Preference reversals
with social distances

Geoffrey Castillo[*]

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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.

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.

Preference reversals of this kind are often interpreted as failures of procedure invariance, which says that revealed preferences should not vary with the elicitation

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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.

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 attribute 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 literature 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 transposes 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 having allocations that 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 the social distances show that social distances were more spread out in the former than in the latter. These two observations point toward an explanation combining the scale compatibility hypothesis (Tversky et al., 1990) and the recent similarity and focusing literature (e.g. Kőszegi and Szeidl, 2013). According to scale compatibility the preference reversal phenomenon is caused by people overweighting amounts of money when forming a monetary valuation. Focusing, on the other hand, tells us that people overweight social

distances when they are more spread out. In the Charity Setting the two cancel out, leading to less preference reversals.

Preference reversals with social distances have clear implications. They mean that, for example, 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 of projects involving social distances, for instance if they impact different communities or countries, would not reveal true preferences, 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, after choice under risk and choice over time, preference reversals also carry over to choice across social distances. To my knowledge no other paper has studied preference reversals in this domain. This conclusion further validates *construal level theory* (Liberman et al., 2007; Trope and Liberman, 2010) that has shown that risk, time, and social distances are manifestations of a unique psychological distance.[2] It has also shown that people use the same mental processes whether they deal with risk, with time, or with social distances,[3] thus creating preference reversals across domains.

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

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[2]Some studies have shown that one distance affects the perception of others (Bartels and Rips, 2010; Pronin et al., 2008; Pronin and Ross, 2006; Stephan et al., 2011; Wakslak, 2012; Yi et al., 2011). Others have directly studied the interplay between the distances and the mechanisms behind their perception (Bar-Anan et al., 2007; Fiedler et al., 2012; Maglio et al., 2013).

[3]In time see temporal construal theory (Liberman and Trope, 1998; Trope and Liberman, 2000, 2003). In risk see Todorov et al. (2007); Wakslak and Trope (2009); Wakslak et al. (2006). More generally see Liberman and Trope (2008, 2014) for reviews.

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 simple 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 first one, the 'Faculty Setting', I invited subjects from a given faculty at the University of Nottingham, and the allocations benefited students from other faculties. In the second setting, the 'Charity Setting', the allocations benefited charities.

To construct ω_s and ω_x we need to be able to tell 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 the social distances, the experiment controlled for selfish motives by having allocations that never benefited the subjects themselves. For example, in the Faculty Setting subjects chose between a member of the Faculty of Arts 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 that 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 Appendix A) 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 receipts of the donations, which we did.

4 Results

The experiment was conducted in the CeDEx laboratory at 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

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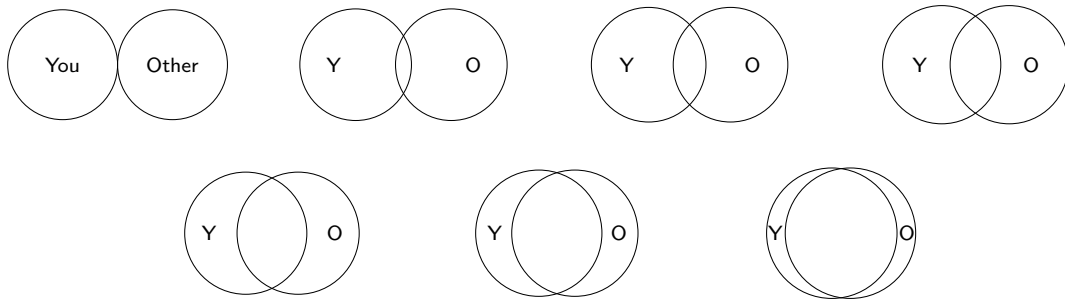
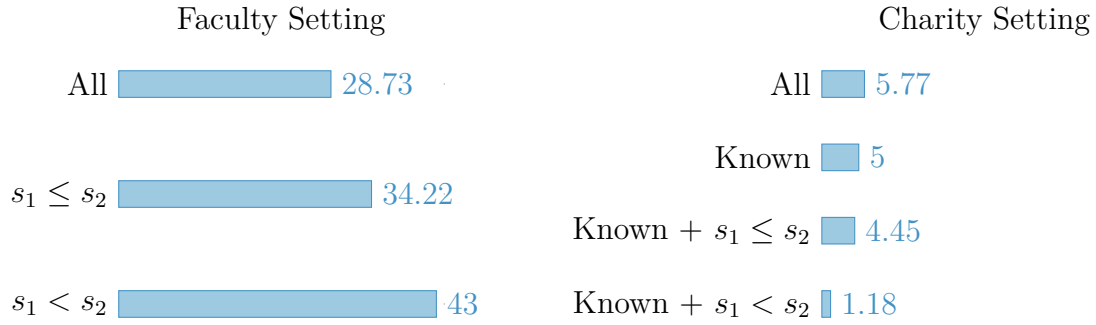Indicate your answer by drawing a line around the pair of circles you select.

