NBER WORKING PAPER SERIES

WHY DO PEOPLE VOLUNTEER? AN EXPERIMENTAL ANALYSIS OF PREFERENCES FOR TIME DONATIONS

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Working Paper 19066 http://www.nber.org/papers/w19066

NATIONAL BUREAU OF ECONOMIC RESEARCH 1050 Massachusetts Avenue Cambridge, MA 02138 May 2013

We would like to thank the Texas A&M Humanities and Social Science Enhancement of Research Capacity Program, Texas A&M College of Liberal Arts Seed Grant Program, and the College of Liberal Arts at Texas A&M for providing generous financial support for our research. We have benefited from comments by Catherine Eckel, Ericka Farret, and seminar participants at Chapman University, the University of California - San Diego, Washington State University and the 2012 North American Economic Science Association Meetings. We would also like to thank Xiaoyuan Wang and Jeremy West for helping to conduct the sessions. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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Why Do People Volunteer? An Experimental Analysis of Preferences for Time Donations Alexander L. Brown, Jonathan Meer, and J. Forrest Williams NBER Working Paper No. 19066 May 2013 JEL No. D64,H41

ABSTRACT

We conduct a laboratory experiment to test if there are differences in behavior when subjects can donate either time or money to charity. Our subjects perform an effort task to earn money. In one condition they can have their efforts accrue to a charity instead of themselves. In other conditions subjects may only earn money for their private account but then donate it to a charity. We vary the timing and availability of donation opportunities in the monetary donation settings to test the impact of subtle solicitation pressure. We find that subjects with a more opportunities to donate will donate more often and in larger amounts. Further, subjects giving effort to charity give far more than subjects who give monetary donations – between two and five times as much, on average. We posit that this difference is driven by different warm glow from the two donation types.

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1 Introduction

Most non-profit organizations rely on donations of both money and time—that is, volunteering. Though both types are substantial,¹ most of the literature on this topic addresses aspects of monetary donations. In most charitable giving models, a sophisticated donor should maximize the benefit of her donation to the organization subject to her personal costs. For instance, when a consultant whose hourly rate is \$100 donates her time at a local soup kitchen, it is unlikely that the kitchen is getting \$100 worth of increased service provision, yet this was the opportunity cost of the donation. The charity would be better served if the consultant had worked an extra hour and donated her extra salary to them. Further, her opportunity cost would have been identical.

The experiments in this paper are largely inspired by the observation that many high earners do, in fact, volunteer their time.² It is our hypothesis that individuals may volunteer because they derive higher levels of warm glow when donating time and effort than when donating money. Our experimental design controls wage rates and tasks to directly test whether individuals gain different levels of utility from donating money to charity and working an equivalent amount directly for charity. Our main result is that subjects are more likely to donate and give more when working for directly for charity than when working for themselves and then later donating their earnings to charity.

The experimental laboratory is a nearly perfect environment for examining our primary research question. Subjects perform *identical* tasks for charity or themselves, ruling out working for charity due to heterogeneous ability or convex preferences over tasks. It is unlikely that an experiment could feature this level of control in the field. One potential issue is that the nature of our experiment requires offering individuals the choice to volunteer throughout the task; it is therefore plausible that the volunteering condition features a greater level of solicitation. Then it is greater solicitation—not greater warm-glow from working directly for charity—that is responsible for our main result. To address this concern, we

¹In 2010, approximately 8.1 billion hours of volunteering were provided in the United States (Corporation for National & Community Service, 2011) with an estimated market value of nearly \$173 billion. Total monetary gifts to charitable organizations were \$291 billion (Giving USA Foundation, 2011).

²For example, data from the 2011 American Time Use Survey shows that, among full-time workers over 25 years of age, volunteer rates are similar across quartiles of the earning distribution, with the 4.9% of the bottom quartile volunteering an average of 2.15 hours on the day the time diary was collected, conditional on volunteering, and the 5.2% of top quartile volunteering an average of 2.14 hours (United States Department of Labor, 2010). Additionally, the 2010 Study of High Net Worth Philanthropy (Center on Philanthropy at Indiana University, 2010), surveying individuals with household incomes over \$200,000 and/or a non-residential net worth over one million dollars, found that nearly 80% of these individuals with volunteered in a given year, with half that number volunteering over 200 hours.

compare our volunteering condition to three separate conditions all with varying levels of solicitation. In the most extreme case, subjects have the opportunity to give to charity for the entire experiment, the equivalent duration of the volunteering condition. Thus, our experiment also features a secondary, somewhat unintended, research question: the effect of solicitation on charitable giving.

To address both research questions, the experimental design makes use of four conditions. To examine the effects of solicitation, the experiment includes three conditions that allow subjects to give earnings to charity under varying levels of solicitation. To investigate our primary research question, we compare the results of these monetary donation conditions to one that allows subjects to volunteer directly for charity. In the baseline, "Donate at End", condition, subjects earn money first and then decide how much to donate. This setting is the stylized version of the standard monetary gift to charity. Having established this baseline, we add a simple reminder that subjects will have the opportunity to donate to their pre-selected charity at the end of the experiment (we refer to this as "non-actionable solicitation" and to this condition as "Continual Reminder"). Another condition allows subjects to donate any part of their earnings at any time during the experiment ("actionable solicitation," or the "Continual Donation" condition). Finally, we allow subjects to choose to earn money for themselves or *directly* for charity (we refer to this as the "Toggle" condition, since subjects can switch back and forth easily); this condition is a stylized version of volunteering.

As with others (e.g. Andreoni et al., 2011; DellaVigna et al., 2012; Meer and Rosen, 2011) who find evidence of the power of solicitation, we find that the Continual Donation condition attracts more donations, though not necessarily larger ones, than our non-actionable Continual Reminder condition, which in turn is not greatly different than the baseline Donate at End condition. We therefore conclude that non-actionable solicitation in the form of subtle reminders have no impact on donative behavior in our environment. Actionable solicitations, however, do have an impact. The increases in donations are mainly driven by more subjects choosing to donate (extensive margin) and not by an increase in giving behavior among givers (intensive margin).

These additional forms of solicitation do not fully explain the differences across conditions. When working directly for charity in the Toggle condition, subjects are more likely to give and give substantially more on every dimension (including conditional on making any gift) than in any of the other monetary donation conditions. The differential results in Toggle are most striking when compared to Continual Donation which, as described later, effectively allows subjects to produce identical donation patterns as in the Toggle condition. We interpret these findings to be a rejection of a prediction that agents only care about the value of their donation, and not the way it was donated. Our findings suggest that volunteering produces more warm glow than monetary donations.

While we believe that differential warm glow drives our results, we consider other explanations in Section 6. In particular, we discuss the role that loss aversion might play, as well as other explanations like differential cost of donation across conditions, momentum, and subject miscalculation.

Of course, volunteering activities in the field have a number of attributes that are different from work. When an individual volunteers for charity, she may see the grateful faces of others, receive greater recognition for her contribution, make valuable social contacts, or perform a task so different from her work that she may view it as leisure. We readily concede these issues. These features, though, should *increase* the utility individuals receive from volunteering relative to donating money in the field, thereby working against our main finding. The fact that we observe working for charity creates more donations than donating money in the lab, given these points, suggests the effect would be greater in the field.

The remainder of our paper is organized as follows: In Section 2 we present the relevant literature. Then, Section 3 presents the theoretical framework. Section 4 discusses our experimental design and our predictions. Section 5 presents our results, with Section 6 presenting alternative explanations for our main results. Section 7 closes our paper with a brief discussion of our work and concluding remarks.

2 Literature

The charitable giving literature discusses warm glow, prestige, reciprocity, fairness, social pressure, and impact philanthropy as potential explanations for the prevalence of pro-social activity. A detailed discussion of the economics of philanthropy is presented by Andreoni (2006). None of these theories invalidates another and each likely underlies some important aspect of individual behavior. For the purpose of our paper, we focus on warm glow and solicitation as the primary reasons for giving, since our experimental design normalizes many of the other factors which could drive pro-social behavior.

