Preference reversals with social distances

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Preference reversals between choice and valuation are typically studied with probabilities or with time delays. I extend them to social distances and document their existence in this new domain.

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1 Introduction

Preference reversals between choice and valuation are one of the most studied violations of rationality.[1] They show that people reveal different preferences whether they pick an option in a straight binary choice or report a monetary value independently for each option.

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[1] See Lichtenstein and Slovic (1971), Lindman (1971), Lichtenstein and Slovic (1973) and Plott and Grether (1979) for seminal papers, and Tversky et al. (1990) and Cubitt et al. (2004) for more recent contributions.

Preference reversals of this kind are often interpreted as failures of procedure invariance, which says that revealed preferences should not vary with the elicitation method. They have been documented mostly in risky choice and in intertemporal choice, but since this interpretation does not depend on a particular domain they should be observable in other domains.

I extend preference reversals to a new domain, the domain of social distances. Many important decisions involve social distances, such as the choice between different public policies impacting different communities, so it is important to know whether the preferences driving such decisions are stable to the elicitation method. I show that preference reversals carry over to social distances and that preference reversals with social distances exist. The experiment also illustrates how one can import and study social distances in the laboratory.

The options used in standard preference reversal experiments can be written as general two-attribute options in which one attribute is an amount of money and the other is a measure of distance. Interpreting the distance as a probability or as a time delay leads to the usual preference reversals encountered in the risk or in the time domain. The preference reversal phenomenon occurs if people choose the distance-rich option but report a higher monetary valuation for the money-rich one. Here I interpret the distance attribute as a social distance and so transpose classical preference reversal experiments to this new domain.

In the experiment, subjects face options that give either a small amount of money to a socially close recipient or a large amount of money to a socially distant one. I study two types of social distances. In the 'Faculty Setting' I study social distances between individuals by inviting subjects from a given faculty and asking them to consider allocations that benefit subjects from other faculties. In the 'Charity Setting' I study social distances between individuals and social groups by making the allocations benefit charities. I rely on a survey and on measures of social distance to find faculties and charities that create small and large social distances.

I find a clear pattern of preference reversals in the Faculty Setting, but less so in the Charity Setting. A closer look at social distances shows that the difference in social distance between the options was greater in the Charity Setting than in the Faculty Setting. The scale compatibility hypothesis (Tversky et al., 1990) provides a compelling explanation to these findings. According to scale compatibility people's response to an elicitation method depends on the scale used; people thus tend

to overweight amounts of money when forming monetary valuations. For the overweighting to create a preference reversal it needs to overturn the preference revealed in choice for the option with the smaller social distance. In the Faculty Setting, where the social distances of the two options are similar, scale compatibility can easily tip people into reversing their preference when reporting their valuation. On the other hand, in the Charity Setting, social distances are further apart; scale compatibility would need to be stronger to cause people to reverse their choice. As a result we observe more preference reversals in the Faculty Setting than in the Charity Setting.

Preference reversals with social distances have clear implications. They mean that recruiters who judge job candidates on their potential productivity and on how well they would fit in the company, inferred from the social distance between recruiters and candidates, would make different hiring decisions if they directly chose between the candidates or if they first assigned a value to each candidate and then selected the candidate with the highest value. To take another example, contingent valuation studies rely on monetary valuations to compare projects. If the projects involve social distances—if they impact different communities or countries—the preferences revealed under this method would not be the same as the preferences revealed under straight choice, which might lead one to implement the wrong project.

This paper contributes to the large preference reversal literature (see Seidl, 2002, for a review) by showing that preference reversals also carry over to choice across social distances. To my knowledge no other paper has studied preference reversals in this domain. In this sense it follows the tradition of testing to what extent preference reversals generalise to new domains; for example, preference reversals have been found under ambiguity (Ball et al., 2012; Maafi, 2011) or when comparing cash and non-cash incentives (Shaffer and Arkes, 2009). The scale compatibility hypothesis is currently the most compelling explanation of preference reversals, supported by decision times and eye-tracking (Alós-Ferrer et al., 2016, 2021).