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.

Faculty Setting

All 28.73
$s_1 \leq s_2$ 34.22
$s_1 < s_2$ 43

Charity Setting

All 5.77
Known 5
Known + $s_1 \leq s_2$ 4.45
Known + $s_1 < s_2$ 1.18

Notes. $s_1 \leq s_2$: 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; $s_1 < s_2$: 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.

setting) over 6 sessions between mid-December 2014 and mid-January 2015.[4] The average payment was £10.9 (SD = £3.5) and the average session lasted 1 hour 15 minutes.

4.1 Preference reversals

A subject is *Consistent for* ω_s if she chooses ω_s and reports a weakly higher Monetary Valuation for ω_s; and *Consistent for* ω_x if she chooses ω_x and reports a weakly higher Monetary Valuation for ω_x. A subjects commits a *Standard Reversal* if she chooses ω_s but reports a strictly higher Monetary Valuation for ω_x; and a *Counter Reversal* if she chooses ω_x but reports 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, so we have 56 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

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[4] Albeit small, these sample sizes are large enough to detect the smallest effect sizes reported in the literature; see footnote 5.

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

		Faculty			Charity			
		All	$s_1 \leq s_2$	$s_1 < s_2$	All	Known	Known $+ s_1 \leq s_2$	Known $+ s_1 < s_2$
(£5,£6)	Consistent for ω_1	11	10	6	23	13	12	10
	Consistent for ω_2	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_1	9	9	4	16	8	8	7
	Consistent for ω_2	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_1	4	2	1	15	7	7	6
	Consistent for ω_2	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_1	3	3	2	13	5	5	4
	Consistent for ω_2	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_1	1	1	0	11	5	5	4
	Consistent for ω_2	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_1	28	25	13	78	38	37	31
	Consistent for ω_2	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. $s_1 \leq s_2$: 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; $s_1 < s_2$: 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'.

Table 2: Tests of the preference reversal phenomenon.

	Faculty			Charity			
	All	$s_1 \leq s_2$	$s_1 < s_2$	All	Known	Known $+ s_1 \leq s_2$	Known $+ s_1 < s_2$
(£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 $\alpha = 0.05$.
$s_1 \leq s_2$: 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; $s_1 < s_2$: 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'.

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. 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.[5] 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.

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

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[5]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.

subjects available for analysis in the Charity Setting to 36. In Figure 2 we see that 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, $s_1 \leq s_2$, 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 $s_1 \leq s_2$—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, $s_1 < s_2$, 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 seem more robust than those in the Charity Setting.

4.2 Social distances

Next we can compare the social distances observed in the two Settings. Intuitively students of the Faculty of Social Sciences and of the Faculty of Engineering have a lot in common—they study in the same city, in the same university and even sometimes in the same buildings, and they also share extra-curricular activities—whereas Cancer Research UK and The Salvation Army are nothing alike—they use different means to reach different goals and they attract different kinds of people.

