Toulouse School of Economics

TSE M1 – Semester 1

October 2018

Paul Seabright

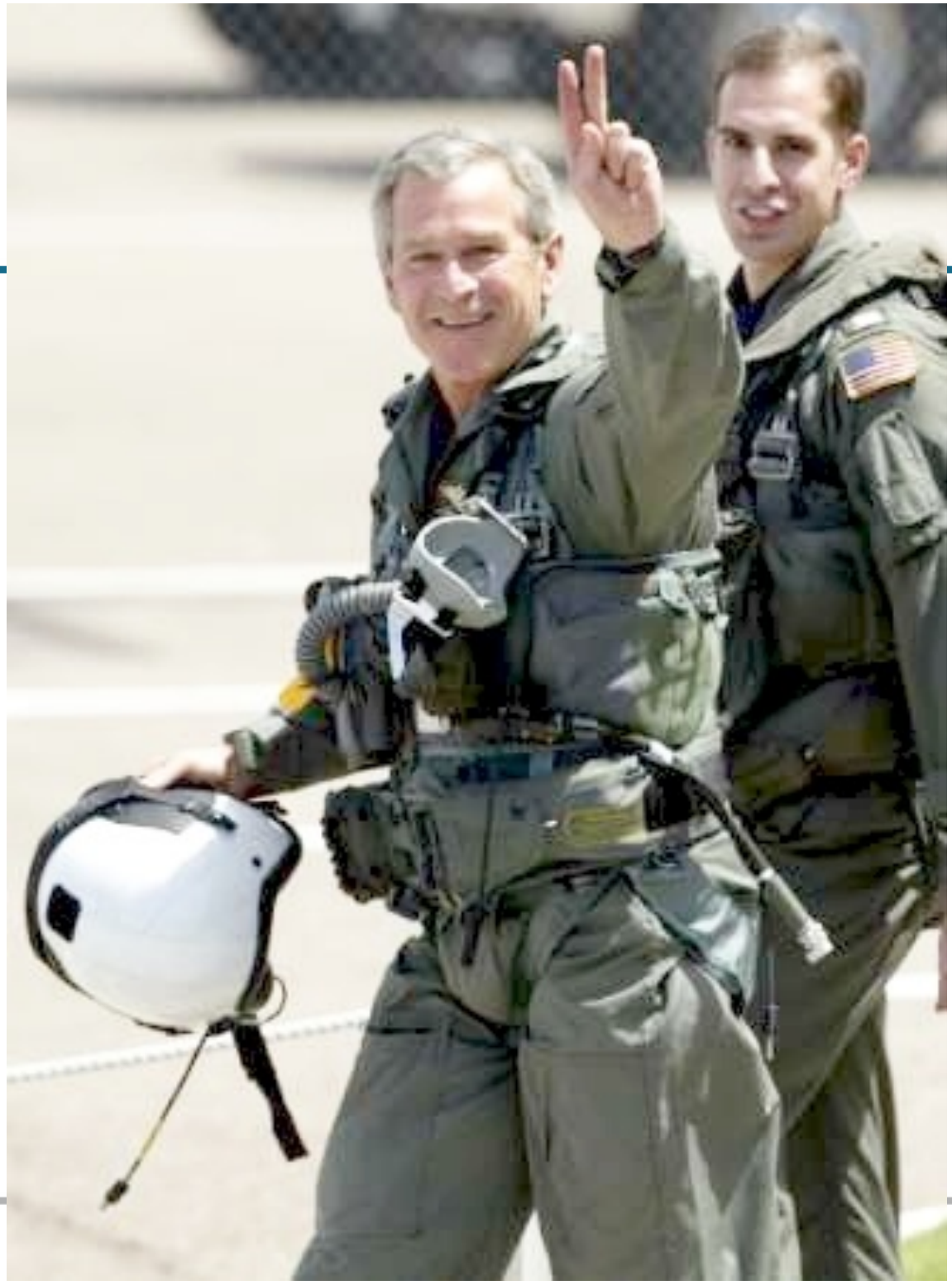
Evolution of Economic Behavior
Week 5:
The cognitive and emotional foundations of cooperation (II)

The cognitive and emotional foundations of cooperation (II): Outline

- Emotions: the key to our credibility?
- Costly signals and cooperation
- An experimental test of smiles as costly signals
- Other kinds of signaling
  - Signaling and sexual selection
  - Costly signals of cooperative reliability

Emotions: the key to our credibility?

- Emotions are not easy to manipulate…
- In a word, they’re *costly*
- You can display them more easily when you have credible intentions (threats, promises)
- But displaying them brings benefits
- An example: the smile
- Fake smiles are easy to produce - genuine smiles are harder…



An experimental test

- Honest signaling in trust interactions (*Evolution and Human Behavior* 2015), co-authors: Samuele Centorrino, Elodie Djemai, Astrid Hopfensitz, Manfred Milinski)

- The puzzle: smiles perceived as genuine use the *orbicularis oculi* as well as the zygomatic major

- The *orbicularis oculi* is under very imperferct conscious control – why did natural selection hit on such an obviously flawed mechanism?

