

## Rage against the machine: A money-burning field experiment

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### Abstract

**Purpose** — This study investigates antisocial behaviour where participants made payoff destruction decisions (“money burning”) that are conditional on the co-participant being a human or a computer.

**Methods** — This study uses the joy-of-destruction minigame experiment with Indonesian citizens living in Australia as the participants. Regression methods are used to observe whether discrimination occurs and to identify factors associated with antisocial behaviour.

**Findings** — This study finds money burning against the computer to be more prevalent than against humans. There was very limited support that such behaviour was correlated with demographic characteristics or subjective norms, suggesting that the presence of a computer co-participant drives the result.

**Implications** — The results have a methodological implication for experimental economics where experimenters should anticipate that computer players may have an unforeseen impact on human behaviour. Policy-wise, the study shows a relatively cohesive community which may be driven by the multicultural policy of Australia.

**Originality** — This is the first antisocial behaviour economics experiment that includes a computer as a potential co-participant.

**Keywords** — Antisocial behaviour; Other-regarding preferences; Lab-in-the-field experiment; Human-computer interaction.

## Introduction

Computers have been included in behavioural economics experiments since the ‘60s where it was initially used to study interdependence strategies (Messick, 1967). Subsequently, hundreds of studies on computer players have been documented and published. Generally, the inclusion of computer participants in economic experiments was aimed at strengthening the internal validity and can be classified into the following categories (March, 2021): (1) to reduce noise (e.g., by simplifying the strategic environment), (2) to induce types (e.g., by having computers to play games with specific strategies), (3) to remove strategic uncertainties (e.g., the computer is playing equilibrium strategy), (4) to exclude social preferences (e.g., reciprocity should be absent when human plays against computers), and (5) to study human-computer interaction (e.g., how human behaviour changes in the presence of a computer player). These objectives generally conform with most economic theories that assume self-interest.

Despite the wide use of computers in economic experiments, the literature on how computer players may affect *antisocial* behaviour is still very limited, if not non-existent. Out of the five categories above, the inclusion of computer players to exclude social preferences is the most relevant in this study. This is because, by design, a computer receives no utility and is not reciprocal.

For example, theories on social preferences suggest that a person's utility is affected by their own payoff and the relative payoff share (Bolton & Ockenfels, 2000). This theory was developed following findings from laboratory experiments where *people's* behaviour was sometimes attributed to equity, reciprocity, and competitive motives. We may argue that a person's standing relative to other people is important as jealousy and sympathy are real and may affect the person's behaviour, but what arguments are there that justify that such behaviour will also present when the relative position is against a computer? More importantly, if one's utility  $u_i$  is directly influenced by other's utility  $u_j$  such that  $u_i = x_i - u_j$  (Sadrieh & Schröder, 2016), where  $x_i$  is  $i$ 's payoff and  $i \neq j$ , it makes no sense to assume that player  $j$  (the computer) is receiving some kind of utility. Another other-regarding theory focuses on the role of belief, where a person's behaviour is influenced by their belief on the other players intentions (Rabin, 1993). If the computer is programmed to behave randomly, and there is no asymmetric information in the experiment (meaning that human participants know this), then there is no "intention" that any human can observe.

There are no empirical studies in the antisocial behaviour literature on human-computer interaction. However, there are similar studies that may help us in predicting behaviour. First, participants tend to send less money in the trust game—a prosocial behaviour experiment—when paired with computer players (Engelmann et al., 2019). Meanwhile, participants behave more selfishly when they have the opportunity to hide their intentions, as shown in a bargaining experiment (Embrey et al., 2015). Interestingly, in a public-goods game experiment, participants playing against computers behave similarly as those facing human participants (Burton-Chellew et al., 2016). Together, results from these studies suggest that playing against the computer is expected to make people behave more selfishly and that the results can be used to predict behaviour against human participants.