Andreoni (1989) lays out a model in which an agent gains utility from the act of donating, a phenonemon dubbed "warm glow." A number of recent experiments have documented the extent to which warm glow drives giving. Crumpler and Grossman (2008) show that agents will give some of their own money to charity even when their donation does not alter the total amount donated to charity. That is, individuals are giving for pure warm glow reasons, not to expand the amount available to the charity. Similarly, Tonin and Vlassopoulos (2010) conduct an experiment in which subjects are sorted into conditions where their donations are crowded-out to different degrees. They find that warm-glow altruism is an important factor for women's contributions, and that pure altruistic motivation is not a strong motivator to give costly effort to charity. Null (2011) suggests that warm glow may be partially to blame for inefficient allocations of gifts to charity.³ Taken together, these studies indicate that warm glow is an important factor in both choosing to give and the allocation of gifts to charity.

Solicitation has an important impact on donor behavior, making potential donors more likely to donate (Andreoni et al., 2011; DellaVigna et al., 2012; Meer and Rosen, 2011). While most papers on this subject have focused on the charity's choice of fundraising strategy and its reaction to grants (e.g., Andreoni and Payne, 2011), Landry et al. (2006) investigate different solicitation approaches and their impact on giving, and find that individuals are much less likely to given in response to direct mail than to a door-to-door solicitation, but conditional on giving, make larger gifts. Breman (2011) finds that allowing donors to defer an increase in the size of their donation to the future increases giving; in future work, we will investigate the effects of commitment mechanisms by giving subjects the opportunity to set their giving schedule prior to the beginning of the effort task.

Though not as often studied, volunteering is a key segment of the non-profit industry. The literature on the relationship between volunteerism and monetary donations consists of theoretical, empirical, and experimental approaches, but even with the various techniques there is no consensus on whether volunteering is a substitute or a complement to a mone-tary donation. Duncan (1999) develops a model showing that agents should be indifferent between giving time or money to charity in equilibrium. Brown and Lankford (1992) assume that giving is a normal consumption good and use survey data and jointly estimate giving functions of time and money, finding that gifts of time and money are complements. Likewise, Apinunmahakul et al. (2009) conduct similar analysis with a later and larger survey data and finds similar results. Conversely, Bauer et al. (2012) use repeated cross-sectional European survey data; they do not find that donations of time and money are gross complements. Feldman (2010) uses a well-specified utility function to build an econometric model and, using national survey data, shows that the two types of gifts are substitutes.

 $^{^{3}}$ The observed inefficient allocations in his study are driven by failures to adequately adjust to different exogenous donor matching rates.

Liu and Aaker (2008) conducts a set of different experiments which indicate that asking subjects to give time to a charity makes them more likely to connect emotionally with the charity's cause and then give when asked later. Pfeffer and DeVoe (2009) use a set of questions to highlight that individuals whose income was based on hourly rate are less willing to volunteer. Further, if individuals are are made to calculate their approximate hourly wage, then they are also less willing to volunteer. Ellingsen and Johannesson (2009) speculate from their experimental results that people in ultimatum games could be more willing to incur non-monetary sacrifices than monetary ones but leave it as further research to ask why that happens.

Concurrent to our work, Lilley and Slonim (2013) conduct a laboratory experiment which offers insights into impure and pure altruism. They employ use a within- and between-subject design in which subjects must determine, under various match rates, private wages, tax rates, and endowments, how much of their time to allocate to charity and how much of any money earned from wages they would give to charity. By varying the phrasing of the value of subjects' donations, they find strong warm glow motivations for giving; in addition they find that gifts of time and money are substitutes for each other.

3 Theoretical Model

We employ a theoretical approach which offers testable implications on how agents may view donations of time and money. Duncan (1999) shows that under relatively mild conditions agents should be indifferent between donations of time and money to a charity that provides a public good. We employ a modified version of the a warm-glow utility function found in Andreoni et al. (1996).⁴

$$U = U(x, d, v, l; s, w, w')$$

$$\tag{1}$$

subject to

$$x + d + wv + wl = wT \tag{2}$$

where w is earned the wage rate, w' the imputed wage of charitable activity, x personal consumption, l leisure, d the amount of money donated, v the time volunteered, T the endowment of time and s is an exogenously given state which captures the level(s) of solicitation. The term w' is the price the charity would have to pay to have the service provided

⁴We remove tax rates from the model and add a parameter for solicitation.

in the absence of an agent volunteering to do it. As pointed out in Andreoni et al. (1996), it is likely the case that $w' \leq w$. We assume the utility function is continuous, quasi-concave, and all cross-partials are zero. Utility increases at a decreasing rate for all choice variables in the utility function. We assume that utility is not increasing in solicitation.

A specific functional form which matches these criteria is

$$U(x, d, v, l|s, w, w') = f(x) + z(l) + \alpha_1(d) + \alpha_2(vw) + \alpha_3(d + vw') + h(d + wv - s)$$
(3)

Here, f and z represent the utility from consumption and leisure, respectively. Functions α_1 , α_2 , and α_3 represent warm-glow accruing to the agent from donating money, volunteering, and the additional utility received based on the charity's value of one's gift. We assume that f, z, α_1 , α_2 , and α_3 are well-behaved concave, continuous, non-decreasing, and differentialable functions similar to Andreoni et al. (1996) whereas h is continuous, nondecreasing, and concave. This structure on h is similar to that of DellaVigna et al. (2012) when investigating the effects of solicitation on giving. A direct implication of the model is that increased solicitation will never decrease gifts to charity.

A direct implication of the model is that increased solicitation will never decrease gifts to charity.⁵

Proposition 3.1 (Nondecreasing returns to solicitation). Suppose s' > s and (x^*, d^*, v^*, l^*) maximizes U(x, d, v, l|s, w, w') and (x'^*, v'^*, d'^*, l'^*) maximizes U(x, d, v, l|s', w, w'). Then $v^*w + d^* \leq v'^*w + d'^*$.

Proof. In appendix.

Our central line of inquiry is the relationship between α_1 and α_2 . The conventional assumption is that these two functions are equal (Andreoni et al., 1996; Duncan, 1999).

Assumption 1. For all d, v, w, if d = vw, then $\alpha_1(d) = \alpha_2(vw)$.

Simply stated, Assumption 1 states that an agent's warm glow from giving money or giving time to a charity is the same if the sacrifice to the agent is the same. This assumption, however, does not directly imply an agent is indifferent between giving time or money to charity. Since it is likely that w > w', agents value their own volunteered time more highly than the charity does. Agents also gain utility from the actual value of their gifts to charity,

⁵There is some evidence which suggests that over-solicitation can lead to decreased giving (Diamond and Nobel, 2001). We do not think our environment has large enough levels of solicitations to warrant that concern.

seen in the term $\alpha_3(\cdot)$; therefore, the value of monetary gifts should be greater than the value of volunteerism. If, however, an agent were to encounter an environment in which w = w'then, under Assumption 1, agents become indifferent between giving v or d to charity. The following proposition results from this reasoning.

Proposition 3.2. Let $w \ge w'$, and α_3 be strictly increasing. Then, $d^* \ge wv^*$

Proof. By way of contradiction, suppose not. Then the agent's personal valuation of time given is larger than her personal valuation of monetary contributions. From Assumption 1, $\alpha_1(\cdot) = \alpha_2(\cdot)$ and each exhibits decreasing marginal returns, she would be better off lowering $v \to \tilde{v}$ and increasing donations by $\Delta v * w$. Further when w > w' there are additional gains to $\alpha_3(\cdot)$ from donating money as opposed to time.

We design an environment in which $w' = w.^6$ Therefore, we develop the following corollary.

Corollary 3.1 (Donative Equivalence). Let w = w'. Then d = vw.

Proof. Proof follows almost immediately from Proposition 3.2. If w = w' then $\frac{\partial \alpha_3(\cdot)}{\partial d} = \frac{\partial \alpha_3(\cdot)}{\partial v}$ and from Assumption 1, $\alpha_1(\cdot) = \alpha_2(\cdot)$ and each exhibits decreasing returns. Therefore, subjects should set d = vw, else they could re-allocate and improve their utility. \Box

Using this theoretical environment we design an experiment with testable implications regarding both types of gifts (Proposition 3.2 and Corollary 3.1) and levels of solicitation (Proposition 3.1). After we explain our experimental design, Section 4.4 applies these Propositions to our experimental environment to obtain specific predictions for this experiment.

