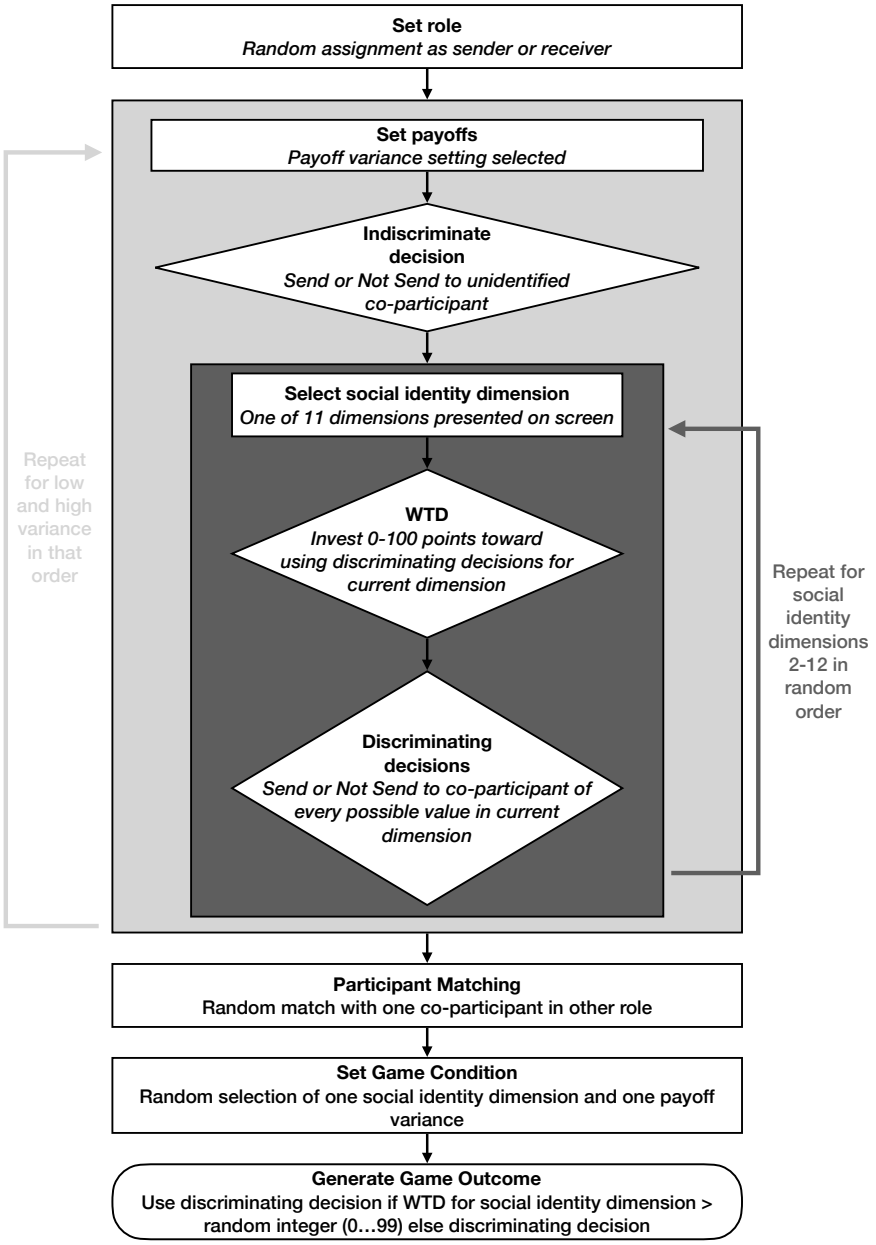

Fig. 6. Flowchart for a participant's trust game task. Rectangles show processes and rhombuses show participant decisions. After random assignment to either the sender or receiver role, the low payoff variance setting is selected. The participant makes one (send/not send or return/not return) indiscriminate decision when no social identity information exists for the co-participant. Next, decision screens (see Figure 2) are presented for the other 11 social identity dimensions in random order. On each screen the participant makes discriminating trust decisions for each value in that dimension. The participant also states their willingness to pay to discriminate, i.e. probability that the applicable discriminating decision i s used rather than the indiscriminate one. These decisions are then repeated for high payoff variance. After all decisions are made, the participant is randomly matched with a co-participant in the other role, and one social identity dimension is randomly chosen. The software then implements the applicable discriminating decision only if the WTD for the social identity dimension exceeds a random integer between 0 and 99.