Antisocial behaviour can be categorised as a type of social preference where one's utility is not only negatively affected by other's utility or payoff, but when doing so also does not bring pecuniary benefit to the perpetrator. For example, in the joy-of-destruction (JoD) game, participants have the opportunity to destroy the payoff of other participants without receiving monetary benefit for doing so (Abbink & Herrmann, 2011; Abbink & Sadrieh, 2009). Along with the money-burning (MB) game, the JoD game is one of the most popular games within the payoff-destruction games family. Here we include a game as a payoff-destruction game if it is strategic, allows for antisocial strategy (i.e., the strategy does not bring material benefit to the player), and is not a punishment-type game (such as a public-goods game with punishment). Up to the writing of this article, 36 out of 46 payoff-destruction experiments were using either MB or JoD games. The two games are identical except that the MB game was designed to capture inequity aversion (e.g., by creating unequal initial endowments among the participants), while the JoD game was created to measure pure spite. A range of factors has been found to be associated with antisocial behaviour. For example, the fear of being harmed made 34 per cent of participants in the first-strike game to choose antisocial behaviour (Abbink & de Haan, 2014). Meanwhile, a prosocial act was found to be effective in reducing antisocial behaviour (Diamond & Blackwell, 2017). A combination of anger and exposure to violence is also associated with antisocial behaviour (Zeitzoff, 2014).

In this study, we present our findings on how the inclusion of a computer player changes human behaviour in a lab-in-the-field antisocial experimental game. It is important to state from the beginning that this was not the primary objective of the experiment. Instead, a computer was added to the experimental design following other considerations regarding the implementation of another experiment. To understand this, we need to take a step back and discuss the broader context of the experiment.

The experiment was designed as a pre-test for another experiment conducted in post-conflict Aceh in Indonesia. The Aceh insurgency lasted from 1976 to 2005 where certain ethnic groups, particularly Javanese, were persecuted by the rebels (Schulze, 2004). The region was in relative peace following the peace treaty, but it was unknown whether grievances among different ethnic groups are still lingered. Specifically, it was designed to elicit in-group/out-group biases in a one-shot JoD game with a strategy method, where participants made simultaneous decisions against different types of co-participants identified by their chosen honorific titles (that correspond

to their ethnicity and gender). One of the results from our main study in Aceh is that gender mediates the effect of conflict experience on antisocial behaviour (Chuah et al., 2019). The fieldwork for the study presented in this paper was conducted before the Aceh study, with Indonesian migrants in Melbourne, Australia as the sample. Unlike in Aceh, we expect the population to have a very low conflict experience.

A computerised co-participant was added to the experiment as a means to reduce upset. It was expected that participants would be upset from losing money if they knew that another person was responsible for this event. However, note that participants in the Aceh study were not students, and many experienced the actual conflict. This was considered to have the potential for igniting new conflict if participants knew that another person, possibly coming from a different ethnic group, was behind the antisocial decision. Therefore, in the Melbourne study, a computer was included as a potential co-participant that made random antisocial behaviour decisions. So, in practice, a (human) participant will be randomly matched against either another human co-participant or a computer. However, a computer co-participant was removed from the Aceh study following some of the results from the experiment in Melbourne.

The objective of this study is to observe antisocial behaviour in a conflict-free environment where participants may encounter a computerised co-participant that makes random decisions. Specifically, we want to investigate whether participants discriminate against different types of co-participants and identify factors that might be associated with such decisions. Because of the absence of systematic horizontal conflict among the Indonesian migrant in Melbourne, we hypothesise an indifferent antisocial behaviour by ethnicity or gender (or both). Following findings from other experimental games that use a computer to exclude social preferences, we expect human participants should not do such behaviour when facing a computer player.

## Methods

The experiment in this study was conducted using a strategy method (Selten, 1967), which requires participants to reveal all of their strategies given a set of possible choices. Brandts and Charness (2011) noted that experiments with either a strategy method and a direct elicitation approach should not provide different results and empirical irregularities are not systematic (see e.g., Brandts & Charness, 2011; Fischbacher et al., 2012).

## Experimental Design

The antisocial behaviour experiment is based on the JoD minigame (Abbink & Herrmann, 2011). Participants could pay to destroy a portion of their co-participant's money in a 1:10 ratio (i.e., paying AUD 1 to destroy AUD 10). We find in the pilot sessions that, relative to lower or higher ratios, antisocial decisions happened quite often but were not so prevalent when this ratio was implemented. The average exchange rate in 2017 (the year this experiment was conducted) was IDR 10,267/AUD.

The strategy method was used by asking participants (of any ethnicity, not limited to Javanese or Acehnese) to make decisions against four types of co-participants (partners), identified by their preferred honorific titles: *Bang* (Acehnese male), *Kak* (Acehnese female), *Mas* (Javanese male), and *Mbak* (Javanese female). We expect such honorifics to be accurate in identifying the participants' gender and ethnicity, especially if one of the ethnic groups is dominant in the sample. It is possible that the titles do not match the actual (preferred) ethnicity and gender, which will be discussed later in the results and discussion section.

