

## WORKING PAPER SERIES



### **Distributional preferences and donation behavior among marine resource users in Wakatobi, Indonesia**

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## Abstract

This study examines the effect of participants' distributional preferences on donations of money and time using a field experiment with marine resource users in Indonesia. Individuals participate in a real effort task to earn money and are faced with a donation decision under different treatments – monetary donation, time donation, monetary match, and time match. In the distributional preferences elicitation we classify individuals' preferences as benevolent, egalitarian, own-money-maximizing, and spiteful. We find that the different distributional preference types are a significant indicator of participants' donation behavior. The people showing spiteful preferences and those that focus only on maximizing their own payoff are less likely to donate any amount compared to those that make egalitarian choices. Furthermore, we find strong evidence that individuals that choose payoff structures characterized as "benevolent" donate a significantly higher amount compared to the egalitarian types. We analyze the results econometrically in two-stages to better understand the determining factors for whether an individual donates and those factors that determine how much one donates. Practical implications involve the segmentation of the target audience, not by the type of charity but by the mechanism which motivates their donation behavior.

## Keywords

Distributional preferences, donations, field experiment

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## I. Introduction

Human behavior is widely accepted as the key driver that threatens biodiversity (Wright et al., 2015). Overharvesting, habitat loss, pollution, climate change, and invasive species are consequences, although not necessarily intentional, of the lifestyles of billions of humans. Conservation science often focuses on documenting losses and identifying causes for declines in biodiversity. In order to move toward identifying the underlying drivers and implementing solutions, practitioners need to accept that conservation is not only about animals, plants, and their environment but equally about societies, people, and their behavior. The compelling logic is that damage is likely to be worse where natural resources are open-access because some people will be able to enjoy the benefits without contributing to the costs of provision. Maintaining large-scale cooperation for the provision and management of open-access goods is fraught with this infamous cooperation dilemma in which people tend to free-ride, both by overusing resources and underinvesting in their maintenance.

Conventional economic reasoning is typically based on the self-interest hypothesis, i.e. the assumption that people are exclusively motivated by their material self-interest (Fehr & Fischbacher, 2002). However, overwhelming experimental evidence has refuted the self-interest hypothesis by showing that people often behave with un-selfish preferences, which can help explain how and why communities are able to manage open-access resources. A core question pertaining to conservation economics is: what are the conditions necessary for encouraging successful collective action for conservation?

Social preferences for the distribution of wealth (hereafter referred to as distributional preferences) shape individual behavior on a range of issues related to: competition in the labor market (Balafoutas, Kerschbamer, & Sutter, 2012; Charness & Rabin, 2002), political party affiliation (Fisman, Jakiela, & Kariv, 2014), collective behavior (Fehr & Fischbacher, 2002; Hedegaard, Kerschbamer, & Tyran, 2011) and charitable giving (Kamas & Preston, 2008, 2015). Relatively little is known about how the distributional preferences of resource users relates to the behavior of giving to public goods. It is unclear how distributional preferences factor in situations where the costs of an action are large, but the benefits are dispersed among many individuals, such as in the situation of environmental goods (Schumacher, Kesternich, Kosfeld, & Winter, 2014). Additionally, it is not clear whether concern for the welfare of others extends to the environment and open-access resources. While there is literature showing that personal values affect giving behavior, the majority of research does not distinguish between the heterogeneity in prosocial motivations, such as differences between benevolence, inequity aversion, and efficiency or how this information could be useful to practitioners (Kamas and Preston, 2012).

Fundamental to achieving conservation goals is the ability to understand and manage biodiversity as a collective good that requires people to change their behavior by modifying, halting, or replacing detrimental activities. According to Wright et al. (2015) and Harrison et al. (2014), in general, conservationists have failed



to influence people's behavior, and, as a result, biodiversity and natural environments continue to decline in extent and quality. Efforts to influence people's behaviors for the benefit of conservation should therefore seek new approaches from other disciplines such as marketing, and charitable giving (Kraft-Todd, Yoeli, Bhanot, & Rand, 2015; Veríssimo, 2013; Wright et al., 2015). Voluntary approaches, as opposed to command-and-control regulatory approaches, are considered an important "new tool" for conservation and environmental management, but little is known about how to motivate voluntary contributions for the environment (Brouhle, Griffiths, & Wolverton, 2005; Dietz & Stern, 2002).

Given the proximity and direct impact on the environmental good, understanding resource users' ability and willingness to contribute to conservation is essential (Thaman, Icely, Fragoso, & Veitayaki, 2016).

