Warm glow in charitable auctions: Are the WEIRDos driving the results?

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1. Introduction

The satisfaction that comes from contribution has long been identified as a motivation behind donations for public goods provision. The term 'warm glow' was first coined by Andreoni (1989) to distinguish among the pure egoist deriving utility (warm glow) from donating, like from any other private good, and the pure altruist being concerned only with the level of provision of a public good irrespectively of the method that this is financed. Since then, there has been ample evidence of satisfaction generated by the act of giving in empirical studies in real and hypothetical settings. Nunes and Schokkaert (2003) have used a list of attitudinal statements to identify potential warm glow incentives in a contingent valuation study. Their empirical results confirm the presence of warm glow in elicited willingness-to-pay (WTP) values. In a recent experiment, Crumpler and Grossman (2008) examine giving in a dictator game presenting participants with the opportunity to contribute in a charity of their choice. Participants' contributions were crowded out by reduced giving by the proctor, so that the charity would always receive a preset amount. Contributions were thus motivated only by warm glow and authors report a significant percentage (approximately 57%) of respondents making positive contributions. Elfenbein and Mc Manus (2007) employ data from eBay's charity auction program and compare revenues from identical products sold in charity and non-charity auctions. Authors report a charity premium of 6% which increases with the share of revenue donated.

In line with these findings, Andreoni and Payne (2010) using a panel of 8.000 charities report a very low crowding out effect (even crowding in the case of some charities) of donors' contributions due to government grants. Earlier empirical studies have also provided significant evidence of low crowing out of private contributions by government expenditures calling into question the long dominant neutrality theory predicting dollar-for-dollar crowding out of private contributions in the presence of government donations (see Crumpler and Grossman (2008) and Andreoni (2006) for a detailed review of the relevant literature).

Neural evidence further supports the existence of warm glow motives. Harbaugh et al. (2007) report certain neural activity taking place in areas known to respond to rewards when a payment to a public good is made. Consistent with the warm glow argument, this brain activation further increases when people make voluntary donations compared to mandatory tax payments. This is an indication that warm glow provides the giver a reward that is higher than the benefit the giver receives from paying an equivalent amount of taxes.

On the other hand, Isaac et al. (2010) did not find any evidence of warm glow when revenues from an auction were donated to actual charities. Their results were robust even when a specialized subject pool, consisting of students affiliated with a local church which already supported the charity, was used in the experiment. However, in contrast to what we do in this paper, in the above applicationwarm glow was not isolated from pure altruism.

Meanwhile, a common criticism of laboratory experiments is that participants are usually students from western developed countries and thus results may not be representative of the entire population and consequently generalizable to consumer behaviour. Convenience, due to proximity to the experimenter, and low cost, due to

minimal monetary incentives required for their participation, are the main advantages of employing university students (Feltovich 2011). Further, students exhibit high cognitive skills and adapt quickly to the experimental setting which is an additional advantage explaining their wide use in experiments in many disciplines. However, concern on the use of students as research surrogates for consumers or adults in general, is rather old (McNemar, 1946; Enis et al., 1972). McNemar's (1946) reference to the "science of sophomores" is indicative. Another manifestation of this early scepticism over experimenters' reliance on undergraduates is the Cunningham et al. (1974) paper bearing the provocative title "Are students real people?"

Reservations are attributed to the fact that students exhibit psychological, social and demographical differences from other segments of the population along with the fact that they are not yet complete personalities and thus their attitudes are unstable (Harisson and List, 2004; Sears, 1986). On the other hand there are arguments favouring the use of students as experimental subjects when the nature of the research is universal. As stated by Lusk and Shogren (2007, p46): 'A theory is a generalization that should hold for everyone, *including students*'. Following this line of reasoning using student samples, when the aim of the study is to test a theory, is of little concern. After six decades of research the debate is still active. Henrich et al. (2010) call the usual subject pool of experiments as WEIRDos, being an abbreviation of the Western, Educated, Industrialized, Rich and Democratic societies they live in and argue that generalization of the findings relied upon these subjects can be misleading since they are outliers of the rest of humanity. Authors review a broad literature providing evidence of significant variability across human population and argue that universality cannot be claimed not even for fundamental behavioural processes. The arguments developed triggered the release of a special issue in the Behavioral and Brain Sciences journal (vol. 33, Issue 2-3, 2010) accommodating commentaries to the article and replies by the authors. The majority of the commentaries are supportive to the main thesis developed in the target article with authors agreeing on the need for research on culturally diverse, non-weird populations to permit generalization of the findings.

