Altruism among Consumers as Donors*

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Abstract: Like most charitable and non-profit organizations, the arts, cultural institutions and universities often ask individuals for financial gifts to help fund their operations. However, a key difference is that the individuals who are solicited for charitable donations by arts and cultural institutions are oftentimes also purchasing services from the same institution. Thus, an open question is whether, and how, individuals make trade-offs between charitable gifts and consumer purchases from the same institution. We investigate this question in an online experiment that asks Sydneysiders to make a series of decisions between donating to the iconic Sydney Opera House, purchasing merchandise from the Sydney Opera House and keeping money. Our findings show that demand for SOH merchandise and SOH donations are substitutes. Further, we find evidence that increasing the individuals' awareness of the substitutability between money received from donations and money received from the sale of merchandise, increases the cross-price elasticity. This is particularly true for those individuals who positively identify with the Opera House. Our results suggest that the unique nature of arts, cultural and educational institutions as recipients of donations and providers of services mean that fundraising among "patrons" may crowd-in additional revenue.

JEL Classification: C9, D12, D64

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1 Introduction

Charitable giving to the arts and cultural institutions comprise a small fraction of total giving (for example, in the United States total giving in 2018 topped $427 billion and $19.5 billion went to the arts,[1] but is distinct from other types of giving in that the donors are oftentimes also consumers. Art museums, symphonies and operas sell tickets and experiences to consumers while also simultaneously asking consumers for donations to support their activities and to provide educational and community services. Although having historically strong public support for the arts, (e.g., the Australian government provided $7 Billion in 2013 according to the Australian Bureau of Statistics), rising costs and budget cuts to the arts in many countries (e.g., over $100 Million in 2014 in Australia) are forcing art organizations to increasingly ask individuals for donations. This dual role of the individual—donor and consumer—means that understanding charitable behavior of consumers-donors is a critical policy question.

Economists have theoretically, empirically and experimentally studied the demand for goods and services and the motivations for charitable behavior. However, there is a void in the literature towards understanding charitable behavior when the potential donor is *also* a customer of the organization. This paper addresses this gap. We focus on the cross-price elasticities of donation and product demand, which theoretically are expected to affect the relationship between donations and purchases. This allows us to ask whether donations to an organization and purchases from the same organization are complements or substitutes. Further, we study the extent to which the cross-price elasticity of demand is affected by two factors that vary the degree to which donations and sales are likely to be perceived as substitutes or complements: (1) the awareness that some of the money earned through product purchases may be used for the same purposes as the donations, and (2) whether the organization that is the recipient of the donation is the same organization selling merchandise.

The charitable giving literature in economics has been interested in how individuals substitute across two dimensions: (1) time and (2) pro-social behaviors. Addressing the first dimension in their review piece, Gee and Meer (2019) conclude that while there is some evidence of donor fatigue (Meier, 2007; Cairns and Slonim, 2011; Damgaard and Gravert, 2018), "the preponderance of evidence finds that gifts today do not cannibalize gifts tomorrow" (Shang and Croson, 2009; Landry et al., 2010; Castillo, Petrie, and Samek, 2017; Adena and Huck, 2019; Heger and Slonim, 2019).

Our paper is more closely related to the second dimension, which explores how people substitute between pro-social behaviors. For example, there is a growing literature looking at

[1] See Giving USA (2019).

the joint decision to give to charity and to engage in other behaviors, including volunteering (Feldman, 2010; Lilley and Slonim, 2014) health-related behaviors (Yörük, 2014; Cornish and Heger, 2020), and religious participation (Gruber, 2004; Yörük, 2013). For example, Feldman (2010) examines the joint decision to give money to charity and to volunteer time and finds that when the after-tax price of giving decreases, people give more to charity and volunteer more. However, Lilley and Slonim (2014) find that people substitute between volunteering time and donating money when their utility is determined more by pure altruism relative to warm glow motives (see Andreoni (1989, 1990)). Yörük (2014) finds that when the after-tax price of giving decreases, people have better health outcomes, implying that giving and healthy behaviors are complements. One potential mechanism for this is presented in Cornish and Heger (2020), when the after-tax price of giving decreases, individuals are more likely to exercise, which is likely to lead to better health outcomes. While this literature also offers mixed and nuanced conclusions, the concepts of moral consistency versus moral balancing provide a psychological interpretation for why pro-social or virtuous behaviors may be complements or substitutes, respectively (Monin and Miller, 2001; Fishbach, Dhar, and Zhang, 2006; Mullen and Monin, 2016).[2]

Our paper is distinct from the current literature on the substitution effects in charitable giving in that it studies how individuals substitute between charitable giving and consumerism. To do so, we ran an online experiment where we asked participants to simultaneously make product purchases from and donations to the same organization—the Sydney Opera House (SOH), one of the most iconic and well-known art institutions in Australia and the world. The SOH operates seven performing arts theatres with hundreds of thousands of customers, runs restaurants and bars, and sells a wide variety of merchandise. The SOH also collects donations for a large range of activities from physical maintenance to support for the programs it offers to community outreach and educational programs. Thus, like many arts institutions, it both sells products and solicits donations for its activities.