Environmental protection in many countries is funded from general tax revenues, but poor countries often have weak governmental financial support for conservation initiatives, meaning that a large proportion of conservation resources must be provided privately by non-governmental organizations (NGOs). Much of these funds come from voluntary contributions to NGOs and informal community groups, in the form of both volunteer services and monetary donations. This article explores the determinants of voluntary contributions to charitable organizations through an experimental analysis of a fishing community's donations of money and time.

Previous studies indicate that different demographic, socioeconomic and psychographic characteristics make up market segments that affect the type of charity preferred and level of donations made to charities (Diamantopoulos, Schlegelmilch, & Love, 1993; Dolnicar & Randle, 2007; Nichols, 1995; Straughan & Roberts, 1999). The development of psychographically defined segments offers benefits in terms of greater precision when targeting marketing strategies, particularly promotional or behavior change strategies (Schlegelmilch & Tynan, 1989). Dolnicar and Randle (2007) argue that motivation-based data-driven market segmentation represents a useful way of gaining insight into heterogeneity amongst donors. Such insight is useful to charity organizations to more effectively target segments with customized messages.

We investigate the demographic and psychographic factors that influence people from a fishing village in Indonesia to give to charity. We conducted a field experiment whereby participants earned money through completion of a task and then had the opportunity to donate some or all of their earnings to local or national charitable organizations. Each participant was presented with one of the four treatment scenarios: 1) monetary donation, 2) monetary donation with matching at a rate of 1:1 (i.e. the value of the contribution is doubled), 3) volunteer time donation, and 4) volunteer time donation with matching at a rate of 1:1. Each participant faced two decisions in sequence: whether to donate, and how much to donate. We incorporate this two-level decision structure into the analysis<sup>1</sup>.

This was followed by a binary-choice task to elicit distributional preferences in the psychographic dimension. Our analysis focuses on the relationship between distributional preferences and donation behavior, as

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<sup>1</sup> Nelson, Schlüter, and Vance (2016) focus on an in-depth analysis of the differences between the treatments in this experiment.

experimental evidence on this topic is scarce (Kidd, Nicholas, & Rai, 2013). We measure distributional preferences using the Equality Equivalence Test developed by Kerschbamer (2010). According to individuals' payoff choices, the measurement test distinguishes between different categories of distributional preferences. The most prominent ones are *benevolence* (where increases in the payoffs to others enter positively into the decision maker's utility function) (Andreoni & Miller, 2002), *egalitarianism* (where there is a preference for equal payoffs, even when decision-maker's payoffs could be higher) (Dawes, Fowler, Johnson, McElreath, & Smirnov, 2007; Fehr, Bernhard, & Rockenbach, 2008), *own-money-maximization* (where the decision maker's preference is for higher payoffs for self only) (Kerschbamer, 2015), and *spitefulness* (where reductions in the payoffs to others are preferred) (Levine, 1998). If the distributional preference type helps explain giving behavior among resource users, we can use this information to customize communications regarding the benefits of conservation to appeal to specific psychographic types in the community of resource users. Therefore, understanding distributional preferences and the relationship to donation behavior could be an important indicator in successfully managing collective resources (Fehr & Fischbacher, 2002).

### **Coral reef conservation**

Coral reef ecosystems are the archetypal example of a natural resource that suffers from the cooperation dilemma. Coral reefs represent both local and global public goods in that they provide a source of food for millions of people; they are hotspots of marine biodiversity; they protect coastlines against storm surges; they provide habitat, spawning, and nursery grounds for diverse fish species; they provide jobs and income to local economies from fishing, recreation, and tourism; and they are a source for new medicines. The destruction of coral reefs can be attributed to direct and indirect human behaviors (i.e. pollution, overfishing, destructive fishing, coastal development, climate change resulting in rising sea temperatures and ocean acidification, and increases in the global demand for fish).

Indonesia has the highest diversity of corals and reef fishes and is home to one of the most biologically diverse and economically valuable marine ecosystems on earth (Allen, 2008). Tropical coral reefs are important fishing grounds for coastal communities, and it has been estimated that hundreds of millions of people depend on fish catches from reef areas for their livelihood (Whittingham, Campbell, & Townsley, 2003). However, these reefs are under immediate threat, with estimates of serious damage ranging from 30% to 85% and forecasts of losses up to 60% by 2030 (Veron et al., 2009). The lack of sustainable funding for marine protected areas, coupled with low community involvement and ownership, contribute to the somber outlook for reef conservation in Indonesia (Bos, Pressey, & Stoeckl, 2015).

Many conservation activities require financial support and government regulation to function properly. Particularly in a situation of weak government involvement, many of the activities require voluntary contributions and behavioral change. Contributions can be in the form of money or time (i.e. donations, attendance at meetings, participation in training and events, proper disposal of waste, following rules, etc.). The experiments in this paper are inspired by the need to better understand the giving behavior of marine resource users to collectively sustain the conservation of coral reef public goods. The research question motivating this analysis is: to what extent do distributional preferences help explain such donation behavior?

