

**Supplementary material to the paper**  
**“Incentivization matters: a meta-perspective on dictator games”**  
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**Overview.** These supplementary materials are structured into three sections.

**Appendix A:** A summary table of the protocols used in the different studies used in Engel (2011), together with a summary of the corrections applied to means and standard errors.

**Appendix B:** An overview over and explanation of the variables used in the meta-regressions.

**Appendix C:** Results obtained under alternative regressions.

All data, original and corrected, are available together with further details and analysis files at the Open Science Framework under <https://osf.io/xc73h/>.

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## A. PROTOCOLS USED AND CORRECTIONS OF REPORTED MEANS AND STANDARD ERRORS

Table A1 gives a summary of the applied protocol (standard [Std], interactive [Int], role uncertainty [RU], not classifiable [N/c]) and potentially incorrect reporting of mean or standard error of the mean [se] respectively for the 107 studies (445 treatments) where these data points were available and thus entered the meta-regression. More detailed information is given on our OSF repository at <https://osf.io/xc73h/>. See Engel (2011) for further bibliographical information.

Table A1—: STUDY OVERVIEW

Study	Protocol	Mean false	se false
Ackert Gillette 2009	RU		Yes
Ahmed 2008	Std		
Anderson Rodgers 2000	Std		
Andrade Ariely 2009	Std		Yes
Andreoni Bernheim 2009	Std		Yes
Asheim Helland 2008	Std		
Ashraf Bohnet 2006	N/c		Yes
Bardsley 2008	Std		Yes
Barr Wallace 2009	Std		Yes
Bellamare Kröger 2008	Std		Yes
Ben-Ner Kong 2004	Std		
Ben-Ner Kramer 2008	Std		
Ben-Ner Putterman 2004	Std		
Benenson Pascoe 2007	Std		Yes
Bohnet Frey 1995	Std		
Bohnet Frey 1999	Std		Yes
Bolton Katok 1998a	RU		Yes
Bolton Katok 1998b	Std		Yes
Bosch-Domenech Nagel 2010	Std		Yes
Boschini Muren 2008	Int		Yes
Bosco 2008	Std		
Branas-Garza 2006	Std	Yes	
Branas-Garza 2007	Std		
Branas-Garza 2009	Std		
Branas-Garza Duran 2009	Std		Yes
Branas-Garza Ottone 2009	Std	Yes	Yes
Brandstätter Güth 2002	Std		
Broberg Ellingsen 2007	Std		
Burnham 2003	Std		Yes
Cadsby Servatka 2009	Std		Yes
Cappelen Hole 2007	RU		Yes
Cardenas 2008	N/c		Yes
Cardenas Candelo 2008	Std		
Carlsson He 2008	Std		
Carpenter Burks 2004	Std		Yes
Carpenter Connolly 2008	Std		Yes

Carpenter Liati 2006	Int		Yes
Carter Castillo 2005	Std		
Cason Mui 1997	Std		Yes
Castillo Cross 2008	RU		Yes
Charness Gneezy 2008	Std		Yes
Chaudhuri Gangadharan 2007	Int		Yes
Cherry 2001	Std		Yes
Cherry Frykblom 2002	Std		Yes
Cox 2004	Std		Yes
Cox Deck 2006	Std		Yes
Cox Sadiraj 2008	Std	Yes	
Dana Cain 2006	Std	Yes	Yes
Dickson 2009	Std		Yes
Diekmann 2004	Std		
Duffy Kornienko 2009	Std		Yes
Dufwenberg Muren 2006	RU		Yes
Eckel Grossman 1996	Std		Yes
Eckel Grossman 1998	Std		Yes
Eckel Grossman 2000	Std		Yes
Eckel Grossman 2005	Std		Yes
Eichenberger Oberholzer-Gee 1998	Std	Yes	Yes
Ensminger 2004	Std		Yes
Farina O'Higgins 2008	Std		Yes
Fershtman Gneezy 2001	Std		Yes
Fisman Kariv 2007	Int		Yes
Fong 2007	Std		
Fong Luttmer 2009	Std		
Forsythe Horowitz 1994	Std		Yes
Frohlich Oppenheimer 2001	Std		Yes
Greiner Güth 2005	Std		
Gurven 2004	Std		
Gurven Zanolini 2008	Std		Yes
Haley Fessler 2005	Std		
Harbaugh Krause 2000	Int		
Harbaugh Krause 2003	Std		
Hoffman McCabe 1994	Std		Yes
Hoffman McCabe 1996	Std		Yes
Holm Danielson 2005	Std		Yes
Holm Engseld 2005	Std		Yes
Houser Schunk 2009	Std		
Johannesson Persson 2000	Std		
Kamas Baum 2005	Std		Yes
Klempt Pull 2009	Std		
Knafo Israel 2007	Std		Yes
Koch Normann 2008	Std		Yes
Korenok Millner 2008	Std		
Lazear Malmendier 2009	Std		Yes
Leider Möbius 2009	Std		Yes