Using a between-subjects' experiment, we gave participants a budget of $500 to allocate towards purchasing merchandise from the SOH, making donations to the SOH and keeping for themselves in the form of a popular mall gift card. Each participant either saw a range of prices for the SOH merchandise or saw a range of donation prices (through variations in matching rates), holding all else constant. The variation in price allows us to address our research question by estimating a cross-price elasticity that reflects the degree of substitution or complementarity between donations to the SOH and merchandise purchases from SOH.

[2]There is also related literature that looks at how people bundle vice "goods" with virtue "goods" (Dhar and Simonson, 1999; Read, Loewenstein, and Kalyanaraman, 1999; Milkman, Minson, and Volpp, 2014; Liu et al., 2015).

The experiment consisted of three main treatment groups. In our baseline (Control) treatment, participants made decisions about purchases from and donations to the same organization (i.e., the Sydney Opera House), without receiving explicit information about how the SOH will use the funds from the sales of the merchandise. In the *Aware treatment*, we provided information about how the funds from the sale of the SOH merchandise also supported the same charitable causes within the SOH. In the *Alternative Donation treatment*, we changed the recipient of the donation—instead of going towards the organization that sells the merchandise (SOH), the donation goes to the Sydney Children's Hospital (a charity in the same geographic location with a very different mission).

We find that, on average, we estimate an own-price elasticity of demand of -.17 and -.78 for charitable giving and SOH merchandise, respectively, implying that subjects have downward-sloping demand curves for charitable giving and SOH merchandise. The -.17 price elasticity of demand for charitable giving aligns with findings in the match-price literature (Eckel and Grossman, 2003; Karlan and List, 2007; Hungerman, Ottoni-Wilhelm et al., 2016), though it is smaller than the estimate from tax-price literature (Meer and Priday, 2019; Cornish and Heger, 2020).

Next, we examine the cross-price elasticity between donations to the SOH and SOH merchandise. On average, we find that donations to the SOH and purchases of SOH merchandise are weak substitutes; that is, the cross-price elasticity is positive (p-value=.108). Thus, purchasing SOH merchandise appears to weakly crowd-out donations to the SOH and vice versa. However, it is unclear whether this weak substitutability is due to the fact that the SOH is the recipient of the donation *and* the vendor of merchandise. The results from the *Alternative Donation treatment* shed some light on this question—when the recipient of the donation is changed to the Sydney's Children Hospital, we find a positive and significant cross-price elasticity of .12, suggesting that donations to the Sydney Children's Hospital and purchases of SOH merchandise are substitutes.

By contrast, the *Aware treatment* allows us to test how increased awareness of the degree of substitutability of donations to the SOH and money earned through the sale of their merchandise affects the cross-price elasticity. On average, we find no significant difference in the cross-price elasticity in the Control and Aware treatment. However, this masks important heterogeneity. Typically, when individuals are tasked with making a trade-off between donating and consuming, we are likely to treat consumerism as an egoistic activity. However, in our context, purchasing merchandise from the Sydney Opera House may be viewed differently than typical consumerism, as the iconic Sydney Opera House is a source of pride and identity for many Sydneysiders. Thus, some individuals may view purchasing SOH merchandise not as an egoistic or consumer activity but instead as a pro-social behavior, reinforcing

their commitment and attachment to the Opera House. In line with moral consistency, we find that among subjects who positively identify with the SOH, the *Aware treatment* has a significantly negative effect on cross-price elasticity relative to the Control treatment—the Aware treatment significantly *reduces* the cross-price elasticity by 175% (from .12 to -.09), while there is no significant effect on those who do not positively identify with the SOH.

2 Experimental Design and Procedures

2.1 Experimental Design

A total of 1,090 participants took part in the experiment between February and May 2018.[3] We recruited subjects from two distinct sources: 424 participants were recruited from the database of the University of Sydney economics experiments research volunteers using ORSEE (Greiner, 2015) without any exclusion criteria and 666 participants were recruited on Facebook using advertisements targeting users who 'liked' the SOH Facebook site and lived within 20 miles of the SOH. We implemented the additional Facebook recruitment to include participants who, a priori, have shown interest in the SOH. Throughout our analysis, we always include a control for the source of the sample.

The participants' task was to allocate 500 Australian dollars between SOH vouchers, a donation, and a gift card for the Australian mall chain Westfield. Westfield malls are the biggest shopping centres in Australia, selling a wide range of products including groceries, general supplies, clothing, games, household appliances from over 8,000 participating retailers. They are widespread throughout Sydney and are located in close proximity to the university and anyone within 20 miles of the SOH. Sydney Opera House vouchers can be used to purchase tickets to performances, events, and tours at the Sydney Opera House. They are valid for 12 months and can be kept for oneself or transferred to others. Although the vouchers cannot be explicitly donated, not using the voucher to purchase a good from the SOH is technically equivalent to giving money to the SOH. We used Westfield gift cards instead of cash because it is a close substitute to cash, the ubiquitous locations of the Westfield malls, and due to the ease of delivery to subjects.