The use of honorific titles is necessary for gauging possible group bias while at the same time reducing ethnic salience. Past studies show that the failure to do so would create a demand effect and bias the result (Chuah et al., 2013; Fershtman & Gneezy, 2001). Thus, participants were asked if they were willing to pay to destroy some parts of their partner's money if that person preferred to be called *Bang/Kak/Mas/Mbak*.

The inclusion of a computerised partner aimed to create uncertainty about whether the participant faces humans or computers. Adding the computer as one of the co-participants should

not affect behaviour as it was programmed to make random decisions. Note that the computer partner was not used in the Aceh experiment as we could not find an indication of participants feeling distressed, and they were generally happy to be engaged in such a game.

Lastly, the experiment was designed to observe antisocial behaviour at the lower bound by: (1) only allowing for one decision from one of the participants to be implemented; this was by tossing a coin in one of the locations, (ii) limiting the amount of co-participant's money that could be reduced (40 per cent), and (iii) anonymous decisions. Randomly limiting money-burning was also implemented in Zizzo (2003) and is also expected to remove money-burning decisions that are motivated by their fear of receiving money burning from another participant.

## **Implementation**

There were three phases during each of the sessions.

*Phase 1.* Participants were asked to choose a seat where the seats were arranged in such a way that it ensured privacy. They were directed to read and sign the consent form and then may start filling in the demographic questionnaire. One of the questions asked about their honorific titles, and once all participants had finished writing the answers to the questionnaire, the experimenter started reading the instruction sheet.

*Phase 2.* Each participant received AUD 25 and was then asked if they were willing to pay AUD 1 to destroy their partner's money. The decisions needed to be made against human and computer partners. The participants were asked to answer some comprehension questions prior to making the real decisions. Only one randomly chosen decision (using coin toss) from each pair of participants was implemented.

*Phase 3.* The participants were asked to answer questions on conflict experience, belief (of having their money destroyed), social value orientation (SVO) and personal attitudes. There was a separate payment of AUD 15 for answering the questions. They were then directed to another room for payment and were allowed to leave the session. The applicable decision given the co-participant's actual title was used to determine earnings.

This study was used as a trial for a similar experiment in Aceh, where it was suggested that there would be a potential for tensions to reoccur between the Acehnese and Javanese. Hence, two teams of research assistants (RAs) were assigned to two locations (as far as 37 km), and sessions were held simultaneously. In each location, one RA communicated with the other RA in the other location to (randomly) match the participants while one of the RAs read the instructions.

Posters were publicly advertised around the Indonesian community and also distributed using social media. We did not limit the time for the experiment, although the posters stipulate that each session is expected to last for a couple of hours. Similar to the Aceh experiment, participants must be at least 25 years old. The experiments were conducted in either a community hall (located in the suburbs with prominent Indonesian communities) or a university lecture room.

Graduate students from Indonesia volunteered as RAs. Four pilot sessions were conducted in September 2017. All materials were written in formal Indonesian language and were identical. Lastly, we use pen and paper to run the sessions.

## **Subject Pool**

Based on the Australian Census in 2016, approximately 29 per cent of Indonesian-born residents of Australia were full-time students. This was probably due to the quality of higher education and the two countries' closeness. We could not find evidence of systematic conflicts or social tensions among the Indonesian communities living in Australia, particularly Melbourne.

Around 45 per cent of Indonesian migrants in the larger Melbourne region aged between 30 and 49 years. They are also well educated, with more than half holding higher education degrees. The ethnic composition of the migrants is not known, although Javanese is expected to remain the dominant ethnic group. We also do not expect a significant number of Acehnese in the sample as the ethnic group is just under two per cent of all Indonesians.

## Post-experimental Questionnaire

We used several questionnaires to gain some information that might be correlated with money burning behaviour. The main survey was a self-report war victimisation questionnaire, modified from the original questionnaire used in the context of the Tajik Civil War (Cassar et al., 2013), adjusting for some properties that are unique to Aceh. This questionnaire is only required for participants who lived in Aceh during the last five years before the end of the conflict (2000-2005).