4 Experimental Design

All experiments took place at the Economic Science Laboratory in the Department of Economics at Texas A&M University. 246 undergraduates were recruited from econdollars.tamu.edu, an ORSEE (Greiner, 2004) website database.

The experimental design features the four conditions mentioned previously: Donate at End, Continual Reminder, Continual Donation, and Toggle, described in the next sections.

⁶Forthcoming research investigates the strength of the volunteer wage wedge, w - w' and its effects on donative behavior.

The Donate at End and Toggle conditions are designed to compare the choice between working and then donating to charity against the option to volunteer for charity. Continual Reminder and Continual Donation help to ascertain whether actionable and/or non-actionable solicitation can explain any part of the difference in results between the two conditions.

In each condition, subjects performed the same effort task over identical lengths of time and faced the same list of charities with the order randomized for each subject. Subjects earned all money they donated to charity rather than receiving it as an endowment; this design allows for a clearer comparison to our condition where subjects can choose to work directly for charity and may also more accurately model outside behavior. Additionally, Reinstein and Riener (2012) show there are large differences in donation behavior when subjects are endowed with money rather than earning their endowment. They find that those subjects who earned their compensation choose to donate less.

4.1 Charity Selection

Subjects were informed they would have to select one charity from a menu of ten charities and corresponding descriptions. Charities were randomly sorted on the screen into one of two different menu styles, organized either by location (local v. national) or by type of charity (e.g. food security, special needs, etc.). The order of the relevant categories was randomized, as was the order of charities within each category. This random sorting was done to help assuage any concerns of anchoring effects from specific menus. An example menu can be seen in Figure 1. Subjects were given four minutes to review the options available to them and select their charity.⁷ Each subject knew that her choice was finalized once selected and understood that selection of a charity did not require compulsory contribution to it. After all subjects selected a charity, the experiment would proceed.

For the purposes of examining another hypothesis, some subjects were given information detailing if the charities were approved by either the State Employee Charitable Campaign of Texas or were three or four star rated by Charity Navigator during the charity selection process. The information was provided independent of condition and did not greatly affect results.⁸

⁷This process rarely took more than two minutes.

⁸Indicators for the interaction of our baseline conditions with these information-provision conditions were not jointly or individually statistically significant, whether entered separately for each rating organization (p = 0.31) or together (p = 0.97).

1 of 1			
		Remaining time (sec): 236	
F	Please choose a charity for donation. You mu	ust select only one.	
cal Charities			
np for All	A unique camping and retreat facility that works to provide life changing programs for children and adults with challe	nging illnesses and special needs.	
tty's House: Child Advocacy Center of the Brazos ay	Facilitating a multidiscipline team approach to the prevention, intervention, investigation, prosecution, and treatment	t of child abuse through forensic interviews, medical exams, counseling and case coordination.	
tos Valley Food Bank	Strives to alleviate hunger in the Brazos Valley by distributing food and educational resources to neighbors in need t	through a network of hunger relief organizations.	
lth for All	Provides free doctor visits, pharmaceuticals, specialist exams, lab tests, X-rays, chronic disease management edu and do not qualify for government programs such as Medicaid, Medicare or County Indigent funds.	cation and counseling services to low income patients in the Brazos Valley who do not have health insurance	
tos Valley Animal Shelter	The Brazos Animal Shelter provides humane shelter and care for stray and unwanted animals. Varied services are designed to promote responsible pet ownership and to enhance the quality of life for the people and animals in our community.		
tional and International Charities			
cial Olympics	Provides year-round sports training and athletic competition in a variety of Olympic-type sports for individuals eight y fitness, demonstrate courage, experience joy and participate in a sharing of gifts, skills and friendship with their far	ears of age and older with intellectual disabilities, giving them continuing opportunities to develop physical nilies, other Special Olympic athletes and the community.	
nane Society of America	The lead disaster relief agency for animals, providing direct care for thousands of animals at sanctuaries and rescu	e facilities, wildlife rehabilitation centers, and mobile veterinary clinics.	
ding America	The nation's leading domestic hunger-relief charity, secures and distributes more than two billion pounds of donate	ed food and grocery products annually.	
e the Children	The leading independent organization creating real and lasting change for children in need in the United States and and mainutrition, and U.S. literacy and nutrition.	I around the world, focusing on: economic opportunities, education, emergencies, protection, health, hunger	
tors Without Borders	An international medical humanitarian organization that provides aid in nearly 60 countries to people whose surviva exclusion from health care, or natural disasters.	I is threatened by violence, neglect, or catastrophe, primarily due to armed conflict, epidemics, mainutrition,	
	L		
	OK		
	All Charities p for All //s House: Child Advocacy Center of the Brazos // s House: Child Advocacy Center of the Brazos // so Valley Food Bank for All so Valley Animal Shelter ional and International Charities ial Olympics ane Society of America ing America the Children ors Without Borders	Please choose a charity for donation. You mutable plan Charities Aunique camping and retreat facility that works to provide life changing programs for children and adults with chalk p for All A unique camping and retreat facility that works to provide life changing programs for children and adults with chalk g's House: Child Advocacy Center of the Brazos Facilitating a multidiscipline team approach to the prevention, intervention, investigation, prosecution, and treatment so Valley Food Bank Strives to alleviate hunger in the Brazos Valley by distributing food and educational resources to neighbors in need in for All Provides free doctor visits, pharmaceuticats, specialist exams, tab tests, X-rays, chronic disease management edu and do not qualify for government programs such as Medicaid, Medicare or County Indigent funds. sis Valley Animal Shelter The Prazos Animal Shelter provides humane shelter and care for stray and unwanted animals. Varied services are in our community. aial Olympics Provides year-round sports training and athletic competition in a variety of Olympic-type sports for individuals eight in threes, demonstrate courage, experience joy and participate in a sharing of dist, skills and thendship with their far and manufation, and U.S. Ilteracy and nutrition. ing America The nation's leading domestic hunger-relief charity, secures and distributes more than two billion pounds of donati and malnutifion, and U.S. Ilteracy and nutrition. ars Without Borders Ar international medical humanitarian organization that provides aid in nearly 60 c	

Figure 1: Sample Charity Selection Menu by Location

4.2 Effort Task and Payment Schedule

The effort task began after all subjects had selected their charity.⁹ Subjects had 75 minutes to move as many "sliders" from one position on the screen to a specific randomized target (see Figure 2) as they could.¹⁰ Subjects were told they would be paid \$0.03 per slider completed in addition to a participation award of \$5.00.¹¹ Subjects moved their slider markers along the line to a randomly generated target number (an integer in the set [1,99]), with the slider beginning at the far left at the point corresponding to 0. In Figure 2, the target position is located at 73 and the subject's current position is at 63. Once the subjects aligned their markers, they (or their charity, if applicable, in the Toggle condition) were credited \$0.03 and they were able to move to another slider.

The subject saw thirty sliders (10 rows of three) on the screen and could complete the sliders in any order; once all thirty sliders were finished, the page reset with thirty more sliders and newly randomized target numbers for each slider. This process repeated throughout the

⁹In the Toggle condition, subjects were first asked to select if they wished to start working for charity or themselves.

 $^{^{10}}$ This task was developed by Gill and Prowse (2012).

¹¹Subjects were not permitted to give their participation award to charity.



Figure 2: An Example Slider

experiment until the time expired, providing no upper bound on the amount of money subjects could earn. Subjects who did not wish to participate in this task for the full length of time were allowed to browse the internet. An earnings summary and the time remaining were displayed at the top of the screen, and subjects were given a verbal notification when two minutes remained and when thirty seconds remained.