For all options, we imposed a minimum expenditure of $10. We did this to keep the transaction costs constant independent of individual allocations, as well as to maintain consistency since this is the minimum amount available for Westfield gift cards. A full copy of the experimental instructions can be found here.

[3]The experiment was approved by the Ethics Office at the University of Sydney (project number 217/627).

2.1.1 Treatments and Hypotheses

Each participant made allocations in various pricing scenarios, where either (1) the price for a one-dollar SOH voucher was fixed at either \$0.50, \$0.80, or \$1.00 and the price of making a one-dollar donation varied from \$0.33 to \$1.00, or (2) the price of the donation was fixed at either \$0.50, \$0.67 or \$1.00 and the price for the SOH voucher varied from \$0.50 to \$1.10. To offer different donation prices, the donation was either not accompanied by a matched donation, resulting in the highest donation price of \$1.00 for \$1.00, or we would match the donation with an additional amount between \$0.20 and \$2.00, resulting in donation prices varying between \$0.33 and \$0.83. We used the strategy method to collect data for these various scenarios.

From the law of demand, and assuming the vouchers and donations are normal goods, we would expect the amount of money allocated to SOH vouchers (donations) to weakly fall as the voucher (donation) price increases. In addition, and this is the main goal of the study, we can estimate how the amount of money allocated to donations changes when the price of SOH vouchers changes and vice versa, to determine the degree of complementarity/substitutability between voucher purchases and donations. Between participants, we exogenously varied two factors that we conjectured would affect the degree of substitutability between the donations and the purchased products. Each participant was assigned to one of three treatments: (1) Control, (2) Aware, and (3) Alternative Donation.

In the Control and the Aware treatments, participants allocate \$500 to SOH vouchers, donations to SOH, and Westfield vouchers. Donations to the SOH are used for many purposes including improving building access, opening new areas to the public, helping provide performances for people with disability, offering discounted tickets for disadvantaged students and families, training and work experience for Aboriginal and Torres Strait Islander students, and helping students in remote and regional Australia experience the Opera House through unique interactive digital programs.

The Aware treatment differs from the Control treatment in that we explicitly explain the relationship between vouchers and donations to the subjects; that is, that profit from the sale of SOH merchandise (including voucher sales) are directed to support the same organization as the donations collected by the SOH. We anticipated that emphasizing the shared mission would increase the degree of perceived substitutability between SOH vouchers and donations to SOH. More specifically, in the Aware treatment, we explicitly mention that "that the Opera House may use some of the income from voucher sales to finance the same causes that it finances from money obtained via donations." Thus, providing this information will ensure that all participants in this treatment are aware that their consumer purchases

and donations to the SOH support the same causes. Comparing our Control treatment to the Aware treatment permits a test of the effect of making individuals more aware of the substitutability of the two expenditures on the cross-price elasticity.

Following the literature in psychology, we hypothesize that the effect of the Aware treatment will depend on how participants view themselves in relation to the SOH. On the one hand, participants who positively identify with the SOH may use their purchasing and donation behavior as an identity-enforcement activity and escalate their commitment to this identity when the substitutability of the two expenditures in emphasized (Bénabou and Tirole, 2011). Thus, we hypothesize that among subjects who positively identify with the SOH, subjects in the Aware treatment will view purchases of SOH merchandise and donations to the SOH as more complementary than subjects in the Control treatment. On the other hand, among subjects who do not positively identify with the SOH, the Aware treatment will simply emphasize the similarity of the two expenditures relative to the Control treatment and thus we hypothesize that the Aware treatment will decrease the cross-price elasticity.

In our Alternative Donation treatment, participants have the opportunity to donate to the Sydney Children's Hospital instead of the SOH.[4] In this treatment, when participants purchase SOH vouchers, they know for certain that this does not lead to additional financial support for the Children's Hospital. Comparing our Control treatment to the Alternative Donation treatment allows us to test the effect of decreasing the similarity between the recipient of the donation and the recipient of the voucher purchase. We hypothesize that the Alternative Donation treatment will decrease the cross-price elasticity relative to the Control treatment as the distinction between the two expenditures will increase.

Table 1 summarizes all of our treatments and the corresponding participant numbers. Pv is the voucher price and Pd is the donation price. For all participants in conditions with even numbers, we can derive the price elasticity of SOH voucher demand and the cross-price elasticity of donation demand, while for the participants in conditions with odd numbers we can derive the price elasticity of donation demand and the cross-price elasticity of SOH voucher demand.

[4]The Sydney Children's Hospital in Randwick is one of Australia's leading specialist medical centres for children, caring for seriously ill and injured children from across NSW and beyond. The Children's Hospital provides a complex and comprehensive range of services in paediatric and adolescent medicine and surgery, treating children with conditions including cancer, trauma, HIV/AIDS, congenital abnormalities, disabilities, heart disease and respiratory disorders.