The belief question asked if the participants thought their partners would choose the money reduction option. This is an important indicator of antisocial behaviour, as shown in past studies (Abbink & Herrmann, 2011; Prediger et al., 2014). The SVO questionnaire is a series of unincentivized allocation tasks where participants can be categorised as either prosocial, competitive, individualistic or other/unknown (Van Lange, 2000).

This study also utilised questionnaires that measure personal attitudes. The Mach-IV test measures Machiavellianism (Christie et al., 1970). The Buss-Perry Aggression Questionnaire is a well-known survey on self-reported aggression, which consists of four sub-traits (physical aggression, verbal aggression, hostility and anger) (Buss & Perry, 1992). The questionnaire on religiosity consists of a few questions on ritual, consequential, experiential and ideological dimensions (Rohrbaugh & Jessor, 1975). Finally, a set of 12-item questions were used to measure respondents' beliefs about fundamental aspects of their religion (Altemeyer & Hunsberger, 2004).

## Results and Discussion

The experimental sessions were held in October 2017, and the complete information of 127 respondents were obtained. Table 1 shows the descriptive statistics where, among other things, ethnic Javanese was the dominant ethnic group.

**Table 1.** Summary Statistics

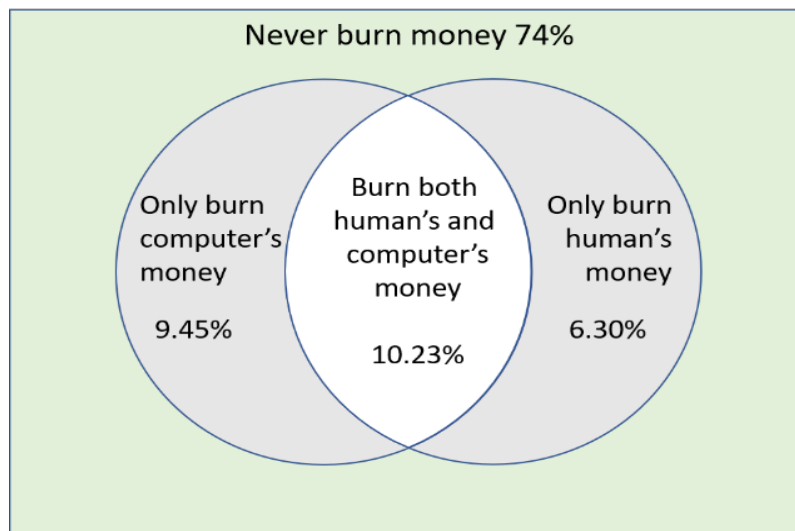
Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Burn any types of co-participant money	127	0.26	0.44	0	1
Burn at least one human co-participant's money	127	0.16	0.37	0	1
Burn at least computer co-participant's money	127	0.20	0.40	0	1
Burn only human co-participant's money	127	0.06	0.24	0	1
Burn only computer co-participant's money	127	0.09	0.29	0	1
Count any burning decision	127	0.54	1.10	0	5
Count any burning decision (except computer)	127	0.35	0.88	0	4
Negative belief	127	0.20	0.40	0	1
Female	127	0.46	0.50	0	1
Age	127	31.75	5.91	25	50
Javanese	127	0.50	0.50	0	1
Muslim	127	0.77	0.42	0	1
Married	127	0.63	0.48	0	1
Income > AUD 2,000/month	125	0.53	0.50	0	1

## Patterns of Antisocial Behaviour

The results indicated that 26 per cent of the participants chose to destroy their partners' money (Table 1). Moreover, the driver of such behaviour was the money burning decisions against computer co-participant, where 20 per cent of the participants at least chose this option. See Figure 1 for a visual depiction of money burning behaviour.

Using the Mann-Whitney tests we could not find different money burning behaviour by ethnicity or gender (Table 2). As we have very few observations with specific ethnicity-gender combinations (e.g., whether Javanese females are more likely to reduce the money of non-Javanese males), we simplify the categorisation in the following analyses. For example, "female partner" identified decisions against co-participants who preferred female honorifics, the same goes for "Javanese partner". A test of proportions (by gender) provides a p-value of 0.1071, suggesting the slight proneness of male participants to destroy money relative to female participants, but this is

only when we used observations that exclude decisions against computer co-participant. However, using the index of similarity (Sent & van Staveren, 2018), we also find high values (more than 0.9), suggesting that the money burning distributions by gender are overlap.



