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The Endogenous Nature of Social Preferences*

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Abstract

This paper presents evidence which challenges the view that techniques which are designed to measure the social preferences of subjects can always be accomplished in a nonintrusive manner. We find evidence that such measurements can influence the preferences which they are designed to measure. Researchers often measure social preferences by posing a series of dictator game allocation decisions; we use a particular technique, Social Value Orientation (SVO). In our experiment we vary the order of the SVO measurement and a larger stakes dictator game. We find that subjects with prosocial preferences act even more prosocially when the SVO measurement is administered first, whereas those with selfish preferences are unaffected by the order of the measurement. Additionally, we find evidence that this difference is driven by the presence of choices involving the size of surplus.

JEL Codes: C91, D64

Keywords: Other-Regarding Preferences, Social Value Orientation, Dictator Game

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1 Introduction

Ideally, an experimenter measures the preferences of a subject in order to make predictions regarding behavior. It is commonly thought that such a measurement could be done in a nonintrusive manner: that the measurement does not affect the preferences which they are designed to measure and hence behavior would be identical whether or not the measurement was made. In this paper, we present evidence which challenges this view.

It is known that many subjects do not simply maximize their own material payoffs.¹ Specifically, it is often observed that some subjects will sacrifice their own material payoffs so that other subjects will receive a better material outcome. Researchers often attempt to infer the nature of these social preferences by posing a series of allocation decisions, often referred to as dictator games. These decisions entail a choice of an allocation of hypothetical or small material outcomes distributed between the subject and another subject. A specific measurement technique, which we use here, is Social Value Orientation (SVO).

If SVO does not affect preferences then the order of the measurement should not matter to our results. If, however, SVO does affect preferences then the order will matter to our results. In our experiment we vary the order of the measurement of SVO and a standard, larger stakes dictator game.² While we find that the measure of SVO is significantly related to behavior in the dictator game, we also find that the mapping between the measurement of SVO and behavior in the dictator game is related to the timing of the measurement. Specifically, we find that the subjects, for whom SVO indicates prosocial preferences, act even more prosocially when the SVO measurement is administered first. By contrast, we find that the subjects for whom the SVO suggests selfish preferences are unaffected by the order of the measurement. These results suggest that measuring social preferences, through techniques such as SVO, might affect the preferences which they are designed to measure.

To help identify possible causes of the result above, we also run the identical experiment with the exception that the dictator game is such that the relative price of each allocation is 1 to 3 rather than the standard 1 to 1. In other words, each \$0.50 kept by the subject reduces the recipient's payoffs by \$1.50. In this case, we find no significant difference between

¹For an early example, see Deutsch (1958).

²For more on dictator games, see Forsythe et. al. (1994), Hoffman et. al. (1994), Eckel and Grossman (1996), Ruffle (1998) and Bolton et. al. (1998).

the prosocials who have SVO measured before the dictator game and the prosocials who have SVO measured after the dictator game. This suggests that decisions involving the creation of surplus in the measurement of SVO are important to the endogenous nature of the social preferences of the prosocials.

1.1 Social Value Orientation as a Measure of Social Preferences

We measure social preferences through SVO because the measure is relatively easy to administer and interpret. The technique (adapted from Van Lange et. al. 1997) consists of 9 items with three possible choices involving material payoffs accruing to the subject and another subject.³ Each of the nine items has an *individualistic* response, a *prosocial* response and a *competitive* response. The individualistic response is the one in which the material payoffs accruing to oneself are the largest. In other words, selecting the individualistic choice suggests that the subject neither positively nor negatively values material payoffs accruing to the other subject. The prosocial response is the one in which the sum of the material payoffs accruing to both the subject and the other subject are the largest. In other words, selecting the prosocial response suggests that the subject positively values material payoffs accruing to the other subject. The competitive response is the one in which the difference between the material payoffs accruing to the subject and the other subject are the largest. In other words, selecting the competitive choice suggests that the subject negatively values material payoffs accruing to the other subject.