Table 1: treatment Overview

Condition	treatment	Fixed	Varied	Charity	Awareness	USyd	Fb
Main							
1	Alternative Donation	Pv=0.80	Pd	Hospital	No	42	124
2	Alternative Donation	Pd=0.67	Pv	Hospital	No	41	116
3	Aware	Pv=0.80	Pd	SOH	Yes	44	107
4	Aware	Pd=0.67	Pv	SOH	Yes	45	102
5	Control	Pv=0.80	Pd	SOH	No	42	99
6	Control	Pd=0.67	Pv	SOH	No	42	108
Additional							
7	Control	Pv=1.00	Pd	SOH	No	46	3
8	Control	Pd=1.00	Pv	SOH	No	40	2
9	Control	Pv=0.50	Pd	SOH	No	43	3
10	Control	Pd=0.50	Pv	SOH	No	39	2

Sample sizes by treatment, sample source, the fixed price and the varied price.

2.1.2 Payment Information

To preserve incentive-compatibility, before making their decisions, participants were informed that when data collection finishes, out of all participants five will be randomly selected to have their decision in one randomly selected scenario implemented. The random draw was supervised by the Head of the School of Economics at the University of Sydney. The five winners received their donations receipts and the SOH vouchers via e-mail, and the Westfield gift cards were either sent via e-mail or picked up at the office of one of the researchers at the University of Sydney.

2.1.3 Additional Experimental Details

Prior to making any decisions, participants read online written instructions that explained all of the details. The experiment was conducted via an online survey generated using Qualtrics software (Qualtrics, Provo, UT, USA). To ensure that participants did not complete the survey more than once, we activated the "prevent ballot-box stuffing" option. This option places a cookie on a participant's browser once a response is submitted. That way the survey cannot be taken repeatedly on the same browser. Furthermore, participants were asked to provide their e-mail address so that we could contact them in case they were one of the five randomly selected winners. Three participants completed the survey twice, as identified by repeated email addresses, and their second survey entry was excluded from the analysis.

To increase task comprehension, participants were guided through three practice scenarios before making their payment-relevant decisions. In the practice scenarios, they made decisions as in the real experiment and observed their consequences. Participants could make adjustments to their allocation decisions by using a back button, which allowed them to see the payment consequences for several choices in a given scenario.

In the main part of the experiment, participants saw all seven decision scenarios on one screen. The scenarios were shown in ascending order of the seven voucher prices or the seven donation matching rates, respectively. Again, participants could use a back button to change their allocation decisions after seeing the consequences of their choices. After completing the allocation decisions, each participant filled in a detailed questionnaire, including questions on demographics and a range of behaviors, attitudes and opinions related to the institutions mentioned in the study.

2.2 Data

Table 2: Summary Statistics

	Control treatment	Aware treatment	Alternative Donation treatment
Female	.64	.70	.66
	(.48)	(.46)	(.47)
Age	25.97	25.46	25.55
	(5.62)	(4.40)	(5.20)
No Dependents	.41	.40	.40
	(.49)	(.49)	(.49)
Agreed SOH is an important institution	.71	.70	.
	(.45)	(.46)	
Donated to SOH Before	.05	.07	.
	(.22)	(.25)	
Bought SOH Merchandise Before	.09	.08	.09
	(.28)	(.28)	(.28)
Attended an SOH event last year	.47	.44	.41
	(.50)	(.50)	(.49)
Positive SOH identity	.71	.70	.
	(.45)	(.46)	
Recruited through FB	.37	.39	.56
	(.48)	(.49)	(.49)
Agreed Hosp. is an important institution	.	.	.94
			(.23)
Donated to the Hosp. before	.	.	.15
			(.36)
Know about the Hosp.			.71
			(.45)
Observations	291	298	323

Means with standard errors reported in parentheses.

Table 2 presents the mean and standard deviations for the variables collected in our

survey for each of the three treatments.[5] In addition to these collected variables, we also construct a factor that measures the strength of identity towards the Sydney Opera House by conducting a principal component analysis using four variables: past donation behavior to the SOH, attitudes towards the SOH, attendance at SOH events, and past consumer behavior of SOH merchandise. We then discretized this factor to produce a dummy variable that takes a value of 1 when subjects have a positive identity towards the SOH and 0 otherwise. We present the factor loadings in Table A1. Finally, we find no significant differences in the means of these variables between the Aware and Alternative Donation treatments and the Control treatment.

3 Results

First, we estimate own-price elasticity of demand using a log-log random effects estimator with standard errors clustered at the individual level.

$$\log(x_{g,i}) = \beta_0 a_i + \beta_{gg} \log(p_{g,i}) + \varepsilon_i \quad \forall g = \text{donation, voucher} \tag{1}$$

where $x_{g,i}$ and $p_{g,i}$ are the demand and price, respectively, and a_i is the fixed effect for participant i. We present the results of this regression analysis in Table 3. In columns (1) and (2), we pool together our three treatments and consistent with the law of demand, both the demand for charitable giving and the demand for SOH merchandise is downward sloping. We estimate an elasticity of demand for making a charitable donation to the SOH of -0.12 and an elasticity of demand for purchasing SOH merchandise of -0.76. For clarity, these estimates imply that a 10% decrease in the relevant price corresponds to a 1.2% and 7.6% increase in demand for donations and SOH merchandise, respectively. We repeat this estimation in Table A7 dropping subjects with non-monotonic choices and obtain qualitatively equivalent results.