In the next Section I translate preference reversals to social distances. Section 3 details the experimental design and Section 4 reports the results. Section 5 closes the paper with a discussion of the results.

2 Extending preference reversals to social distances

Denote the options by $\omega = (d, x)$ where d is a measure of distance and x an amount of money. Preference reversals experiments use options ω_d and ω_x where ω_d is better in d while ω_x is better in x. A standard preference reversal happens when people pick ω_d in choice and so reveal $\omega_d \succ \omega_x$; but report a higher monetary valuation $V(\cdot)$ for ω_x, $V(\omega_x) > V(\omega_d)$, and so reveal $\omega_x \succ \omega_d$.

When d is a probability p the options become binary gambles, for example used by Plott and Grether (1979): ω_p is a gamble that offers a large probability of winning a small amount of money while ω_x offers a smaller probability of wining a larger amount. When d is a time delay t the options are delayed payments, used by Tversky et al. (1990): ω_t is a small amount of money to be received soon while ω_x is a larger amount to be received later.

Transposing these to social distances, the options become (s, x) where s is the social distance measured between a subject and the recipient of an amount of money x. Then, ω_s gives a small amount of money to a recipient socially close to the subject, and ω_x, a larger amount of money to a recipient more socially distant. If preference reversal carry over to social distances we should observe subjects revealing $\omega_s \succ \omega_x$ in choice but reporting monetary valuations such that $V(\omega_x) > V(\omega_s)$. The experiment will test this prediction.

3 Experimental design

3.1 Social distances in the laboratory

In principle social distances can be of two types: social distance between individuals, and social distance between individuals and groups. The experiment studies both in two separate settings. In the 'Faculty Setting' I invited subjects from a given faculty of the University of Nottingham, and the allocations benefited students from other faculties. In the 'Charity Setting', the allocations benefited charities.

To construct ω_s and ω_x we need to know what are small and large social distances, therefore we need to measure them. For the distance between individuals I use the Inclusion of Other in the Self scale (Aron et al., 1992). This measure has proven popular in psychology (see for example Aron and Mashek, 2004; Aron et al.,

2004; Cialdini et al., 1997) and has recently entered the toolbox of economists (Gächter et al., 2015, 2017). Its counterpart to measure the social distance between individuals and groups is the Inclusion of Ingroup in the Self scale (Schubert and Otten, 2002; Tropp and Wright, 2001; Wright et al., 2004).

I conducted online surveys using these measures to find small and large social distances. For the Faculty Setting I invited students from all faculties at the University of Nottingham and administered the Inclusion of Other in the Self scale with targets being students from other faculties. Members of the Faculty of Arts reported the greatest difference between members of the Faculty of Social Sciences and the Faculty of Engineering. Therefore, I decided to invite members of the Faculty of Arts in the Faculty Setting, with members of the Faculty of Social Sciences serving as recipients in ω_s and members of the Faculty of Engineering serving as recipients in ω_x. For the Charity Setting I administered the Inclusion of Ingroup in the Self scale with one of several charities as the target. Participants reported that Cancer Research UK was their closest charity, and The Salvation Army, their most distant; these charities were thus selected as recipients in ω_s and ω_x.

To isolate the effect of social distances, the experiment controlled for selfish motives by having allocations that never benefited the subjects themselves. For example, in the Faculty Setting subjects from the Faculty of Arts chose between a member of the Faculty of Social Sciences receiving a small amount or a Member of the Faculty of Engineering receiving a large amount, but the subjects themselves received the same show-up fee regardless. The experiment also controlled for reputation concerns and second-order beliefs by making the recipients of the allocations unaware of the experiment. For them receiving money was a surprise and appeared to come from the experimenters. Finally I controlled for social image concerns by running the experiment double-blind. The assistants checking the register were the only ones to know the names of the subjects, they stayed outside the laboratory and they were blind to the treatment. Effectively, subjects knew we could never find who made which choice.