Subjects were paid individually and discretely in cash at the conclusion of the experiment to avoid any social stigma from their earnings and donation selection. Subjects were presented two envelopes; one envelope was unlabeled and contained their personal earnings while the second was labeled with the charity's name. Each subject was asked to confirm that these amounts were correct and sign a form stating that they wished to contribute their charity total to the charity whose name was on the envelope. The experimenter then collected the charitable envelope from the subject, taped it shut, and placed the envelope in a box labeled donations. Subjects were informed that all donations would be made within 90 days and were given contact information for the experimenter making the donation. Donation totals for each charity were calculated, and a donation in that amount was given to each charity at the conclusion of all the sessions.

4.3 Experimental Conditions

The experimental design made use of four conditions to determine the effects of donations of time versus money and solicitation. The Toggle condition provided subjects an opportunity to work directly for charity as a comparison to three other monetary-donation conditions. Those three conditions, Donate at the End, Continual Reminder, and Continual Donation, gave subjects the opportunity to donate money to charity under different levels of solicitation.

4.3.1 Donate at the End (DE)

The Donate at the End (DE) condition is the standard environment in which agents work for themselves, receive their pay, and then make a donation to charity. Subjects were informed

Table 1: Conditions

Donate at End (DE)	Can only donate from earnings at the end of experiment.
Continual Reminder (CR)	Can only donate from earnings at the end of experiment; reminded
	of their charity choice.
Continual Donation (CD)	Can donate any amount of earnings at any time; reminded of their
	charity choice.
Toggle (T)	Can switch where money from effort is accruing at any time; re-
	minded of their charity choice.

at the beginning of the experiment that they would have the option to earn money and give any portion of their earnings to charity at the end of the time allotted.¹² Once the effort task ended, subjects were reminded which charity they selected at the beginning of the experiment; they then decided how much of their earnings to donate to that charity.

4.3.2 Continual Reminder (CR)

The Continual Reminder (CR) condition is nearly identical to DE. The only difference is that near the top of the screen beneath the earnings summary, the subject is reminded that she will have the opportunity to donate her earnings to the charity she selected at the beginning of the experiment. An example reminder can be found in Figure 3b. We see this reminder as a minimally intrusive form of non-actionable solicitation, similar to a billboard. That is, subjects are reminded of the potential to donate, but cannot do so immediately. Any differences between DE and CR should only arise from non-actionable solicitation on subject behavior.

4.3.3 Continual Donation (CD)

In the Continual Donation (CD) condition, subjects could donate any of their current earnings to charity at any point during the experiment. Like CR, a subject in the continual donation condition has a sentence at the top of her screen, directly under her earnings summary, which informs her of the charity she selected at the beginning of the experiment, though with the addition of a box in which to enter a donation.

¹²This is essentially a dictator game where the recipient is a charity (Eckel and Grossman, 1996) in which the subject earns their endowment before determining the allocation between herself and another party (Oxoby and Spraggon, 2008).



Figure 3: Display of Earnings and Donation Opportunities During Effort Task

Subjects may have wanted to wait until the end to submit donations, so as to have more complete information on earnings. We see some evidence of this behavior; many subjects in this condition waited until the final 5 minutes to contribute. Because subjects were reminded at both two minutes and thirty seconds remaining that time was nearly expired, we feel that the likelihood of a subject wishing to donate but not submitting her donation in time is unlikely.¹³

4.3.4 Toggle (T)

The Toggle (T) condition simulates an agent's choice between working for oneself and volunteering for charity. Subjects had the option to have their effort accrue to themselves or to the charity. Each subject in the condition had a button (see Figure 3d) under their earnings display which allowed them to change how their earnings accrue; either the earnings went to the individual or the charity she selected at the beginning of the experiment. To avoid framing effects, subjects were allowed to choose if they would like to start working for charity or themselves and these buttons were randomized on the screen before the effort task began.

4.4 Hypotheses and Predictions

Section 3 provides a theoretical model for charitable donation that may be applied to this experimental environment. Proposition 3.1 provides a prediction of subject behavior under the varying levels of solicitation in the three monetary donation conditions. Corollary 3.1 gives a general prediction about the difference (or lack thereof) in subject behavior between the Toggle and monetary donation conditions due to warm glow.

 $^{^{13}}$ See Section 5 for further discussion.

4.4.1 Solicitation

We begin by examining the potential effects of solicitation on donor behavior. Based on earlier research (Andreoni et al., 2011; DellaVigna et al., 2012; Meer and Rosen, 2011) and our theory (Proposition 3.1) linking solicitation to donative behavior, subjects who are reminded that they are able to donate to charity throughout the seventy-five minutes of the experiment may be more likely to give and give more than they otherwise would. Though unobtrusive, our reminder of a donation in the Continual Reminder condition could potentially induce a subject to donate a small amount more relative to what she would have given in DE.

Continual Donation and Continual Reminder vary only in that that CD uses actionable solicitation and CR uses non-actionable solicitation. One possible reason for greater donations under actionable rather than non-actionable solicitation is greater social pressure. The presence of the donation box itself may produce greater disutility from ignoring it; if this pressure increases with exposure to the actionable solicitation, then under Proposition 3.1 one would expect higher donations to charity when the opportunity to donate is constant for seventy-five minutes as opposed to only at the end of the effort task. Thus, we expect a greater amount of donations in the Continual Donation condition relative to the Continual Reminder.

Another possibility is that subjects derive more utility from giving several times than just once at the end of the experiment, or that habit formation drives multiple donations. In both T and CD, it is possible for a subject to give a little due to social pressure and then develop a giving pattern based on her prior gift(s) (Meer, Forthcoming).

Hypothesis 1. Both actionable and non-actionable solicitation increase giving behavior, but actionable solicitation has a stronger effect. Therefore, consistent with Proposition 3.1, giving is greater in the Continual Donation condition than in Continual Reminder, which is in turn greater than in Donate at End.

$$g_{DE} < g_{CR} < g_{CD}.$$

4.4.2 Warm glow

The Toggle condition captures behavior when a subject can donate their effort rather than money; the other conditions involve donating already-accrued earnings to charity. This difference across conditions allows for us to rule out switching between charity and self due to convex preferences over effort tasks, unobservable heterogeneous abilities, or tastes over tasks which would be impossible to identify in a field experiment, along with other motivations for volunteering (networking, social status, and so on).¹⁴ We feel this normalization gives us a clean approach to how people view potential donations of time and effort in a warm-glow context. Since our design removes other reasons for volunteering, our results can be thought of as a lower bound on the behavioral difference between gifts of time and money.

We assume that Toggle and Continual Donation feature the same level of actionable solicitation. In both CD and T, subjects have the same non-actionable solicitation (reminder of the charity selected) and very similar actionable solicitation in the form of opportunities to contribute their resources to charity. Essentially, subjects can recreate the exact same giving patterns in T and CD if they desire. Therefore, differences in donation levels between the conditions are the result of differences between the warm glow associated with volunteering and monetary donations.

Hypothesis 2. By Assumption 1, volunteering and donating earnings produce equivalent warm glow. Therefore, giving should be equal in the Toggle and Continual Donation conditions. Formally,

$g_{CD} = g_T.$

An alternative to Hypothesis 2 consistent with the conventional wisdom is that individuals gain greater warm glow from volunteering time than giving money to charity and will contribute more in Toggle than Continual Donation. The thrust of this prediction comes from our discussion in Section 3 and the observations on volunteering patterns in Section 1. Thus in our theoretical environment, we consider a rejection of Hypothesis 2 to be strong evidence against Assumption 1.

Note that our hypotheses and alternative hypothesis form the ordered relation $g_{DE} \leq g_{CR} \leq g_{CD} \leq g_T$. The first relationship $(g_{DE} \leq g_{CR})$ indicates the possible difference between the no solicitation and non-actionable solicitation; both our model and our intuition predict the latter produces more giving. The second relationship $(g_{CR} \leq g_{CD})$ indicates the possible difference between actionable solicitation and non-actionable solicitation; both our model and our indicates the possible difference between actionable solicitation and non-actionable solicitation; both our model and our model and our model and our indicates the possible difference between actionable solicitation and non-actionable solicitation; both our model and our indicates the latter produces more giving. Finally, $(g_{CD} \leq g_T)$ indicates the

¹⁴Linardi and McConnell (2011) shows the importance of social pressure in continuing to volunteer if one's departure is observable; Carpenter and Myers (2010) examine volunteer firefighters and find that social reputation is an important factor in beginning to volunteer. These findings are related to the theoretical work of Ellingsen and Johannesson (2008) which looks at a model in which esteem from actions are based, in part, on the audience.

possible difference between donating money versus volunteering labor for charity; our model predict no difference, but we suspect the latter produces more giving.