Translated into a utility function, SVO measures the form of:

$$u(x_{own}, x_{other}) = f(x_{own}) + \alpha g(x_{other})$$

where x_{own} is the material payoff accruing to self, x_{other} is the material payoff accruing to another person and f and g are increasing functions. A prosocial choice indicates that $\alpha > 0$, an individualistic choice suggests that $\alpha = 0$ and a competitive choice suggests that $\alpha < 0$.

Further, there is much written on the stability of SVO. For instance, Bogaert et. al. (2008) suggest that over the 40 years since its introduction by Messick and McClintock (1968), it has been widely regarded as providing a stable measure of a personality trait. However, recent

³See the appendix for a complete description of the SVO items.

work has suggested instances where SVO can be affected by the setting and is thereby a less than perfectly stable measure.⁴ Iedema and Poppe (1994) show that the measurement of SVO can be affected by self-presentation effects. Smeesters et. al. (2003) show that priming certain types of behavior can lead to a different mapping from SVO to behavior. While SVO is considered relatively stable, to our knowledge there is no work suggesting that the measurement of SVO can affect the preferences which they are designed to measure.

It is obviously problematic that taking a measurement might affect the quantity it is designed to gauge because a measure is primarily useful to the extent that it can form a basis of making predictions about behavior. This is certainly the case with SVO as it has been used to study behavior in games (Parks, 1994; Kramer et. al., 1986; Pruyt and Riezebos, 2001), the decision to use public transportation (Van Vugt et. al., 1996), proenvironmental behavior (Cameron et. al., 1998; Joireman et. al., 2001) and volunteerism (McClintock and Allison, 1989)

SVO also appears in the economics literature.⁵ However each of these papers uses the ring measure, which is slightly different than the technique which we use. The ring measure consists of 24 pair-wise items rather than 9 items with 3 choices. However, similar to the technique which we employ, the ultimate objective is to classify subjects as one of a few types. Relatively little is known about the relationship between the ring measure and the measure which we employ (Bogaert et. al., 2008). However, we opt for the latter as it requires fewer responses and is more transparent. As a result of these characteristics, we conjecture that the effects which we find here would only be strengthened by using the ring measure.

Finally, measuring social preferences via dictator games, like SVO, has the advantage that it only considers a situation where strategic issues are absent. Although all decisions would be made in the absence of the feedback of the actions of other dictators, it still remains possible that the subject would anticipate some reciprocal arrangement. Therefore, similar to Carpenter (2005), we employ a triadic design whereby each dictator decides an allocation involving self and another dictator. However, this other dictator does not decide on an allocation involving the original dictator but rather on a third dictator.

⁴Also see Au and Kwong (2004) and Hertel and Fiedler (1994,1998).

⁵See Buckley et. al. (2001), Buckley et. al. (2003), Burlando and Guala (2005), Carpenter (2003), Carpenter (2005), Cornelissen et. al. (2007), Kanagaretnam et. al. (2009), Offerman et. al. (1996) and Sonnemans et. al. (2006).

1.2 Other Measures of Social Preferences

Another commonly used social preference measurement technique is GARP as developed by Andreoni and Miller (2002). SVO is similar to GARP in that both techniques pose a series of dictator games however there remain important differences. In GARP, choice is much less restricted than in SVO. Each SVO item has only three possible responses, whereas each GARP item seeks an allocation of tokens ranging from 40 to 100. As a result, GARP yields less coarse data than SVO. However, the choice in GARP is less transparent than SVO, as the latter explicitly lists the material allocation of each choice. We are not aware of a study which compares the relative merits of the two measures.

Charness and Rabin (2002) pose a series of simple games to learn the specific form of social preferences⁶ related to relative wealth and reciprocity. The nature of the social preferences might depend on whether other's payoffs are higher than or lower than the subject's own payoffs therefore Charness and Rabin vary this aspect of their items. By contrast, in SVO the subject decides among choices where monetary payoffs accruing to self are never less than that accruing to the other subject. Also, in contrast the technique employed in Charness and Rabin, SVO is not equipped to evaluate preferences for reciprocity.