Applying a second-order meta-analysis of studies examining the external validity of experiments that use student pools, Peterson (2001) concludes that ''…researchers should be cautious when using college student subjects and be cognizant of the implications of doing so if the purpose of the investigation is to produce universal principles''. In line with this argument, more recent research comparing undergraduate student samples with samples drawn from the general population, reports considerably smaller other-regarding considerations among the students. Students have been found to be less cooperative (Burks et al., 2009; Carpenter and Seki, 2010; Anderson et al., 2010), more inclined to free-ride (Anderson et al., 2010), exhibit different trust attitudes and thus contribute less in public good experiments (Gachter et al., 2004), exhibit less loss aversion when compared to professional traders (Haigh and List, 2005) and are more selfish compared to workers as manifested by extremely decreasing offers in Ultimatum and Dictator games (Carpenter et al., 2004). In experimental auctions, studies attempting an external validity test of the results from student pools are rather few. Depositario et al. (2009) have found no significant differences in the bidding behaviour between students and the general population in an auction eliciting WTP for a novel food. A similar result is reported by Lusk (2005) in a meta-analysis of genetically modified food valuation

studies. Authors, however, argue that their results should be treated with caution since the literature examining the validity of extrapolating the results from auctions with students to the broader population is rather limited.

Against this background we investigate the existence of warm glow considerations in charitable auctions and examine the validity of results derived from a student pool when a representative sample is employed. Our research thus opts to contribute to the ongoing debate on the legitimacy of generalizing results from students to the broader population. We also address the call for further empirical investigation of the existence of warm glow motives in charitable auctions given the mixed evidence from the existing studies. We conducted one set of sessions with a standard student pool in what constitutes a *conventional lab experiment* (in Harrison and List's (2004) terminology) and a second set of sessions with a representative sample of consumers (*artefactual field experiment*). We differentiate from the existing literature in that our experimental procedures were designed to isolate warm glow by donating revenues from auction winners to the charity of the majority's choice by crowding out proctor's contribution. This procedure is in essence a combination of the procedures employed by Isaac et al. (2010) and Crumpler and Grossman (2008). Comparing with standard auction (control) treatments we find that the warm glow theory is verified only for the student sample, suggesting that arguments supporting that results and conclusions from lab experiments with student pools can be extrapolated to a more general population of interest, merit greater attention.

2. Experimental design

The laboratory experiment was conducted in an experimental economics lab in the ... University of ... (Western Developed economy; removed for peer review, to be adjusted upon publication) using the z-Tree software (Fischbacher, 2007). For the consumer sessions, a random sample of the population of the city of AAA (capital city of the country; removed for peer review, to be adjusted upon publication) was drawn. Recruitment was undertaken by a professional research company. For the student sessions, subjects were recruited from the undergraduate student population of the university. None of the authors was their professor.

A variant of the Vickrey auction, a fourth-price sealed-bid auction was used to determine subjects' buying price for the products in auction. The specifics of the nature of the experiment were not mentioned during the recruitment but we did provide information regarding the provision of stochastic fees. Stochastic fees have been shown to be able to generate samples that are less risk averse than would otherwise have been observed (Harrison et al. 2009).