**Figure 1.** Money burning decisions, human vs computer

*Result 1: No differential antisocial behaviour was found by ethnicity or gender.*

**Table 2.** Mean burning decisions by gender and ethnicity

	Gender			Ethnicity		
	Male	Female	p-value	Javanese	Non-Javanese	p-value
Full sample	0.290	0.224	0.402	0.266	0.254	0.881
Excluding computer	0.203	0.121	0.216	0.141	0.190	0.451

Notes: The p-values are from the Mann-Whitney test for difference by gender or ethnicity.

When only considering decisions against human co-participants, the money burning ratio fell to only 16 per cent (including burning both humans' and the computer's money). This rate was higher than the equivalent result from Abbink and Hermann (2011) (10 per cent in the open treatment). The burn rate dropped to six per cent if we only consider decisions against a human partner. But the rate was higher if we only use decisions that were only aimed at the computer partner.

*Result 2: Antisocial decisions against the computer were higher than against human co-participant.*

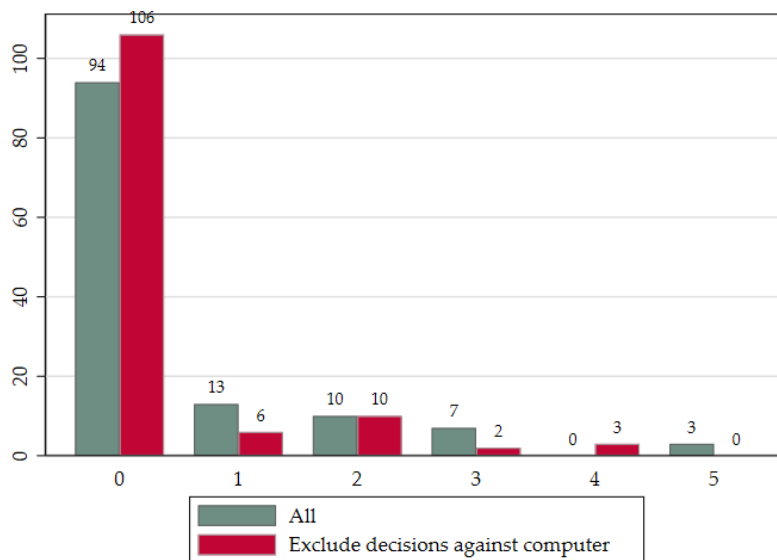
The large number of antisocial decisions aimed at the computer was not anticipated. There are some possible explanations for this result. First, it might be the case that the participants failed to comprehend the instructions. However, we conducted a mandatory comprehension quiz prior to the real task. Second, maybe the cost of burning money was too low. This is unlikely as money burning was costless in the original JoD experiment, and we calibrate the cost of burning money during the pilot sessions. Although Javanese tended to burn computer's money more than non-Javanese, but this difference is statistically insignificant as indicated in Table 3. In general, the table suggests demographic characteristics have no explanatory power to explain variations in burning decision that are solely aimed at the computer. It suggests specific experimental design (the option to destroy computer's money) was responsible for the result.

We found that most participants (who burn money) only did it once. The rate is negatively correlated with the number of money burning decisions (Figure 2). Importantly, we could not find differential antisocial behaviour against those with different gender or ethnicity (Figure 3), although Javanese participants tended to destroy non-Javanese co-participants' money a bit more often (Wilcoxon's two-sided p-value = 0.317). This result was expected, as there is no systematic violent conflict among the different Indonesian ethnic groups or gender in Melbourne.