3.2 Tasks and procedures

In the two settings, the payment in ω_s was fixed at £5 and the payment in ω_x varied between £6 and £10, resulting in five pairs of allocations: $(£5, £6)$, $(£5, £7)$, $(£5, £8)$, $(£5, £9)$ and $(£5, £10)$. For each pair subjects made a pairwise Choice and reported their Monetary Valuation for each allocation, so in total subjects made 5 Choices and reported 6 Monetary Valuations. Figure 1 gives a sample of these and subsequent tasks.

In addition, subjects completed the Inclusion of Other in the Self (in the Faculty Setting) or the Inclusion of Ingroup in the Self (in the Charity Setting) scales. This way, we can check for each subject whether what we call small and large social distances matches their perception of the social distances. Subjects in the Charity Setting also indicated how familiar they were with Cancer Research UK and The Salvation Army. The order of the tasks was randomised independently for each subject.

The ordinal payoff scheme (Cubitt et al., 2004; Tversky et al., 1990) made Choice and Monetary Valuation strategically equivalent: At the end of the experiment a pair of allocations was randomly selected. Then, for this pair of allocations Choice or Monetary Valuation was randomly selected. If Choice was selected then the allocation that the subject chose was implemented; if Monetary Valuation was selected then the allocation that received the higher valuation was implemented. The instructions (see the Supplementary Materials) explained the ordinal payoff scheme in details and featured control questions.

I implemented the allocations as follows. If, in the Faculty Setting, the allocation to implement was, for example, £7 to a member of the Faculty of Engineering, a member of the Faculty of Engineering was invited to participate in the Charity Setting and was paid £7 at the end of this experiment. Participants in the Faculty Setting were provided the date, time and location of the experiments featuring the participants of the Charity Setting and they were actively encouraged to come monitor the payments. In the Charity Setting, Cancer Research UK and The Salvation Army were also paid as a result of the ordinal payoff scheme and the choices of the participants. Participants in the Charity Setting were told that we would send them the receipt of the donations, which we did.[2]

[2]Because of the double-blindness of the experiment it was not possible to send each subject the

Option A: We give £5 to *the member of the Faculty of Social Sciences*
Option B: We give £10 to *the member of the Faculty of Engineering*

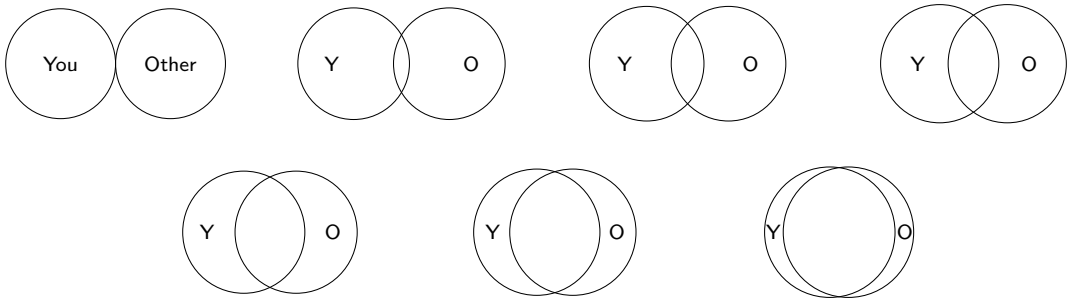
Choose **A** or **B**:

How much money *given to you* would be just as good as us giving £6 to *the Salvation Army*?

Please write the amount here:

We will refer to this amount as your equivalence valuation of giving £6 to the Salvation Army.

Please consider the member of the Faculty of Engineering. Select the pair of circles that best represents how you feel toward *the member of the Faculty of Engineering*:



Indicate your answer by drawing a line around the pair of circles you select.

Indicate how familiar you are with *The Salvation Army* by ticking one of the following options:

☐ I have never heard of it

☐ I have only heard the name

☐ I know the name but I have only a vague idea of what it does

☐ I know the name and I have a good idea of what it does

Figure 1: Examples of the tasks.