1.3 Endogenous Social Preferences and Behavioral Spillovers

Our paper is related to the study of endogenous social preferences. For instance, Carpenter (2005) and Canegallo et. al. (2008) investigate how the environment can affect preferences.⁷ By contrast, we study whether a subject's own response to a measurement instrument can affect subsequent behavior. In this sense, we are closely related to Guth et. al. (2008). These authors find that subjects who contribute more in a public goods game are significantly more trusting in a subsequent investment game.

There also exists a strand of literature which examines the role of the environment on play in games. For instance, Bednar et. al. (2009) describe an experiment in which subjects simultaneously play two distinct games with different opponents. The authors find that

⁶Chen and Li (2009) perform a similar type of analysis when considering the type, or identity, of the other subject.

⁷Schotter et. al. (1996) examines the effect of framing on judgements of fairness and is therefore related to endogenous preferences. Eckel and Grossman (2005) find that a strong identity manipulation can induce more cooperation in public goods game. Also, see Bowles (1998) for more on endogenous preferences.

behavior in a particular game is affected by corresponding paired game.⁸ This literature contends that strategies which are used in one game are often applied to the other, despite that the games should be played independently.

Although the line between the endogenous social preferences literature and the behavioral spillovers literature can be imprecise, we describe our paper as the former because SVO is explicitly designed to measure social preferences.

2 Study 1

2.1 Overview

We seek to better understand the effects which dictator-type measurements of social preferences can have on subjects. If these measures do not affect preferences then the order of the measurement should not matter to the results. If, however, the measures do affect preferences then the order will matter to the results.

2.2 Procedure

A total of 96 students from Rutgers University-Camden participated in Study 1. The subjects were given course credit for attendance and were told that that a randomly selected 25% from each session would be paid the amount earned from the experiment. The subjects completed a measure of SVO and decided on an allocation in a standard \$10 dictator game.

The subjects were aware of the triadic design as they were told to make allocation decisions involving themselves ("You") and another subject ("Other1"). Another subject ("Other2") was to make allocations involving Other2 and You. Therefore, the amount accruing to each subject was what was kept in the You-Other1 allocation decisions plus what Other2 did not keep in the Other2-You allocation decisions. In both the measurement of SVO and the choice in the dictator game, the status of You, Other1 and Other2 would remain fixed.

The measurement of SVO entailed the nine items from Van Lange et. al. (1997). For the measurement of SVO, the amount the subject could earn ranged from \$0.94 to \$1.06. Also the subject could send an amount which ranged from \$0.19 to \$0.94. The subjects were not told these amounts, however they could be calculated with relative ease. The dictator game

⁸Also see Bednar and Page (2007), Crawford and Broseta (1998) and Van Hyuck et. al. (1993).

was presented to the subjects in \$0.25 increments. The subjects were directed to indicate which of the 41 dictator game allocations they most preferred.

In each trial, approximately half of the subjects answered the SVO items then made a choice in the dictator game. We refer to this treatment as SVO First. Approximately half responded to the dictator game then answered the SVO items. We refer to this treatment as SVO Last.

2.3 Results

Using the procedure of Van Lange et. al. (1997), we categorized 32 subjects (33%) as prosocial, 39 subjects (41%) as individualists and 5 subjects (5%) as competitors. There were 20 subjects (21%) who we could not classify as they did not select a minimum of 6 choices of a particular type. Table 1 summarizes the distribution of subjects according to SVO categorization and timing of measurement.

| | Prosocial | Individualistic | Competitive | Uncategorized | Total |
|-----------|-----------|-----------------|-------------|---------------|-------|
| SVO First | 14 | 24 | 3 | 8 | 49 |
| SVO Last | 18 | 15 | 2 | 12 | 47 |
| Total | 32 | 39 | 5 | 20 | 96 |