**Table 3.** Money burning decision against computer by demographic characteristics

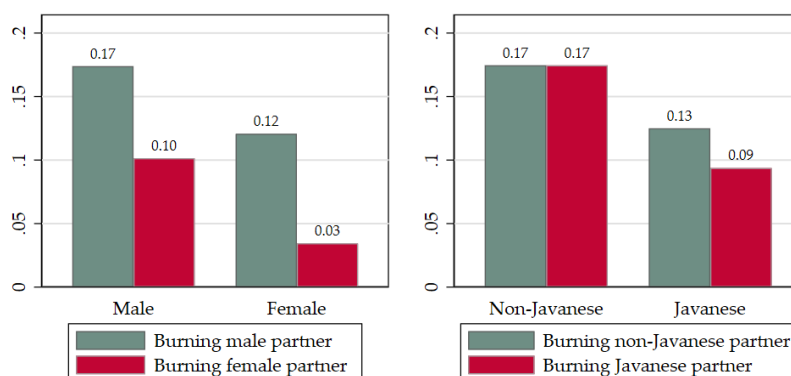
		Mean	Difference	p-value
Javanese	Yes	0.12	-0.06	0.24
	No	0.06		
Male	Yes	0.09	-0.02	0.76
	No	0.10		
Married	Yes	0.10	-0.01	0.78
	No	0.08		
Muslim	Yes	0.09	0.01	0.86
	No	0.10		
Student	Yes	0.09	-0.00	0.99
	No	0.09		

Notes: The p-values are from the t-test with unequal variances. Burning decision is equal to 1 if participant only burn computer’s money and 0 otherwise. Similar results were obtained when Fisher exact test and Pearson chi-square test are used.



**Figure 2.** Count burning decisions

*Result 3: No discrimination was found by ethnicity or gender.*



**Figure 3.** Share of money-burning decisions by ethnicity and gender

Notes: Excluding the computer co-participant.

Males were targeted for money burning significantly more than females, as shown in the left panel of Figure 3. The Wilcoxon test for paired sample gave the p-value of 0.025 (0.096) for differential antisocial decisions among females (males).

*Result 4: Females were less likely to have their money destroyed when decisions against the computer co-participant were excluded.*

The majority of participants had prosocial tendencies, and their burn rate (destroy the money of the human co-participant) was just 14 per cent—much lower than those in the other categories. However, we only have 16 observations that are not in the prosocial category.

Statistical tests suggested anger has some correlations with money burning behaviour, where, relative to male participants, female participants' average scores for anger are higher.

*Result 5: Females that chose to burn tended to have higher scores for anger than did males.*

Lastly, negative expectation predicts money burning behaviour where the burn rate for participants who thought that they would receive money burning was 50 per cent—significantly higher than those who did not have such thought (20 per cent). This was confirmed by the Mann-Whitney test, which yielded a p-value < 0.01.

*Result 6: Negative belief strongly predicted spiteful behaviour.*

## Regression Results

Panel data regressions confirmed the results after adding for various controls. Burning decisions were strongly correlated by the types of co-participants (Table 4). When facing the computer (Models 1 to 3), the probability of antisocial decisions was higher than when facing a human (Models 4 and 5). The negative belief was strongly correlated with a higher likelihood of money burning behaviour. We could not find ethnic or gender discrimination (interaction terms were not significant in Models 4 and 5). This finding did not change when subjective norms such as personal attitudes and beliefs were included (results not shown).

**Table 4.** Panel probit regressions (dependent variable: money burning decision)

	(1)	(2)	(3)	(4)	(5)
Female partner	-1.501*** (0.310)	-1.488*** (0.307)		-0.773* (0.453)	-0.971** (0.401)
Male partner	-0.680** (0.294)	-0.666** (0.280)			
Javanese partner			-1.009*** (0.269)	-0.130 (0.181)	-0.108 (0.185)
Non-Javanese partner			-0.921*** (0.238)		
Female x Female partner				-0.615 (0.825)	
Javanese x Javanese partner					-0.0598 (0.376)
Negative belief		1.685*** (0.445)	1.588*** (0.420)	2.432*** (0.671)	2.396*** (0.664)
Student		-1.148*** (0.427)	-1.084*** (0.404)	-1.796*** (0.654)	-1.760*** (0.646)
Constant	-1.737*** (0.366)	-0.485 (1.320)	-0.494 (1.241)	-1.679 (1.664)	-1.659 (1.634)
Sample	All	All	All	Exclude computer	Exclude computer
Observations	635	625	625	500	500
Number of id	127	125	125	125	125

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. In (1) to (3) partner was relative to computer co-participant. All demographic variables (gender, ethnicity, age, religion, marital status, income) are included in above regressions but their coefficients are not displayed for brevity.



A relatively consistent result is found when the data is simplified to money burning decisions against computers or humans. Although student status negatively predicts money burning decisions against human co-participants, but it is only weakly significant (Table 5).