5 Results

Table 2 provides summary statistics across conditions. Figure 4 shows the cumulative amount donated across conditions; note that the intercept with the y-axis shows the proportion of subjects who do not make any gift. It is clear that subject donations vary greatly across conditions; a Kruskal-Wallis test rejects the hypothesis that the distribution of donations is the same across conditions (p = 0.000).

We further examine the percent of earnings donated in Figure 5; this eliminates the possibility that individuals in one condition are earning less but behaving more generously (for instance, an individual earning \$20 and giving all of it to charity would appear to be the same as one earning \$30 and donating \$20 to charity). Figure 5 demonstrates that this is not a concern; the patterns are qualitatively and quantitatively similar; the exceptions in which the results do differ are discussed below. This is not surprising given the similarity in earnings across conditions.

Our first result examines the effectiveness of non-actionable solicitation by comparing Donate at End and Continual Reminder.

Result 1. Donative behavior in the Continual Reminder condition is not different than the Donate at End condition.

A Kolmogorov-Smirnov test shows no difference between the CR and DE distributions (p = 0.831). In addition to nonparametric tests of equality of distributions, we examine several outcomes directly.¹⁵ We focus on the giving rate across conditions, the total amount donated, the amount donated conditional on making a donation, and quantile regressions at the 25th, 50th, and 75th percentiles. We also examine the probability of giving one dollar or more; there is some evidence to suggest that subjects were donating their change in an effort to receive a whole dollar amount as payment. In an effort to focus on those who gave more than a token amount, we also examine the probability of giving five dollars or more. Comparisons of these amounts across conditions can be found in Table 2. The two conditions also do not

¹⁵To test whether individual subject characteristics affect our results, we also performed the estimations in this section with a number of controls, such as gender, geographic origin (Texas or elsewhere), and so on. As one would expect from random assignment, our results are qualitatively unaffected. Full results are available on request.

	Donate at End	Continual Reminder	Continual Donation	Toggle
Ν	47	48	70	81
Earnings from Effort	26.59	28.88	27.36	27.15
	(6.74)	(7.16)	(7.52)	(7.91)
Percent Giving Any Amoun	t 31.9	31.3	57.1	71.6
Percent Giving \$1 or More	17.0	16.7	44.3	67.9
Percent Giving \$5 or More	10.6	8.33	22.9	43.2
Amount Donated	1.02	1.64	2.84	5.55
	(2.26)	(5.23)	(5.49)	(6.00)
Percent Donated	3.90	5.50	12.10	20.20
	(9.10)	(16.80)	(22.80)	(20.60)
Conditional on Giving				
Ν	15	15	40	58
Earnings from Effort	27.11	27.47	24.81	27.30
	(6.74)	(6.96)	(6.54)	(8.04)
Percent Giving \$1 or More	53.3	53.3	77.5	94.8
Percent Giving \$5 or More	33.3	26.7	40	60.3
Amount Donated	3.20	5.26	4.97	7.76
	(3.06)	(8.44)	(6.52)	(5.75)
Percent Donated	12.20	17.50	21.20	28.20
	(12.80)	(26.90)	(26.90)	(19.20)
25th Percentile of Giving	0.70	0.69	1.00	2.70
50th Percentile of Giving	3.00	1.02	2.30	6.65
75th Percentile of Giving	5.00	5.38	5.00	10.95

Table 2: Summary Statistics

Standard deviations are in parentheses.



Figure 4: CDF of dollars donated by condition

differ either in giving rate (p = 0.945), amount given (p = 0.449), amount given conditional on giving (p = 0.367), or at the 25th, 50th, or 75th percentiles of giving conditional on making a gift (p = 0.991, p = 0.503, and p = 0.890, respectively). There is no difference between conditions in the probability of giving more than one (p = 0.945) or five (p = 0.704) dollars. We therefore find no evidence to suggest that non-actionable solicitation in the form of a simple reminder has an effect on giving. Perhaps the reminder text can be ignored easily (similar to billboard solicitations) or there is sufficient distance between the reminder and the opportunity to donate, and this type of solicitation does not induce giving from those who would not otherwise have done so.

We next turn to the differences between actionable and non-actionable solicitation. Result 2 confirms that actionable solicitation has a positive effect on subject donation in our environment, though non-actionable solicitation does not have an effect. This is partly con-



Figure 5: CDF of percent of earnings donated by condition

sistent with Hypothesis 1.

Result 2. Some donative behavior in the Continual Donation condition is greater than in Continual Reminder.

A Kolmogorov-Smirnov test shows a large difference between the CD and CR distributions (p = 0.008). The giving rate in CD is higher than that in CR (p = 0.004), as is the percent given (p = 0.071); furthermore, subjects are more likely to give a dollar or more (p = 0.000) and five dollars or more (p = 0.026). However, the mean amount given in CD is not significantly higher than in CR, even though, as discussed above, the overall distributions are different. The total amount donated (p = 0.232), amount given conditional on donating (p = 0.903), and the 25th, 50th, and 75th percentiles conditional on giving (p =0.675, p = 0.567, p = 0.867) are not significantly different. Thus, it seems that allowing for giving during the task elicits, at least, more giving behavior on the extensive margin. A far greater proportion of subjects (31.2 percent vs. 57.1 percent) gave when they were offered the opportunity to do so through the experiment, and there appears to have been some shifts above relatively small amounts such as one or five dollars, but these individuals did not give much more. This is consistent with the findings in Meer (2011), in which "the mere act of making a gift alleviates the social pressure [from solicitation], but making a larger gift has no effect." Thus, actionable solicitation has some effect on behavior.

Finally, we compare our volunteer condition (Toggle) to Continual Donation, the condition that most closely matches Toggle in actionable solicitation. Indeed, subjects can recreate the same pattern of donative behavior in CD as in T. However, as seen in Figure 6, subjects in CD do nearly all of their giving at the very end of the experiment, with nearly 80% of the amount donated coming in the last ten minutes, while subjects in T give at a consistent rate throughout the experiment.¹⁶

Result 3. Donative behavior in the Toggle condition is stronger than in Continual Donation.

We can easily reject the hypothesis that these two distributions are the same with a Kolmogorov-Smirnov test (p = 0.001), while we cannot reject the hypothesis that the distribution of giving in T is uniform (p = 0.919). Further, we see substantial differences in the amount donated, not just the timing of these donations. Not only are the distributions for CD and T different, as discussed above, but on every metric, T dominates CD. The giving rate (p = 0.066); giving one or more dollars (p = 0.006); giving five or more dollars (p = 0.007); amount given (p = 0.004); amount given conditional on giving (p = 0.032); 25th percentile (p = 0.001); 50th percentile (p = 0.008); and 75th percentile (p = 0.000) are all higher under T than CD. These results also holds with comparison between both T and CR and T and CD; indeed, with the exception of a small number of very generous individuals who gave all or nearly all of their earnings, the distribution of giving for T is always higher than the other conditions.

The differences are economically substantial as well. Subjects in T are nearly 15 percentage points more likely to make a gift than in CD and about 40 percentage points more likely to give than in CR or DE. The unconditional mean gift is nearly twice the size of that in CD and five times the size of that in DE. Conditional on making a gift, those in the Toggle condition still give half again more than in Continual Donation and twice as much

¹⁶The precise timestamps for one session of the Toggle condition were corrupted; these data are excluded from Figure 6. There is no reason to believe that the inclusion of this particular session would affect the overall time pattern.



Figure 6: CDF of dollars donated by minute in T and CD

as in Donate at End. Nearly every subject who donated in T gave more than a dollar, as compared to about half in DE and CR and three-quarters in CD.