In columns (3)-(6), we compare own-price elasticities between the Aware and Alternative Donation treatment to the Control treatment by interacting the Price variable with a dummy for the Aware and Alternative Donation treatments. We estimate the following equation

[5]Further, we graphically show the responses to each questionnaire item separately for the two participant samples, Facebook (FB) and ORSEE, across all conditions in Figure A1. Tables A5 and A6 also show that we do not get significantly different results for the Facebook sample and the non-Facebook sample.

TABLE 3: OWN PRICE ELASTICITY

	(1) Log(Don)	(2) Log(SOH)	(3) Log(Don)	(4) Log(SOH)	(5) Log(Don)	(6) Log(SOH)
Log(Donation Price)	-0.12***	.	-0.17**	.	-0.09	.
	(0.04)		(0.07)		(0.06)	
Log(Voucher Price)	.	-0.76***	.	-0.83***	.	-0.71***
		(0.08)		(0.13)		(0.11)
Don Price × Aware	.	.	0.06	.	.	.
			(0.09)			
Voucher Price × Aware	.	.	.	0.07	.	.
				(0.21)		
Don Price × SOH cause	.	.	.	.	-0.08	.
					(0.09)	
Voucher Price × SOH cause	.	.	.	.	.	-0.12
						(0.17)
Aware	-0.3**	0.09	-0.27*	0.1	.	.
	(0.14)	(0.12)	(0.15)	(0.14)		
SOH Recipient	-0.75***	0.47***	.	.	-0.8***	0.44***
	(0.13)	(0.13)			(0.14)	(0.13)
FB Sample	0.31***	0.01	0.36**	-0.02	0.32**	0.16
	(0.12)	(0.11)	(0.15)	(0.14)	(0.14)	(0.14)
Constant	4.81***	3.45***	4.00***	3.93***	4.82***	3.36***
	(0.12)	(0.12)	(0.14)	(0.14)	(0.14)	(0.14)
Observations	3206	3178	2044	2079	2149	2149
treatments						
Control	✓	✓	✓	✓	✓	✓
Aware	✓	✓	✓	✓		
Alt. Donation	✓	✓			✓	✓

Donation Price, voucher price and the two dependent variables, the donation amounts and the amount spent on SOH merchandise, are in logs. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

$$\log(x_{g,i}) = \gamma_0 a_i + \gamma_{gg}\log(p_{g,i}) \quad + \gamma_{g\tau}\log(p_{g,i}) \times \mathbf{1}[\text{treatment} = \tau] + \gamma_\tau \mathbf{1}[\text{treatment} = \tau] + \nu_i$$
$$\forall g = \text{donation, voucher} \tag{2}$$

where $\mathbf{1}[\text{treatment} = \tau]$ takes a value of 1 when the treatment, τ, is either the Aware treatment or the Alternative Donation treatment. In columns (3) and (4), we only include the Control and Aware treatments, while in columns (5) and (6) we only include the Control and Alternative Donation treatments. We do this to make direct comparisons between the treatments and the Control conditions. We do not find any evidence of significant differences in the own-price elasticity for these treatments relative to the Control treatment.

Second, we estimate cross-price elasticities of demand by regressing the demand for good

Table 4: Cross Price Elasticity

	(1)	(2)	(3)	(4)	(5)	(6)	(7) Pos. SOH ID only	(8) Not Pos ID only
Log(Cross Price)	0.03	0.09	-0.02	0.12***	0.09	0.09	0.12	0.07
	(0.06)	(0.06)	(0.06)	(0.04)	(0.06)	(0.06)	(0.09)	(0.07)
Log(Cross Price) × Aware	.	.	.	.	-0.11	.	-0.22*	-0.05
					(0.08)		(0.12)	(0.1)
Log(Cross Price) × Alt Charity	.	.	.	.	.	0.03	.	.
						(0.07)		
Aware	0.02	.	.	.	-0.02	.	-0.14	0.04
	(0.1)				(0.1)		(0.14)	(0.13)
AltDonation	0.04	.	.	.	.	0.06	.	.
	(0.1)					(0.11)		
FB Sample	.	0.09	0.31**	0.08	0.2*	0.08	0.27*	0.1
		(0.15)	(0.15)	(0.17)	(0.1)	(0.11)	(0.16)	(0.13)
Constant	4.13***	4.21***	4.03***	4.27***	4.23***	4.21***	4.47***	3.97***
	(0.1)	(0.13)	(0.13)	(0.14)	(0.55)	(0.11)	(0.15)	(0.13)
Observations	6384	2037	2086	2261	4123	4298	1568	2555
treatments								
Control	✓	✓			✓	✓	✓	✓
Aware	✓		✓		✓		✓	✓
Alt. Donation	✓			✓		✓		