## Distributional preferences and donations of time and money

This research contributes to the growing literature on donation behavior by highlighting and analyzing the impact of an important factor – distributional preferences – on donations. Specifically, we build on an earlier study (Nelson et al., 2016) that exposed participants to a real effort task under four different treatments. The results from this study address the conventional economic assumption that whenever the value of cash donations equals the value of time donations, people are indifferent between giving monetary contributions or the value of volunteer labor to the charity (Andreoni, Gale, Scholz, & Straub, 1996).<sup>2</sup> By exposing individuals to different options to donate money or time, we found that participants gave a higher percentage of their earnings when donating money compared to time (Nelson et al., 2016). Additionally, matching contributions does not increase the amount given in either case (Nelson et al., 2016).

In the present paper, we report on the findings from the second part of the experiment, where we first elicit distributional preferences using the measurement test proposed by (Kerschbamer, 2010), and subsequently include the preferences revealed in the test as an independent variable in an econometric analysis of donation behavior. In previous lab experiments, Kamas and Preston (2008) found that preferences are heterogeneous and linked to particular patterns of giving. Using a comparable elicitation technique, they find that participants that behave equitably and altruistically give more to charity than do efficiency maximizers or the self-interested. They show a significant price response by altruists and self-interested individuals to matched giving. Similarly, we investigate whether distributional preference categories are reliable indicators for donation behavior.

## II. Study location

Experiments took place in the township of Wanci, part of the Wakatobi island chain in the province of South East Sulawesi, Indonesia. The Wakatobi National Park is the third largest national marine park in Indonesia and the most populated. The area boasts some of the highest recorded levels of marine biodiversity in any ecosystem in the world. However, numerous human behaviors threaten the health of the ecosystem including destructive fishing practices from bomb and cyanide fishing, overfishing, pollution, tourism development, and coral mining.

All 302 participants were from the Mola village area of Wanci, which is home to the majority of fishermen in the area. Over fifty percent of the Mola population is engaged in fishing as their primary occupation and almost all households depend directly on fishing as a source of livelihood and subsistence. The village is comprised of people from the Bajo ethnicity, traditionally a sea-faring population that settled in the area in 1958. With a population of 6,336, this is the largest settlement of Bajo people in Indonesia.

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<sup>2</sup> Although there is very little cross-over between the literature on managing common-pool resources and charitable giving behavior as both occupy separate niches within economics, they both operate on the same economic theory that people will behave in their own best interest. However, empirical evidence from both disciplines shows that people often behave unselfishly by cooperating to manage common resources and donating to charity. It is my intention to draw these together to show how theories and methods from charitable giving research can be applied to common pool resource problems and potentially increase collective behavior.

### **III. Study design**

Participants were recruited by a hand delivered invitation letter indicating the date and time of a session. Every house received an invitation, and approximately one-third of households from the village participated. Men preferred to participate in sessions with other men and the same was true for women. Therefore, we divided the sessions by gender and would invite only women or men to participate at certain times. The socio-demographics of the sample are in line with the average population socio-demographics for gender, occupation, and education level, suggesting that the sample is broadly representative of the economically active population.

The study was designed in two parts, where the first part featured four experimental treatments: Donation, Donation Match, Volunteer, and Volunteer Match and the second part involved a demographic survey and elicitation of distributional preferences.

In all treatments, respondents performed the same effort task over a one-hour period and were offered the same choices for charities. Participants earned any money they donated to charity rather than receiving it as an endowment. This design allows for comparison between the Donation and Volunteer conditions, where participants can choose to work directly for charity, which would not be possible with an endowment. In addition, working for earnings and deciding what amount of time or money to allocate to charity more accurately resembles real-life behavior than a windfall endowment.

Participants were provided with a list of six charities and their missions (see Appendix 1). The order of the charities was randomly determined to avoid any bias from anchoring effects. Participants were instructed to select one charity from the list and at this time they were informed that they would have an opportunity to donate some of their earnings to the selected charity. They were assured that a donation was not a requirement but was their choice and any donations would be sent to the charity within 90 days. Following the standard protocol of other charitable-giving studies, we provided participants with several options for charitable causes so as to increase the likelihood that participants would find at least one cause they would consider supporting (A. L. Brown, Meer, & Williams, 2013; Gallier, Reif, & Römer, 2014).