3.3 Implementation

The experiment was conducted in the CeDEx laboratory of the University of Nottingham. Subjects were recruited with ORSEE (Greiner, 2015). 108 subjects participated in the experiment (56 in the Faculty Setting and 52 in the Charity Setting) over 6 sessions between mid-December 2014 and mid-January 2015.[3] The average payment was £10.9 (SD = £3.5) and the average session lasted 1 hour 15 minutes.

4 Results

4.1 Preference reversals

Subjects are *Consistent for* ω_s if they choose ω_s and report a weakly higher Monetary Valuations for ω_s; and *Consistent for* ω_x if they choose ω_x and report a weakly higher Monetary Valuation for ω_x. Subjects commit a *Standard Reversal* if they choose ω_s but report a strictly higher Monetary Valuation for ω_x; and a *Counter Reversal* if they choose ω_x but report a strictly higher Monetary Valuation for ω_s.

Table 1 reports the frequencies of these patterns for each parameter set and at the aggregate level. For the time being focus on the column 'All' that looks at the raw data without any added requirement. One subject in the Faculty Setting left a task blank so we have 55 subjects in the Faculty Setting and 52 subjects in the Charity Setting. Note that some subjects are consistent for ω_s; if none were they would have simply maximised the amount of money of the allocation; instead subjects traded off social distance and money.

Following Cubitt et al. (2004) we say that there is a preference reversal phenomenon if the proportion of Standard Reversals is greater than the proportion of Counter Reversals; or, equivalently, if the net proportion of reversals (proportion of Standard Reversals minus proportion of Counter Reversals) is significantly greater than 0. Figure 2 displays this net proportion aggregating over all parameter sets.

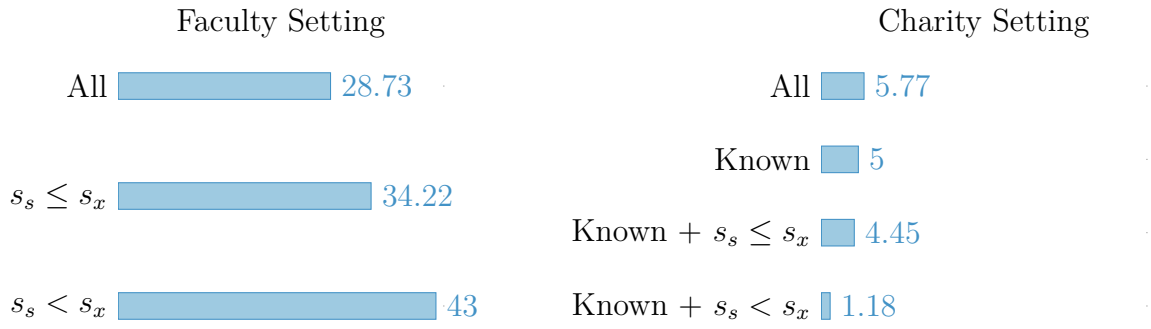
receipt corresponding to their donation. For each session I thus pooled the donations, made a single payment, and sent a single receipt to all the participants of the session.

[3] Since subjects in the Charity Setting are paid with the allocations selected by the ordinal payoff scheme in the Faculty Setting, there should be the same number of subjects in both Settings. Recruitment issues, however, lead to only 52 subjects participating in the Charity Setting. It was subsequently decided not to run an additional session for the missing subjects.

Table 1: Frequencies of the different patterns, for each parameter set and for each Setting.