Price and demand are in logs. Cross Price refers to the price of the donation when estimating the demand for the SOH voucher, and refers to the price of the SOH voucher when estimating demand for the donation. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

d on the price of good g for each good, d, g, using the following equation

$$\log(x_{j,i}) = \gamma_0 a_i + \gamma_{jg} \log(p_{g,i}) + \nu_i \quad \forall j, g = \text{donation, voucher} \tag{3}$$

As before, we use a random-effects estimator with standard errors clustered at the individual level. Note that the well-known Young's theorem states that $\gamma_{jg} = \gamma_{gj}$ (Young, 1912). We impose this restriction on our estimates of the cross-price elasticity and verify that it holds in Table A4.[6] We present our estimates of the cross-price elasticities in Table 4. In column (1), we pool together the three treatments and find a positive cross-price elasticity, suggesting that donations and purchases of SOH merchandise are substitutes. However, we see from columns (2), (3) and (4), where we estimate the cross-price elasticity separately for each treatment, that this positive cross-price elasticity is driven by the Alternative Donation treatment and to a lesser extent by the Control treatment (p-value=.108). By contrast in

[6]We also separately estimate the cross-price elasticities in Table A2.

the Aware treatment, we find that donations to the SOH and purchases from the SOH are independent.

In columns (5) and (6), respectively, we examine whether the cross-price elasticities in the Aware and Alternative Donation treatments are different from the Control treatment. We do this by estimating the following equation

$$\log(x_{j,i}) = \gamma_0 a_i + \gamma_{gj}\log(p_{g,i}) \quad + \gamma_{g\tau}\log(p_{g,i}) \times \mathbf{1}[\text{treatment} = \tau] + \gamma_\tau \mathbf{1}[\text{treatment} = \tau] + \nu_i$$
$$\forall j, g = \text{donation, voucher} \tag{4}$$

On average, we find no evidence that there are significant differences in cross-price elasticity between either of the two treatments and the Control. However, we do find an important source of heterogeneity, which we report in columns (7) and (8). More specifically and consistent with our hypothesis in Section 2.1, we find that among those subjects who we identify as having a positive identity towards the SOH through our principal component analysis (described in Section 2.2), the Aware treatment has a significantly negative effect on the cross-price elasticity. In fact, among this group of subjects, the Aware treatment reduces the cross-price elasticity by 175%, from .12 to -.10. By contrast, column (8) shows that we find no such effect for those subjects who do *not* positively identify with the Opera House.

The Aware treatment makes subjects more aware of the "joint mission" of their donations to the SOH and their purchases of SOH merchandise. Thus, our results are consistent with the interpretation that individuals who have a positive identity towards the SOH use this more salient opportunity to reaffirm their positive identity and escalate their commitment to the SOH. In other words, when the price of SOH merchandise decreases, subjects who positively identify with the SOH increase their purchases of SOH merchandise, and in the Aware treatment also (weakly) increase their donations to SOH, relative to the Control treatment, while decreasing the amount of cash they keep for themselves.

4 Conclusion

This paper investigates the behavior of people who are simultaneously potential donors and customers of an organization. To gain a deeper understanding of how perceived substitutability between a donation and a product purchase affects behavior, we exogenously vary the degree of substitutability in two treatments: (a) we raise people's awareness that money earned through product purchases may be used for the same purposes as the collected donations, and (b) we replace the recipient of the donation by another independent organization.

Our results reveal that an increase in the price for SOH vouchers is associated with an increase in donations and vice versa. Further, using the Alternative Donation treatment, we find that this *crowding-out* is also present when the recipient of the donation is another, unrelated organization.

On the other hand, increasing people's awareness that SOH donations and SOH purchases may result in the support of similar causes does not affect the average cross-price elasticity of demand, unless the individual positively identifies with the iconic Sydney Opera House. For those who positively identify with the SOH, this increased awareness significantly decreases the cross-price elasticity relative to the Control treatment.

Our experiment focused on the donation request that takes place at the same point in time when a customer makes a purchase. Next to this purchase-related donation request, in the field, donations are also often asked for at other points throughout the year independent of purchases. This creates a time delay between a customer's purchase and the donation request. The length of this delay, the experience of the purchased event per se, or the degree of enjoyment at the event may influence the relationship between donations and product purchases. Future research should thus investigate spill-over effects of donation matching and voucher rebates in a time-variant setting and could thus potentially identify the optimal time for donation collection.