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

member of Faculty of Social Sciences   3.35

member of Faculty of Engineering   3.05

Cancer Research UK   3.54

The Salvation Army   2.58

1 2 3 4 5 6 7
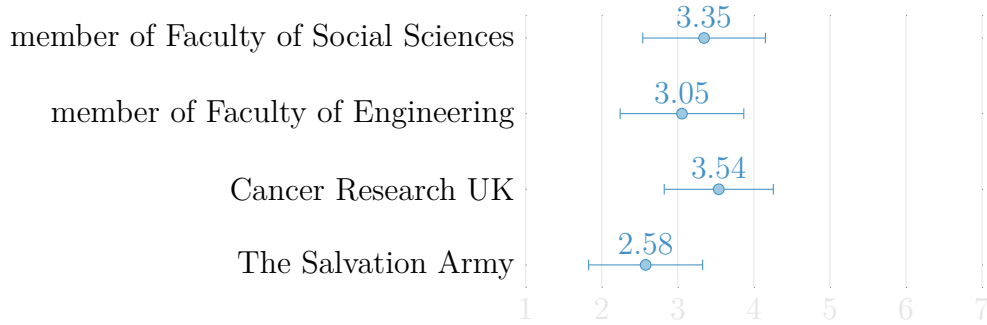
Notes. The scores obtained with the Inclusion of Other in the Self scale and the Inclusion of Ingroup in the Self scale range between 1 and 7, 7 corresponding to the smallest social distance. Error bars represent one standard deviation.

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

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

To explain why preference reversals between choice and valuation transfer to social distances, and why we observe more preference reversals in the Faculty Setting compared to the Charity Setting, we can rely on a combination of scale compatibility and focusing.

The *scale compatibility hypothesis* (Cubitt et al., 2004; Tversky et al., 1990) is the currently accepted explanation to preference reversals: people's response to an elicitation method depends on the scale used; when using a monetary scale to report a monetary valuation, people tend to overweight the monetary component of the option. They thus reveal a preference for the distance-rich (probabilities, delays, social distances) option in choice, but a preference for the money-rich option in valuation. This hypothesis explains neatly the process behind preference reversals, but it fails to explain why we observed more preference reversals in the Faculty Setting than in the Charity Setting.

The weight-change literature and the similarity literature provide a possible explanation. These literatures have broadly found that people place more weight on attributes that are more outspread,[6] an idea that resurfaced in economics with Kőszegi and Szeidl (2013). As we have seen, social distances were significantly more different in the Charity Setting than in the Faculty Setting; according to this literature we can therefore assume that social distances counted more in the former Setting than in the latter.

For scale compatibility to create preference reversals it needs to reverse the preference for the distance-rich option. If the preference for small distances is initially strong then scale compatibility will not be enough to reverse it—this is what we observe in the Charity Setting. On the other hand, if the preference for small distances is fairly weak, then scale compatibility and the overweighting of the money component of the options has more room to reverse preferences—this is what we observe in the Faculty Setting.

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[6]For the weight-change literature, see Fischer (1995); Mellers and Cooke (1994); von Nitzsch and Weber (1993); Wedell (1998); Wedell and Pettibone (1996). For the similarity literature, see also Mellers and Biagini (1994); Mellers et al. (1992a,b).

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Appendices

Appendix A Instructions

The next pages reproduces the instructions used in the Faculty Setting. They are here reproduced two-pages-on-one to save space. Instructions in the Charity Setting were similar, except that they mentioned charities instead of Faculties and that the subjects were told that we would send them the receipts of the donations after the experiment.

Instructions

Welcome to the experiment. It is composed of two parts: Part 1 and Part 2. You will receive a fixed payment of £5 at the end of the experiment and you will earn more depending on your choices during Part 2. Please remain silent and do not speak with other participants. If you have a question of any kind, please raise your hand at any time and an experimenter will come to your desk.

You have in your possession two envelopes, respectively labelled 'Part 1' and 'Part 2'. They contain the material you will need for this experiment. Please do not open any of the envelopes until instructed to do so by the experimenters.