Table 1: Number of subjects by SVO categorization and measurement timing

The measure of SVO was found to provide a significant predictor of behavior across both treatments. See Table 2 for the amount kept in the dictator game by SVO classification.

| | Prosocial | Unclassified | Proself |
|--------------------------------------|-----------|--------------|---------|
| Average Amount Kept in Dictator Game | \$4.68 | \$5.75 | \$7.28 |
| | (2.574) | (10.204) | (6.173) |

Table 2: Average amount kept in dictator game by SVO classification with variance in parentheses

The prosocial subjects kept significantly less than did the proself (individualists and competitors) subjects ($t = 5.54, p < 0.01$).⁹ While unclassified subjects kept less than proself subjects ($t = 1.902, p = 0.067$) and prosocial subjects kept less than unclassified subjects ($t = 1.393, p = 0.0880$).

⁹In this paper, all given p-values are for one tail.

Additional evidence that SVO sufficiently predicts behavior comes from the relationship between the consistency of the SVO responses and the choice in the dictator game. A measure equaling 9 indicates perfect consistency in the set of responses and a measure between 6 and 8 indicates a less than perfectly consistent set of responses. See Table 3 for the amount kept in the dictator game by SVO classification and consistency of measurement

| | Prosocial | Individualistic |
|-----------|----------------------|---------------------|
| Measure=9 | 4.3125 (2.8220) | 7.95192 (4.5001) |
| Measure<9 | 5.78125 (0.27567) | 6.11538 (4.4335) |

Table 3: Average amount kept in dictator game by SVO classification and consistency of measurement with variance in parentheses

Among those classified as prosocial, those with a measure equal to 9 kept a significantly smaller share than those with a measure between 6 and 8 ($t = 3.7667, p < 0.01$). Also, among those classified as individualistic, those with a measure equal to 9 kept a significantly larger share than those with a measure between 6 and 8 ($t = 2.561, p < 0.001$). Therefore, we are reasonably confident in the SVO measure as a predictor of behavior in the dictator game.

As our primary objective is to learn whether the mapping from the measure of SVO to behavior depends on the order of the measurement, we now compare dictator allocations given the treatment. First, the difference between the amount kept in the SVO First treatment (mean=\$6.036) and in the SVO Last treatment (mean=\$6.160) is not significant ($t = 0.228, p = 0.4099$). However, a significant relationship emerges when one looks within SVO classifications. See Figure 4 and Table 1 for the amount kept in the dictator game by SVO classification and treatment.

| | Prosocial | Individualistic |
|-----------|----------------------|----------------------|
| SVO First | \$4.1429 (5.2088) | \$7.375 (4.9783) |
| SVO Last | \$5.0972 (0.2878) | \$7.2833 (5.7399) |

Table 4 Average amount kept in dictator game by SVO classification and treatment with variance in parentheses