As discussed in Section 4, our stylized experiment eliminates many of the other rewards to volunteering. The magnitudes of these results are powerful evidence against Hypothesis 2, that giving effort directly, akin to volunteering, provides the same warm glow as donating money. This finding is consistent with conventional wisdom discussed previously as well as our alternate hypothesis.

Taken together, our results suggest that both the act of working directly for charity and being solicited with the immediate ability to donate (actionable solicitation) increase the level of charitable donations in our environment. The act of being reminded about donating to charity (non-actionable solicitation) has little effect on donative behavior.

6 Alternative Explanations

The primary result of this paper is that subjects give more when they accrue earnings for their charity directly than in environments in which they accrue earnings for themselves and have the opportunity to donate those earnings to charity. Our contention is that this difference in donative behavior is due to differing amounts of warm glow when an individual works for charity as opposed to giving an equivalent amount of money. We discuss other possible explanations for our results below.

6.1 Loss Aversion

Loss aversion is a fundamental part of behavioral economics literature (Kahneman and Tversky (1979); see Camerer (2005) for a survey). In this experiment, one could argue that the proceeds donated to charity in Toggle are foregone gains, while the earnings accrued for oneself and then given to charity represent losses. Since individuals are loss averse, the utility loss would be greater for a subject giving their earnings to charity than from forgoing an identical amount in potential earnings. Then individuals would give more in Toggle than in other conditions.

It is very difficult to differentiate an explanation of loss aversion from differential warm glow in our experiment. Under the warm glow mechanism, working for charity produces a greater benefit; with loss aversion, donating money incurs a greater cost. For several applications of a basic model, these two features are mathematically equivalent. Further, the most obvious experimental tests to disentangle these mechanisms are not promising. Conditions in which subjects pre-commit "time" or "money" in an effort task with a fixed wage rate may be viewed by subjects as working for charity (or donating to charity) with a minor semantic difference. Having subjects accrue money to charity and take money back for themselves likely involves a moral dimension. Having subjects accrue money to a unlabeled pot and then withdraw money for themselves and charity would only work if loss aversion can simply be remedied with labeling which is unlikely. Further, that manipulation may also alter results due to the cognitive costs on the subject.

The extent of loss aversion and how it manifests in the laboratory is a topic of some controversy (see Plott and Zeiler, 2005). That debate notwithstanding, we concede that loss aversion is a plausible alternative explanation for our results. Furthermore, we do not see a clear way to disentangle loss aversion from warm glow in an experimental design without making changes that would lead to additional alternative mechanisms.

6.2 Differential Cost of Donation

It may be that the cost to give in Continual Donation is greater than that in Toggle. In the latter condition, subjects only push a button to donate, while in CD subjects must choose an amount to donate, enter the amount, and push a button. As field literature has shown (Meer and Rigbi, 2012; Rasul and Huck, 2010), even a minor cost may greatly reduce charitable donations. If our experiment is a similar environment to the field, these minor costs might explain the difference between the two conditions.

It should first be noted that this argument purports to explain the probability of giving at all might be higher in T (because the costs of initial donation are lower), but it does not explain why donations are larger conditional on giving.

Moreover, the data do provide evidence that subjects do not endure a greater cost per donative action in CD than in T. The average productivity of subjects in CD declines by about 23% in minutes in which they make a donation, while subjects in T see a productivity decline of 16% in minutes in which they switch the target of their earnings. Moreover, conditional on switching at all, the median subject in T switches three times, while the median subject in CD only donates once, usually in the last few minutes of the experiment. The total expected loss from switching among those in T is 8.1 sliders, while the expected loss from giving is 7.4 sliders for givers in CD; this difference is approximately two cents. We therefore believe that the difference in behavior between CD and T does not arise from differences in the cost of making a donation.

6.3 Momentum

Another explanation for the increased donations in T is that the condition takes advantage of momentum. With a touch of a button, donations become the status quo and subjects must exert effort to stop donating. Status quo bias is widely regarded as an important driver of behavior (e.g. Samuelson and Zeckhauser, 1988). The other conditions do not have an equivalent momentum component, so this difference may explain the greater amount in contributions among donating subjects in toggle.

In order to avoid a default setting, subjects in T had to choose whether they would begin donating to themselves or charity before the experiment began; 36% of subjects started the experiment donating to charity. With well over half of subjects beginning by working for themselves, this mechanism could also explain *lower* donation levels in Toggle. A subject could get caught up in working for herself and not donate anything to charity. That is, momentum does not favor working for charity over oneself or vice versa. Further, the data do not appear to support the momentum explanation; among those who work for charity at all, the median subject switched 3 times, with a mean of 4.

6.4 Miscalculation

Another possible explanation is that subjects somehow miscalculate and overshoot their desired gift to charity in the Toggle condition, but do not make a similar mistake in any of the other conditions. If this explanation is true, we would expect to see subjects accumulating the bulk of their donations to charity in the early part of the experiment. That is, over the course of the 75 minute experiment, they would regret this initial donation and compensate by switching to earning for themselves towards the end. The data do not support this contention at all, as seen in Figure 6. We therefore do not find this explanation credible.

7 Discussion

This paper presents a series of laboratory experiments aimed at divining whether individuals behave more generously when working for directly for charity (volunteering) rather than working for themselves and donating part of their earnings, as well as the effect of solicitation on giving. The comparison of results between Donate at End and Continual Reminder conditions shows that non-actionable solicitation does not seem to have a substantial effect on giving, at least in our laboratory environment. There is some evidence that actionable solicitation (added in the Continual Donation condition) has some effect, mostly on the extensive margin—consistent with previous research. Comparing Continual Donation to Toggle, we find results consistent with a strong difference in warm glow from volunteering and standard monetary gifts; subjects in our experiment donate more often and at greater levels when working for charity than when donating earnings they have already accrued.

Given these experimental results, a natural question to ask would be how they might translate to other settings. We suspect that factors like social recognition, enjoyment of the volunteer activity itself, and the salience of one's "donation" all may increase the utility from donating time to charity rather than money. If anything, our result may underestimate the effects of the tendency of individuals to give more through volunteering than when donating one's earnings.

Our results on actionable and non-actionable solicitation are somewhat more difficult to translate. It is difficult to believe that continually reminding people would not at least have some effect on their donation behavior over time, but, as discussed above, individuals may find frequent solicitation off-putting. A field experiment may provide a better test on the differences between actionable and non-actionable solicitation as they relate to charity's strategies in donation acquisition.

Additionally, these findings inform the literature on labor markets for non-profit firms. After all, if there is a wage differential between the non-profit and for-profit sectors, individuals could always take higher-paying jobs and donate the difference. That many individuals seek out jobs in the non-profit sector is some evidence that they are taking part of their wage in the form of warm glow, though there is disagreement as to whether those working for non-profits are paid less, all else equal. For example, Ruhm and Borkoski (2003) find no evidence of wage differentials. On the other hand, Preston (1989) finds that those in the non-profit sector earn less, and a recent field experiment by Frank (2012) found that half of workers in an online labor market were willing to accept a lower wage rate to work for an organization with greater "social value."

Our initial results suggest charities should make it easy to for donors to respond to a solicitation — effectively, to keep transactions costs low, as found in previous work (e.g. Meer and Rigbi, 2012; Rasul and Huck, 2010). Overall, based on our results, we posit that models of charitable giving should carefully model donations of time and money, as well as the impact of solicitation. Future research will focus on the extent to which warm glow can outweigh the utility of the impact of a gift, as well as the role of commitment mechanisms and signals of quality.

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A Appendix—Proof of Proposition 3.1

This proof relies on a few general lemmas about concavity. We first start with an alternate definition of concavity,

Definition 1. A function f is concave on the interval if for a, x, and b in the interval with a < x < b we have

$$\frac{f(x) - f(a)}{x - a} \ge \frac{f(b) - f(a)}{b - a}$$

We expand the properties of concavity using Lemmas 1 and 2.