> Before we proceed, we would like you to verify that you are from the Faculty of Arts. If this is the case, please tick the following checkbox:
>
> ☐ I acknowledge I am a member of the Faculty of Arts.
>
> If this is not the case, please raise your hand and wait for an experimenter to come to your desk.

We have a lot of procedures in place throughout the experiment designed to ensure your anonymity. The first one is the use of an identification number. This is the number printed at the top of this page. Each of the experimental packages that you saw outside the room had a different identification number. In effect, one of the identification numbers has been randomly attributed to you as you randomly selected one of the experimental packages. Your decisions are linked to this identification number, not to your identity. We are trying our best not to link your decisions to your identity, so please play your part in not allowing anyone—*including the experimenters*—to see this identification number. For similar reasons, do not write anything on any of the pages that would allow us to identify you.

We will now present Part 1 of the experiment in detail.

Part 1

You will be randomly matched with one participant from the Faculty of Social Sciences and one participant from the Faculty of Engineering. From now on, we will use the expressions 'the member of the Faculty of Social Sciences' and 'the member of the Faculty of Engineering' to refer to the two participants you will be matched with. This matching will be constant throughout the experiment. You will not be told who these people are either during or after the experiment. The only information disclosed is their Faculty membership. Also, they will not be told who you are. As a matter of fact and as explained below, participants from the Faculty of Social Sciences and the Faculty of Engineering will not even know that this experiment took place.

In this part of the experiment, we will give money to the member of the Faculty of Social Sciences or to the member of the Faculty of Engineering depending on your choices. Hence, *the money donated is not your money* and nothing is taken from you.

There are only members of the Faculty of Arts in this room; hence, none of your choices in Part 1 will affect someone in this room nor will their choices affect you.

The experimental material for Part 1 of the experiment is composed of the present instructions and the envelope labelled 'Part 1'. Do not open the envelope until instructed to do so.

We will start by describing the tasks.

Tasks

There will be three types of tasks, which we call **allocation tasks**, **equivalence tasks** and **circle tasks**.

Allocation tasks

Allocation tasks ask you to choose between two alternatives. Here is an example:

> **Option A**: We give £y to *the member of the Faculty of Social Sciences*
> **Option B**: We give £z to *the member of the Faculty of Engineering*
>
> Choose **A** or **B**:

You will choose one of the two options by writing 'A' or 'B'. There will be a range of such tasks involving different money amounts.

Equivalence tasks

In equivalence tasks, we propose an allocation of a specific amount to either the member of the Faculty of Social Sciences or the member of the Faculty of Engineering. We then ask you to specify how much money we would have to *give to you* instead so that you would think that amount of money was just as good as the proposed allocation. Here is an example:

> How much money *given to you* would be just as good as us giving £w to *the member of the Faculty of Social Sciences*?
>
> Please write the amount here:
>
> We will refer to this amount as your equivalence valuation of giving £w to the member of the Faculty of Social Sciences.

The participant (and hence the Faculty) and the amount of the allocation will change from task to task.

We will never actually give money to you as part of those tasks, but as explained later your answers to the equivalence tasks may affect which participant we will give money to, so please give considered and careful answers.

Circle tasks

For these tasks, we will ask you how you feel toward the participants you have been matched with. You will be asked in this way:
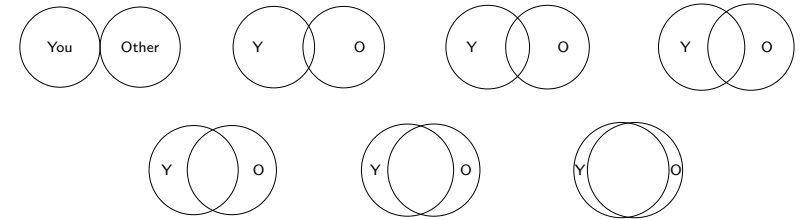
> Please consider the member of the Faculty of Engineering. Select the pair of circles that best represents how you feel toward *the member of the Faculty of Engineering*:
>
>
>
> Indicate your answer by drawing a line around the pair of circles you select.