Our design involved two treatments, namely a standard auction treatment and a charitable auction treatment. Four sessions[1] (two sessions per treatment) were conducted with a total of 61 consumers and two sessions (one session per treatment) with a total of

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[1] In session 2 and session 4 of the consumer sessions, subjects were given additional information on the higher health risk to which children are exposed, given their longer time span, when consuming contaminated agricultural products. The aim of these two sessions was to further examine whether consumers respond differently when provided with this extra information. Results of this analysis will be reported elsewhere. Although it is out of the scope of this paper, a dummy variable indicating whether additional information was provided to respondents is included in the econometric analysis to control for potential information effects (see table 3).

36 students. The average duration of a session was a little more than an hour and experiments were conducted in June 2010. Each session included a training phase and an auction phase. For the treatment that aimed to isolate warm glow, a charity selection phase preceded the auction. Subjects were given prior instructions on the overall layout of the session and were also reminded the procedures at the beginning of each phase.

Table 1 shows the experimental design. We only used one proctor or monitor (i.e., one of the authors) for all sessions. To further preclude experimenter bias, subjects were informed that the correspondence between the id number of their computer and their identity would remain unknown to the experimenter and to the other participants at every stage.

Table 2 displays the socioeconomic characteristics of the subjects.

[Table 2 here]

2.1 The training phase

After arriving at the lab, subjects were randomly assigned to a computer. A computer-training phase was conducted for subjects in the consumer sessions that did not have previous experience with computers. An interactive PowerPoint application was used that allowed subjects to familiarize with the mouse and keyboard. The training with the auction phase followed.

To control for possible monetary endowment effects, subjects were told that further to their participation fee, a random amount of money was going to be assigned to each one of them. For consumers this amount ranged between €0.5 and €5 and for students between €0.5 and €3. Participation fees were fixed to 20€ for consumers and 15€ for students. Different fees intended to approximate what is a standard compensation fee for these subjects' pools given their income and the opportunity costs they faced for participation. Everyone then received a random draw determining their individual-specific extra fee. We emphasized to the subjects that the endowment they received was private information and that they should not communicate this information to other subjects in the lab. All transactions were completed at the end of the experiment.

Subjects initially watched a short PowerPoint presentation to familiarize them with the auction and procedures. The presentation included a short explanation of the fourth-price auction, along with a numerical example demonstrating why it is in subjects' best interest not to deviate from bidding their true value for the good under evaluation. Subjects then took a short computerized test regarding the procedure. The monitor explained the correct answers afterwards.

Subjects, then, bid in three practice *hypothetical* auction rounds for a bag of potato chips. The monitor emphasized that these rounds were hypothetical and that one binding round would be randomly chosen at the end of these rounds. A screen displayed subjects' hypothetical earnings after these rounds.

After getting fully familiarized with the auction mechanism and procedures, subjects bid in three *real* auction rounds for a chocolate bar. The monitor emphasized that these rounds were now real and that the highest bidders would actually pay for the products. Again, one round was randomly chosen as binding at the end of these rounds. A screen displayed subjects' earnings after these rounds. Between rounds the only available information was whether the subject was one of the highest bidders or not.

2.2 The charity organization selection phase

This phase was only applied in the charitable auction treatment (see Table I). Subjects were asked to select their favorite organization from a list of six non-government organizations (NGOs) with the understanding that the NGO selected by most subjects in the session will be donated an amount of €30 by the proctor. Subjects were told that deposit verification will be sent to everyone's mail address. The donation amount was specified to 30€ since usually this is what most NGOs request for annual membership. All charities were environmental NGOs and a short description from each NGOs website was provided to subjects (all experimental instructions, supplemental material and information provided to subjects are available at https://sites.google.com/site/warmglowweirdos/). The selected charity was revealed only after the auction phase was through.

2.3 The auction phase

In the auction phase subjects were endowed with one kilo of potatoes from a very specific location of the country. The region was *never* revealed to subjects and was called with the generic name "region A". Potatoes were packed in paper bags and were labeled "Potatoes from region A".