		Faculty			Charity			
		All	$s_s \leq s_x$	$s_s < s_x$	All	Known	Known + $s_s \leq s_x$	Known + $s_s < s_x$
(£5,£6)	Consistent for ω_s	11	10	6	23	13	12	10
	Consistent for ω_x	22	17	4	22	20	13	6
	Standard reversal	18	16	9	5	3	2	1
	Counter reversal	4	2	1	2	0	0	0
(£5,£7)	Consistent for ω_s	9	9	4	16	8	8	7
	Consistent for ω_x	23	17	6	23	21	13	6
	Standard reversal	19	18	9	10	6	5	3
	Counter reversal	4	1	1	3	1	1	1
(£5,£8)	Consistent for ω_s	4	2	1	15	7	7	6
	Consistent for ω_x	26	19	7	29	26	17	9
	Standard reversal	20	19	10	4	1	1	0
	Counter reversal	5	5	2	4	2	2	2
(£5,£9)	Consistent for ω_s	3	3	2	13	5	5	4
	Consistent for ω_x	25	17	7	30	27	19	10
	Standard reversal	25	23	10	5	2	1	1
	Counter reversal	2	2	1	4	2	2	2
(£5,£10)	Consistent for ω_s	1	1	0	11	5	5	4
	Consistent for ω_x	34	27	10	29	27	18	10
	Standard reversal	16	14	10	8	3	3	2
	Counter reversal	4	3	0	4	1	1	1
Aggregate	Consistent for ω_s	28	25	13	78	38	37	31
	Consistent for ω_x	130	97	34	133	121	80	41
	Standard reversal	98	90	48	32	15	12	7
	Counter reversal	19	13	5	17	6	6	6

Notes. $s_s \leq s_x$: recipient of ω_s received a weakly higher Inclusion of Other in the Self (in the Faculty Setting) or Inclusion of Ingroup in the Self (in the Charity Setting) score than recipient of ω_x; $s_s < s_x$: strictly higher.
Known: subject indicated for both charities 'I know the name but I have only a vague idea of what it does' or 'I know the name and I have a good idea of what it does'.



Notes. $s_s \leq s_x$: recipient of ω_s received a weakly higher Inclusion of Other in the Self (in the Faculty Setting) or Inclusion of Ingroup in the Self (in the Charity Setting) score than recipient of ω_x; $s_s < s_x$: strictly higher. Known: subject indicated for both charities 'I know the name but I have only a vague idea of what it does' or 'I know the name and I have a good idea of what it does'.

Figure 2: Net proportion of preference reversals, at the aggregate and by Setting.

At a glance we see that the preference reversal phenomenon is prevalent in the Faculty Setting but that it is much smaller in the Charity Setting.

To test for the preference reversal phenomenon I rely on one-sided McNemar tests.[4] Table 2 reports the corresponding χ^2 values and significance levels. We see that in the Faculty Setting the preference reversal phenomenon is significant for all parameter sets. In the Charity Setting, it is significant only for one parameter set and at the aggregate level. This result confirms what we saw in Figure 2: preference reversals are more pronounced in the Faculty Setting.[5]

In the Charity Setting, however, some subjects might have been unfamiliar with Cancer Research UK or The Salvation Army. To control for this, 'Known'—in Table 1 and Figure 2—only looks at subjects who indicated for both charities 'I know the name but I have only a vague idea of what it does' or 'I know the name and I have a good idea of what it does'. This requirement decreases the number of subjects available for analysis in the Charity Setting to 36. In Figure 2 we see that

[4] Cubitt et al. (2004) observe the smallest preference reversal phenomenon in parameter set 5 (condition MV), with 21.92% of Standard Reversals and 1.75% of Counter Reversals. Using $\alpha = 0.05$ and $1 - \beta = 0.8$, the required sample size to detect such an effect with a one-sided McNemar test is $N = 34$ (Stata command `power pairedproportions`), well below the sample size in the current experiment.

[5] Instead of looking at the net proportion of reversals, the literature sometimes looks at conditional reversal rates—for example, the rate at which a subject commits a standard preference reversal conditional on choosing ω_s. Appendix B in the Supplementary Materials reports the analysis using these conditional rates and finds similar results.

Table 2: Tests of the preference reversal phenomenon.