### **IV. Part One: Real effort task and donation decision**

Next, the field manager explained the real effort task. Participants would be given one hour to roll paper beads. This type of task was chosen because it does not require any prior knowledge; it is simple and easy to teach to a person of any education level or age; and it does not require any particular skill that would give any person an advantage over another. For a full description of instructions, please see Appendix 2.

Participants were informed that they would be paid 1000 Indonesian Rupiah (IDR)<sup>3</sup> for each bead completed. Once the hour was finished, participants stopped the task and set aside their collection containers of their

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<sup>3</sup> European Central Bank exchange rate 7 October, 2015 is EUR 1 = IDR 15,492.07. Therefore, 1000IDR is equivalent to 0.07€.



beads. One-by-one, participants brought their bead containers to a discreet area where the beads would be counted and the respondent would be paid privately in cash.

### **Experimental Treatments**

The first part included four treatments to determine the effects of contributions of time versus money and how matching offers effect these contributions.

#### ***Donation***

The Donation treatment reflects a condition in which agents work to earn money for themselves, receive their pay, and then decide how much of a donation to make to charity. At the end of the sixty minutes, participants were paid in cash<sup>4</sup> for the completed beads into an envelope with their name on it. Each participant had another envelope with the name of the charity they selected and were allowed to make their donation decision discreetly in a private room and seal both envelopes before returning to complete the second part of the experiment.

#### ***Donation Match***

The only difference in the Donation Match treatment is that participants are informed that any amount that is donated to their charity will be equally matched so that double the amount will go to the charity of their choice.

#### ***Volunteer***

The Volunteer treatment represents an agent's choice between having their effort accrue to their own earnings or to the charity of their choice. Each person had the choice between depositing each completed bead into the work-for-self container or the volunteer-for-charity container. Participants were instructed to place each bead as it was completed into one of the containers. The containers were visible to participants but were hidden from view of others during the course of the experiment by a cardboard box. Participants were told that they would be paid in cash for the value of their work that was allocated to the collection container for themselves and the charity they chose would receive the value of their labor for the beads they put into the container labeled "charity".

#### ***Volunteer Match***

The only difference in the Volunteer Match treatment is that participants are informed before the task began that the value of their time (measured in the number of beads made for their charity) will be equally matched so that double the amount will go to the charity of their choice.

## **V. Part Two: Distributional Preferences Elicitation Task**

Following the protocol developed by Kerschbamer (2010), each participant was subjected to a randomized series of ten binary choices between allocations that both involved a payoff for the decision maker and a payoff for a randomly matched anonymous second participant (see Figure 1). We used the double-role-assignment protocol, where each subject makes ten decisions. After the experiment was completed, each subject received two randomly chosen payoffs – one based on their decision as the active person and one as a

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<sup>4</sup> The cash payment always included several bills of differing amounts (bills ranged from 1000, 5000, 10,000 and 20,000 depending on the total payment) so the participant could make any combination of donation they liked.

passive person based on the results of another anonymous participant (Kerschbamer, 2015). In each of the ten binary choices, one of the two allocations was symmetric (i.e., both people get equal amounts), while the other decision was asymmetric – involving unequal payoffs.

**Figure 1 Choices in the distributional preferences elicitation task**

Left		Your choice		Right	
You get	They get			You get	They get
Disadvantageous inequality block*					
1) 8.000	13.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
2) 9.000	13.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
3) 10.000	13.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
4) 11.000	13.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
5) 12.000	13.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
Advantageous inequality block					
1) 8.000	7.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
2) 9.000	7.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
3) 10.000	7.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
4) 11.000	7.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000
5) 12.000	7.000	Left <input type="radio"/>	<input type="radio"/> Right	10.000	10.000

\*The asymmetric options were not labeled as ‘disadvantageous’ and ‘advantageous’ inequality blocks for participants, nor were they ordered from smallest to largest as seen in the table above.

As described in Balafoutas et al. (2012), on the left-side asymmetric allocation options, half of the options involve a higher payoff of 13.000IDR for the other person while the payoff of the decision maker increased from one option to the next in 1.000IDR increments from 8.000IDR in the first choice to 12.000IDR. The other half of the asymmetric options involve a lower payoff of 7.000IDR for the other person while the payoff of the decision maker increases from one option to the next in 1.000IDR increments from 8.000IDR to 12.000IDR. In each of the two blocks, a “consistent” decision maker switches at most once from the symmetric (right-side) to the asymmetric (left-side) allocation (Balafoutas et al., 2012).

