

# Gender Differences in Altruism:

## Evidence from a natural field experiment on matched donations

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### Abstract

This paper reports new findings on gender differences in altruism. Conducting a natural field experiment (N=2,164) we study donation behavior in a naturally occurring environment using a matched donation design. Contrary to previous research, we find that reducing the “price of altruism” by increasing matching efficiency has a significantly stronger effect on females than on males.

**JEL classification:** C93, D03, D64

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## 1. Introduction

Are females more altruistic than males? Differences in altruism will influence behavioral predictions for several allocation decisions, e.g., intra-household bargaining (Andreoni et al., 2003), intra-generational transfers, including inheritance distribution (Wilhelm et al. 2008) and charitable donations (Mesch et al., 2011). Differences in altruistic preferences also has practical consequences for behavioural interventions relying on social information provision or personalization (see e.g., Huck et al., 2015).

This paper approaches the question by applying an experimental design pioneered by Andreoni and Vesterlund (2001). These authors combine a dictator game with treatments that vary the relative price of altruism; when sending one token costs three, the relative price is three ( $3/1$ ) but when sending three tokens costs one, relative price is a third ( $1/3$ ). The authors find no gender difference in donation levels when price is equal to unity, but that females are more altruistic above unity, and males more altruistic below.

The effect of price on average levels of altruism has been studied using matched donation schemes when soliciting donations via mail (e.g., Eckel and Grossman, 2008; Huck and Rasul, 2011). Karlan et al. (2011), using relative price ratios of  $1/1$  and  $1/3$  (i.e., receiver is allocated \$1 vs. \$3 for each \$1 sent), find weak evidence of a positive relationship between donations and price. Karlan and List (2007), however, find that reducing relative price to  $1/2$  increases donations relative to  $1/1$ , but a further decrease to  $1/3$  does not.

A small set of studies investigate the relationship between gender differences in altruism and relative price. Boschini et al. (2012), using price levels of  $2/1$ ,  $1/1$  and  $1/2$ , find that a lower price increases donations for both genders, but more so for males. Similarly, males tip more generously when the bill is relatively small (price of altruism is low) and females more generously when the bill is relatively large (price of altruism is high) (Conlin et al., 2003). Both studies confirm the findings from Andreoni and Vesterlund (2001).

Using a natural field experiment ( $N=2,164$ ) we measure the behavioral impact of changes in the relative price of altruism in a naturally occurring donation task. Since subjects are not directly confronting a solicitor, this rules out demand effects potentially correlated with gender. Our matching levels also imply relative prices of altruism lower than what has previously been examined, allowing for a test of diminishing matching efficiency observed by Karlan and List (2007).

Our paper contributes to the literature by presenting two until now unobserved patterns of behavior. We find that reducing the price of altruism increases the proportion of male donors

only weakly, but the proportion of females donating increases steadily as price falls. Both results are contrary to previous findings and highlight the need for further empirical studies.

## 2. Experimental design

Swedish law stipulates that commercially sold cans, PET- and glass bottles must be a part of the national recycling system. A small deposit, stated on the container, is paid at the time of purchase.<sup>1</sup> The deposit is subsequently refunded upon return to a recycling machine found in most grocery stores. Machines in our experiment offer two options after deposit: (i) cash return, obtained from the cashier, or (ii) donation to charity. Having recycled, all customers face the decision of either donating or keeping the deposit by pressing one of two buttons (see Figure 1). Donations in our experiment benefit the organization “VI-SKOGEN” (“Our forest”), a Swedish development organization aiming to reduce poverty and improve the environment.

**Figure 1.** The decision environment: A binary dictator game with heterogeneous endowment



Note: “Pantknappen” on the left is the “Return deposit” button. The instruction translates as “press here to receive your deposit receipt.” “Biståndsknappen” on the right is the “Donate” button. The instruction translates as “press here and let your deposit become trees in Africa.”

The experiment consists of one baseline and three treatments. In each treatment, a sign was attached next to the choice buttons, stating that any donations made by the customer will

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<sup>1</sup> Over 90% of all sold Cans, Glass bottles and PET bottles in Sweden are recycled each year.

be matched by the store. Treatments differed by matching factor set to either 0 (baseline), 1, 3 or 5, resulting in relative prices of 1/1 (baseline), 1/2, 1/4 and 1/6. A nearby enumerator, standing out of view from the recycling customer, recorded customer donation decisions, approximate age, gender and the amount donated. Primarily, the enumerator inferred the donated amount using the count of bottles the customer entered the recycling machine. On occasion, the enumerator viewed the display of the recycling machine, where the amount is reported. This information was then used to implement the matching at the factor of the specific treatment that obtained when the customer made his/her donation. When the field experiment (described as a “campaign” to recycling customers) was finished, the resulting donation was published on a poster near the recycling machine.