**Table 5.** Probit regressions (dependent variable: burning decision)

	Only burn human's money		Only burn computer's money		Any money burning	
	(1)	(2)	(3)	(4)	(5)	(6)
Javanese	-0.217 (0.444)	-0.242 (0.449)	0.721** (0.355)	0.828** (0.387)	0.0988 (0.293)	0.192 (0.305)
Age	0.00624 (0.042)	0.00488 (0.045)	-0.0392 (0.032)	-0.0591 (0.039)	-0.00146 (0.027)	-0.0114 (0.028)
Muslim	0.399 (0.462)	0.471 (0.493)	-0.398 (0.371)	-0.799* (0.435)	-0.263 (0.300)	-0.601* (0.363)
Married	-0.211 (0.469)	-0.167 (0.464)	0.293 (0.305)	0.232 (0.296)	-0.0838 (0.305)	-0.139 (0.310)
Income > AUD 2,000	-0.419 (0.399)	-0.445 (0.416)	-0.560* (0.293)	-0.573** (0.263)	-0.0265 (0.274)	-0.0367 (0.275)
Student	-0.788* (0.415)	-0.734* (0.398)	0.0784 (0.333)	0.144 (0.325)	-0.592* (0.304)	-0.628** (0.305)
Negative belief	0.577 (0.385)	0.532 (0.395)	-0.308 (0.417)	-0.336 (0.418)	0.852*** (0.295)	0.867*** (0.297)
Constant	-1.31 (1.480)	1.095 (2.570)	-0.101 (1.085)	-0.401 (2.974)	-0.142 (0.917)	-1.655 (2.234)
Personal attitudes	No	Yes	No	Yes	No	Yes
Observations	125	125	125	125	125	125

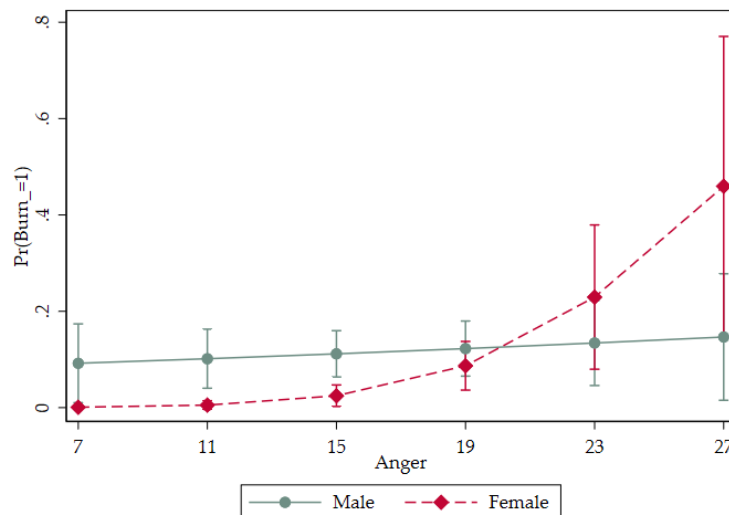
Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Personal attitudes: religiosity, religious fundamentalism, Mach-IV and aggression.

Money burning behaviour is positively associated with anger at 5 per cent level (Table 6 Model 1), but this effect is gone once we add an interaction between gender and anger (Model 2). However, this interaction term becomes positively and significantly correlated with money burning behaviour if the sample excludes decisions against the computer (Model 3; see also Figure 4 based on this model). Adding measures of personal attitudes, beliefs, and other sub-traits of aggression to Model 3 did not change the significance of the interaction term. However, bootstrapping reduces the significance of the interaction term, except when Poisson regression with a count of antisocial decisions as the dependent variable is used (results not shown).

**Table 6.** Panel regression on the role of anger (dependent variable: burning decision)

	(1)	(2)	(3)
Female	-0.581 (0.362)	-2.960* (1.782)	-6.877*** (2.514)
Anger	0.0987** (0.0425)	0.0467 (0.0422)	0.0333 (0.0564)
Female x Anger		0.138 (0.0979)	0.337** (0.136)
Constant	-1.541 (1.428)	-1.087 (1.400)	-2.429 (1.860)
Sample	All	All	Excluding computer
Observations	625	625	500
Number of id	125	125	125

Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Partner ethnic was relative to non-Javanese. Controls: gender, ethnicity, age, marital status, religion, income, belief, student status and types of partners (by ethnicity and gender).