Following the characterization rules from Balafoutas et al. (2012), a subject who displays benevolent preferences, will switch to the left-side asymmetric option by no later than the third choice in the disadvantageous inequality block (see Figure 2). A person who switches to the asymmetric choice later than the third choice in the disadvantageous block is inconsistent with benevolence (and therefore counted as malevolence or spitefulness here). In the advantageous inequality block, a person with benevolent preferences will switch to the asymmetric option for the first time in the fourth choice or later. And those that switch earlier than the fourth option in the advantageous block are also inconsistent with benevolence. We use the following names for the four categories: decision makers who are benevolent in both domains are called *benevolents*; decision makers who always choose the symmetric option are called *egalitarians*; decision makers who are malevolent in both domains are called *spitefuls*; and decision makers who are malevolent in the disadvantageous block, but benevolent in the domain of advantageous inequality, are called *own-money-*

*maximizers* (see Figure 2 for a visual depiction). Approximately 10% of our sample responded inconsistently to the distributional preferences elicitation task. Rather than drop them from the analysis altogether, we include them under the name of *inconsistents*.

**Figure 2 Characterization of distributional preference types**

Benevolents						Egalitarians					
Left		Right		Left		Right		Left		Right	
You get	They get	You get	They get	You get	They get	You get	They get	You get	They get	You get	They get
Disadvantageous inequality block <sup>1</sup>						Disadvantageous inequality block <sup>1</sup>					
1) 8.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	1) 8.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
2) 9.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	2) 9.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
3) 10.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	3) 10.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
4) 11.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	4) 11.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
5) 12.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	5) 12.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
Advantageous inequality block						Advantageous inequality block					
1) 8.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	1) 8.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
2) 9.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	2) 9.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
3) 10.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	3) 10.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
4) 11.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	4) 11.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
5) 12.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	5) 12.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000

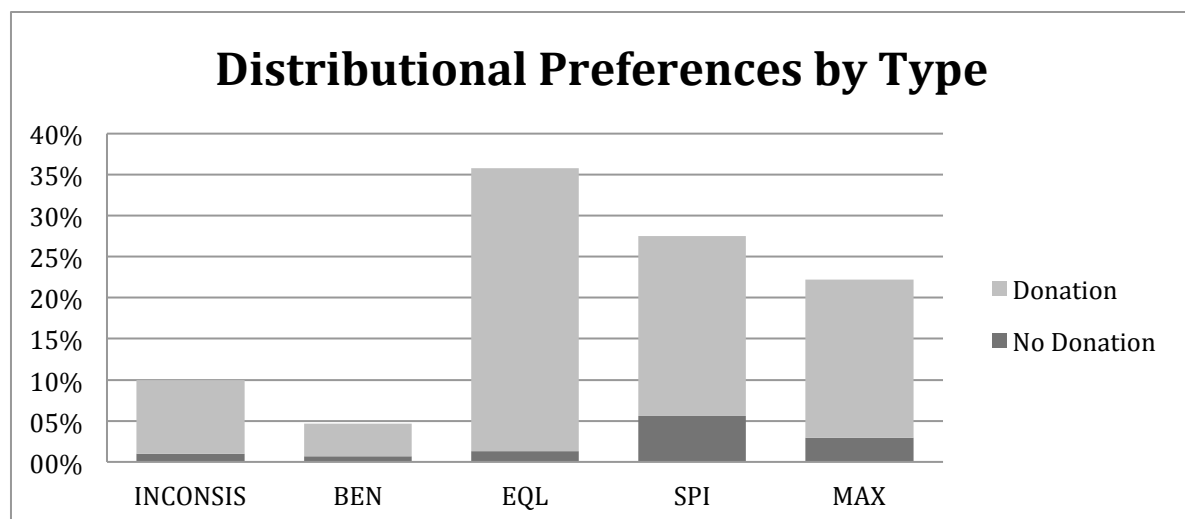
Own-money-maximizers						Spitefuls					
Left		Right		Left		Right		Left		Right	
You get	They get	You get	They get	You get	They get	You get	They get	You get	They get	You get	They get
Disadvantageous inequality block <sup>1</sup>						Disadvantageous inequality block <sup>1</sup>					
1) 8.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	1) 8.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
2) 9.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	2) 9.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
3) 10.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	3) 10.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
4) 11.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	4) 11.000	13.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
5) 12.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	5) 12.000	13.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000
Advantageous inequality block						Advantageous inequality block					
1) 8.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	1) 8.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
2) 9.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	2) 9.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
3) 10.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000	3) 10.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000
4) 11.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	4) 11.000	7.000	Left <input type="radio"/>	Right <input checked="" type="radio"/>	10.000	10.000
5) 12.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000	5) 12.000	7.000	Left <input checked="" type="radio"/>	Right <input type="radio"/>	10.000	10.000

Note: Strongly benevolent types select left before the third line in the disadvantageous inequality block and strongly spiteful types select the left option before the third line in the advantageous inequality block and may select all right options in the disadvantageous inequality block.

