A flexible z-Tree implementation of the Social Value Orientation Slider Measure (Murphy et al. 2011) – Manual –

by

Paolo Crosetto
Ori Weisel
Fabian Winter

www.jenecon.de

ISSN 1864-7057

The JENA ECONOMIC RESEARCH PAPERS is a joint publication of the Friedrich Schiller University and the Max Planck Institute of Economics, Jena, Germany. For editorial correspondence please contact markus.pasche@uni-jena.de.

Impressum:

Friedrich Schiller University Jena
Carl-Zeiss-Str. 3
D-07743 Jena
www.uni-jena.de

Max Planck Institute of Economics
Kahlaische Str. 10
D-07745 Jena
www.econ.mpg.de

© by the author.
A flexible z-Tree implementation of the Social Value Orientation Slider Measure (Murphy et al. 2011)*
— Manual —

Paolo Crosetto‡, Ori Weisel‡, and Fabian Winter‡,†

‡Max Planck Institute of Economics, Kahlaische Strasse 10, 07743 Jena, Germany
†Corresponding Author: winter@econ.mpg.de

November 22, 2012

Abstract

This manual describes a z-Tree implementation of the paper-based Social Value Orientation (SVO) Slider Measure by Murphy et al. (2011). Using the paper-based version instead of the slider-based version (as implemented on the SVO-Website) avoids server-traffic related delays we experienced in the latter implementation.

JEL-Classification: C91, D03, D64

Keywords: z-Tree, Social Value Orientation

This manual describes an implementation of the SVO Slider Measure (Murphy et al. 2011, SVOSM hereafter) in z-Tree, the de-facto industrial standard of experimental economics research. SVOSM is designed to measure social preferences on a continuous scale. We refer to the corresponding publication for further details. The z-Tree implementation is attached to this pdf-file, and you can simply double-click here to open the file.

Murphy et al. (2011) present two different versions of the SVOSM: a quasi-continuous web-based measure using sliders, and a discrete paper-based version capturing the important features of the web-based version, but (to some researchers) easier to administer. After implementing a slider-based version with real-time display of the slider’s position in z-Tree, we experienced serious time delays, causing the server to freeze for up to several minutes. Whether this was due to traffic on the network or to excessive read-and-write activities on the hard drive could not finally be settled, but slightly increased performance after switching to a solid state drive points towards the latter cause. This finally led us to implement a point-and-click version of the SVOSM, heavily reducing network traffic as well as hard drive issues.

Our implementation of the SVOSM provides all the features of the paper-based version of the SVOSM, except for interior decisions (i.e., choices which are in between the discrete values on the

* Assistance by Tina Hilbig is gratefully acknowledged.
Moreover, we generalized our implementation by allowing for different matching protocols of the decision makers, different languages, and different scaling, ordering and subsets of the items. Table 1 gives an overview of the important parameters of the implementation.

The z-Tree implementation of the SVOSM was designed as a stand-alone treatment which is easy to integrate in existing z-Tree treatments. It was created in z-Tree 3.36 and can be used as any other treatment.

## Parameters

This section describes parameters of the z-Tree treatment which can easily be changed by the experimenter to match specific needs. Standard parameters, e.g. number of subjects, are treated in the conventional ways of z-Tree. To change treatment specific parameters, open the globals program “////INSERT PARAMETERS HERE ////” (see Figure 1) and change the respective values described below.

![Figure 1: Screenshot of the program indicating where to change setup parameters](image)

---

1Interior decisions in the paper-based version are possible in principle, but rarely used in practice (personal communication with R. Murphy).
1.1 language
Sets the language in which the SVOSM is displayed to the decision maker. Implemented languages are English, German, and Italian.

1.2 select_items
Allows you to choose whether only the six primary items or all fifteen items (six primary and nine secondary) are displayed. Using only the secondary items is not possible.