**Figure 4.** Predicted probability of money burning decision with 95 per cent confidence interval  
Notes: The prediction was based on Model 3 in Table 6.

### Mismatched Titles and Ethnicity/Gender

While honorific titles that represent ethnicity and gender are common knowledge among the Indonesian population, the accuracy of these titles in predicting the actual ethnicity and gender is subject to population composition. Specifically, the population should be predominantly Acehnese or Javanese for it to be accurate.

The honorifics accurately predicted the ethnicity of all 64 Javanese participants. With the exception of one participant, the Javanese honorifics also correctly predicted gender. However, not all non-Javanese chose *Bang* or *Kak*, and many preferred typical Javanese honorifics. Also, six participants' actual gender identity did not fit with the honorifics they preferred.

Removing observations with mismatched ethnicity and gender did not change the previous results. In particular, result 3 (no discrimination was found by ethnicity or gender), where the Wilcoxon test failed to reject the null of same distribution in money burning decision. The results generally remain the same when participants with mismatched ethnicity or gender were excluded. Those who misreport their honorifics were not different from the rest of the sample regarding to their demographic characteristics based on the Wilcoxon test.

Our data support the absence of discrimination, either by ethnicity or gender. Interestingly, a significant proportion of participants chose antisocial (money burning) decisions, where most were directed toward computer co-participants. We also find that anger, mediated by gender, seem to be correlated with antisocial decisions.

A large number of the participants chose the money burning decision despite the absence of material incentive from doing so. However, once decisions against the computer were excluded, only six per cent of the participants chose money burning. This number is less than the result from a similar experiment (Abbink & Herrmann, 2011). Thus, we concluded that adding the computer affects antisocial behaviour.

The first and third results (indifferent antisocial behaviour against those of different ethnicity or gender) showed unbiased behaviour. It adds to the literature on other-regarding preferences, where the effect of gender was unclear (Croson & Gneezy, 2009; Sent & van Staveren, 2018). These results also confirmed our casual observation that there were no systematic tensions and conflict within the Indonesian community in Melbourne.

The second result—participants were more likely to burn computer's money—was interesting yet unanticipated. This result is likely to be driven by the design of the experiment rather than due to certain individual characteristics of the participants.

The fourth result, where female participants were less likely to have their money destroyed, was new in the literature. This result is similar to the other study that used a dictator game, where women tended to receive more money than men (Dufwenberg & Muren, 2006).

The fifth and sixth results answered the research question on the antecedents of antisocial behaviour. The higher score of anger for female participants who chose to destroy money provides an indication that anger might be perceived differently by gender and that this was reflected in their behavioural decisions. This result was consistent with past studies in psychology, which hypothesises that, in one hand, women view anger as a loss of control (men, on the other hand, view anger as seizing control) (Astin et al., 2003; Litvak et al., 2010). In addition, an antisocial experiment in Israel found that anger had mixed effects on antisocial behaviour and its impact on behaviour was subject to participants' violent experience (Zeitsoff, 2014). The sixth result indicated that negative expectation predicts antisocial behaviour, which was commonly found in the literature (Abbink & Herrmann, 2011; Prediger et al., 2014).

These results were generally unchanged after excluding observations with mismatched gender/ethnicity, using other sub-traits of aggression, an interaction variable between anger and some demographic variables, and personal attitudes variables. However, using standard bootstrap errors weakened some of the results. We also find the average money burning lower in Melbourne compared to the Aceh data, but this location fixed effect diminished when more controls were added.

## Conclusions

To conclude, this study complements the Aceh study findings and shows the absence of in-group/out-group discrimination in a community with no experience of extended conflict. Moreover, the surprising finding on antisocial decisions against computer co-participants raises questions regarding motivation, which opens up to future research.

This study has at least two implications. The first is the methodological implication on the method of the experiment where the inclusion of computer players may have an unforeseen impact on participant's behaviour. Second, the relatively small number of antisocial behaviours directed towards human co-participant is relieving, which suggests the relative peace among Indonesian migrants in Melbourne. It is also a reflection, at least partially, of the relative success of the governments—both Australian and Indonesian representatives in Australia—in managing the community. Policy-wise, this could also be the result of the National Agenda for a Multicultural Australia that, among others, is concerned with social justice and cultural identity. Finally, we must also acknowledge the Indonesian community itself for being able to stay cohesive and vibrant despite being far from home.

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