## VI. Results

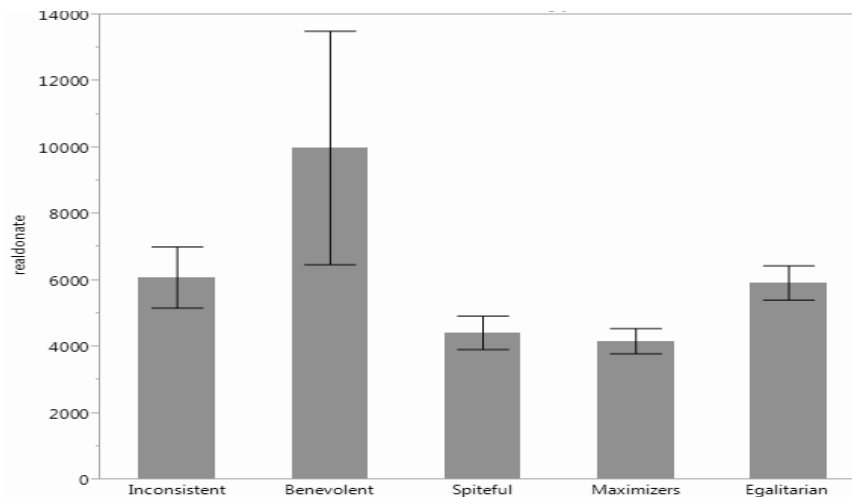
As shown in Figure 3, 4.7% of the sample are categorized as *benevolents*, 35.7% are categorized as *egalitarians*, 27.5% are *spitefuls*, and 22.2% are *own-money-maximizers*. Figure 3 also shows that a high percentage of participants in our sample donate some amount to charity. Almost half of the non-donors are in the *spitefuls* category.

**Figure 3 Percentage of distributional preferences by type and binary donation decision**



From Figure 4 we can see prominent differences in the mean giving amount between the distributional preference types. Individuals with spiteful and own-money-maximizing preferences give the lowest amount of income to charity, both averaging around 4000IDR, while those with egalitarian preferences average 6000IDR, and those with benevolent preferences average 10000IDR. In a multiple comparison of the means across the preference categories using the Tukey HSD test, we find significant differences ( $p=0.0023$ ) between the amount donated by *benevolents* and *own-money-maximizers* and also between individuals with benevolent and spiteful preferences ( $p=0.003$ ).

**Figure 4 Average amount donated by distributional preference type**



Similar studies examining distributional preferences observe strong gender differences across preference categories in relation to behavior in labor market tasks (Balafoutas et al., 2012) and trust games (Kamas & Preston, 2015). However, we do not observe significant gender differences across preference types using a Chi square test ( $p = 0.60$ ).

To assess whether these findings are robust to the inclusion of control variables, we now analyze these descriptive results econometrically using a two-stage procedure originally developed by Cragg (1971), sometimes referred to as the two-part model. The first stage employs a probit model to identify what factors determine why people donate in the first place, while the second stage employs an ordinary least squares (OLS) regression to identify what factors determine how much they donate - among those who donated a positive amount. Of particular interest are the estimates on the dummy variables indicating the treatments as well as the distributional preference types.

The model additionally includes a suite of socioeconomic variables to control for age, education, gender, and income. Age and education are measured in years while gender is measured with dummy variable indicating females. Income is measured with two dummy variables indicating low and medium income households (high income is the base category). Given the nature of a subsistence fishing economy that ebbs and flows with the seasons and availability of fish, average income can be difficult to determine. Therefore, we employed a three-part question that asked for the lowest household monthly income earned and how many months per year this amount is expected, the highest monthly income earned and how many months, and the normal monthly income earned. This allowed us to calculate an estimated annual income. We then divided the sample into

three income categories – low income, middle income, and high income. Those in the low income category earn less than the equivalent of 695€ per annum or less than 2€ per day. The middle income earn between 695€ - 3,095€ per year or between 2€ - 8.50€ per day, while the high income category earns over 3,095€ per year.

Referring to the first column of estimates in Table 1, we start by analyzing a parsimonious probit model that excludes the distributional preferences to see if any of the other variables explained by previous literature are relevant. Neither the demographic variables nor the treatments are seen to be statistically significant determinants of the discrete donation decision. The model in the second column includes the dummies indicating distributional preference type. With egalitarian serving as the base category, two of these dummies have negative and statistically significant coefficients, those indicating *spiteful* and *maximizers*. We thereby find that individuals that respond with spiteful and maximizing payoff decisions in the distributional preferences elicitation task are less likely to donate anything to charity than those with egalitarian preferences. Moreover, a Wald test indicates the four dummies to be jointly statistically significant, while a likelihood ratio test indicates that they significantly improve the fit of the model at  $p=0.01$ .