Lemma 1. If f is a concave function over [a, b], for any a < x < b,

$$\frac{f(b) - f(x)}{b - x} \le \frac{f(x) - f(a)}{x - a}$$

Proof. We may decompose [f(b) - f(a)]/(b - a) the following way:

$$\frac{f(b) - f(a)}{b - a} = \frac{f(b) - f(x)}{b - a} + \frac{f(x) - f(a)}{b - a}$$
$$\frac{f(b) - f(a)}{b - a} = \left(\frac{b - x}{b - a}\right) \left[\frac{f(b) - f(x)}{b - x}\right] + \left(\frac{x - a}{b - a}\right) \left[\frac{f(x) - f(a)}{x - a}\right]$$
$$\left(\frac{b - x}{b - a}\right) \left[\frac{f(b) - f(a)}{b - a}\right] + \left(\frac{x - a}{b - a}\right) \left[\frac{f(b) - f(a)}{b - a}\right] = \left(\frac{b - x}{b - a}\right) \left[\frac{f(b) - f(x)}{b - x}\right] + \left(\frac{x - a}{b - a}\right) \left[\frac{f(x) - f(a)}{x - a}\right]$$

By concavity, $\frac{f(b)-f(a)}{b-a} \leq \frac{f(x)-f(a)}{x-a}$. So it follows that,

$$\frac{f(b) - f(x)}{b - x} \le \frac{f(b) - f(a)}{b - a} \le \frac{f(x) - f(a)}{x - a}.$$

Lemma 2. If f is a concave function and b > a, for any c > 0, $f(a + c) - f(a) \ge f(b+c) - f(b)$.

Proof. Either a + c = b, a + c > b, or a + c < b. If a + c = b then a < a + c = b < b + c and the result follows from Lemma 1. If a + c < b then under Lemma 1,

$$\frac{f(a+c) - f(a)}{c} \ge \frac{f(b) - f(a+c)}{b - a - c} \ge \frac{f(b+c) - f(b)}{c},$$

and f(a+c) - f(a) > f(b+c) - f(b). If a+c > b then by Lemma 1,

$$\frac{f(b) - f(a)}{b - a} \ge \frac{f(a + c) - f(b)}{a + c - b} \ge \frac{f(b + c) - f(a + c)}{b - a}$$

Multiplying the outside parts of the inequality by $\frac{b-a}{c}$ and adding $\left(\frac{a+c-b}{c}\right)\left[\frac{f(a+c)-f(b)}{a+c-b}\right]$ to both sides we have

$$\left(\frac{b-a}{c}\right)\left[\frac{f(b)-f(a)}{b-a}\right] + \left(\frac{a+c-b}{c}\right)\left[\frac{f(a+c)-f(b)}{a+c-b}\right] \ge \\ \left(\frac{b-a}{c}\right)\left[\frac{f(b+c)-f(a+c)}{b-a}\right] + \left(\frac{a+c-b}{c}\right)\left[\frac{f(a+c)-f(b)}{a+c-b}\right].$$

This inequality simplifies to

$$\frac{f(a+c) - f(a)}{c} \ge \frac{f(b+c) - f(b)}{c}$$

Thus $f(a+c) - f(a) \ge f(b+c) - f(b)$.

Proposition 1 relies on Lemma 2 and the concavity of h.

Proposition 3.1. Suppose s' > s and (x^*, d^*, v^*, l^*) maximizes U(x, d, v, l|s, w, w') and (x'^*, v'^*, d'^*, l'^*) maximizes U(x, d, v, l|s', w, w'). Then $v^*w + d^* \le v'^*w + d'^*$.

Proof. Suppose not, that there exists a (x^*, d^*, v^*, l^*) and (x'^*, v'^*, d'^*, l'^*) where $v^*w' + d^* > v'^*w' + d'^*$. Then $x'^* + wl'^* > x^* + wl^*$.

We know $U(x^*, d^*, v^*, l^*|s, w, w') > U(x'^*, d'^*, v'^*, l'^*|s, w, w')$ and $U(x'^*, d'^*, v'^*, l'^*|s', w, w') > U(x^*, d^*, v^*, l^*|s', w, w')$. Let us construct U such that

$$U(x, d, v, l|s, w, w') = F(x, l) + A(d, v|w, w') + h(d + wv - s)$$

where F(x, l) = f(x) + z(l), $A(d, v|w, w') = \alpha_1(d) + \alpha_2(vw) + \alpha_3(d + vw')$ and $h(\cdot)$ is defined as before. It follows that

$$F(x'^*, l'^*) - F(x^*, l^*) > A(d^*, v^* | w, w') - A(d'^*, v'^* | w, w') + h(d^* + wv^* - s') - h(d'^* + wv'^* - s')$$

$$F(x'^*, l'^*) - F(x^*, l^*) < A(d^*, v^* | w, w') - A(d'^*, v'^* | w, w') + h(d^* + wv^* - s) - h(d'^* + wv'^* - s)$$

Combining the two inequalities we have $h(d^* + wv^* - s) - h(d'^* + wv'^* - s) > h(d^* + wv^* - s') - h(d'^* + wv'^* - s')$. Clearly, $d'^* + wv'^* - s' < d'^* + wv'^* - s$. This means the difference of a concave function over a fixed distance $((d^* + wv^*) - (d'^* + wv'^*))$ is greater at higher values. This contradicts Lemma 2 and the properties of concave functions.

B Appendix—Subject Instructions—Not Intended for Publication

Experimental Instructions—Toggle

Today, you will be participating in an economics experiment. The experiment tests how well people perform certain tasks when working for others and themselves. Your performance in this experiment will determine the benefits given to both you and a charity of your choice. You will participate in this task on the computer in front of you. Please pay attention to these instructions so you will understand how to earn money for yourself and the charity of your choice. In addition to the money earned during the experiment, you will be paid a \$5.00 dollar participation award upon conclusion of the session.

During this experiment, it is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim aloud, etc., you will be asked to leave and neither you nor your charity will be paid. We expect and appreciate your cooperation.

You will be presented a list of ten charities and their descriptions. You will be asked to select a single charity. Based on your actions during the experiment the charity you select can receive a donation from you. The amount of the donation will depend on your actions during the experiment. Please note that you can choose only one charity from this list. Once you have selected your charity, select the OK button and the experiment will proceed.

You then will select if you would like your tasks to accrue money for the charity selected on the previous screen or for yourself. At any point during the experiment you will be allowed to switch back and forth as often you like between accounts without a penalty.

This experiment consists of completing a set of exercises by adjusting the location of sliders. You will sit at a computer and, with your mouse attempt to move the slider marker to the correct number labeled next to each slider (see Figure 1 below). Each slider marker starts on the far left of that slider which corresponds to the 0 position. Your task is to move the slider marker with your mouse to the position corresponding to the number located on the left of each box (37 in Figure 1). To do this, you will click on the slider marker, and drag toward the target number indicated on the left side of the box. Your current position on the line is located on the right side of the box (21 in Figure 1).

Once you properly align the marker, the slider will disappear and the income you generated for you or your charity will increase. This information is displayed on the top of the page of sliders (see Figure 2). Once you complete all thirty sliders on the page, the page resets and you have opportunity to continue earning money until the time runs out. Your total earnings for both yourself and your charity are displayed at the center near the top of the page with your time remaining located to the top right. Beneath your earnings summary, there are buttons that allow you to switch between working for yourself and the charity selected earlier in the experiment. If you unsure of which account is earning money, you can find this information directly below the earnings summary. At any time during the experiment, you may take a break from completing sliders and browse the internet. To do this select Alt + Tab on your keyboard. Note that the timer on the experiment does not stop while you are on the internet. If you would like to return to the sliders, you can do so at any time while on the internet. To return to the task select Alt + Tab again. There is no limit on the amount of times you are allowed to switch between these two screens.



	Individual Earnings	Charity Earnings		Time Remaining: 0:02
	\$0.00	\$0.00		
	You are work	ing for yourself.		
	Switch to W	fork for Charity		
53 /, 0	2 [. 0	77	, 0
39	5 /	. 0	8	, 0
60 / 0	81	0	52	. 0
73	88 /	. 0	78	, 0
68 / 0	17 /	0	77	. 0
16	74	0	31 /	. 0
59 / 0	64 /	. 0	3 /	. 0
27	46 /	0	19	. 0
79	38 /	0	25	. 0
95 / 0	33 /	0	94 /	. 0

You will have 75 minutes to complete sliders. You will be given a both a two-minute and thirty second warning before time expires. Each page of sliders completed is worth \$.90 (three cents per slider). With two minutes remaining you will be reminded of that the task is nearly over. At the conclusion of 75 minutes the experiment will end and you will be asked to complete a survey related to the experiment. Once the survey has been completed, you will be paid your earnings and, if applicable, your charity will be presented with your contributions.