Who Discriminates? Evidence From a Trust Game Experiment Across Three Societies

Swee-Hoon Chuah Simon Gächter Robert Hoffmann
Jonathan H. W. Tan

Supporting File

Acknowledgements

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Supplementary Materials

Table S1
Number (percentage) of participants by religious and ethnic identity and campus location.

		Religion						
Campus	Ethnicity	Buddhist	Christian	Hindu	Muslim	Other	None	Total
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	Indian	1 (0.18)	0 (0.00)	10 (1.85)	2 (0.37)	0 (0.00)	3 (0.55)	16 (2.95)
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	Total	15 (2.77)	56 (10.33)	12 (2.21)	3 (0.55)	8 (1.48)	100 (18.45)	194 (35.79)
China	Chinese	25 (4.61)	4 (0.74)	0 (0.00)	0 (0.00)	0 (0.00)	131 (24.17)	160 (29.52)
	Indian	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	White	0 (0.00)	1 (0.18)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.18)	2 (0.37)
	Other	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	Total	25 (4.61)	5 (0.92)	0 (0.00)	0 (0.00)	0 (0.00)	132 (24.35)	162 (29.89)
Malaysia	Chinese	51 (9.41)	24 (4.43)	0 (0.00)	0 (0.00)	1 (0.18)	29 (5.35)	105 (19.37)
	Indian	1 (0.18)	1 (0.18)	14 (2.58)	4 (0.74)	1 (0.18)	1 (0.18)	22 (4.06)
	White	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.18)	1 (0.18)
	Other	9 (1.66)	11 (2.03)	1 (0.18)	22 (4.06)	4 (0.74)	11 (2.03)	58 (10.70)
	Total	61 (11.25)	36 (6.64)	15 (2.77)	26 (4.80)	6 (1.11)	42 (7.75)	186 (34.32)
Grand Total		101 (18.63)	97 (17.90)	27 (4.98)	29 (5.35)	14 (2.58)	274 (50.55)	542 (100.00)

Left-Right Values Scale (Evans et al., 1996)

(1) Government should redistribute income from the better off to those who are less well off.
(2) Big business benefits owners at the expense of workers.
(3) Ordinary working people do not get their fair share of the nation's wealth.
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(5) Management will always try to get the better of employees if it gets the chance.

Religiosity Scale (Rohrbaugh and Jessor, 1975)

(1) How many times did you attended religious services in the past year?
(2) Which best describes your practice of prayer or religious meditation?
(3) When you have a serious problem, how often do you take religious teaching into consideration?
(4) How much does religion influence how you act and spend your time?
(5) Which one of the following comes closest to your belief about God?
(6) Which of the following comes closest to your belief about life after death?
(7) During the past year, how often have you experienced a feeling of religious reverence or devotion?
(8) Do you agree? "Religion gives me a great comfort and security in life".