1.3 items_in_random_order
Determines whether items are displayed in the order presented in the paper-based SVOSM as in the original publication, or in random order. If the RANDOM option is chosen, the order is randomized separately for each subject.

1.4 matching
Determines the matching procedure of the measure. This is the major difference to the original publication. Murphy et al. (2011) chose a RING matching, such that A gives to B, B gives to C, C gives to D and D gives to A (see left side of Figure 2). Here, every subject is a sender and a receiver at the same time, though not from and to the same person. The RING matching works with any number of Subjects greater than 1.

In the RANDOM_DICTATOR matching (right side of Figure 2), subjects A,B,C,D are matched in groups of 2 (say (A; B) and (C;D)). Every subject submits his/her choices in the SVOSM. Later, one member of each group (say A and C) is randomly selected to be the sender, and the other (B and D, respectively) is the receiver. In this case, B receives from A and D receives from C. The choices by B and D are recorded but not implemented. RANDOM_DICTATOR matching thus limits the interaction to two subjects, where only one choice is finally implemented. This may reduce chains of reciprocity, where A might give to B because she expects to be compensated by D. The RANDOM_DICTATOR matching is an implementation of the strategy method, and decisions are only implemented with probability 1/2. It has been argued that such decision making may be perceived as "colder", and thus may lead to more strategic (Brandts and Charness, 2000) or normative choices (Rauhut and Winter, 2010).

1.5 scale
The scale of the circle underlying the SVOSM can be changed. The default is scale = 1, which results in a circle of diameter 100, as in the original publication. Inputs greater than 1 scale the circle up (e.g. a 2 results in a circle of diameter 200 with 100,100 in the center), inputs smaller than 1 scale the circle down (e.g. a 0.5 results in a circle of diameter 50 with 25,25 in the center). Scaling may be useful if you want to present the decisions in real monetary values and cannot afford to pay 100 €/$/CHF/cdot.
1.6 precision
Determine the precision of the displayed values. This option is more or less hard-coded, since z-Tree does not allow for conditional layout of decimals. **INTEGERS** displays values as integers, which is desired for larger numbers, e.g. a circle of diameter 100. For a circle with small diameter, two decimals should be more appropriate (choose option **TWO_DIGITS_AFT_POINT**).

1.7 debug
Displays some debugging information, including a kill-button. Useful for testing the treatment.

2 Output
The z-Tree treatment writes all the relevant output in the subjects-table and calculates the important measures straight away. This makes it possible to readily use the result in the experiment (e.g. for matching purposes) and makes the subsequent data analysis more convenient, since all important measures are already in the data set. There are more variables in the subjects table than we discuss here, but most of them are explained in Table 2. Some of the output variables are only important under specific parameters, e.g. **avg_dist_to_equality** is only calculated if also the secondary items are used. The rightmost column of table 2 indicates if and when the variables are used.

2.1 Profit
The **Profit**-variable is built-in in z-Tree, and is automatically written to the **TotalProfit**-variable in the session table. Thus, you can use the profits earned in the SVOSM also in later treatments, if there are any. To determine the profits, one of the sliders is randomly selected and the corresponding
earnings are written to the Profit-variable. If RING matching is used, Profit contains the sum of
the amount received as a receiver and the amount kept as a sender. When the RANDOM_DICTATOR
option is chosen, Profit depends on the subjects role: If she was chosen to be a sender, Profit
returns the amount kept, and if she was chosen to be a receiver, it returns the amount sent to her
by the sender.

2.2 svo_angle
The svo_angle is the core measure of the SVOSM. It is calculated from the primary items as

\[
\text{arctan} \left( \frac{\text{mean}_\text{to_self} - 50 \times \text{scale}}{\text{mean}_\text{to_other} - 50 \times \text{scale}} \right)
\]

See Murphy et al. (2011) for a detailed discussion. The svo_angle is stored in the subjects table
and in the session table. Storing values in the session table is necessary if some of the SVOSM
information is required in other treatments later in the session.