The experiment was conducted Wednesday-Sunday for five consecutive weeks, starting at the beginning of October 2016, running from 12 AM and finishing at 8 PM each day. Each day started with a different treatment and rotated every 30 minutes, assuring randomization both within- and between days. Experimental materials are available as supplementary online information (SOI Appendix).

### 3. Results

In total, we observed 2,164 recycling customers with an average of 541 observations in each treatment, including the baseline. We observed no significant differences between treatments in terms of age or gender, indicating successful randomization. See Table 1 below.

**Table 1.** Summary of demographic variables by treatment

Variable	T1 (Baseline, 1/1) (n=540)	T2 (1/2) (n=539)	T3 (1/4) (n=544)	T4 (1/6) (n=541)	H <sub>0</sub> : No difference ( <i>p</i> -value <sup>a</sup> )
Male (%)	67	66	66	67	0.99
Age (fr.)					0.52
Below 21	21	27	36	31	
21-30	37	23	37	38	
31-40	73	73	74	80	
41-50	152	155	157	159	
51-60	138	126	122	125	
61-70	98	102	100	90	
Above 70	21	31	17	18	

Note: a = Pearson  $\chi^2$ -test

**Figure 2.** Proportion of recycling customers donating their deposit by treatment

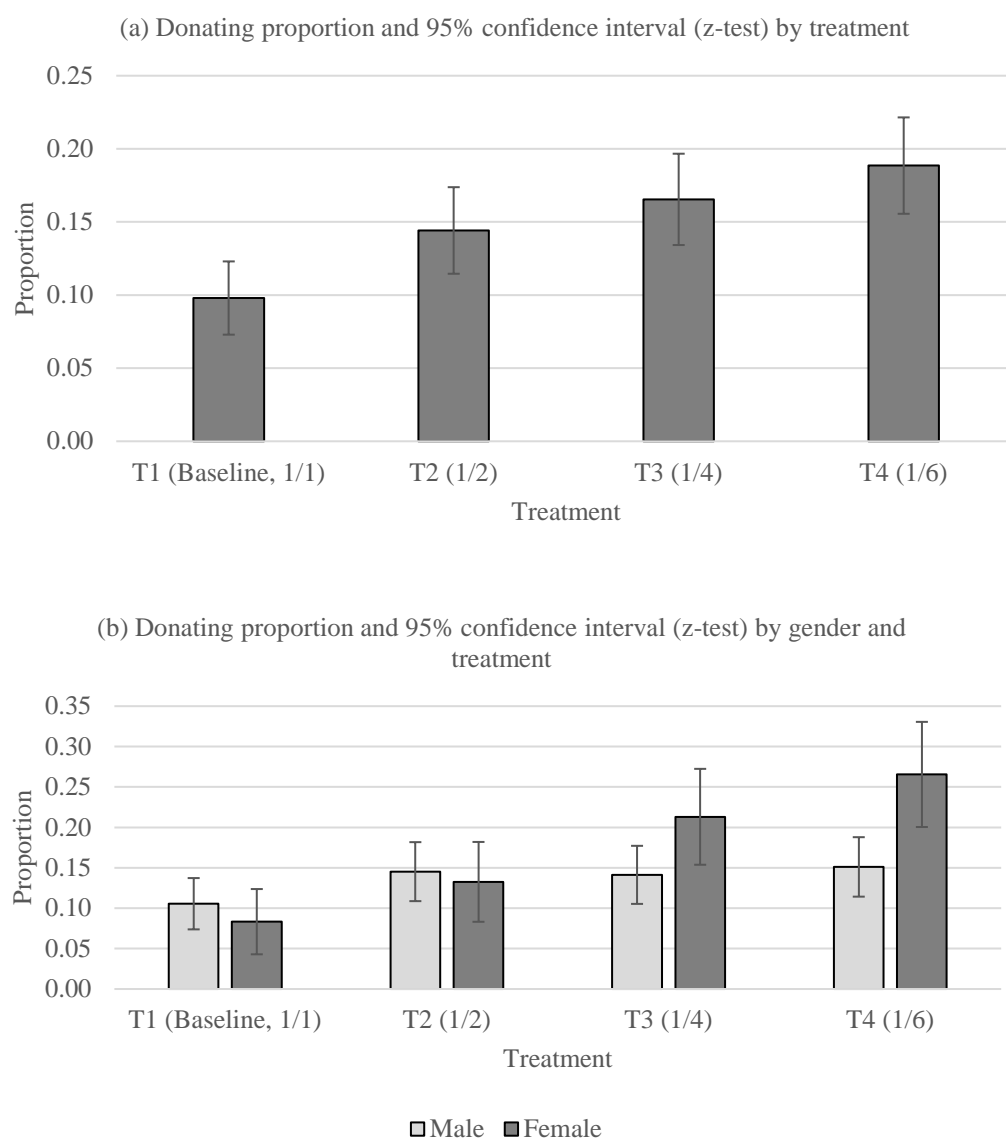


Figure 2 summarizes donation behavior by treatment. Both panels display the proportion of recycling customers that donate their deposit to the charity by treatment. Panel (a) reveals a positive relationship between donating proportion and relative price. All pairwise comparisons with the baseline treatment are significantly different from zero ( $\chi^2$ -tests,  $ps < 0.05$ ). This result is in line with Huck and Rasul (2011) who found an increasing response rate on donation behavior. We summarize these results below:

**Result 1.** *Reducing the price of altruism increases the proportion of people donating their deposit to charity.*

Panel (b) of Figure 2 shows that this effect is driven by the females in the sample. Separating the proportion of donating customers by gender reveals a strong effect of price among females (e.g., 1/1 vs. 1/6:  $\chi^2(1) = 20.6$ ,  $p < 0.001$ , Cohen's  $h = 0.50$ ) but not among males (e.g., 1/1 vs. 1/6:  $\chi^2(1) = 3.35$ ,  $p = 0.07$ , Cohen's  $h = 0.14$ ). In addition, there is no gender difference in the donation fraction in the baseline treatment (females vs. males:  $\chi^2(1) = 0.67$ ,  $p = 0.41$ ), but there is in the 1/4 and 1/6 treatments (females vs. males:  $\chi^2$ -tests,  $ps < 0.05$ ). Finally, Table 2 presents a probit regression analysis with a dummy variable equal to 1 if the subject donated the deposit and 0 otherwise.

**Table 2.** Probit regression result: Donation probability as a function of gender and treatment

Model	(1)	(2)
T2 (1/2)	0.061 (0.041)	0.061 (0.041)
T3 (1/4)	0.133*** (0.038)	0.132*** (0.039)
T4 (1/6)	0.172*** (0.038)	0.173*** (0.038)
Male (1 if male)	0.030 (0.037)	0.034 (0.037)