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Appendix A Appendix: Additional Tables and Figures

Figure A1: Summary Statistics: Means by Source of Sample

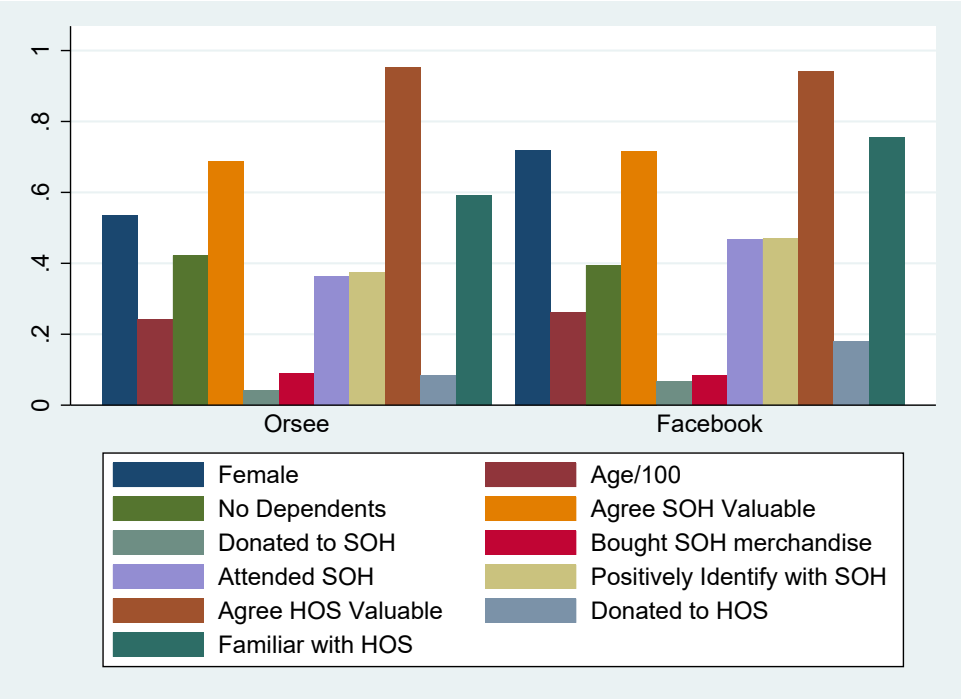

Table A1: Factor Loadings

Variable	Factor1	Uniqueness
Last Event Attended at SOH	-0.64	0.5871
Bought SOH Merchanise Before	0.58	0.6610
Donated to the SOH Before	0.67	0.55
Attitude towards the SOH	-0.56	0.68

The variables "Last Event Attended at SOH" and "Attitude towards the SOH" are negatively coded, while "Bought SOH Merchandise" and "Donated to the SOH" are positively coded.

TABLE A2: CROSS PRICE ELASTICITY

	(1) Log(Don)	(2) Log(SOH)	(3) Log(Don)	(4) Log(SOH)	(5) Log(Don)	(6) Log(SOH)	(7) Log(Don)	(8) Log(SOH)
Log(Donation Price)	.	0.09**	.	0.1	.	0.04	.	0.14**
		(0.04)		(0.08)		(0.07)		(0.06)
Log(Voucher Price)	-0.008	.	0.08	.	-0.13	.	0.02	.
	(0.04)		(0.07)		(0.1)		(0.05)	
Aware	-0.06	0.12	.	.	.	.	.	.
	(0.14)	(0.13)						
SOH Recipient	-0.84***	0.7***	.	.	.	.	.	.
	(0.13)	(0.13)						
FB Sample	0.29**	0.04	0.34	-0.17	0.35*	0.27	0.17	0.02
	(0.12)	(0.12)	(0.22)	(0.2)	(0.21)	(0.21)	(0.18)	(0.2)
Constant	4.92***	3.49***	4.08***	4.34***	3.95***	4.12***	5.02***	3.54***
	(0.12)	(0.12)	(0.19)	(0.17)	(0.17)	(0.19)	(0.16)	(0.17)
Observations	3178	3206	1050	987	1029	1057	1099	1162
treatments								
Control	✓	✓	✓	✓				
Aware	✓	✓			✓	✓		
Alt. Donation	✓	✓					✓	✓

Donation Price, voucher price and the two dependent variables, the donation amounts and the amount spent on SOH merchandise, are in logs. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE A3: CROSS PRICE ELASTICITY WITH TREATMENT INTERACTIONS

	(1) Log(Don)	(2) Log(SOH)	(3) Log(Don)	(4) Log(SOH)
Log(Donation Price)	.	0.1	.	0.14**
		(0.08)		(0.06)
Log(Voucher Price)	0.08	.	0.02	.
	(0.07)		(0.05)	
Don Price × Aware	.	-0.06	.	.
		(0.1)		
Voucher Price × Aware	-0.21*	.	.	.
	(0.12)			
Don Price × SOH cause	.	.	.	-0.04
				(0.1)
Voucher Price × SOH cause	.	.	0.06	.
			(0.09)	
Aware	-0.12	0.09	.	.
	(0.14)	(0.14)		
SOH Recipient	.	.	-0.82***	0.67***
			(0.13)	(0.14)
FB Sample	0.34**	0.05	0.25*	-0.07
	(0.15)	(0.14)	(0.14)	(0.14)
Constant	4.07***	4.19***	4.96***	3.61***
	(0.15)	(0.14)	(0.13)	(0.14)
Observations	2079	2044	2149	2149
treatments				
Control	✓	✓	✓	✓
Aware	✓	✓		
Alt. Donation			✓	✓

Donation Price, voucher price and the two dependent variables, the donation amounts and the amount spent on SOH merchandise, are in logs. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A4: Test of Young's Theorem