A leaflet was then distributed to subjects that described the environmental profile of region A (see Appendix). In brief, the leaflet mentioned that the initial potatoes endowment from region A is of unknown quality due to extensive pollution of the groundwater but the risks for human health could not be assessed since the epidemiological study in the area of origin was not completed. The description accurately described region A and in fact epidemiologists and agronomists that study the environmental health effects of this specific region were advised about the content of the leaflet (see Appendix).

Subjects were then asked to bid to exchange a kilo of potatoes from region A with a kilo of potatoes from region B. A second leaflet was subsequently distributed to subjects (prior to the actual auction) with a description of the environmental profile of region B (see Appendix). In brief, the leaflet described region B as being in a good ecological status (in the terminology of the European Water Framework Directive) and explained that this characterization implies that, among others, agricultural products are safe for human health. We made sure that potatoes from the two regions are of the same variety to avoid differences in appearance characteristics. Potatoes were packed in a similar paper bag and were labeled "Potatoes from region B". Both potatoes are available at the market for sale but the origin was not revealed to subjects to avoid regional affiliation effects. The label was the only visible difference between the two products.

To elicit subjects' WTP, a 4th price Vickrey auction was employed. Vickrey auctions are demand revealing, that is, each bidder has a dominant strategy to submit a bid that truthfully reflects her value for the good. Considering the size of the session groups and the likelihood of disengaging some of the participants due to small number of winners, the 4th price auction was regarded as a compromise between a 2nd price auction and a nth random price auction for engaging off-margin bidders. Subjects participated in five consecutive rounds and were told that at the end one round would be randomly chosen as binding. Between rounds subjects again could only observe if they were one of the highest bidders of the previous round or not.

2.4 Isolating warm glow incentives

In the charitable auction treatment, subjects were additionally informed that the revenues from the highest bidders would be donated to the charity selected by the session's majority on their behalf and a deposit receipt would be mailed to the address of the highest bidders.

To disentangle motives behind donations in the charity treatment we followed Crumpler and Grossman (2008). We crowded out participants donation by reduced giving by the proctor, so as to keep the charity contribution constant at €30. Subjects were told that the charity would receive neither more nor less than €30 and that the monitor would add to the contributions by the highest bidders that much, so that the total amount would always sum to €30. Only respondents with warm glow incentives, purchasing moral satisfaction from the act of giving itself, had thus incentive to contribute higher in the charitable auction sessions. Since the amount the charity would be receiving was preset (fixed), pure altruists, deriving utility from increases in provision of public goods, had no incentive to raise their contribution when a charitable session was employed. If, however, average bids are higher when a charity treatment is employed, there is an evidence of warm glow i.e., people derive utility from their contribution irrespective of the level of provision of the public good. Thus, the main advantage of this design is its ability to isolate warm glow incentives from pure altruism.

To check respondents understanding of the donation mechanism we asked three test questions. Subjects that failed to answer two or more questions were dropped from the subsequent analysis which resulted in dismissing observations from 2 individuals.

2.5 The post-auction phase
The socio-economic background of the subjects was elicited in the final phase.

3. Research Hypothesis and Data Analysis
To scrutinize our data for warm glow we need to examine whether submitted bids in the charitable auction treatment (where revenues by highest bidders are donated to the charity) are higher than bids in the standard auction procedure (where revenues are collected by the experimenter to provide the good). Higher WTP estimates in the charitable auction treatment would be evidence of warm glow motives. We are further interested in investigating whether similar results are obtained between subject pools. Students are commonly used in economic laboratory experiments. Especially when it comes to methodological studies, it is very common for experimenters to employ WEIRDos as their guinea-pigs and rarely to question the appropriateness of generalizing the inference on observed behaviour, from this sample to the general population. Our study, therefore offers a test of external validity of the experimental results when student pools are employed contributing to the ongoing debate on whether results from students can be extrapolated to the entire adult population.