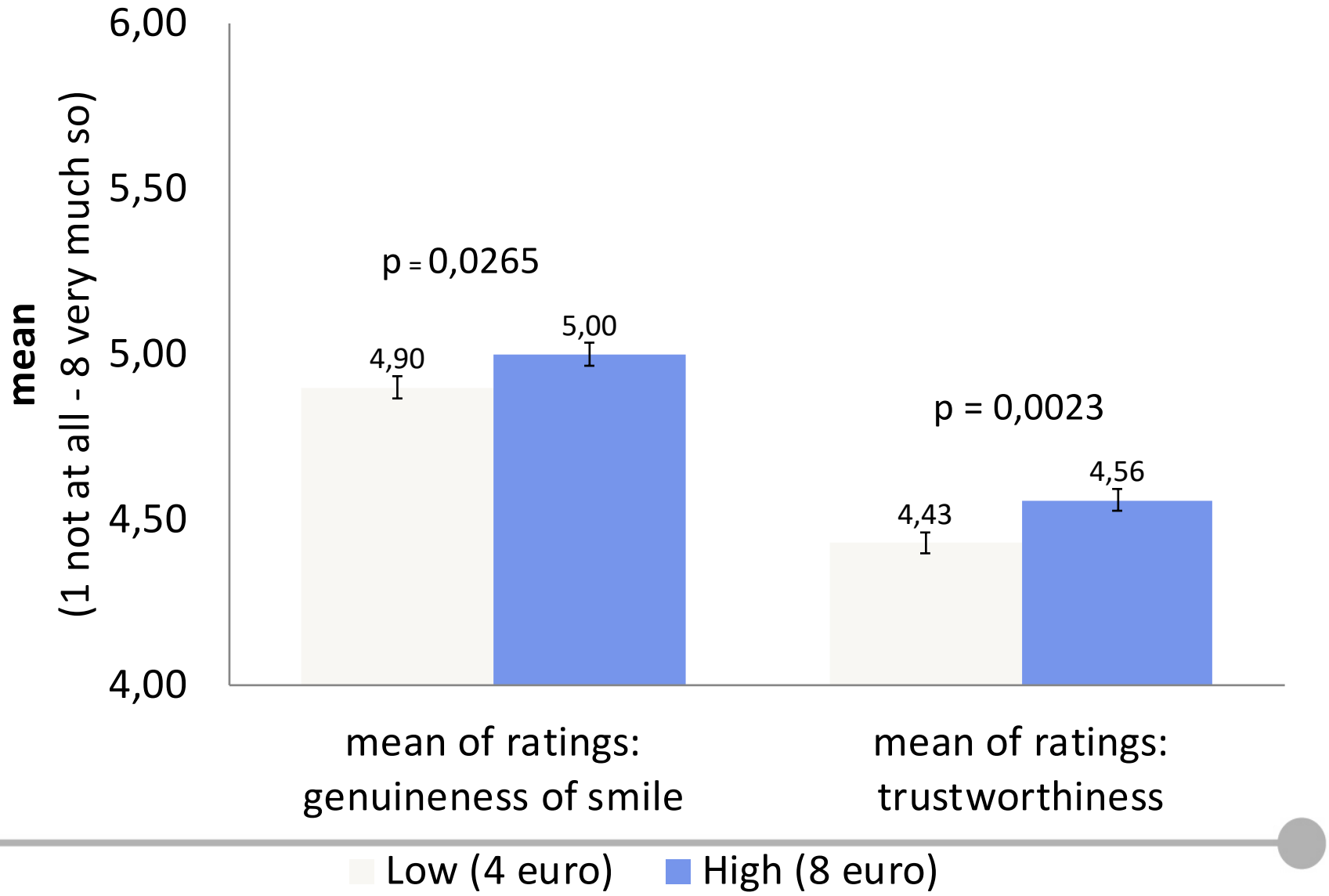
An experimental test

- We test the hypothesis that smiling convincingly is a *costly* signal of cooperation opportunities
- 1) It is costly; people smile more convincingly when the stakes are higher
- 2) It pays them to invest that cost, because it is effective at inducing others to cooperate with them
- 3) It is an honest signal (rather than, say, a piece of psychological manipulation) because those who smile more convincingly are more rewarding cooperation partners
- We do this by giving subjects the chance to make video clips as part of their participation in a trust game