Procedure

In a minute, we will ask you to open the envelope labelled 'Part 1'. In it, you will find a booklet containing several of the aforementioned tasks in a random order. On each page, just as at the top of these instructions, you will notice a number: this is your identification number.

As a consequence of your decisions, one of two people with whom you will be matched with—the member of the Faculty of Social Sciences and the member of the Faculty of Engineering—will get paid. We will now explain who and how much. After the experiment and after everybody has left, we will open the envelopes. We will then randomly select one pair of amounts, say ($£y$, $£z$), independently for each participant. You would have encountered each of those two amounts twice:

- both of them at the same time in an allocation task, where you had to choose between giving $£y$ to the member of the Faculty of Social Sciences and giving $£z$ to the member of the Faculty of Engineering;

- each of them separately in equivalence tasks, where you had to tell us the amount of money given to you that you think is just as good as giving to the member of the Faculty of Social Sciences or to the member of the Faculty of Engineering.

We will then flip a coin to select between the allocation task and the equivalence task:

- If the allocation task is selected, we will give the money to the person you chose;

- If the equivalence task is selected, we will give the money to the person for which you indicated a higher equivalence valuation.

Let us illustrate this with an example. Imagine two fictitious Faculties: the Faculty of Xenostudies and the Faculty of Patascience. As explained earlier, assume you have been paired with one member from each of those fictitious Faculties. Imagine that the amounts ($£5$,$£10$) are selected. During the experiment, you encountered those amounts in the following allocation task:

> **Option A**: We give £5 to the member of the Faculty of Xenostudies
> **Option B**: We give £10 to the member of the Faculty of Patascience
>
> Choose **A** or **B**: A

Suppose you chose **A**, that is, giving £5 to the member of the Faculty of Xenostudies you have been paired with.

You also faced an equivalence task with the member of the Faculty of Xenostudies:

> How much money given to you would be just as good as us giving £5 to the member of the Faculty of Xenostudies?
>
> Please write the amount here: 4
>
> We will refer to this amount as your equivalence valuation of giving £5 to the member of the Faculty of Xenostudies.

This example supposed that you stated that the member of the Faculty of Xenostudies having £5 and you getting £4 makes you indifferent. You faced a similar question with the member of the Faculty of Patascience:

> How much money given to you would be just as good as us giving £10 to the member of the Faculty of Patascience?
>
> Please write the amount here: 2
>
> We will refer to this amount as your equivalence valuation of giving £10 to the member of the Faculty of Patascience.

Here, imagine that you stated that the member of the Faculty of Patascience having £10 and you getting £2 are just as good.

Finally, we use a coin flip to determine whether it is your response to the allocation task, or your responses to the equivalence tasks that determine the person we will pay on your behalf:

- If the allocation task is selected, we are going to give £5 to the member of the Faculty of Xenostudies because this is what you chose in the allocation task involving the member of the Faculty of Xenostudies and the member of the Faculty of Patascience.

- If the equivalence task is selected, we are going to give £5 to the member of the Faculty of Xenostudies because your equivalence valuation of giving £5 to the member of the Faculty of Xenostudies (£4) is greater than your equivalence valuation of giving £10 to the member of the Faculty of Patascience (£2).

Hence, in this particular example, the money is always given to the member of the Faculty of Xenostudies. This would not have been the case had the answers been different.

At this stage, we will know to whom the money is allocated and we will give the money accordingly. Members of the Faculty of Social Sciences and the Faculty of Engineering will get paid on 13 January 2015 during an experimental session at 10am or at 3pm. You are free to come to the laboratory that day at any of these times to monitor the payment.

We will never tell members of the Faculty of Social Sciences and of the Faculty of Engineering about this experiment. For participants receiving money, the money will appear to come from the experimenter. Participants not receiving money will not know they could have received some money had your choices be different.