3.1 Econometric analysis
To account for the panel nature of our data, we estimated a random effects regression model for each subject pool, as well as for the pooled sample. Variables in the regression function for each subject pool are displayed in Table 3 and explained in table

2. We assume bidding behavior to be affected by: the treatment variables, the respondents' socio-demographic characteristics, perceived health risk associated with the consumption of potatoes from areas A and B, respectively, and the potato consumption habits.

[Table 2 here]

Table 3 displays regression coefficients

[Table 3 here]

Students bid on average €0.44 more in the charitable auction compared to the standard auction which is a clear evidence of warm glow. On the other hand, consumers in the charitable auction sessions bid on average €0.25 less than consumers in the standard auctions. Note that the coefficient is marginally not significant (p-value=0.106).

The pooled model reconfirms inferences drawn from the two subsamples. Students that participated in the charitable auctions bid on average €0.44 more than students that participated in the standard auction sessions. On the other hand, consumers that participated in the charitable auctions bid on average €0.29 less than consumers that participated in the standard auctions.

4. Conclusions

Student pools are widely used as experimental subjects in laboratory applications. After six decades of research in experimental economics, the question on the representativeness of students and consequently on the extent to which results derived from studies with students generalize to the entire adult population is still open, triggering hot debates. This study offers an external validity test of the presence of warm glow motives when a charitable auction is administered to students. We find that student subjects drawn from a university population and consumer subjects drawn from the general population behaved in a completely opposite direction. The student pool verified the presence of warm glow motives behind charitable giving. Student subjects were bidding more in an auction that contributed the sum of revenues by highest bidders to a charity, than a control group that was bidding in a standard auction. This was so, even though subjects knew that their contribution was crowded out by reduced giving by the proctor. Oddly, the consumer subject pool was bidding less than the control group. Although previous evidence, based on experiments invoking other-regarding considerations, suggests that students are generally more selfish and much less generous than subjects from the general population (Belot et al., 2010; Carpenter et al., 2008; Anderson et al., 2010), results from our study indicate that students may well exhibit stronger warm glow incentives.

The present study therefore shows that inferences drawn from a student population are not automatically transferable to the general population even when a methodological issue is explored. Students and non-student pools differ in a variety of social, economic and demographic dimensions that likely influence their experimental behaviour as substantial accumulated evidence from experimental studies suggests. Whether different subject pools can lead every economic experiment to different inferences is not a generalization we want or can make. We further recognize that consumers from western and developed societies, like those participated in our experiments, can be as weird as students and therefore claims of universality of our results are not intended. The results from this study do urge, in agreement with the concerns raised by Henrich et al. (2010),

for validation of the results drawn from WEIRDos using representative and diverse samples before firm conclusions are drawn.

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6. Tables

Table 1. Experimental design and number of subjects by session

	Students	*Consumers*
Charitable auction Treatment	18	29 (15+14)
Non charity (standard auction) Treatment	18	32 (16+16)

Table 2 Variable description

Variable	Variable description	Students		Consumers	
		Mean	**SD**	**Mean**	**SD**
Bid	Bid to exchange product	0.626	0.628	0.604	0.589
Charity	Dummy, 1=Subject participated in the charitable auction	0.500	0.507	0.458	0.502