Table S2
Regression results for WTD controlling for trust behaviour. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
basetrust	0.0513*	0.0528*	0.0520*	0.0528*	0.0573	0.0646	0.0444	0.0385
	(0.0244)	(0.0236)	(0.0244)	(0.0232)	(0.0356)	(0.0346)	(0.0343)	(0.0320)
Receiver	0.00715		0.00677					
	(0.0177)		(0.0177)					
UK Campus	-0.0242		-0.0244		-0.0476		-0.0162	
	(0.0255)		(0.0276)		(0.0407)		(0.0388)	
Female	0.0202		0.0196		0.0278		0.0260	
	(0.0181)		(0.0181)		(0.0249)		(0.0273)	
Age	-0.00203		-0.00199		-0.00567		-0.00225	
	(0.00432)		(0.00504)		(0.00821)		(0.00655)	
Class	0.0113		0.0107		-0.00191		0.0192	
	(0.0147)		(0.0140)		(0.0197)		(0.0203)	
Income	0.00512		0.00583		-0.00518		0.0133	
	(0.00630)		(0.00662)		(0.00948)		(0.00957)	
Hometown	-0.00565		-0.00580		-0.00316		-0.00883	
	(0.00462)		(0.00463)		(0.00649)		(0.00676)	
Clerical	0.0476*	0.0381	0.0467*	0.0381	-0.0217		0.107***	0.0832**
	(0.0230)	(0.0218)	(0.0218)	(0.0210)	(0.0313)		(0.0318)	(0.0294)
UK National	-0.0393		-0.0398		-0.0493		-0.0388	
	(0.0296)		(0.0375)		(0.0538)		(0.0535)	
White	-0.0625*	-0.106***	-0.0631	-0.106***	-0.0410	-0.119***	-0.0719	-0.112***
	(0.0310)	(0.0184)	(0.0381)	(0.0213)	(0.0557)	(0.0287)	(0.0530)	(0.0299)
Christian	0.0106		0.0112		0.0139		0.00659	
	(0.0277)		(0.0274)		(0.0399)		(0.0382)	
Economics Major	-0.0668*	-0.0625*	-0.0665*	-0.0625*	-0.0859	-0.0855	-0.0564	
	(0.0271)	(0.0258)	(0.0323)	(0.0317)	(0.0471)	(0.0459)	(0.0452)	
Conservatism	0.00140*	0.00130*	0.00141*	0.00130*	0.000903		0.00175	
	(0.000654)	(0.000616)	(0.000648)	(0.000617)	(0.000889)		(0.000965)	
Religiosity	-0.000366		-0.000307		0.00694		-0.00638	
	(0.0139)		(0.0129)		(0.0183)		(0.0184)	
High Variance			0.0104***	0.00889***	0.0208***	0.0193***	-0.000254	
			(0.00192)	(0.00186)	(0.00276)	(0.00269)	(0.00266)	
Constant	0.139	0.138***	0.131	0.134***	0.333	0.215***	0.0615	0.202***
	(0.105)	(0.0378)	(0.119)	(0.0401)	(0.193)	(0.0217)	(0.157)	(0.0187)
N	512	540	44118	46440	22360	23478	21758	23134
R^2	0.112	0.0927	0.0581	0.0479	0.0662	0.0516	0.0750	0.0477

Table S3
Regression results for WTD excluding irrational participants and decisions. Decision-level regressions use random effects. Standard errors in parentheses. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
Receiver	0.0288		0.00473					
	(0.0198)		(0.0175)					
UK Campus	-0.0471		-0.0331		-0.0512		-0.0306	
	(0.0288)		(0.0276)		(0.0407)		(0.0386)	
Female	0.0163		0.0161		0.0270		0.0175	
	(0.0207)		(0.0181)		(0.0249)		(0.0274)	
Age	0.00216		-0.00202		-0.00579		-0.00198	
	(0.00610)		(0.00505)		(0.00822)		(0.00660)	
Class	0.0155		0.00351		-0.000807		0.00390	
	(0.0164)		(0.0137)		(0.0198)		(0.0195)	
Income	0.00599		0.00467		-0.00531		0.0110	
	(0.00634)		(0.00658)		(0.00950)		(0.00948)	
Hometown	-0.00589		-0.00650		-0.00232		-0.0118	
	(0.00511)		(0.00459)		(0.00650)		(0.00663)	
Clerical	0.0674*	0.0588*	0.0465*	0.0419*	-0.0203		0.105**	0.0865**
	(0.0278)	(0.0269)	(0.0218)	(0.0210)	(0.0313)		(0.0321)	(0.0294)
UK National	-0.0560*		-0.0348		-0.0499		-0.0274	
	(0.0275)		(0.0376)		(0.0539)		(0.0536)	
White	-0.0367	-0.117***	-0.0658	-0.109***	-0.0407	-0.121***	-0.0774	-0.115***
	(0.0318)	(0.0192)	(0.0383)	(0.0213)	(0.0559)	(0.0289)	(0.0535)	(0.0300)
Christian	-0.0111		0.0149		0.0152		0.0114	
	(0.0283)		(0.0274)		(0.0399)		(0.0385)	
Economics Major	-0.0571*	-0.0512	-0.0720*	-0.0694*	-0.0954*	-0.0961*	-0.0558	
	(0.0276)	(0.0266)	(0.0318)	(0.0313)	(0.0464)	(0.0454)	(0.0444)	
Conservatism	0.00196**	0.00168*	0.00125	0.00113	0.000842		0.00148	
	(0.000749)	(0.000721)	(0.000648)	(0.000617)	(0.000891)		(0.000964)	
Religiosity	-0.00179		-0.00177		0.00699		-0.00930	
	(0.0145)		(0.0129)		(0.0184)		(0.0184)	
High Variance			0.0113***	0.0101***	0.0238***	0.0223***	-0.00113	
			(0.00197)	(0.00191)	(0.00279)	(0.00272)	(0.00279)	
Constant	-0.0108	0.102*	0.199	0.163***	0.354	0.241***	0.176	0.216***
	(0.142)	(0.0430)	(0.118)	(0.0386)	(0.193)	(0.0137)	(0.153)	(0.0152)
N	357	379	42765	45020	21369	22445	21396	22734
R^2	0.164	0.120						