	(1)	(2)	(3)	(4)
	Log(Demand)			
Log(Cross Price)	-0.008	0.08	-0.13	0.02
	(0.04)	(0.07)	(0.1)	(0.05)
Log(Cross Price) × Don Price	0.1*	0.01	0.16	0.12
	(0.06)	(0.11)	(0.12)	(0.08)
Donation Context	-0.56***	-0.09	0.11	-1.59***
	(0.08)	(0.15)	(0.14)	(0.12)
Aware	0.04	.	.	.
	(0.1)			
SOH Recipient	-0.06	.	.	.
	(0.1)			
FB Sample	0.16*	0.08	0.31**	0.09
	(0.09)	(0.15)	(0.15)	(0.13)
Constant	4.47***	4.26***	3.98***	5.07***
	(0.1)	(0.15)	(0.14)	(0.13)
Observations	6384	2037	2086	2261
treatments				
Control	✓	✓		
Aware	✓		✓	
Alt. Donation	✓			✓

Donation Price, voucher price and the two dependent variables, the donation amounts and the amount spent on SOH merchandise, are in logs. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE A5: CROSS PRICE ELASTICITY WITH SAMPLE SOURCE INTERACTIONS

	(1)	(2)	(3)	(4)
Log(Cross Price)	0.03	0.03	-0.05	0.1
	(0.06)	(0.13)	(0.1)	(0.09)
LogCrossPrice× FB	0.06	0.09	0.05	0.02
	(0.07)	(0.14)	(0.12)	(0.1)
Aware	0.02	.	.	.
	(0.1)			
AltDonation	0.04	.	.	.
	(0.1)			
FB Sample	0.18*	0.12	0.33**	0.08
	(0.1)	(0.16)	(0.16)	(0.17)
Constant	4.13***	4.19***	4.02***	4.27***
	(0.1)	(0.14)	(0.13)	(0.15)
Observations	6384	2037	2086	2261
treatments				
Control	✓	✓		
Aware	✓		✓	
Alt. Donation	✓			✓

Price and demand are in logs. Cross Price refers to the price of the donation when estimating the demand for the SOH voucher, and refers to the price of the SOH voucher when estimating demand for the donation. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A6: Cross Price Elasticity Interactions by Sample Source

	(1) Non-FB sample	(2) FB sample	(3) Non-FB sample	(4) FB sample
Log(Cross Price)	0.03	0.12*	0.03	0.12*
	(0.13)	(0.06)	(0.13)	(0.06)
Log(Cross Price) × Aware	-0.08	-0.12	.	.
	(0.16)	(0.09)		
Log(Cross Price) × Alt Charity	.	.	0.08	0.008
			(0.16)	(0.08)
Aware	-0.17	0.04	.	.
	(0.19)	(0.12)		
AltDonation	.	.	0.08	0.05
			(0.2)	(0.12)
Constant	4.19***	4.31***	4.19***	4.31***
	(0.14)	(0.09)	(0.14)	(0.09)
Observations	1211	2912	1169	3129
treatments				
Control	✓	✓	✓	✓
Aware	✓	✓		
Alt. Donation			✓	✓

Price and demand are in logs. Cross Price refers to the price of the donation when estimating the demand for the SOH voucher, and refers to the price of the SOH voucher when estimating demand for the donation. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A7: Own Price Elasticity with Consistent Subjects Only

	(1) Log(Don)	(2) Log(SOH)	(3) Log(Don)	(4) Log(SOH)	(5) Log(Don)	(6) Log(SOH)
Log(Donation Price)	-0.18***	.	-0.29***	.	-0.09	.
	(0.05)		(0.09)		(0.07)	
Log(Voucher Price)	.	-0.82***	.	-0.82***	.	-0.63***
		(0.1)		(0.17)		(0.13)
Don Price × Aware	.	.	0.12	.	.	.
			(0.12)			
Voucher Price × Aware	.	.	.	-0.25	.	.
				(0.29)		
Don Price × SOH cause	.	.	.	.	-0.2*	.
					(0.11)	
Voucher Price × SOH cause	.	.	.	.	.	-0.2
						(0.22)
Aware	-0.36**	0.1	-0.3	0.04	.	.
	(0.18)	(0.17)	(0.2)	(0.18)		
SOH Recipient	-0.86***	0.46***	.	.	-0.97***	0.43***
	(0.18)	(0.16)			(0.2)	(0.16)
FB Sample	0.28*	-0.04	0.39**	-0.12	0.24	0.15
	(0.15)	(0.14)	(0.19)	(0.18)	(0.18)	(0.17)
Constant	4.68***	3.28***	3.69***	3.79***	4.76***	3.19***
	(0.16)	(0.15)	(0.18)	(0.17)	(0.18)	(0.16)
Observations	2121	2086	1337	1281	1400	1463
treatments						
Control	✓	✓	✓	✓	✓	✓
Aware	✓	✓	✓	✓		
Alt. Donation	✓	✓			✓	✓

Donation Price, voucher price and the two dependent variables, the donation amounts and the amount spent on SOH merchandise, are in logs. Random effect regressions with clustered standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.