T2 (1/2) X Male	-0.017 (0.049)	-0.018 (0.049)
T3 (1/4) X Male	-0.093** (0.047)	-0.093** (0.047)
T4 (1/6) X Male	-0.122*** (0.047)	-0.128*** (0.047)
Age		-0.010* (0.005)
Time		Yes
N	2164	2161
Pseudo R-squared	0.019	0.025

Note: \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.01$ , average marginal effects (standard errors in parentheses). Time dummies (by clock hour) are included in Model 2.

In model 1, we see a consistent increase in the treatment coefficients, verifying that the probability for donating increases in the female group as price falls. There is no gender difference in the baseline treatment. Assessing the coefficients on the gender-treatment interactions, we find that the treatment is more effective in the female group, e.g., the donation probability increases on average with 12.2 percentage points more for females than males when

the matching efficiency changes from 1/1 (baseline) to 1/6. Results from model 2 controlling for time of day and age are qualitatively the same.<sup>2</sup> We summarize these results below:

**Result 2.** *Reducing the price of altruism increases the proportion of females donating their deposit to charity more than the proportion of males who donate their deposit to charity. There is no gender difference in the baseline treatment.*

#### **4. Conclusion**

Gender differences in altruism are still not well understood. We contribute with new knowledge by conducting a field experiment in a well-known natural setting. Previous studies using matched donations have used explicit requests, which may induce experimenter demand effects. If females are more sensitive to environmental cues, as has been suggested (Croson and Gneezy, 2009), such effects may correlate with treatments and studies that consist of a male majority may not observe any effect of price changes. This may in part explain the results from Karlan and List (2007) whose sample consisted of 70% males and found no effect of price reductions beyond 1/2. An additional explanation for contrasting results could be that our study includes a different type of recipients compared to previous studies on matched donations.

That females respond more to the price of altruism than do males runs contrary to previous studies finding the opposite pattern (Andreoni and Vesterlund, 2001; Boschini et al. 2012; Conlin et al., 2003). This suggests that the relationship between the price of altruism and donation behavior is more complicated than previously thought and may be contingent on heterogeneity in the population. This highlights the need for further empirical efforts to better understand gender differences in altruism.

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<sup>2</sup> Whether the customer is in company or not does not affect the donation decision. Results are available upon request.

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