Who Discriminates? Evidence From a Trust Game Experiment Across Three Societies

Swee Hoon Chuah, Simon Gächter, Robert Hoffmann*, Jonathan H. W. Tan

Corresponding author: robert.hoffmann@rmit.edu.au

EXPERIMENTAL INSTRUCTIONS

You are participating in a social science experiment on decision-making, where you will be asked to perform some *'tasks'*. This experiment has been funded by the Arts and Humanities Research Council, UK. Participants of this experiment are located in the three campuses of Nottingham University, in Kuala Lumpur (Malaysia), Ningbo (China), and Nottingham (UK). The experiment will be conducted in the three abovementioned locations. You have been randomly matched with one other *co-participant* from amongst the participants of any one of the three experimental locations mentioned above. A part of your payment will depend on your earning in a task that has been randomly chosen by the computer – this task that determines your eventual payment is known as your *'winning task'*. You will be notified of your winning task at the end of the entire experiment. A general description of your tasks is provided below. Payments are to be collected at a later date, after they have been calculated at the end of the entire experiment (i.e. after all participants have completed the experiment). You will be informed of the collection date at the end of the experiment. Today, you will first receive a *participation fee* of RM 10.

Before you begin, please read these instructions, fill in the questionnaire (only to the purpose of checking if you have understood the task), and raise your hand after doing so. Please note that communication with other participants is not allowed in this experiment.

Tasks: There are two *parts* to each task: PART I and PART II.

PART I:
Each task will appear in what is called a *'round'*. There are 24 rounds in the experiment. In each round, you have the chance to earn some *'points'*. The number of points you earn depends on the decisions you and/or your co-participant make for that task. In each task, there are 2 *Persons*: Person A and Person B. You have been randomly assigned to be Person A or Person B (this is indicated at the top row of your computer display) – this assignment will remain unchanged throughout the experiment. For Part I in each task, Persons A and B have 200 points each. Person A can choose to send (SEND) or not to send (NOT SEND) X points to Person B. If Person A chooses SEND, Person B will receive triple the number of points Person A has sent, i.e. 3X, and can then choose to return (RETURN) or not to return (NOT RETURN) Y points to Person A. If Person A chooses SEND and Person B chooses RETURN, Person A will earn 200 – X + Y, and Person B will earn 200 + 3X – Y. If Person A chooses SEND and Person B chooses NOT RETURN, Person A will earn 200 – X and Person B will earn 200 + 3X. If Person A chooses NOT SEND, and Person B chooses RETURN or NOT RETURN, both Persons A and B will earn 200 points each. There are two different scenarios, Scenarios 1 and 2, where the number of points that Persons A and B can send and return, i.e. X and Y respectively, differ. The figure on the computer display shows each person's earning in each case. Please refer to it as you continue reading the instructions.

Scenario 1: X = 50 points; 3X = 150 points; Y = 100 points. If Person A chooses NOT SEND and Person B chooses RETURN or NOT RETURN, both Persons A and B will earn 200 points each. If Person A chooses SEND and Person B chooses NOT RETURN, Person A will earn 200 – 50 = 150 points and Person B will earn 200 + 3(50) = 350 points. If Person A chooses SEND and Person B chooses RETURN, Person A will earn 200 – 50 + 100 = 250 points, and Person B will earn 200 + 3(50) – 100 = 250 points.

Scenario 2: X = 150 points; 3X = 450 points; Y = 300 points. If Person A chooses SEND and Person B chooses RETURN, Person A will earn 200 – 150 + 300 = 350 points, and Person B will earn 200 + 3(150) – 300 = 350 points. If Person A chooses SEND and Person B chooses NOT RETURN, Person A will earn 200 – 150 = 50 points and Person B will earn 200 + 3(150) = 650 points. If Person A chooses NOT SEND and Person B chooses RETURN or NOT RETURN, both Persons A and B will earn 200 points each.