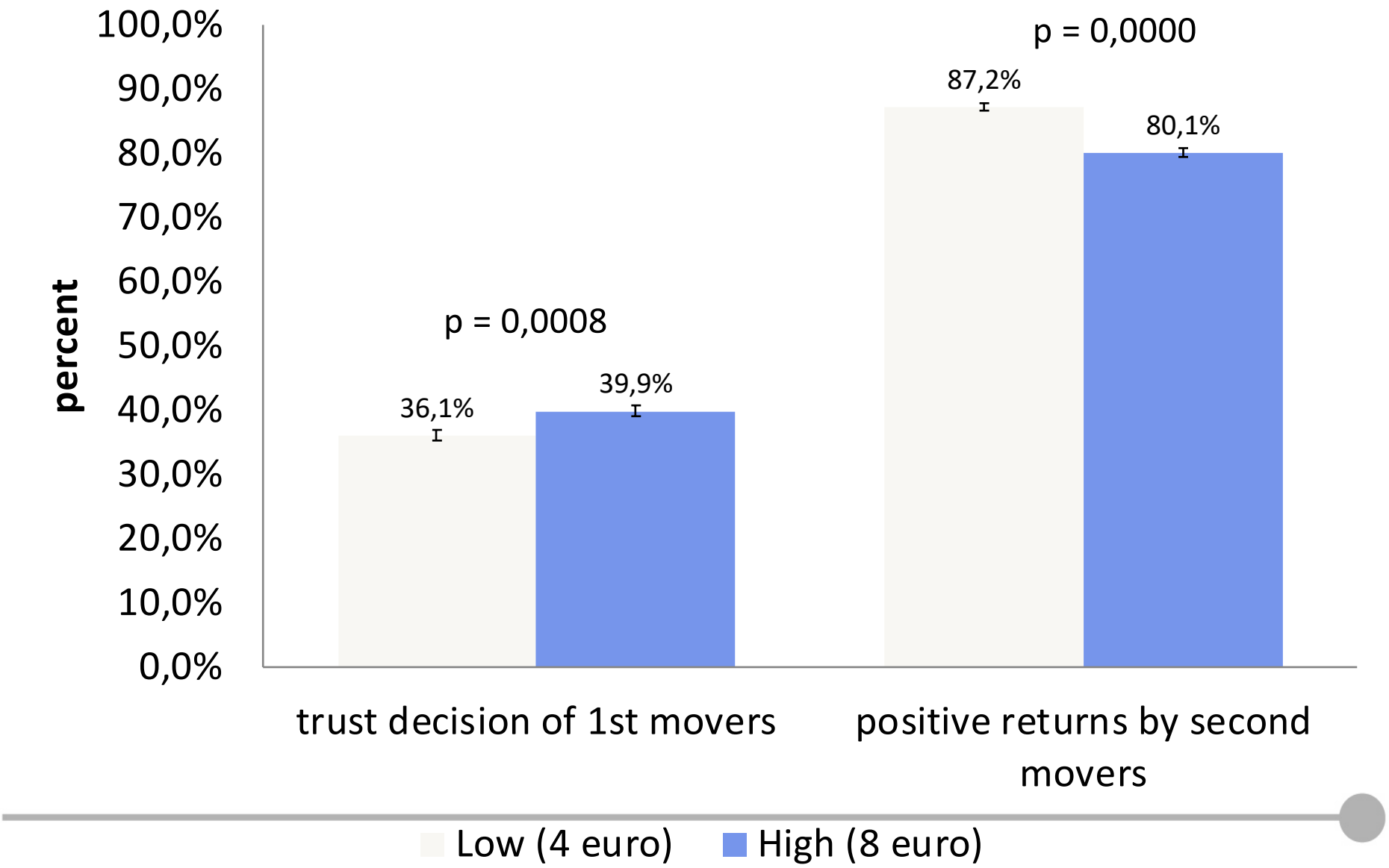
The experiment

- A trust game
- A video clip viewed before taking the trust decision
- A rating of the video clips by a sample of trusters
- What we find:
  - Subjects playing for higher stakes produce more convincing smiles
  - Subjects viewing more convincing smiles are more likely to trust the smilers
  - Those who successfully produce more convincing smiles are on average more profitable cooperation partners.

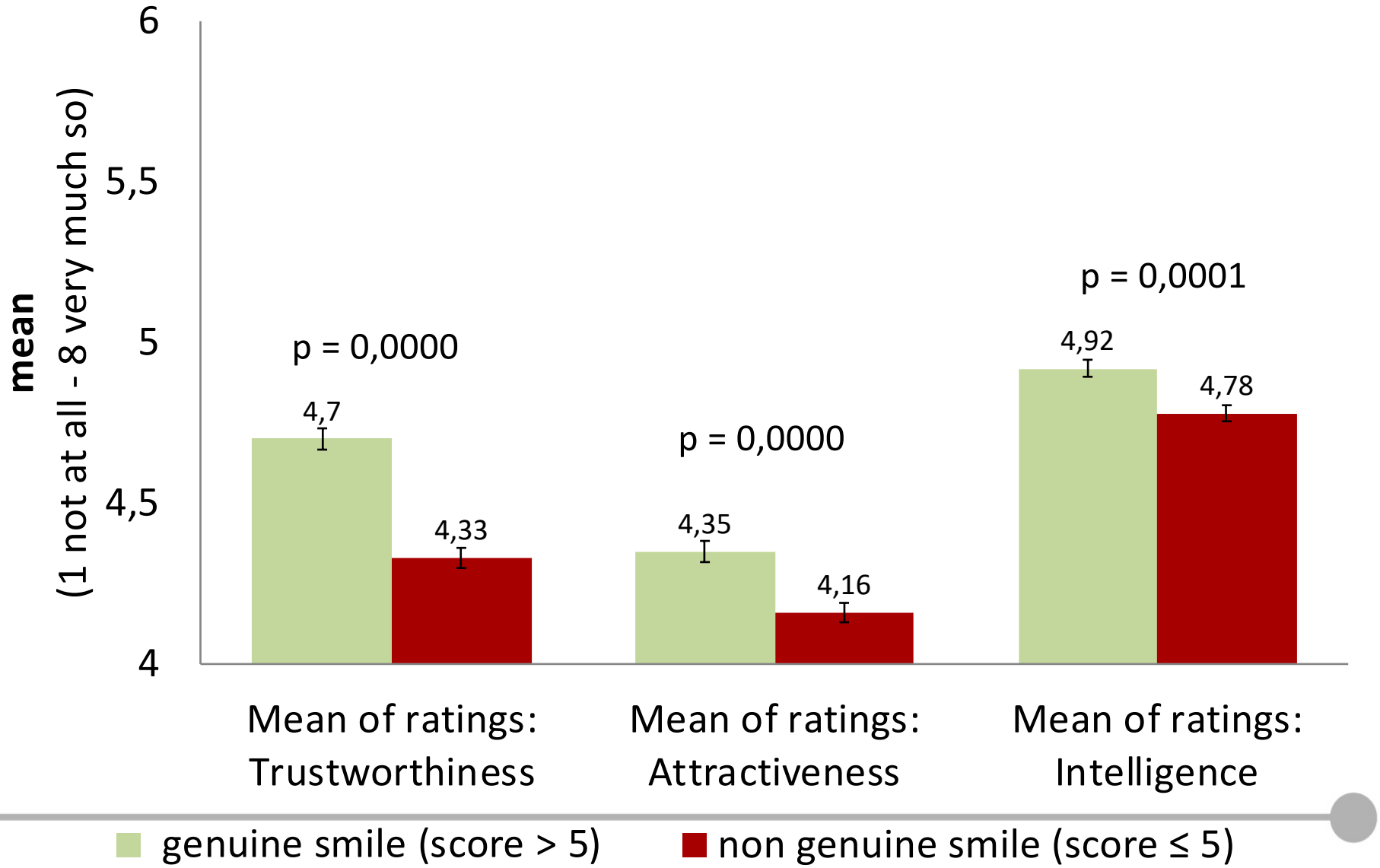
Differences by trustee treatment in smile quality and trustworthiness