2.3 svo_type
The svo_type assigns labels to specific value ranges of the svo_angle. These labels are more or less
arbitrary and should only be used if really necessary. In all other cases, the continuous form of the
measure is preferable. The following values are used: 1 = Altruist, 2 = Prosocial, 3 = Individualist,
4 = Competitive. Thresholds are taken from the original publication. The svo_type is stored in
the subjects table and in the session table.

2.4 inequality_aversion_score
The inequality_aversion_score is calculated from the secondary items and is only computed if
they are used. It is designed to distinguish between the motives of efficiency maximization and
material equality. It is calculated as

\[
\frac{\text{avg_dist}_\text{to_equality}}{\text{avg_dist}_\text{to_equality} + \text{avg_dist}_\text{to_joint}}
\]

if the subject is classified as being “prosocial” (see subsection 2.4 above). In all other cases it
is set to -99. The inequality_aversion_score is stored in the subjects table and in the session table.

3 Disclaimer
We tested the treatment carefully, both on our own and with “real” subjects. However, the authors
disclaim all warranties, express or implied, regarding the Software, including any implied warranties
of satisfactory quality, merchantability or fitness for a particular purpose. The authors shall have no
liability whatsoever to the User of the Software for any direct, indirect, special or consequential loss
and/or expense (including loss of profit) suffered by the User and arising out of a malfunctioning
of the Software.

You can use, modify and distribute this Manual and the corresponding treatment if you agree
with the above points. If you use this implementation of the SVOSM, please cite the SVOSM as
Murphy et al. (2011) and make sure to follow the license agreements associated with z-Tree, in particular to cite Fischbacher (2007). Citing this manual is gratefully acknowledged.

References


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>language</td>
<td>ENGLISH</td>
<td>Language is English</td>
</tr>
<tr>
<td></td>
<td>GERMAN</td>
<td>Language is German</td>
</tr>
<tr>
<td></td>
<td>ITALIAN</td>
<td>Language is Italian</td>
</tr>
<tr>
<td>select_items</td>
<td>PRIMARY</td>
<td>only the primary items (items 1-6) are elicited.</td>
</tr>
<tr>
<td></td>
<td>FULL</td>
<td>primary and secondary items (items 1-15) are elicited</td>
</tr>
<tr>
<td>items_in_random_order</td>
<td>ORDERED</td>
<td>items are presented according to the order in Murphy et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>RANDOM</td>
<td>items are presented in random order</td>
</tr>
<tr>
<td>matching</td>
<td>RING</td>
<td>Subject A,B,C,D are ordered on a ring-structure as in Murphy et al. (2011). In this case, A gives to B, B gives to C, C gives to D and D gives to A, which makes everyone a sender AND a receiver.</td>
</tr>
<tr>
<td></td>
<td>RANDOM_DICTATOR</td>
<td>Subjects A,B,C,D are matched in groups of 2 (say (A; B) and (C;D)). One member of each group (say A and C) is selected to be the sender, the other one as receiver. In this case, B receives from A and D receives from C.</td>
</tr>
<tr>
<td>precision</td>
<td>TWO_DIGITS_AFTER_POINT</td>
<td>values on sliders are rounded to two digits after decimal point</td>
</tr>
<tr>
<td></td>
<td>INTEGERS</td>
<td>values on sliders are rounded to integers</td>
</tr>
<tr>
<td>scale</td>
<td>(0, +∞]</td>
<td>Parameter to scale up (&gt; 1) or down (&lt; 1) all the numbers on a slider. Default is 1, resulting in a circle of diameter 100</td>
</tr>
<tr>
<td>debug</td>
<td>{1;0}</td>
<td>set to 1 to display some debug info; set to 0 while running actual sessions</td>
</tr>
</tbody>
</table>