	Faculty			Charity			
	All	$s_s \leq s_x$	$s_s < s_x$	All	Known	Known $+ s_s \leq s_x$	Known $+ s_s < s_x$
(£5,£6)	8.91*	10.89*	6.40*	1.29	3.00*	2.00	1.00
(£5,£7)	9.78*	15.21*	6.40*	3.77*	3.57*	2.67	1.00
(£5,£8)	9.00*	8.70*	5.33*	0.00	0.33	0.33	2.00
(£5,£9)	19.59*	17.64*	7.36*	0.11	0.00	0.33	0.33
(£5,£10)	7.20*	7.12*	10*	1.33	1.00	1.00	0.33
Aggregate	53.34*	57.56*	34.89*	4.59*	3.86*	2.00	0.08

Notes. One-sided McNemar tests. A symbol indicates significance at $\alpha = 0.05$.
$s_s \leq s_x$: recipient of ω_s received a weakly higher Inclusion of Other in the Self (in the Faculty Setting) or Inclusion of Ingroup in the Self (in the Charity Setting) score than recipient of ω_x; $s_s < s_x$: strictly higher.
Known: subject indicated for both charities 'I know the name but I have only a vague idea of what it does' or 'I know the name and I have a good idea of what it does'.

preference reversals decrease but Table 1 shows that they stay significant at the aggregate level.

We can also control for the perception of social distances using the Inclusion of Other in the Self (in the Faculty Setting) and the Inclusion of Ingroup in the Self (in the Charity Setting) scores reported by the subjects during the experiment. The allocations are correctly constructed when the recipient of ω_s is socially closer than the recipient of ω_x, $s_s \leq s_x$, otherwise subjects face no trade-off between amounts of money and social distance.

The scores range from 1 to 7, with a larger score corresponding to a smaller social distance. Imposing the requirement that $s_s \leq s_x$—that the recipient of ω_s received a weakly higher score than the recipient of ω_x— decreases the number of subjects to 45 in the Faculty Setting and to 27 in the Charity Setting. With a strict inequality, $s_s < s_x$, the number of subjects drops to 20 and 17. Figure 2 shows that these requirements increase the net proportion of preference reversals in the Faculty Setting but decrease it in the Charity Setting. Despite the small sample size, Table 2 shows that preference reversals remain significant in the Faculty Setting. In the Charity Setting, however, the significance vanishes.

Therefore, while on the surface we observe preference reversals in both Settings, preference reversals in the Faculty Setting are more robust than those in the Charity Setting.

Notes. The scores obtained with the Inclusion of Other in the Self scale and the Inclusion of Ingroup in the Self scale range between 1 and 7, 7 corresponding to the smallest social distance. Error bars represent one standard deviation.

Figure 3: Average of the reported Inclusion of Other in the Self (Faculty Setting) and Inclusion of Ingroup in the Self (Charity Setting) scores.

4.2 Social distances

Next we can compare the social distances observed in the two Settings. Figure 3 reports the averages of the Inclusion of Other in the Self (Faculty Setting) and the Inclusion of Ingroup in the Self (Charity Setting) scores. As predicted, subjects in the Faculty Setting perceived similarly a member of the Faculty of Social Sciences and a member of the Faculty of Engineering: the difference is not significant (two-sided Wilcoxon signed rank test, exact $p = 0.1428$) and 25 out of 55 subjects (45%) reported the same score for both.

On the other hand subjects in the Charity Setting thought Cancer Research UK and The Salvation Army were different: the difference is significant (two-sided Wilcoxon signed rank test, exact $p < 0.001$) and only 11 out of 52 subjects (21%) reported the same scores.

5 Discussion

That preferences reversals carry over to social distances is perhaps not surprising. The scale compatibility hypothesis (Cubitt et al., 2004; Tversky et al., 1990), the leading explanation to preference reversals, is domain-agnostic: it would thus apply equally to options featuring probabilities, delays, or social distances.

