



# Hypothetical bias in value orientations ring games



Emmanouil Mentzakis<sup>a,\*</sup>, Stuart Mestelman<sup>b</sup>

<sup>a</sup> Economics Division, University of Southampton, Southampton, SO17 1BJ, UK

<sup>b</sup> Department of Economics, McMaster University, 1280 Main St. West, Hamilton, Ontario, Canada

## HIGHLIGHTS

- The social value orientations game is tested for hypothetical bias.
- 109 students played hypothetically and 103 students were saliently incentivized.
- Bias was tested on two measures: VO angle and VO consistency.
- No evidence of hypothetical bias is found for either measure tested.

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## ABSTRACT

The social value orientations ring game is often used to identify behavioral types and provide insight regarding choices made by individuals in market or non-market environments. Following the literature from other experimental fields, this paper is concerned with the presence of hypothetical bias in the method used to identify social value orientation (i.e. a difference between subject behavior when rewards are not salient and subject behavior when rewards are salient). We find no evidence of hypothetical bias in the value orientations or the subjects' consistency.

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## 1. Introduction

Over the past 40 years, experimental tools have been developed to measure the social value orientations (SVOs) of individuals (Messick and McClintock, 1968; Griesinger and Livingston, 1973; Liebrand, 1984). These SVOs are used as explanatory factors in studies where identification of behavioral types can provide insight for understanding various kinds of decisions made by individuals. SVOs were introduced into the economics literature by Offerman et al. (1996) to help understand decisions to contribute resources towards the provision of public goods when the conventional economic theory does not predict provision (or cooperation). Compensating and creating salient incentives for subjects participating in the ring game used to measure SVOs are not universal, with some studies not paying subjects according to their decisions (Camerer et al., 1998; Liebrand, 1984) and others paying subjects (Brosig, 2002; Buckley et al., 2001; Offerman et al., 1996). Little

research has focused on the incentive mechanism used to measure SVOs and any resulting bias.

Hypothetical bias exists if there is a difference between the measured SVOs derived from environments without salient and dominant rewards and those with salient and dominant rewards. The presence of hypothetical bias would suggest caution in drawing inferences from hypothetical games and a need to reconsider the results of such studies, while an absence of such a phenomenon would be a strong indication of the robustness of the SVO measure. The resulting low cost of administering the SVO ring game would encourage and ease incorporation of individual value orientations as a covariate in decision-making environments.

Hypothetical bias has been observed in a number of stated preference methods using various elicitation formats and contexts (Harrison and Rutstrom, 2008; Lusk and Schroeder, 2004). Reviewing a large number of experiments with no, low, or high incentives, Camerer and Hogarth (1999) found a modal result of no effect on mean performance though variance was usually reduced by higher payment. Incentives tended to reduce presentation effects (e.g. generosity and risk-seeking), while in dictator games subjects usually kept more when choices were real rather than hypothetical. However, more recent studies have disputed some of

\* Corresponding author. Tel.: +44 0 2380 59 7247.

E-mail address: [e.mentzakis@soton.ac.uk](mailto:e.mentzakis@soton.ac.uk) (E. Mentzakis).

**Table 1**

Distribution of social value orientation measures (percentage of sample) and sample means and standard deviations.

	Hypothetical treatment (T1)	Incentivized treatment (T2)
Aggressive (−112.5° to −67.5°)	0.0	0.0
Competitive (−67.5° to −22.5°)	3.7	8.8
Individualistic (−22.5° to 22.5°)	47.7	44.1
Cooperative (22.5° to 67.5°)	44.9	43.1
Altruistic (67.5° to 112.5°)	1.8	2.9
Other	1.8	1.0
Sample mean	21.0°	17.3°
Standard deviation	26.0°	29.4°

the findings in Camerer and Hogarth (1999), Andersen et al. (2011) studying ultimatum games find a stakes effect, while more importantly, Ben-Ner et al. (2008) specifically looking at hypothetical bias in dictator games finds little evidence of its presence. Given the mixed results for hypothetical bias across a number of laboratory settings in money sharing games and no published studies of its evaluation in SVOs this study tests for the presence of hypothetical bias in the SVOs ring game developed by Griesinger and Livingston (1973) and Liebrand (1984).