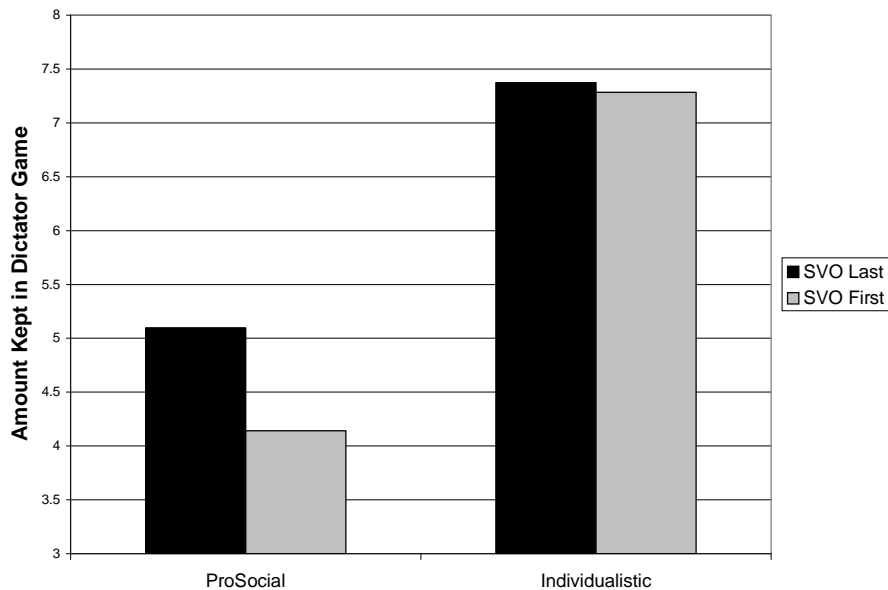


Figure 1: Average amount kept in dictator game by SVO classification and treatment

Although the individualists in the SVO First treatment do not keep a significantly different amount than the individualists in the SVO Last treatment, there is a significant difference within the prosocial subjects. Prosocial subjects in the SVO First treatment keep significantly less than the prosocials in the SVO Last treatment ($t = 1.5321$, $p = 0.07390$).

This relationship becomes even more significant when one restricts attention to those with a consistent SVO measure. Among the prosocials who had an SVO score of 9 in the SVO Last treatment (Mean=4.885, Variance=0.0897) kept more than the prosocials who had an SVO score of 9 in the SVO First Treatment (Mean=3.636, Variance=5.455). This relationship is significant ($t = 1.760$, $p = 0.0544$).

It appears that those with individualistic preferences are not influenced by their actions in the measurement of SVO, however those with prosocial preferences are affected by their choice.

3 Study 2

3.1 Overview

Roughly speaking, Study 1 finds that subjects with prosocial preferences act even more prosocially when the SVO measurement is administered first whereas those with selfish preferences are unaffected by the order of the measurement. Based on the data available from Study 1, it is not clear to us what drives this result. As there is no choice involving the creation of surplus in the standard dictator game, it is possible that the prosocial subjects in the SVO First treatment have primed themselves whereas no priming exists for the prosocials in the SVO Last treatment. Therefore, if the dictator game was designed in a manner in which choice decided the amount of surplus then the results in the SVO Last treatment might converge to that of the SVO First treatment. However, it is also possible that with the standard dictator game, being selfish is too "easy" and so the individualists are not affected by the timing. Therefore, if the dictator game is designed in a manner in which being selfish is more costly then we expect a divergence of the results of the SVO First and Last treatments of the individualists. In Study 2, we hope to shed some light on the relative merit of these two explanations.

Study 2 follows the same procedure as Study 1 with the exception that, rather than using a standard dictator game, we use a dictator game in which the relative allocation "price" is 1 to 3. In other words, the most selfish allocation is \$10 to self and \$0 to other and the most generous allocation is \$30 to other and \$0 to self. This somewhat nonstandard dictator game has the advantages that 1. the amount of total surplus is a matter of choice and 2. being selfish is now relatively costly. If we find that the timing has a reduced influence on the prosocials then we favor the former explanation. If we find that individualists are now affected by the timing then we will favor the latter explanation.

3.2 Procedure

A total of 90 students from Rutgers University-Camden participated in Study 2. The procedures in Study 2 are identical to that in Study 1 with the exception of the form of the dictator game. Rather than the standard dictator game in which the trade-off between own payoffs and other payoffs is 1 to 1, the dictator game used in Study 2 has a trade-off of 1 to 3. In

other words, to increase the amount kept by \$0.50, the subjects must reduce the amount sent to the other subject by \$1.50. The subject’s own payoffs were listed in \$0.50 increments and the other subject’s payoffs were listed in \$1.50 increments. The subjects were directed to indicate which of the 21 dictator game allocations they most preferred.