To summarize:

1. You will be attempting to move slider markers to the indicated location on the slider bar. Each page of sliders is worth \$.90. As you complete sliders they will disappear.

- 2. You can switch between working for yourself or your charity at any point in the experiment by clicking the button in the top-middle of the page. This change can be done as many times as you would like. You are notified of your current selection under your earnings summary at the top of the page.
- 3. At any time, you are allowed to take a break from working on sliders and browse the internet by pressing Alt + Tab. You may return by pressing Alt + Tab again. You may cycle between these two pages at any time during the experiment.
- 4. Once 75 minutes have expired all allocations are finalized. With two minutes remaining you will be reminded that the experiment is about to end. You will fill out a survey and then you and your charity are paid based on the number of sliders completed in the time of the experiment. There is no maximum on the number of sliders that you can complete.

Experimental Instructions—Continual Donation

Today, you will be participating in an economics experiment. The experiment tests how well people perform certain tasks. Your performance in this experiment will determine your earnings, which will be paid to either you or a charity of your choice in to cash at the end of the session. You will participate in this task on the computer in front of you. Please pay attention to these instructions so you will understand how to accumulate earnings. In addition to the money earned during the experiment, you will be paid a \$5.00 dollar participation award upon the conclusion of the session.

During this experiment, it is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim aloud etc., you will be asked to leave and neither you nor the charity you selected will be paid. We expect and appreciate your cooperation.

You will be presented a list of ten charities and their descriptions. You will be asked to select a charity. Based on your actions during the experiment the charity you select can receive a donation from you. The amount of the donation will depend on your actions during the experiment. Please note that you can choose only one charity from this list. Once you have selected your charity, select the OK button and the experiment will proceed.

This experiment consists of completing a set of exercises by adjusting the location of sliders. You will sit at a computer and, with your mouse attempt to move the slider marker to the correct number labeled next to each slider (see Figure 1 below). Each slider marker starts on the far left of that slider which corresponds to the 0 position. Your task is to move the slider marker with your mouse to the position corresponding to the number located on the left of each box (37 in Figure 1). To do this, you will click on the slider marker, and drag toward the target number indicated on the left side of the box. Your current position on the line is located on the right side of the box (21 in Figure 1).

Once you properly align the marker, the slider will disappear and the income you generated will increase. This information can be seen at the top of the page of sliders (See Figure 2). Once you complete all thirty sliders on the page, the page resets and you have opportunity to continue earning money until the time runs out. An earnings summary is displayed at the center near the top of the page with your time remaining located to the right of your earnings. (Figure 2)

During the experiment you may donate any of your earnings to the charity you selected. To do so, type the amount of money you wish to donate in the box labeled Donation Amount. Once you do this, click the Confirm button located just to the right of donation box. Note that you cannot donate more than you have earned. You may donate at any point and as many times as you wish during the experiment.

At any time during the experiment, you may take a break from completing sliders and browse the internet. To do this select Alt + Tab on your keyboard. Note that the timer on the experiment does not stop while you are on the internet. If you would like to return to the sliders, you can do so at any time while on the internet. To return to the task select Alt + Tab once more. There is no limit on the amount of times you are allowed to switch between these two screens.



You will have 75 minutes to complete sliders. You will be given a both a two-minute and thirty second warning before time expires. Each page of sliders completed will earn you \$.90 (three cents per slider). You will be provided verbal warnings of the time remaining. Once time expires all earnings and donations are finalized. At the conclusion of 75 minutes the experiment will end and you will be asked to complete a survey related to the experiment. Once the survey has been completed, you will be paid your earnings and, if applicable, your charity will be presented with your contributions.

To summarize:

- 1. You will be attempting to move slider markers to the indicated location on the slider bar. You will earn \$.90 for each page of slider markers correctly aligned within the 75 minutes allotted.
- 2. You may donate any of your earnings to charity at any time by inputting that number into the box at the top of the screen and hitting the confirm button. You can do this as often as you would like.

- 3. At any time, you are allowed to take a break from working on sliders and browse the internet by pressing Alt + Tab. You may return by pressing Alt + Tab again. You may cycle between these two pages at any time during the experiment.
- 4. Once 75 minutes have expired all allocations are finalized. With two minutes remaining you will be reminded that the experiment is about to end. You will fill out a survey and then you and your charity are paid based on the number of sliders completed in the time of the experiment. There is no maximum on the number of sliders that you can complete.

Experimental Instructions—Donate at the End and Continual Reminder

Today, you will be participating in an economics experiment. The experiment tests how well people perform certain tasks. Your performance in this experiment will determine your earnings, which will be paid to either you or a charity of your choice in to cash at the end of the session. You will participate in this task on the computer in front of you. Please pay attention to these instructions so you will understand how to accumulate earnings. In addition to the money earned during the experiment, you will be paid a \$5.00 dollar participation award upon the conclusion of the session.

During this experiment, it is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim aloud etc., you will be asked to leave and neither you nor the charity you selected will be paid. We expect and appreciate your cooperation.

You will be presented a list of ten charities and their descriptions. You will be asked to select a charity. Based on your actions during the experiment the charity you select can receive a donation from you. The amount of the donation will depend on your actions during the experiment. Please note that you can choose only one charity from this list. Once you have selected your charity, select the OK button and the experiment will proceed.

This experiment consists of completing a set of exercises by adjusting the location of sliders. You will sit at a computer and, with your mouse attempt to move the slider marker to the correct number labeled next to each slider (see Figure 1 below). Each slider marker starts on the far left of that slider which corresponds to the 0 position. Your task is to move the slider marker with your mouse to the position corresponding to the number located on the left of each box (37 in Figure 1). To do this, you will click on the slider marker, and drag toward the target number indicated on the left side of the box. Your current position on the line is located on the right side of the box (21 in Figure 1).

Once you properly align the marker, the slider will disappear and the income you generated will increase. This information can be seen at the top of the page of sliders (See Figure 2). Once you complete all thirty sliders on the page, the page resets and you have opportunity to continue earning money until the time runs out. An earnings summary is displayed at the center near the top of the page with your time remaining located to the right of your earnings. (Figure 2)

Once the time runs out you will be given the option to donate any of your earnings to the charity you selected. Note that you cannot donate more than you have earned.

At any time during the experiment, you may take a break from completing sliders and browse the internet. To do this select Alt + Tab on your keyboard. Note that the timer on the experiment does not stop while you are on the internet. If you would like to return to the sliders, you can do so at any time while on the internet. To return to the task select Alt + Tab once more. There is no limit on the amount of times you are allowed to switch between these two screens.

You will have 75 minutes to complete sliders. You will be given a both a two-minute and thirty second warning before time expires. Each page of sliders completed will earn you \$.90



(three cents per slider). You will be provided verbal warnings of the time remaining. Once time expires, you will be given the opportunity to donate any of your earnings to charity. After this decision the experiment will end and you will be asked to complete a survey related to the experiment. Once the survey has been completed, you will be paid your earnings and, if applicable, your charity will be presented with your contributions.

To summarize:

- 1. You will be attempting to move slider markers to the indicated location on the slider bar. You will earn \$.90 for each page of slider markers correctly aligned within the 75 minutes allotted.
- 2. Once the 75 minutes have expired you have the option to donate any of your earnings to the charity you selected at the beginning of the experiment.
- 3. At any time, you are allowed to take a break from working on sliders and browse the internet by pressing Alt + Tab. You may return by pressing Alt + Tab again. You may cycle between these two pages at any time during the experiment.
- 4. With two minutes remaining you will be reminded that the experiment is about to end. You will fill out a survey and then you and your charity are paid based on the

number of sliders completed in the time of the experiment. There is no maximum on the number of sliders that you can complete.