List 2007	Std	Yes
List Cherry 2008	Std	Yes
Luhan Kocher 2009	Std	
Marlowe 2004	Std	Yes
Mittone Ploner 2006	Std	
Mohlin Johannesson 2008	Std	Yes
Oberholzer-Gee Eichenberger 2008	Std	Yes
Oxoby Spraggon 2008	Std	Yes
Rankin 2006	Std	Yes
Rigdon Ishii 2009	Std	
Ruffle 1998	Std	Yes
Saad Gill 2001	Std	Yes
Schotter Weiss 1996	Std	Yes
Schurter Wilson 2009	Std	Yes
Sefton 1992	Std	Yes
Selten Ockenfels 1998	RU	Yes
Slonim Garbarino 2008	Std	
Small Loewenstein 2003	Std	
Swope Cadigan 2008	Std	
Takezawa Gummerum 2006	Std	Yes
Vanberg 2007	Std	Yes
Whitt Wilson 2007	Std	
Xiao Houser 2009	Std	

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**Details on corrections.** The first authors to replicate Engel (2011) are Zhang and Ortmann (2012) and Zhang and Ortmann (2014) who identified data issues and coding problems in the original data and analysis with consequences for the interpretation of the meta-regression results. To understand Engel’s original meta-regression (cf. Table ??), one has to treat some apparently categorical variables as continuous variables, but others not.<sup>1</sup> More importantly though, given the importance of the weightings in meta-regression, we inspected standard errors as reported in Engel’s data set and found numerous sources of aberrations which can be categorized as follows:

- 1) *Confounds between standard deviations and standard errors.* The most common mistake is that reported standard deviations of measurements (sd) were identified with standard errors of their mean (se).<sup>2</sup>
- 2) *Normalization errors.* Standard errors are not properly rescaled to dictator endowments.<sup>3</sup>
- 3) *Errors in the original study.* The original study contained erroneous reporting.<sup>4</sup>

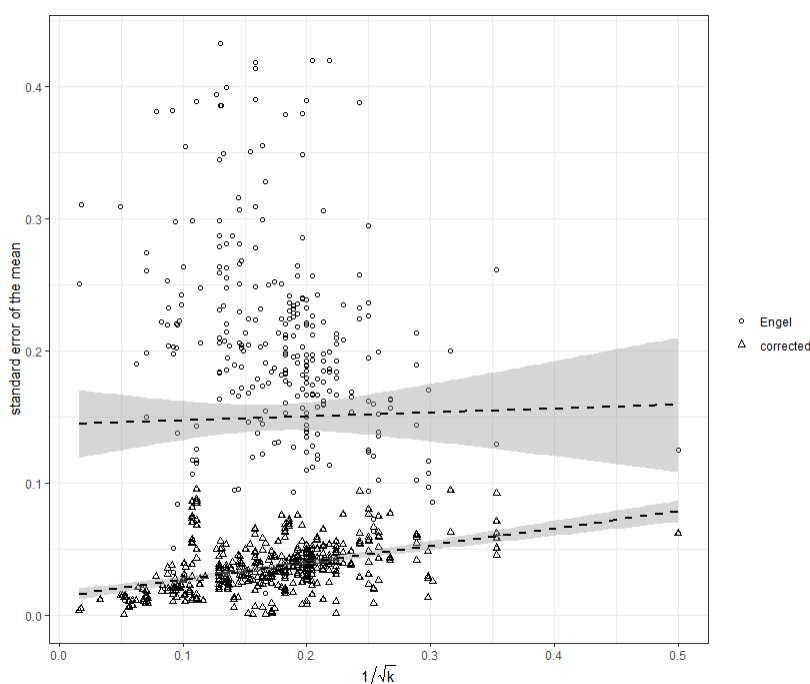


Figure A1. : STANDARD ERRORS DISTRIBUTION. The distribution of standard errors in the treatments (where available) considered by Engel as a function of  $1/\sqrt{k}$ , where  $k$  is the sample size in the given treatment. We note that this number is only available for 433 out of the 445 data point that enter Engel’s meta-regression. Both the original values in Engel’s study as well as our own, corrected, values are reported. Shading indicates the 95% confidence intervals of linear smoothing.