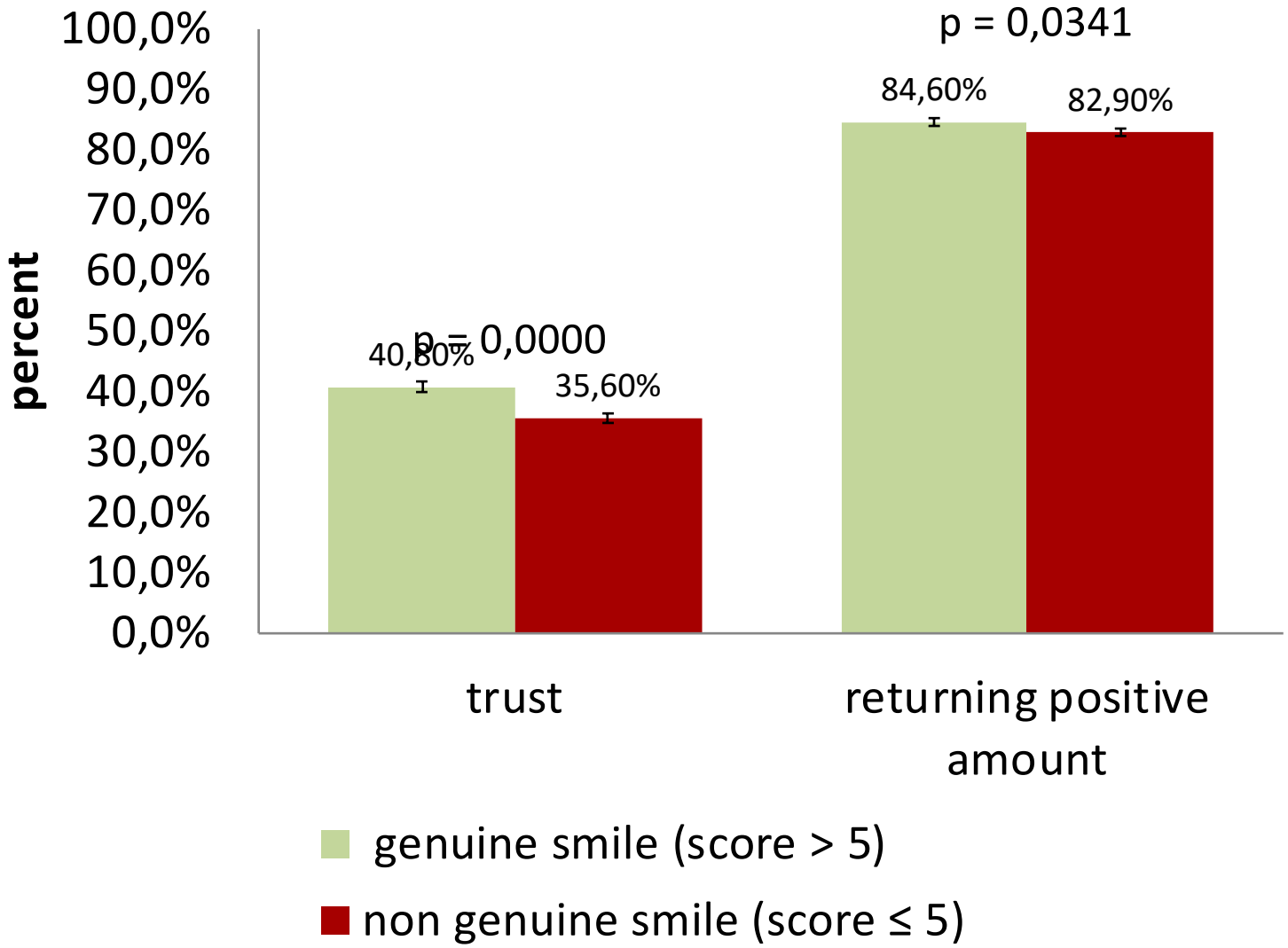
Differences by trustee treatment in trust and trustworthiness



Differences by smile quality in ratings of trustees



Differences by smile quality in trust and trustworthiness



Hypothesis testing

- We need to control for sender treatment when testing trustee treatment and vice versa (some correlation between treatments because of experimental design)
- We need to control for other dimensions (age, gender etc)
- To avoid risk of endogeneity through confirmation bias, we use average clip ratings as variables of interest (thus needing to cluster standard errors by clip)

Tests of components of costly signaling hypothesis

	Equation A	Equation B	Equation C	Equation D
Dependent Variable:	Smile Quality (scale 1-8)	Trustworthiness (scale 1-8)	Decision to send money (send=1)	Gain from sending money (Euros)
Independent variable:				
High treatment	0.124* (0.017)	0.079* (0.026)	-0.011 (0.400)	
Smile quality		0.54** (0.000)	0.219** (0.000)	0.911** (0.005)

Controlling for income, gender, and a range of other variables, including……

	Smile quality	Trustworthiness	Send money	
Intelligence	0.213* (0.030)	0.310** (0.000)	0.154* (0.012)	
Age of trustee	0.0149* (0.017)	0.007 (0.139)	0.005 (0.142)	
Beard	-0.262** (0.003)	-0.006 (0.867)	-0.050 (0.404)	
Décolleté	0.229* (0.011)	-0.008 (0.821)	0.067 (0.188)	

Character or opportunity? Which does smile quality predict?

Dependent Variable:	**Trustee is in High treatment (dummy variable)**	**Unselfish behavior by trustee (dummy variable)**
Independent Variable:		
Mean smile quality rating	0.516 (0.038)*	0.403 (0.126)

Summary of findings

- Genuine smiles appear to be costly, because subjects are more willing to make them when the rewards are higher
- They induce cooperation and therefore reward the costs invested by the smiler
- The reason they induce cooperation is that they are honest signals – but signals more of the size of the pie the trustee expects to share with you than of the intrinsic character of the trustee

Summing up: the emotions and cooperation

- Homo sapiens is the animal above all others that has staked its existence on cooperation among unrelated individuals
- The emotions aren't incidental to this process – they're at the heart of it!
- They help us to commit to those we want to cooperate with
- And they do it more credibly than calculating rationality could ever do on its own

As so often, Adam Smith got there first:

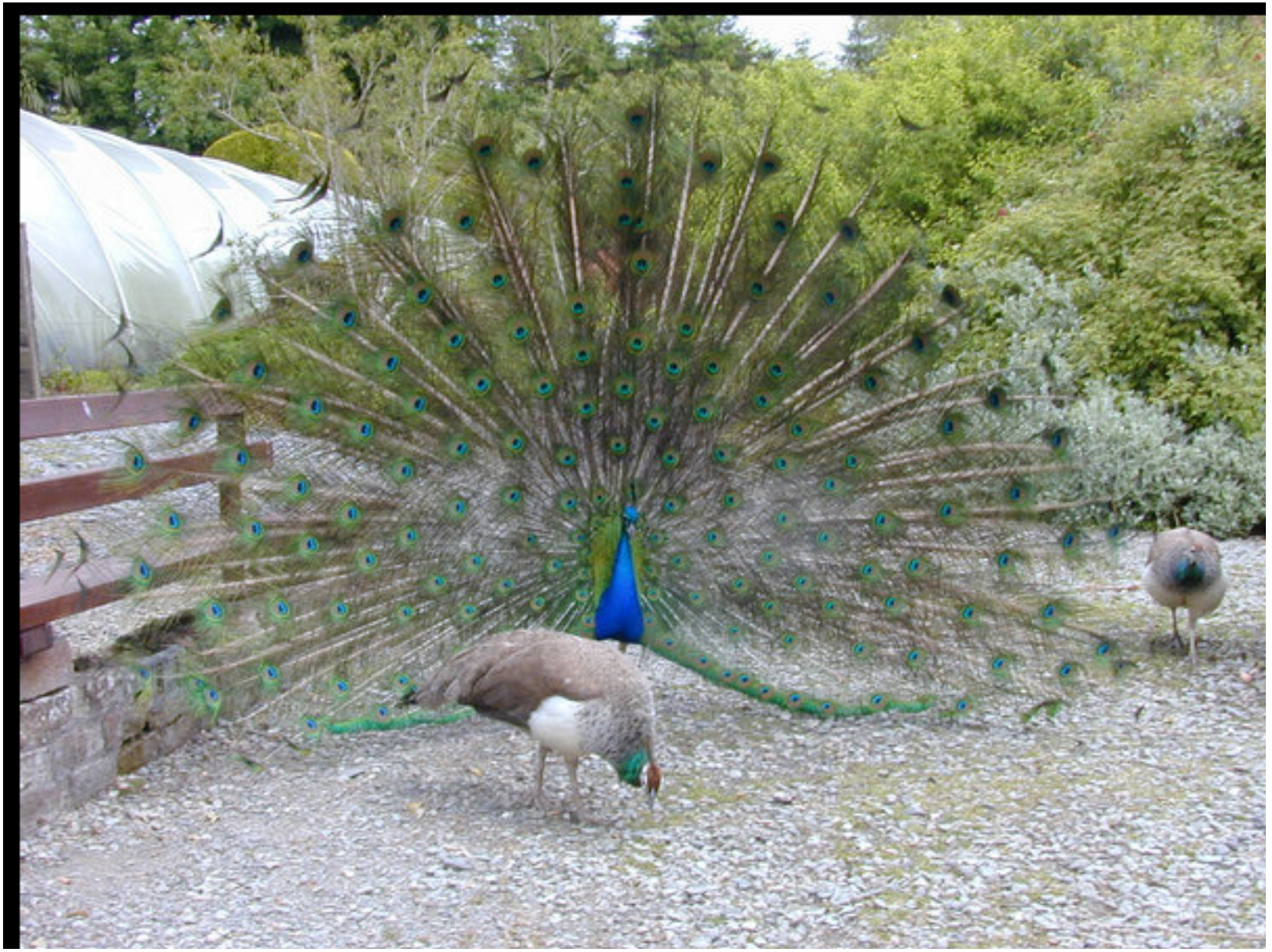
The man who indulges us in this natural passion, who invites us into his heart, who, as it were, sets open the gates of his breast to us, seems to exercise a species of hospitality more delightful than any other. No man, who is in ordinary good temper, can fail of pleasing, if he has the courage to utter his real sentiments as he feels them, and because he feels them.

Adam Smith – The Theory of Moral Sentiments

What other kinds of signaling aid cooperation?