Table 1: Parameters in the z-Tree treatment
<table>
<thead>
<tr>
<th>Relevant Variables in the Subjects Table</th>
<th>Description</th>
<th>Relevant for Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>unique identifier for the Subject</td>
<td>always</td>
</tr>
<tr>
<td>Group</td>
<td>matching group of the Subject.</td>
<td>matching=RANDOM_DICTATOR</td>
</tr>
<tr>
<td>Profit</td>
<td>Profit of the Subject</td>
<td>always</td>
</tr>
<tr>
<td>input_self[i]</td>
<td>allocation to self in item i</td>
<td>always</td>
</tr>
<tr>
<td>input_other[i]</td>
<td>allocation to other in item i</td>
<td>always</td>
</tr>
<tr>
<td>random_ranks[i]</td>
<td>order of item i in RANDOM order</td>
<td>items_in_random_order = RANDOM</td>
</tr>
<tr>
<td>chosen_option[i]</td>
<td>chosen option on item i, counted from left to right (left-most option = 1, rightmost option = 9)</td>
<td>always</td>
</tr>
<tr>
<td>mean_to_self</td>
<td>mean allocation to self in primary items</td>
<td>always</td>
</tr>
<tr>
<td>mean_to_other</td>
<td>mean allocation to other in primary items</td>
<td>always</td>
</tr>
<tr>
<td>svo_angle</td>
<td>svo angle calculated as</td>
<td>always</td>
</tr>
<tr>
<td>svo_type</td>
<td>svo type, always</td>
<td></td>
</tr>
<tr>
<td>avg_dist_to_equality</td>
<td>average standardized distance of the choice to the choice which would maximize equality</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>avg_dist_to_altruist</td>
<td>average standardized distance of the choice to the choice which would maximize altruism</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>avg_dist_to_joint</td>
<td>average standardized distance of the choice to the choice which would maximize joint earnings</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>avg_dist_to_indiv</td>
<td>average standardized distance of the choice to the choice which would maximize individual gains</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>not_altru_indiv</td>
<td>Dummy taking the value 1 if</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>inequality_aversion_score</td>
<td>Degree of inequality aversion calculated as</td>
<td>select_items = FULL</td>
</tr>
<tr>
<td>paid_slider</td>
<td>slider selected for payment as sender</td>
<td>always</td>
</tr>
<tr>
<td>slider_as_receiver</td>
<td>slider selected for payment as receiver</td>
<td>matching=RING</td>
</tr>
<tr>
<td>kept_of_sender</td>
<td>amount kept by the sender</td>
<td>matching=RING</td>
</tr>
<tr>
<td>received_from_sender</td>
<td>amount received from the sender</td>
<td>matching=RING</td>
</tr>
<tr>
<td>kept_as_sender</td>
<td>amount kept as sender</td>
<td>matching=RING</td>
</tr>
<tr>
<td>sent_as_sender</td>
<td>amount sent as sender</td>
<td>matching=RING</td>
</tr>
</tbody>
</table>

\[
\text{svo_angle} = \arctan\left(\frac{\text{mean_to_self} - 50 \times \text{scale}}{\text{mean_to_other} - 50 \times \text{scale}}\right)
\]

\[
\text{svo_type} = \begin{cases} 1 = \text{Altruist} & \iff \text{svo_angle} > 57.15, \\ 2 = \text{Prosocial} & \iff 57.15 \geq \text{svo_angle} > 22.45, \\ 3 = \text{Individualist} & \iff 22.45 \geq \text{svo_angle} > −12.04, \\ 4 = \text{Competitive} & \iff \text{svo_angle} \geq −12.04 \end{cases}
\]

\[
\text{inequality_aversion_score} = \begin{cases} \text{avg_dist_to_equality} & \text{if } \text{not_altru_indiv} == 1, \text{else } -99 \end{cases}
\]

\[
\text{avg_dist_to_equality} = \frac{\text{avg_dist_to_equality} + \text{avg_dist_to_joint}}{2}
\]

Table 2: Relevant variables in the subjects table