3.3 Results

Again using the procedure of Van Lange et. al. (1997), we categorized 44 subjects (49%) as prosocial, 34 subjects (38%) as individualists and 4 subjects (4%) as competitors. There were 8 subjects (9%) who we could not classify as they did not select a minimum of 6 choices of a particular type. Table 5 summarizes the distribution of subjects according to SVO categorization and timing of measurement.

| | Prosocial | Individualistic | Competitive | Uncategorized | Total |
|-----------|-----------|-----------------|-------------|---------------|-------|
| SVO First | 21 | 16 | 2 | 5 | 44 |
| SVO Last | 23 | 18 | 2 | 3 | 46 |
| Total | 44 | 34 | 4 | 8 | 90 |

Table 5: Number of subjects by SVO categorization and measurement timing

We find that the SVO measure predicts behavior across both treatments. See Table 6 for the amount kept across both treatments.

| | Prosocial | Unclassified | Proself |
|--------------------------------------|-----------|--------------|----------|
| Average Amount Kept in Dictator Game | 6.4432 | 6.0625 | 8.2763 |
| | (7.7583) | (14.3884) | (5.4283) |

Table 6: Average amount kept in dictator game by SVO classification with variance in parentheses

The prosocial subjects kept significantly less than did the proself (individualists and competitors) subjects ($t = 3.24, p < 0.01$). As in Study 1 we find that the consistency of the response is related to the choice in the dictator game. See Table 7 to see the amount kept across both treatments by the consistency of the measurement.

| | Prosocial | Individualistic |
|-----------|--------------------|--------------------|
| Measure=9 | 5.9667 (9.6540) | 8.3824 (5.6103) |
| Measure<9 | 7.4643 (2.4794) | 7.9412 (6.4026) |

Table 7: Average amount kept in dictator game by SVO classification and consistency of measurement with variance in parentheses

Similar to Study 1, among those classified as prosocial, subjects with a measure equal to 9 kept a significantly smaller share than subjects with a measure between 6 and 8 ($t = 2.1203$, $p = 0.0199$). However in contrast to Study 1, among those classified as individualistic, subjects with a measure equal to 9 did not keep a significantly different amount than subjects with a measure between 6 and 8 ($t = 0.5248$, $p = 0.302$).

Finally, we may ask whether the timing matters for dictator game in Study 2. Unlike Study 1, the difference between the amount kept in the SVO First treatment (mean=\$6.705) and in the SVO Last treatment (mean=\$7.641) is significant ($t = 1.570$, $p = 0.060$).

| | Prosocial | Individualistic |
|-----------|---------------------|---------------------|
| SVO First | 5.9762 (10.1369) | 8.0000 (6.4333) |
| SVO Last | 6.8696 (5.5504) | 8.30556 (5.6806) |

Table 8: Average amount kept in dictator game by SVO classification and treatment with variance in parentheses

Although the prosocials in the SVO First treatment keep less than the prosocials in the SVO Last treatment, this difference is not significant ($t = 1.0499$, $p = 0.150$). However, as in Study 1, there is no significant difference in the amount kept by individualists in the SVO First and SVO Last treatments ($t = 0.361$, $p = 0.360$).

The timing remains insignificant among the prosocials even when attention is restricted to subjects with perfectly consistent SVO measures. The prosocials who had an SVO score of 9 in the SVO Last treatment (Mean=6.4333, Variance=7.7452) kept more than the prosocials

who had an SVO score of 9 in the SVO First Treatment (Mean=5.5000, Variance=11.7857), however this relationship is insignificant ($t = 0.8179$, $p = 0.210$).

4 Discussion

The main result in Study 1 provided evidence that the measurement of social preferences is not always done in a nonintrusive manner. We find that the timing matters for prosocials but not for individualists. Specifically, we find that prosocial subjects in the SVO First treatment keep significantly less in the standard dictator game than prosocials in the SVO Last treatment. In Study 2 we find that there is no significant difference between the SVO First and SVO Last treatments for either prosocials or individualists. From this we infer that the results in Study 1 are driven by the presence of choices involving the creation of surplus. The choice of the size of surplus is present in both stages of Study 2 but only one stage in Study 1.