**Table 1 Probit and Ordinary Least Squares Regression Table**

Independent Variables	Probit: Binary donation decision	Probit: Binary donation decision	OLS Regression Amount Donated	OLS Regression Amount donated
N	302	302	267	267
Age	-0.015 (1.71)	-0.014 (1.61)	0.001 (0.13)	0.001 (0.21)
Female	-0.016 (0.08)	0.024 (0.11)	-0.054 (0.59)	-0.039 (0.43)
Education	-0.040 (0.60)	-0.038 (0.54)	0.090** (3.05)	0.078** (2.64)
Low income	0.311 (0.94)	0.265 (0.80)	-0.014 (0.08)	-0.025 (0.15)
Mid income	0.292 (0.89)	0.235 (0.71)	0.025 (0.14)	0.015 (0.09)
o.Hi income	0.000	0.000	0.000	0.000
o. Donation	0.000	0.000	0.000	0.000
Donation match	0.402 (1.41)	0.357 (1.22)	-0.301* (2.45)	-0.292* (2.39)
Volunteer	-0.110 (0.44)	-0.120 (0.46)	-0.630** (4.96)	-0.659** (5.23)
Volunteer match	0.461 (1.59)	0.507 (1.63)	-0.675** (5.50)	-0.710** (5.83)
Inconsistent		-0.506 (1.25)		0.072 (0.48)
Benevolent		-0.643 (1.29)		0.494* (2.27)
Spiteful		-0.957** (3.38)		-0.071 (0.64)
Maximizers		-0.718* (2.33)		-0.197 (1.68)
o. Egalitarians		0.000		0.000
_cons	1.402 (2.55)*	2.007** (3.32)	9.220** (34.34)	9.298** (34.20)
R2			0.16	0.20

z statistics in parenthesis; \*  $p<0.05$ ; \*\*  $p<0.01$



The latter two columns of Table 1 present the estimates from the OLS model of the amount donated, conditional on having donated some positive amount. We accommodate non-normal errors with a transformation on the dependent variable. Following Yen, Boxall, and Adamowicz (1997), we use the inverse hyperbolic sine transformation of the dependent variable. The transformation ensures robustness to non-normality (Brown, Greene, Harris, & Taylor, 2015), is scale invariant, and is known to be well suited for handling extreme outliers of the dependent variable (Burbidge, Magee, & Robb, 1988).

The parsimonious model in the third column reveals that the level of education of an individual has a significant and positive effect on the donation amount, while the donation match, volunteer, and volunteer match treatments all have negative effects relative to the base category of donation. Income, age, and gender do not have any significant effect on the amount that is donated. These findings are contradictory to other donation studies that show that women are more likely to donate than men (Kamas & Preston, 2015; Lee & Chang, 2007; Simmons & Emanuele, 2007; Wiepking & Bekkers, 2012), and that higher income has a positive effect on the donation amount (Bryant, Jeon-Slaughter, Kang, & Tax, 2003; Clotfelter, 1997; James & Sharpe, 2007; McClelland & Brooks, 2004; Wiepking & Bekkers, 2012). Including the distributional preference types into the regression model in column 4 significantly improves the fit of the model at  $p=0.03$  using the Likelihood Ratio Test. The inclusion of the dummies indicating preference type in the final column has little bearing on the estimates on the control variables; their magnitude changes only marginally. Participants with benevolent distributional preferences donate more than any other preference category ( $p<0.05$ ), while those with spiteful and maximizing preferences do not have a significant effect compared to individuals that respond with egalitarian preferences.

## VII. Discussion

We use the preferences elicitation tool in combination with a donation experiment to disentangle the impact of distributional preferences from that of other variables to help interpret the data from the donation experiment. We find substantial heterogeneity among distributional preferences, which is in-line with the overwhelming evidence from the lab, the field, and everyday life that refutes the rational self-interest hypothesis that dominates traditional economic theory. The distribution of distributional preferences is, however, rather different from the previous literature. Kerschbamer (2015) observe the most frequent distributional preference types to be benevolent and own-money-maximizers (displaying positive or neutral attitude towards others in both domains) and the least frequent to be egalitarian and spiteful (displaying malevolent preferences in at least one of the domains). Balafoutas et al. (2012) found similar results, with 71% of respondents displaying benevolent preferences, 16% and 13% displaying egalitarian and spiteful preferences, respectively. In contrast, we find that a high percentage, 27.5%, of participants display at least weakly malevolent preferences in both domains (spiteful) and 35.7% prefer equal payoffs even at a loss to themselves (egalitarian). In stark contrast to other studies, we find a very low percentage of participants that display benevolent preferences (4.7%). Given this information, an appeal directed to motivate people based on benevolence may not be the most effective method to engage people from this community in conservation.