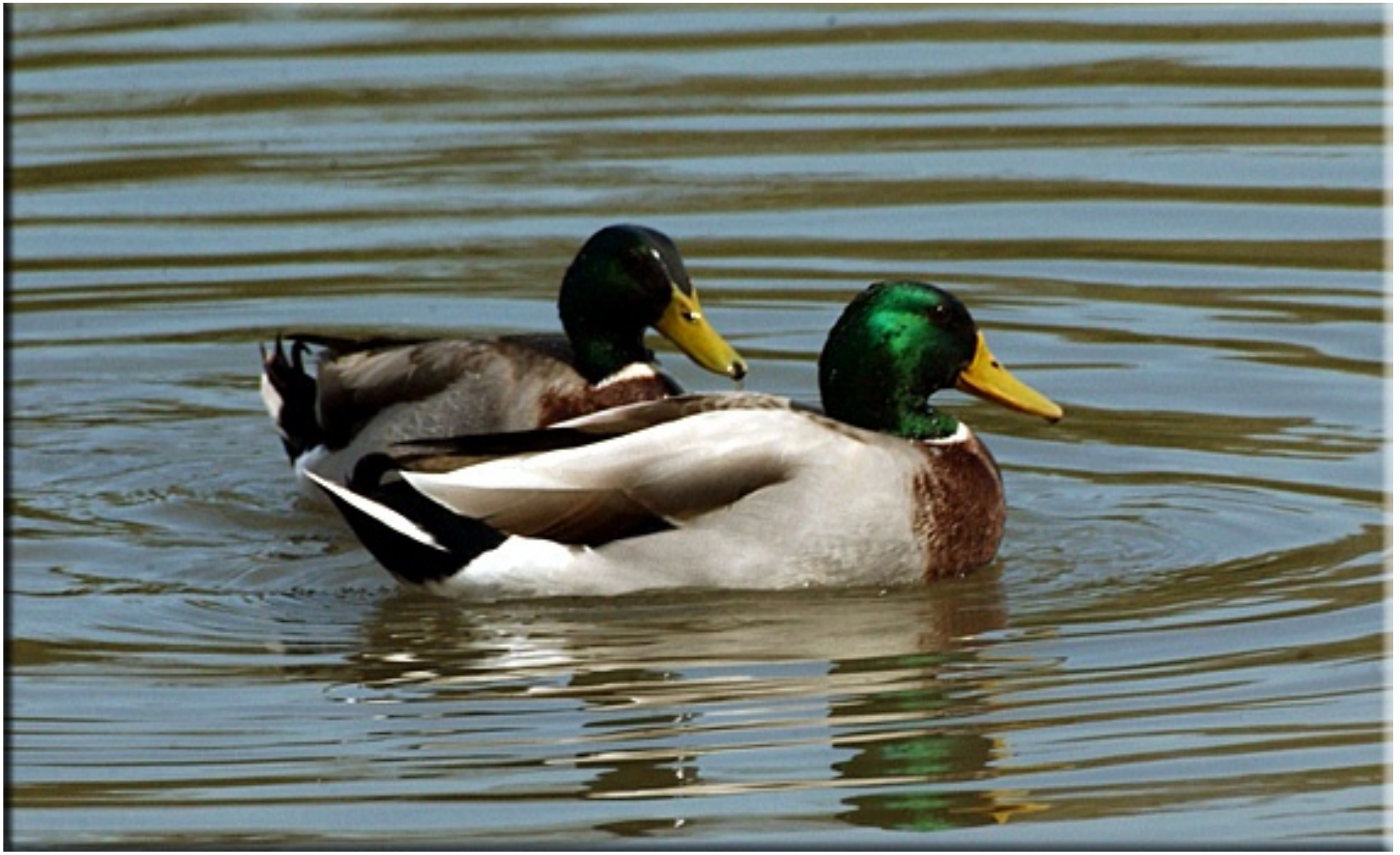
- Sexual selection:
  - Most often the signal is displayed by males towards females, since females are "the limiting sex" in terms of availability of gametes
  - Sometimes signaling is bidirectional
  - The challenge for natural selection is to explain the simultaneous evolution of the signal and the response to the signal
- Altruistic actions as signals of cooperative potential

- The classic example of signaling in sexual selection:



You should easily be able to identify the males among the following species. They’re the ones with the most colorful plumage…


Regent bowerbird
Sericulus chrysocephalus



Mallard
Anas platyrhyncos

Homo sapiens sapiens

Altruistic acts as signals of cooperative potential

- There can be many altruistic acts with positive consequences for cooperation:
  - Giving to charity
  - Heroism
  - Religious devotion
- In each case we have the paradox that the proximate cause of the act is not the aim to increase fitness, but the ultimate cause may be that it increases fitness

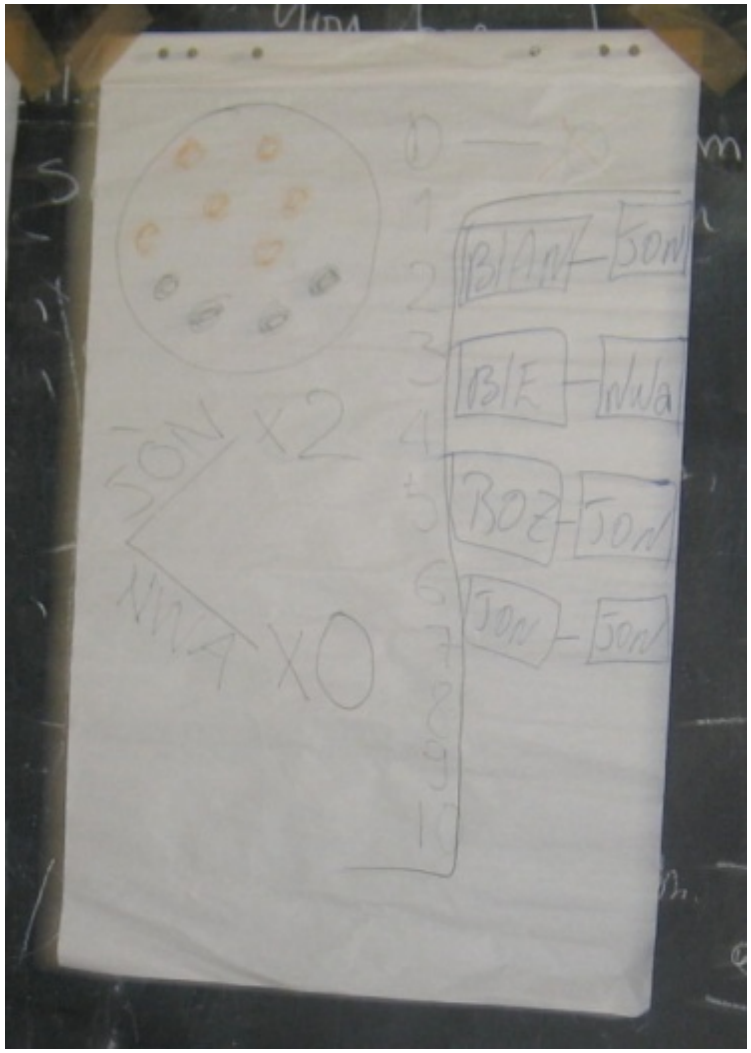
- An example of religious devotion (from Auriol, Delissaint, Fourati, Miquel-Florensa & Seabright “Trust in the Image of God: experimental evidence for a link between religiosity and reciprocity in Haiti”, 2018):