In rounds 3-24 you have the chance to get *information* about your co-participant *revealed* to you. (In rounds 1 and 2 you will make your decision without information, for both scenarios.) The *'category'* of information that is obtainable varies from task-to-task, and they are listed in p.3. Your co-participant will fall under one of the possible *'types'* relevant to each category of information (e.g. for height: < 180cm or ≥ 180cm). In each round, besides rounds 1 and 2, you must choose between SEND or NOT SEND (if you are Person A) or, RETURN or NOT RETURN if you have been sent points (if you are Person B), for different possible types of co-participants for a given category (e.g. for the category 'height', you must decide what to do if your co-participant is '< 180cm', and what to do if your co-participant is '≥ 180cm'). For example, if you are assigned as Person A and had chosen SEND for '< 180cm' and NOT SEND for '≥ 180cm', and it is revealed that the co-participant is < 180cm, the decision that will be relevant when calculating the earning of your co-participant and yourself is SEND.

PART II:
For Part II in each task, each person will be allocated an *allowance* of 100 points. You must decide how many of these points (0-100) to spend on getting the *chance* for information about your co-participant to be revealed to you. You keep what is not spent. The more points you spend on information, the higher will be the chance that this information will be revealed to you. If you spend 0 points, information will certainly not be revealed. If you spend 100 points, information will certainly be revealed. If you spend 40 points, for e.g., there will be a 4 out of 10 chance that information will be revealed, and a 6 out of 10 chance that it will not be revealed. The computer will randomly determine if information is revealed or not, based on the chance in accordance to your choice of how much to spend. If information about your co-participant is revealed, your decision will be based on the decision that you have made (in PART I) for that type of co-participant. If information about your co-participant is not revealed, your decision will be based on that you have made in round 1 or 2, in the relevant scenario without information.

Payments: Your *experimental payment* is based on the total of how much you earn in the randomly chosen winning task, given you and your co-participant's choices of SEND or NOT SEND and RETURN or NOT RETURN, what remains of the 100 points allowance that can be spent on information, your earnings from an "additional task" following these 24 tasks, plus a *participation fee* of RM 10. Each point you earn is worth RM 0.08. For example, if you have earned a total of 230 points in Task Q

based on you and your co-participant's choices of SEND or NOT SEND and RETURN or NOT RETURN, and you have spent 30 points of your allowance on information, your earning for Task Q is (230 + 100 – 30) points x RM 0.08 = RM 24. So, for example, if the task mentioned in this example (Task Q) is indeed the winning task, and RM 5 is received in the additional task, you will receive a total of RM (24 + 5 +10) = 39 for this experiment.

Making decisions on the computer: You may only make decisions after 30 sec into each round. When you are ready to make your decision/s (when applicable), you should:

- PART I: if you are Participant A click on the SEND button or NOT SEND button, or if you are Participant B click on the RETURN button or NOT RETURN button, for each possible type of co-participant; if you want to change your choice, simply click on the button of your choice;
- PART II: click on the relevant white cell using the mouse. Type down your choice, a number between 0-100, of how much you want to pay for information. If you change your choice, please click on the space, delete the old number and enter your new number.
- when you are done, click on the CONFIRM button;
- click OK on the message box that will then appear;
- if you are satisfied with your choice, click on the CONFIRM button again without changing your choice/s.

Any choice you make during the experiment will not be communicated to the other participants, and similarly you will not learn anything about their choices.

Please feel free to raise your hand for help if you feel the need, now or anytime during the experiment, for clarification. Many thanks for your participation.

Information Categories and Types:

- **Gender:** Male; Female
- **Age:** 15 years and below; 16 - 20 years; 21 - 25 years; 26 – 30 years; 31 years and above
- **Nationality:** Same as you; Different from you
- **Religion:** Christian; Muslim; Buddhist; Hindu; Jewish; Other; None
- **Religiosity (how religious a person is):** Low; Medium; High
- **Ethnicity:** Chinese; Indian; Malay; White; Black; Middle Eastern; Other
- **Campus location:** Nottingham, UK; Ningbo, China; Kuala Lumpur, Malaysia
- **Course of Study:** Business; Economics; Pure Science; Applied Science; Social Science; Arts; Other
- **Political Orientation:** Left-wing; Right-wing
- **Participation in Voluntary Organisations:** Active Member; Inactive Member; Not a Member
- **Birthday Group (whether your birthday falls on an even or odd day of the month):** Even Group; Odd Group