## 2. Social value orientations

In the SVO ring game an individual, A, makes choices between pairs of income allocations defined by points along the perimeter of a circle. The circle's origin is at the coordinates (0, 0) and the radius of the circle determines the magnitudes of the incomes to be allocated. The horizontal (x) axis identifies the subject's own payoff and the vertical (y) axis identifies the payoff received by a randomly selected individual, B, with whom individual A is matched. 24 pairs of equally spaced adjacent (x, y) coordinates along the circle identify the income allocations presented to individual A. For our application, the radius of the ring was \$10 (CAD). To avoid ordering effects, the order of presentation of the 24 pairs of income allocations was randomized. Each subject receives a final payment equal to the total income he allocates to himself plus the total income that is allocated to him by the randomly selected individual B. Subjects do not discover how much is allocated to them by the people with whom they are matched until all of the decision rounds are completed. Adding up each subject's 24 chosen coordinates determines the coordinates of the endpoint of the individual's *motivational vector*. The angle of this vector to the horizontal axis (in degrees) identifies the individual's SVO measure. The definitions of the possible SVOs are presented in the leftmost column of Table 1 along with the range of angles to which these SVOs correspond. These angles correspond to rays through the origin of the ring in Fig. 1. The ratio of the length of the motivational vector to twice the radius of the circle is a measure of the internal consistency of the subject's choices (Offerman et al., 1996).<sup>1</sup>

Despite the SVO game resembling a dictator game and providing data that could be used to test common money-sharing (or other-regarding behavior) models (e.g. Goeree et al. (2000)), a priori hypotheses with respect to hypothetical bias are limited. On the one hand, as Camerer and Hogarth (1999, p. 9) note, in hypothetical settings participants "may be intrinsically motivated to fulfill... the experimenter's implicit 'demands' and may want to exhibit socially desirable behavior (like generosity and risk-taking)". On the other hand, unlike dictator or ultimatum games, the SVO ring game we study is composed of 24 different choices between two distributions of payoffs defined over both positive and negative values, which might alter the dynamics in this non-strategic setting.

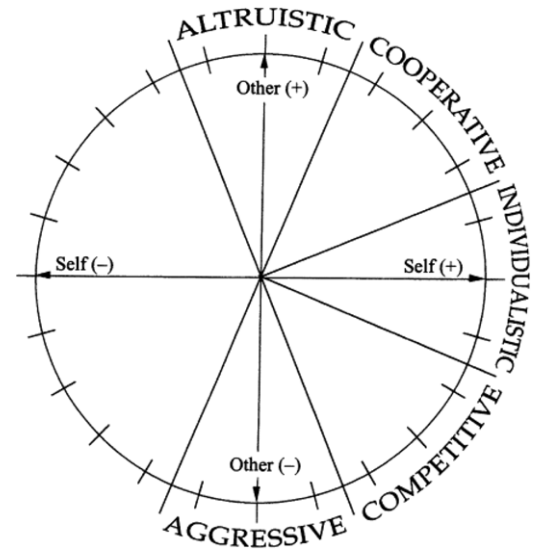


Fig. 1. The value orientation circle (Offerman et al., 1996, p. 823).

**Table 2**

Demographic data (percentage of sample) and sample size.

	Hypothetical treatment (T1)	Incentivized treatment (T2)
Male	43.1	49.0
Age < 20	36.7	43.1
20 ≤ Age < 40	63.3	56.9
Excellent health	19.3	22.6
Very good health	47.7	34.3
Good health	27.5	35.3
Fair to poor health	5.5	7.8
Income < 20 K	10.1	5.9
20 K ≤ Income < 50 K	18.4	12.8
50 K ≤ Income < 100 K	26.6	31.4
Income ≥ 100 K	26.6	33.3
Income not reported	30.3	16.7
Total participants	109	102

## 3. Treatments and bias tests

Subjects were students from a Canadian university. The first treatment (T1) had 109 students completing the ring game with no payment linked to their game choices. The second treatment (T2) had 103 students who were paid according to their choices. In T2 subjects earned, on average, \$11.57 from their allocation to themselves and \$7.62 from the allocations made by the individuals with whom they were matched. Subjects in both treatments received a show up fee of \$8. Hence, the only difference between T1 and T2 was that answers in the latter were incentivized but the answers to the former were not.<sup>2</sup> Demographic and socio-economic characteristics are in Table 2.

Hypothetical bias is investigated based on (a) the SVO measure and (b) the consistency of the SVO decisions. Equality of the mean SVOs of the two samples is tested by bootstrapping their difference 1000 times and testing its statistical difference from zero. Equality of the continuous distributions of SVO and the consistency of SVOs are tested with Kolmogorov–Smirnov tests. Equality of the discrete distributions of SVO and the consistency of SVO measures are tested with Pearson  $\chi^2$  statistics. For completeness, and to account for demographic characteristics, we pool data from the

<sup>1</sup> For more details on the SVO experiment please see Mentzakis and Mestelman (2010).

<sup>2</sup> The letter of information and the experimental instructions made sure that students were aware whether they would or would not receive money for their choices in the VO game, while keeping differences in wording to a minimum.

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