Questions on the procedure

We would like to make sure you understand the procedure fully. Please answer the following questions. Once you have finished, raise your hand and an experimenter will come to your desk to verify your answers. There is no identification number on top of those pages so that the experimenters cannot learn your identification number. When s/he comes, please make sure s/he cannot see the other pages. Your answers here have no consequence for the rest of the experiment.

Question 1

Imagine the amounts (£5,£12) are selected after the experiment. The following choices have been made in the relevant allocation tasks and equivalence tasks:

> **Option A**: We give £5 to the member of the Faculty of Social Sciences
> **Option B**: We give £12 to the member of the Faculty of Engineering
>
> Choose **A** or **B**: B

> How much money given to you would be just as good as us giving £5 to the member of the Faculty of Social Sciences?
>
> Please write the amount here: 4
>
> We will refer to this amount as your equivalence valuation of giving £5 to the member of the Faculty of Social Sciences.

> How much money given to you would be just as good as us giving £12 to the member of the Faculty of Engineering?
>
> Please write the amount here: 14
>
> We will refer to this amount as your equivalence valuation of giving £12 to the member of the Faculty of Engineering.

What happens if the allocation task is selected? Please tick one:

☐ We will give £5 to the member of the Faculty of Social Sciences

☐ We will give £12 to the member of the Faculty of Engineering

What happens if the equivalence task is selected? Please tick one:

☐ We will give £5 to the member of the Faculty of Social Sciences

☐ We will give £12 to the member of the Faculty of Engineering

Question 2

Imagine the amounts (£5,£8) are selected after the experiment. The following choices have been made in the relevant allocation tasks and equivalence tasks:

> **Option A**: We give £8 to the member of the Faculty of Engineering
> **Option B**: We give £5 to the member of the Faculty of Social Sciences
>
> Choose **A** or **B**: B

> How much money given to you would be just as good as us giving £5 to the member of the Faculty of Social Sciences?
>
> Please write the amount here: 7
>
> We will refer to this amount as your equivalence valuation of giving £5 to the member of the Faculty of Social Sciences.

> How much money given to you would be just as good as us giving £8 to the member of the Faculty of Engineering?
>
> Please write the amount here: 3
>
> We will refer to this amount as your equivalence valuation of giving £8 to the member of the Faculty of Engineering.

What happens if the allocation task is selected? Please tick one:

☐ We will give £5 to the member of the Faculty of Social Sciences

☐ We will give £8 to the member of the Faculty of Engineering

What happens if the equivalence task is selected? Please tick one:

☐ We will give £5 to the member of the Faculty of Social Sciences

☐ We will give £8 to the member of the Faculty of Engineering

Question 3

Which tasks are relevant if the amounts (£5,£10) are selected? Tick all that apply:

☐ | How much money given to you would be just as good as us giving £20 to the member of the Faculty of Engineering?

Please write the amount here:

We will refer to this amount as your equivalence valuation of giving £20 to the member of the Faculty of Engineering.

☐ | **Option A**: We give £5 to the member of the Faculty of Social Sciences
Option B: We give £8 to the member of the Faculty of Engineering

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

☐ | **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 £5 to the member of the Faculty of Social Sciences?

Please write the amount here:

We will refer to this amount as your equivalence valuation of giving £5 to the member of the Faculty of Social Sciences.

☐ | **Option A**: We give £5 to the member of the Faculty of Social Sciences
Option B: We give £12 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 £10 to the member of the Faculty of Engineering?

Please write the amount here:

We will refer to this amount as your equivalence valuation of giving £10 to the member of the Faculty of Engineering.

You can now open the envelope labelled 'Part 1', take out the booklet and start completing the tasks. *Once you have completed a task, please turn the page and do not consider it again.* Once you have completed all the tasks, replace the booklet in the envelope along with the present instructions and close the envelope. Then, please raise your hand. When everybody has finished, we will collect the envelopes and mix them under the supervision of several randomly selected participants.

Notice that each envelope returned will look exactly the same, and since your identification number is attributed randomly we will not be able to tell who filled which booklet.

If you have any question, please raise your hand and an experimenter will come to your table to answer it.