<sup>1</sup>Most controls have two factor levels, where such a differentiation has no impact. As for the remaining, ‘limited action space’ (3 levels), ‘degree of uncertainty’ (4), ‘incentive’ (3), ‘group decision’ (3), ‘concealment’ (3), ‘degree of social proximity’ (6) are treated as continuous variables, while for ‘age’ (4 levels; base level: student age), ‘primitive or developing’ ( $\sim$  state of development; 3 levels; base level: Western) respective binary variables are created. Once coded in line with Engel, a replication attempt based on his own data set results in some minor numerical deviations, which are likely due to different software packages and versions, even when re-running the original Stata do-file (see also footnote ??). Qualitative conclusions are mostly similar.

<sup>2</sup>For example, Fisman, Kariv and Markovits (2007) report standard deviations, which were erroneously equated with standard errors in Engel’s data. This results in ignoring the sample size  $k$  in relation to  $se = sd/\sqrt{k}$ , by which larger samples tend to yield more precise estimates, which is why they should be weighted more in a meta-regression.

<sup>3</sup>For example, Andrade and Ariely (2009) report standard errors of 0.38 and 0.39, respectively, for two different treatment groups and the same values are found in Engel’s data set, even though these values referred to an endowment of 10, and therefore should have been scaled down by this factor to describe the standard error of the mean *fraction* of giving.

<sup>4</sup>For example, Bosch-Domènech, Nagel and Sánchez-Andrés (2010) label variances as standard deviations, undetected by Engel, resulting in a too low weight of these data points in the meta-regression.

Figure A1 shows how Engel’s reported standard errors compare to what we found after checking the 131 papers underlying the meta-regression again, illustrating the magnitude of the corrections overall. In alignment to our findings above, the corrected standard errors take lower values than those reported in (Engel, 2011). Importantly, they also indicate a linearly increasing trend in  $1/\sqrt{k}$ ,  $k$  being the sample size of a given treatment in our data as predicted by elementary statistical theory (i.e. larger samples produce smaller confidence intervals) but absent in Engel’s data, thereby serving as a convenient cross-check for the plausibility of our standard error corrections.

## B. OVERVIEW OF VARIABLES

The first 21 rows in the following table correspond to Engel’s 24 variables (note that Engel chooses individual category dummies for ‘age’ and ‘development stage’).

Table B1—: VARIABLE DESCRIPTION

Name	Description	Type <sup>a</sup>	Engel’s implementation
<i>limited action space</i>	captures how free the dictator is to split his/her endowment	<i>3 levels</i> : unlimited/several options/two options	as continuous variable
<i>degree of uncertainty</i>	captures uncertainty of whether passed share arrives at the recipient	<i>4 levels</i> : 0/25%/50%/ 100%	as continuous variable
<i>incentive</i>	describes whether game was incentivized or not	<i>3 levels</i> : no incentive/random pay/each choice paid	as continuous variable
<i>repeated game</i>	captures whether the game was played repeatedly	binary	
<i>group decision</i>	captures whether the dictator’s decision was made by a group	binary <sup>b</sup>	
<i>identification</i>	captures whether the dictator’s identity is made public	binary	
<i>social cue</i>	captures whether the dictator is exposed to a social cue (e.g. a verbal or non-verbal hint) prior to making his/her decision	binary	
<i>concealment</i>	captures whether the recipient will see which fraction of the endowment the dictator has passed	<i>3 levels</i> : no concealment/ optional/mandatory	as continuous variable
<i>double blind</i>	captures whether a double blind implementation was used	binary	
<i>take option</i>	describes whether dictator may take rather than give	binary	
<i>deserving recipient</i>	captures whether the recipient is in need of money	binary	
<i>recipient earned</i>	captures whether the recipient earned the dictator’s endowment	binary	
<i>recipient efficiency</i>	measures by which factor a passed amount is multiplied	continuous	
<i>multiple recipients</i>	captures whether there are multiple recipients or not	binary	
<i>recipient endowment</i>	captures the dictator’s endowment in relation to the receiver	continuous	
<i>dictator earned</i>	captures whether the dictator earned his/her endowment	binary	
<i>real money</i>	describes whether real money is used	binary	
<i>degree of social proximity</i>	describes how distant the relationship between dictator and recipient is	<i>6 levels</i> : foreign group/ unspecified or other/same group/ friend of friend of friend/friend of friend/friend	as continuous variable
<i>student</i>	captures whether or not the dictator was a student	binary	
<i>age</i>	captures the age of the dictator	<i>4 levels</i> : child/student age (base)/ middle age/old age	as categorical variable
<i>development stage<sup>c</sup></i>	captures the state of development of the country the dictator lives in	<i>3 levels</i> : Western/ developing/primitive	as categorical variable
<i>protocol</i>	describes the experimental protocol which was used	<i>4 levels</i> : standard/interactive/role uncertainty/non-classifiable	our implementation as categorical variable