5 Concluding Comments

In this paper, we describe two studies in which we measure social preferences through Social Value Orientation (SVO) and observe the choice in a dictator game. In Study 1 we vary the order of the SVO measurement and the play of the standard dictator game. There, we find evidence that subjects with prosocial preferences act more prosocially when the SVO measurement is taken first. On the other hand, our evidence suggests that subjects with individualistic preferences are not affected by the order of the measurement. These results imply that measuring social preferences, through techniques such as SVO, might affect the preferences which they are designed to measure.

An explanation for the main result in Study 1 is not obvious. To gain some insight on the matter, Study 2 performs the identical procedure as in Study 1 with the exception that the dictator game exhibits a 1 to 3 trade-off between own payoffs and other payoffs (the standard dictator game has a 1 to 1 trade-off). We find no significant difference between those making dictator game decisions before SVO and those making dictator game decisions after SVO, for prosocials or individualists. Study 2 suggests that the result of Study 1 is driven by

the presence of decisions regarding the size of the surplus. This effect, which seems to only influence the prosocials, are absent in the standard dictator game.

It is worth reflecting on the limitations of the present experimental design. For instance, we cannot determine whether the SVO measurement affects dictator game choices, dictator game choices affects the SVO measurement or perhaps both. Also, our results suggest that the preferences of individualists are less malleable than the preferences of prosocials but this could be a result of our experimental design. For instance, it could be that the optimal choice of many individualists involves a corner solution at the most selfish allocation. Finally, SVO only measures social preferences when one receives a larger share than the other subject. The significance of this detail is not clear. Hopefully, future work will shed light on these issues.

Some additional questions which deserve future consideration include, does it matter if the recipient of the dictator game is the same as the recipient of the SVO measure? Would the performance of unrelated tasks between the measurement of SVO and observation of behavior change the relationship? What are the implications for the case where standard games like the ultimatum game or the trust game are substituted for the dictator game? It is also unclear if the timing matters in the measurement of preferences via GARP or Charness-Rabin, Chen-Li techniques. Hopefully, future work will address these questions.

6 Appendix

We asked the following 9 items (from Van Lange et. al. 1997) in order to measure the SVO of the subjects. Each of the 9 items has a competitive answer, a individualistic answer and a competitive answer. Each item is stated in terms of points where 1 point corresponded to \$0.0002103.

| | | | |
|-------------------|------------|------------|------------|
| Question 1 | A | B | C |
| You: | 480 points | 540 points | 480 points |
| Other1: | 80 points | 280 points | 480 points |
| Question 2 | A | B | C |
| You: | 560 points | 500 points | 500 points |
| Other1: | 300 points | 500 points | 100 points |
| Question 3 | A | B | C |
| You: | 520 points | 520 points | 580 points |
| Other1: | 520 points | 120 points | 320 points |
| Question 4 | A | B | C |
| You: | 500 points | 560 points | 490 points |
| Other1: | 100 points | 300 points | 490 points |
| Question 5 | A | B | C |
| You: | 560 points | 500 points | 490 points |
| Other1: | 300 points | 500 points | 90 points |
| Question 6 | A | B | C |
| You: | 500 points | 500 points | 570 points |
| Other1: | 500 points | 100 points | 300 points |
| Question 7 | A | B | C |
| You: | 510 points | 560 points | 510 points |
| Other1: | 510 points | 300 points | 110 points |
| Question 8 | A | B | C |

| | | | |
|---------|------------|------------|------------|
| You: | 550 points | 500 points | 500 points |
| Other1: | 300 points | 100 points | 500 points |

| | | | |
|-------------------|------------|------------|------------|
| Question 9 | A | B | C |
| You: | 480 points | 490 points | 540 points |
| Other1: | 100 points | 490 points | 300 points |

The individualistic answers are: 1B, 2A, 3C, 4B, 5A, 6C, 7B, 8A and 9C. The prosocial answers are: 1C, 2B, 3A, 4C, 5B, 6A, 7A, 8C and 9B. The competitive answers are: 1A, 2C, 3B, 4A, 5C, 6B, 7C, 8B and 9A. Van Lange et. al. classifies a subject according to the above labels if six or more items are answered according to the above.

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