*Students**	Dummy, 1=Subject is student	Mean: 0.379 SD: 0.488			
HRisk	Dummy, 1=Subject received additional health risk information regarding children	-	-	0.492	0.504
TotFee	Total money endowment	16.917	0.806	22.805	1.531
t_i	Dummy, 1=Round *I* where *i*=1 to 5	0.2	0.4	0.2	0.4
Age	Subject's age	20.972	1.665	41.508	9.839
Gender	Dummy, 1=male	0.389	0.494	0.305	0.464
Income	Dummy, 1=Subject's household economic position is above average	0.361	0.487	0.475	0.504
Kids	Dummy, 1=Subject has underage kids	-	-	0.339	0.477
Educ	Dummy, 1= subject is 4th year student or higher	0.306	0.467	-	-
	Dummy, 1=Subject has a university diploma **	-	-	0.610	0.492
*DangA****	Dummy, 1=Subject perceives consumption of agricultural products from region A as being dangerous for her health	0.611	0.494	0.864	0.345
*NotDangB***	Dummy, 1=Subject perceives consumption of agricultural products from region B not being dangerous for her health	0.805	0.401	0.830	0.378
$ConsPot_1****$	Dummy, 1=Subject consumes potatoes 1-2 times/month or less	0.083	0.280	0.153	0.363
$ConsPot_2$	Dummy, 1=Subject consumes potatoes 1 time/week	0.222	0.421	0.186	0.393
$ConsPot_3$	Dummy, 1=Subject consumes potatoes 2-3 times/week	0.527	0.506	0.441	0.501
$ConsPot_4$	Dummy, 1=Subject consumes potatoes 4-5 times/week or more often	0.166	0.378	0.220	0.418

* Only applicable to the pooled model, ** This is the definition used in the pooled model as well, *** These were measured on 7-point Likert scales and were dummy coded for the analysis, **** Excluded from estimations to avoid perfect multi-colline

Table 3 Results from random effects regression models

		Pooled sample		Consumer subject pool		Student subject pool	
		Coef.	Std.Error	Coef.	Std.Error	Coef.	Std.Error
Constant		2.329**	1.087	1.769	1.267	4.677**	1.854
Charity	*Student=1*	0.443**	0.172	-0.251	0.155	0.441***	0.138
	Student=0	-0.297**	0.139				
Student	*Charity=1*	-0.157	0.357	-	-	-	-
	Charity=0	-0.897**	0.372				
Hrisk		-0.148	0.137	-0.208	0.148	-	-

TotFee	-0.098**	0.042	-0.073	0.050	-0.207**	0.098
T_2	0.074***	0.027	0.058*	0.033	0.098**	0.046
T_3	0.131***	0.027	0.149***	0.033	0.103**	0.046
T_4	0.157***	0.027	0.189***	0.033	0.104**	0.046
T_5	0.194***	0.027	0.236***	0.033	0.125***	0.046
Age	0.003	0.007	0.005	0.008	-0.083	0.060
Gender	-0.159	0.113	-0.094	0.171	-0.243*	0.146
$Income_2$	0.182*	0.107	0.235	0.146	0.033	0.146
$Educ_2$	-0.037	0.142	0.007	0.155	0.216	0.209
Kids	-	-	-0.068	0.168	-	-
DangA	0.238*	0.137	0.079	0.236	0.404***	0.137
NotDangB	0.388***	0.143	0.436**	0.209	0.429**	0.174
$ConsPot_2$	0.386**	0.195	0.392	0.275	0.512*	0.277
$ConsPot_3$	-0.024	0.176	-0.170	0.241	0.356	0.243
$ConsPot_4$	0.126	0.192	-0.004	0.251	0.656**	0.303
R-squared	0.288		0.278		0.550	

Note: ***, **, * = Significance at 1%, 5%, 10% level.

Appendix
Environmental profile of region A
Region A is characterized by intensive industrial activity, with many of the industries not fulfilling the safety standards, and intensive agricultural activity. Underground water analysis has revealed the presence of heavy metals, such as chromium and nickel, which **may** have contaminated plants through irrigation. The severity of these substances for human health depends on the **degree** and the **duration** of the **exposure**. However, an epidemiological study assessing accurately the risks for human health from the consumption of agricultural products from region A, **has not been performed yet**. In addition, with respect to potatoes heavy metals tend to accumulate in the skin of potatoes and not in the interior that is commonly consumed.

Environmental profile of region B
Region B is classified as in **good ecological** status, according to the European Water Framework Directive. The good ecological status guarantees that pollution loads are **minor** such that there is no risk for human health and aquatic life. The agricultural sector follows **good agricultural and environmental practices** and there is no industrial activity in the area. Measurements in potatoes from the area revealed that the accumulation in heavy metals is far below the international safety levels.