There remains the question of why we observe more preference reversals in the Faculty Setting. Only students from the Faculty of Arts participated to the Faculty

Setting while students from the Faculty of Social Sciences and from the Faculty of Engineering participated to the Charity Setting; if students from the Faculty of Arts are more prone to preference reversals, preference reversals would naturally be more common in the Faculty Setting. At the University of Nottingham these faculties are very broad: the Faculty of Arts encompasses both the School of Cultures, Languages and Area Studies and the School of Humanities; the Faculty of Social Sciences includes the School of Education and the School of Law alongside the usual School of Economics and School of Sociology and Social Policy; and there are architecture students in the Faculty of Engineering, right next to civil or mechanical engineering students. Unless we make broad generalisations in terms of numeracy or cognitive abilities, there is no particular reason to expect students from one faculty to be more prone to preference reversals. Moreover, by now preference reversals experiments have relied on a variety of subject pools and the existence of a preference reversal phenomenon is a consistent finding.

Another potential explanation is that the options in the Faculty Setting were misconstructed. As explained earlier preference reversal experiments use options ω_d and ω_x where ω_d is better in d while ω_x is better in x. But we have seen that subjects perceived similarly the two Faculties, thus seemingly violating one of the ingredients of preference reversal experiments.

In the online survey conducted to find close and distant faculties, members of the Faculty of Arts reported an average Inclusion of Other in the Self score of 2.71 toward members of the Faculty of Engineering, and an average Inclusion of Other in the Self score of 4.42 toward members of the Faculty of Social Sciences. The difference there was clearly significant (two-sided Wilcoxon signed rank test, exact $p < 0.001$) and one of the largest reported across all faculties. These Inclusion of Other in the Self scores are in stark contrast to those reported in the experiment (Figure 3). Since subjects came from the same pool and were randomly invited to the online survey and to the laboratory experiment, sampling alone is unlikely to explain the difference. Instead, remember that in the online survey subjects had to report an Inclusion of Other in the Self score toward members of all other existing faculties, while in the experiment subjects had to do it only toward members of the Faculty of Social Sciences and toward members of the Faculty of Engineering. It is plausible that reporting Inclusion of Other in the Self scores for more than two faculties allowed subjects to better contextualise their answers and use the full

Table 3: Estimates from a conditional logit model.

	Faculty		Charity	
	Choice	Valuation	Choice	Valuation
Money	0.104	0.619***	0.292***	0.444***
	(0.059)	(0.122)	(0.081)	(0.120)
Social distance	0.264*	0.002	0.567**	0.652*
	(0.121)	(0.128)	(0.197)	(0.270)
Observations	550	510	520	444
Log-likelihood	−181.766	−101.934	−152.048	−114.049

Notes. Coefficients, standard errors (clustered at the subject's level) in parentheses.
Money in £; social distance measured with the Inclusion of Other in the Self (Faculty Setting) or the Inclusion of Ingroup in the Self (Charity Setting).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

range of the scale.

Further, even if social distances were similar in the Faculty Setting, subjects still cared about them. Table 3 reports the estimates from a conditional logit model looking at the determinants of straight choice in the Choice task, or of choice as implied by the monetary valuations reported in the Monetary Valuation task. We see that, in the Faculty Setting, the coefficient placed on social distance is positive and significant in Choice: subjects tended to choose more often options with a smaller social distance. In fact, since the coefficient placed on money is not significant, social distance was the sole determinant of choice.

Table 3 also explains why we observe more preference reversals in the Faculty Setting. In Monetary Valuation of the Faculty Setting, only the coefficient placed on money is significant: subjects, when forming their valuations, relied only on the monetary component of the option. The pattern of subjects considering only social distance in Choice and only money in Monetary Valuation is in line with scale compatibility and would automatically generate preference reversals.

On the other hand, in the Charity Setting, the two coefficients are always significant: subjects always took into account the amount of money and the social distance. Scale compatibility still manifests itself: the ratio of the coefficient placed on money over the one placed on social distance is higher in Valuation than in Choice, $0.444/0.652 > 0.292/0.567$. But it is not strong enough to make subjects abandon social distances when forming their monetary valuation.

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