Phase 2
HAITI
International boundary
Departmental boundary
National capital
Departmental seat
Town, village
Main road
Secondary road
Airport
0 10 20 30 40 km
0 5 10 15 20 25 mi
CUBA
ATLANTIC OCEAN
CARIBBEAN SEA
DOMINICAN REPUBLIC
Golfe de la Gonâve
Canal de Saint-Marc
Canal de la Gonâve
Canal de la Tortue
ÎLE DE LA TORTUE
ÎLE DE LA GONÂVE
ÎLES CAYEMITES
ÎLE À VACHE
PRESQU'ÎLE DES BARADÈRES
Palmiste
Port-de-Paix
St. Louis de Nord
Anse-à-Foleur
Le Borgne
Jean-Rabel
Môle St.-Nicolas
Bassin-Bleu
Port-Margot
Cap-Haïtien
Limbé
Plaine du Nord
Acul du Nord
Milot
Caracol
Fort-Liberté
Trou-du-Nord
Ferrier
Ouanaminthe
Dajabón
Monte Criste
Bombardopolis
Baie de Henne
Anse-Rouge
Gros-Morne
Terre-Neuve
Plaisance
Pilate
Grande-Rivière du Nord
Sainte Suzanne
Perches
Marmelade
Dondon
Ennery
Gonaïves
Bahon
Vallières
Saint-Raphaël
Ranquitte
Mont-Organisé
Saint-Michel de l'Attalaye
Pignon
La Victoire
Cerca Carvajal
Grande-Saline
Dessalines
Petite-Rivière-de-l'Artibonite
Saint-Marc
Verrettes
Maïssade
Cerca-la-Source
Hinche
Thomassique
Thomonde
Belladère
Lascahobas
Baptiste
Savanette
Cornillon
Mirebalais
Saut-d'Eau
Arcahaie
Duvalierville
La Chapelle
Magasin
Pointe-à-Raquette
Abricots
Jérémie
Trou Bonbon
Roseaux
Dame-Marie
Moron
Chambellan
Source Chaude
Anse d'Hainault
Les Irois
Corail
Pestel
Baradères
Petit Trou de Nippes
Anse-à-Veau
Petite Rivières de Nippes
Miragoâne
Petit-Goâve
Grand-Goâve
Trouin
Léogâne
Gressier
Port-au-Prince
Carrefour
Pétion-Ville
Croix des Bouquets
Ganthier
Fond Parisien
Jimani
Kenscoff
Fonds-Verrettes
Thazeau
Tiburon
La Cahouane
Les Anglais
Camp-Perrin
Maniche
Cavaillon
L'Asile
St. Louis du Sud
Aquin
Vieux Bourg d'Aquin
La Vallée de Jacmel
Jacmel
Cayes-Jacmel
Marigot
Belle-Anse
Thiotte
Grand-Gosier
Banane
Anse-à-Pitres
Chardonnières
Port-à-Piment
Côteaux
Chantal
Les Cayes
Torbeck
Roch-à-Bateau
St.-Jean du Sud
Port-Salut
Côtes-de-fer
Cap Raymond
Pointe Jean-Rabel
Cap Saint-Nicolas
Cap-à-Foux
Pointe de la Grande-Pierre
Pointe Ouest
Pointe de Montrouis
Pointe Fantasque
Baie de la Tortue
Baie de Grand-Pierre
Baie de Jacmel
Étang Saumâtre
Lac de Péligre
GRANDE - ANSE
NIPPES
NORD - OUEST
NORD
NORD - EST
ARTIBONITE
CENTRE
OUEST
SUD
SUD - EST
5
6
6
6
3
3
2
4
The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

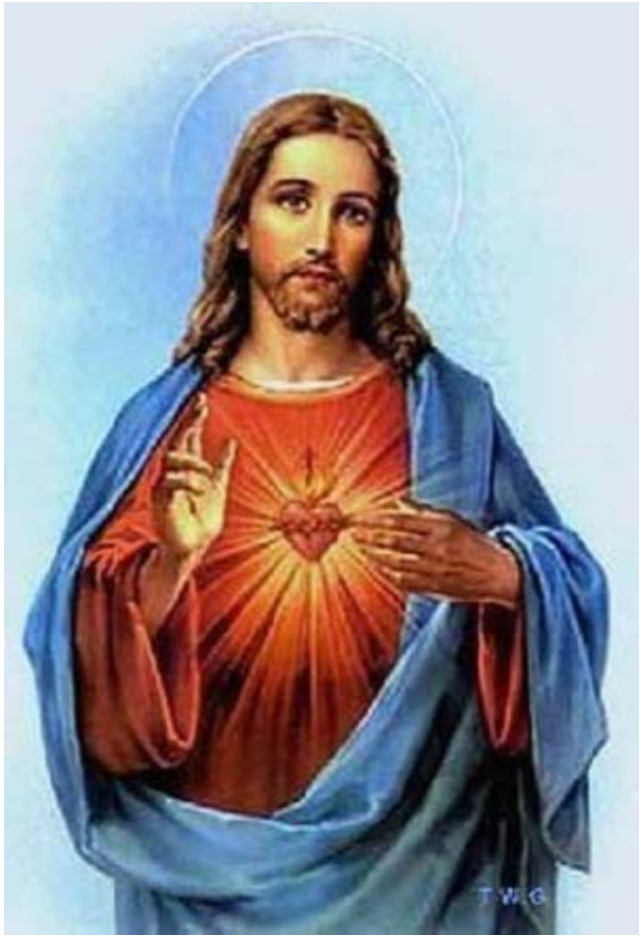
Description of the experiments:

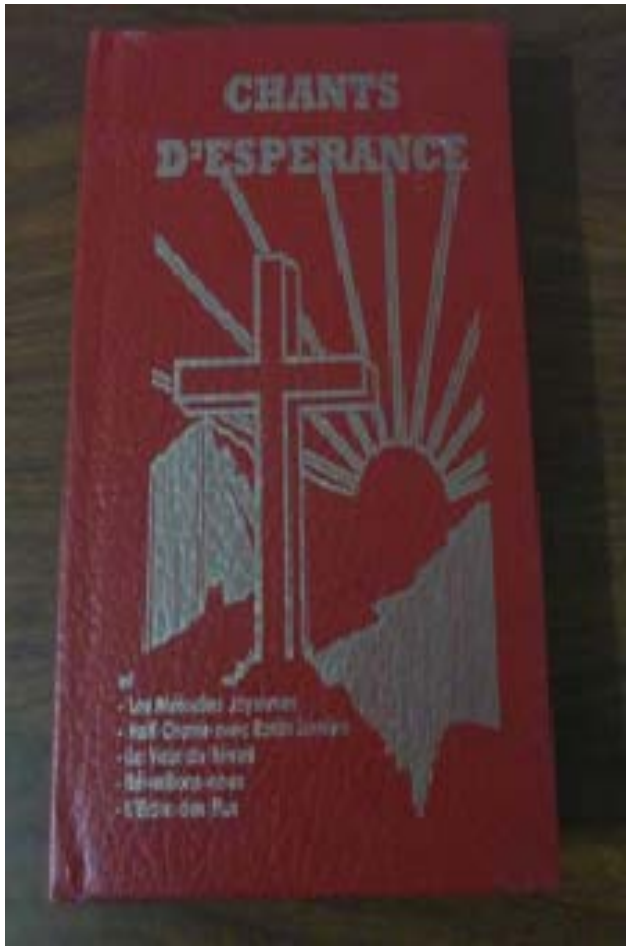
- Lottery:
  - Each subject has 10 tokens
  - Can gamble 1 to 10 tokens, with probability 60% the stake is doubled
  - A neutral baseline game, then three games with 7 or 8 tokens plus one image (price and image order randomized by session)
  - A last game where subjects can choose which to play again
- Trust game:
  - Each subject has 5 tokens and can send to a trustee a sum that is tripled
  - Trustees can keep sum or send a proportion back to the sender
  - Neutral game as sender then receiver, plus one game with choice of image as sender
  - Two games with images as receiver, 6 and 12 tokens, random image

The lottery



The images





Choose game that you want to play again

Trust game


3
8
2

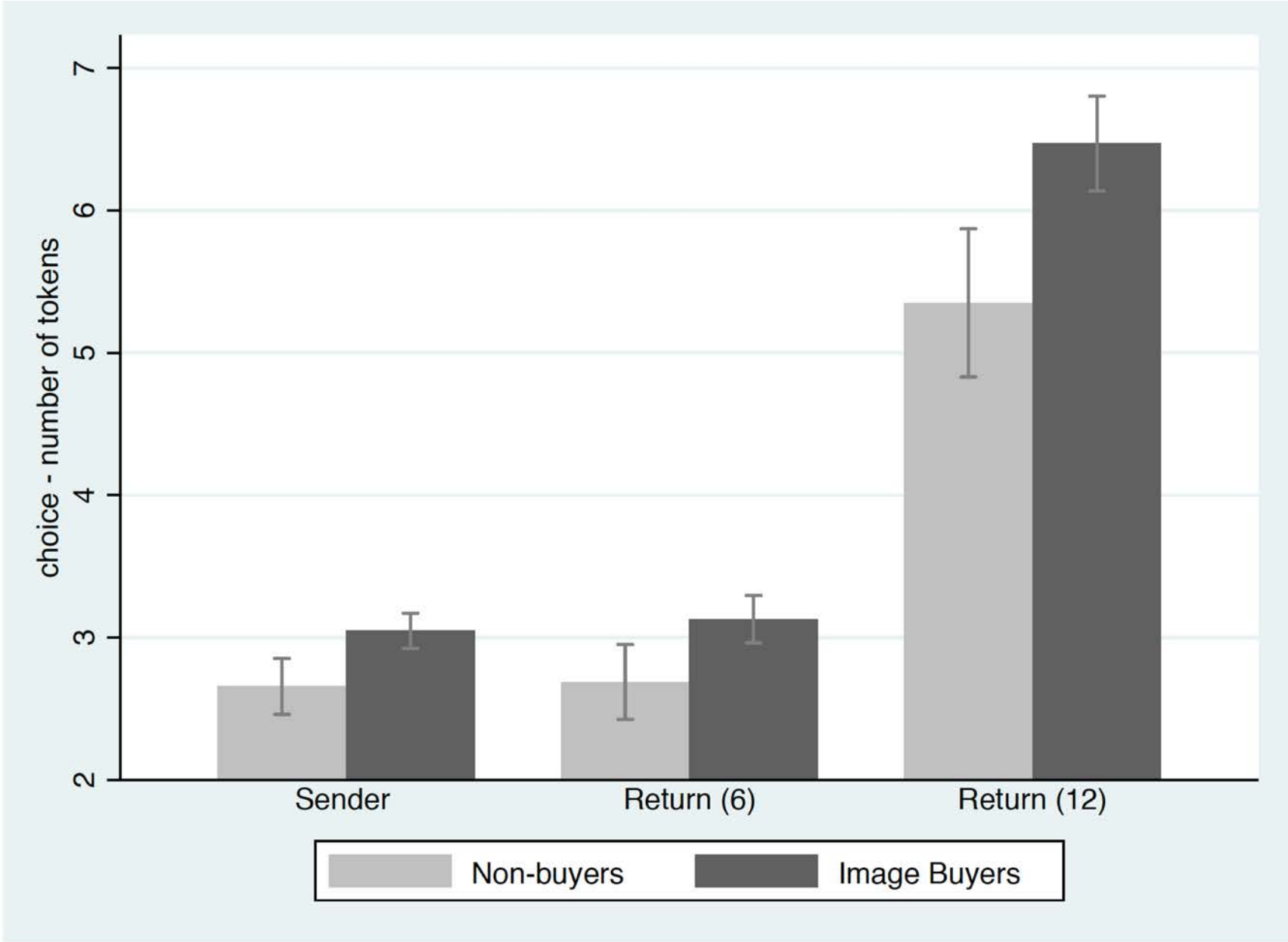


Figure 4: Choices in the Neutral game

Mean amounts sent and returned in the neutral trust game, in the sender and the receiver role, by those who would later buy an image when playing as senders in the image treatment, compared with those who would not buy an image (all comparisons significant at less than 1% - Wilcoxson rank-sum test). Error bars are 95% confidence intervals.

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