<sup>a</sup> Base is first level unless indicated otherwise.

<sup>b</sup> Among the 445 relevant data points (3 levels in the total sample with 620 treatments).

<sup>c</sup> ‘primitive or developing’ in original data set.

C. ALTERNATIVE REGRESSIONS

Table C1—: REGRESSIONS WITH ALL VARIABLES AS CATEGORICAL

Principal variable (where applicable)	Level variables	Protocol differences	+ Interaction Effect
<i>limited action space</i>	several options	-0.008	-0.008
	two options	-0.129 <sup>+</sup>	-0.129 <sup>+</sup>
	degree of uncertainty	-0.043	-0.044
<i>incentive</i>	random	-0.055	-0.053
	each choice paid	-0.082 <sup>*</sup>	-0.081 <sup>*</sup>
	repeated game	-0.060 <sup>**</sup>	-0.060 <sup>**</sup>
	group decision	-0.090 <sup>*</sup>	-0.092 <sup>*</sup>
	identification	0.057 <sup>**</sup>	0.057 <sup>**</sup>
<i>concealment</i>	social cue	-0.032	-0.034
	optional	-0.080 <sup>**</sup>	-0.081 <sup>**</sup>
	mandatory	-0.137 <sup>+</sup>	-0.136 <sup>+</sup>
	double blind	0.003	0.004
	take option	-0.065	-0.064
	deserving recipient	0.127 <sup>***</sup>	0.127 <sup>***</sup>
	recipient earned	0.133 <sup>***</sup>	0.132 <sup>***</sup>
	recipient efficiency	0.020 <sup>+</sup>	0.013
	multiple recipients	0.097 <sup>**</sup>	0.098 <sup>**</sup>
	recipient endowment	-0.126 <sup>***</sup>	-0.125 <sup>***</sup>
	dictator earned	-0.173 <sup>***</sup>	-0.174 <sup>***</sup>
	real money	0.017	0.016
	<i>degree of social proximity</i>	unspecified/other group	-0.015
same group		-0.099 <sup>*</sup>	-0.098 <sup>*</sup>
friend of friend of friend		-0.202 <sup>**</sup>	-0.200 <sup>**</sup>
friend of friend		-0.186 <sup>**</sup>	-0.184 <sup>**</sup>
friend		-0.172 <sup>*</sup>	-0.170 <sup>*</sup>
<i>age</i>	student	-0.118 <sup>***</sup>	-0.122 <sup>***</sup>
	child	-0.091 <sup>*</sup>	-0.093 <sup>*</sup>
	middle age	-0.001	0.001
<i>development stage</i>	old age	0.320 <sup>***</sup>	0.317 <sup>***</sup>
	developing	0.003	0.003
<i>protocol</i>	indigenous	-0.003	-0.007
	interactive	-0.042 <sup>+</sup>	-0.134 <sup>**</sup>
	role uncertainty	-0.050 <sup>+</sup>	-0.051 <sup>+</sup>
	non-classifiable	-0.034	-0.029
	recipient efficiency × interactive		0.083 <sup>*</sup>
	intercept	0.450 <sup>***</sup>	0.460 <sup>***</sup>
N		445	445
adjusted $R^2$		0.548	0.551

Significance levels: 0.1% is coded as \*\*\*, 1% as \*\*, 5% as \* and 10% as <sup>+</sup>.

\*

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