Controlling for other factors, the behavior of individuals in the distributional preferences elicitation task is highly indicative of whether an individual will decide to donate any amount. As intuition would suggest, and as is confirmed by the results, those individuals that display own-money maximizing and spiteful behavior are less likely to donate any amount at all. Individuals that prefer to maximize their own payoffs decide less often to donate to charity than those with egalitarian preferences. Those that behave spitefully, by switching to unequal payoffs for the other person even when there is no benefit to their own payoff, also decide not to donate to charity. However, we do not see a significant difference on the binary decision to donate between *benevolents* and *spitefuls* or *own-money-maximizers*, which is somewhat surprising.

A recent neuroeconomic study may shed some light on the relevance and practical implications of these findings. The study used functional magnetic resonance imaging (fMRI) to explore notions of distributive justice using a model of inequity aversion in conjunction with a charitable giving task (Hsu, Anen, & Quartz, 2008). The study shows a clear anatomical dissociation between the different regions of the brain that focus on inequity and efficiency, meaning that individual differences in choice behavior arise from participants placing different weights upon inequity, as opposed to efficiency (Hsu et al., 2008). The authors note that this anatomical separation implies that the utility derived from fairness is distributed in the brain similarly to reward, risk, social attachment, trust, and charitable giving. Evidence from the study by Hsu et al. (2008) shows that donations motivated by equality are unlikely to be accounted for by mechanisms underlying self-interest—which have received a lot of attention in past research, unlike value motivations (Van Lange, Bekkers, Schuyt, & Vugt, 2007). From an applied perspective, donations may be enhanced by interventions emphasizing fairness (e.g., to enhance equality in outcomes) (Van Lange et al., 2007). What is not yet known is the extent to which the mechanism that motivates equality-oriented people to donate to charity extends to funding environmental resources. Although our research shows that distributional preferences are a strong indicator for donation behavior, more research is necessary to understand the connection between egalitarian motivations and giving to environmental causes.

The importance of this study is to shed light on the relationship between distributional preference types and donation behavior. As we find, even though *spitefuls* and *own-money maximizers* are less likely to donate than *egalitarians*, many of them are still giving to charity. The next step is to examine what motivates the different distributional preference types to give. There is extensive research in the non-profit sector that compares giving for selfish reasons (to feel good or to look good to others) versus purely altruistic giving (selfless concern for others). However, there is far less research that focuses on social value motivations for contributing to public goods, especially environmental goods (Bekkers & Wiepking, 2011). Moving toward more rigorous experimental methods provides us with a better understanding of individual decision-makers, and ultimately helps policy makers to design more effective interventions aimed at increasing both the likelihood that an individual will contribute and the amount they will give.

## **VIII. Conclusion**

Our results suggest that distributional preferences are an important explanatory control variable for donation behavior. Conservation appeals should take into consideration the psychographic characteristics of the community addressed when focusing on motivating local resource users. Specifically, the issue should be explored of whether different kinds of approaches might be more or less effective at engaging different segments of the population in conservation. Thus further investigation is needed, not into segmentation for different types of charities but into the scope for segmentation for different types of engagement techniques (Schlegelmilch & Tynan, 1989). In communities such as that studied in this research, a message reinforcing the equal responsibility to contribute to protecting a shared resource so all can benefit would capture a large percentage of the intended audience. This could be a useful insight in crafting communications on environmental impacts and benefits for marine resource users.

Additionally, this research helps to bridge the gap between the research on open access resource management and charitable giving by using experimental methods that reveal the factors motivating collective behavior among resource users.

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## Appendix 1

### Charity Organizations

Charity	Focus	Description
Terumbu Karang Indonesia (TERANGI)	Environment	TERANGI is dedicated to coral reef conservation in Indonesia. They focus on improving marine management and community-based conservation to reduce threats to local coral reef habitats.
SINTESA	Rural Potential	SINTESA focuses on local empowerment and provides training programs on alternative livelihood projects, clean water resources, and managing finances. They provide savings and loan services in addition to tourism training.
Islamic Relief Worldwide	Religious organization	Islamic Relief Worldwide has been working in Indonesia since 2000 and focuses on climate change, sustainable fishing communities, sanitation, women's empowerment, and access to fresh water.
Karang Taruna	Environment	Karang Taruna is a village-level youth organization and your support will go towards community clean-up activities to protect the marine environment from pollution.
Nahdatul Ulama	Religious Organization	NU is a local Islamic organization that focuses on children's education, religious learning, and women's empowerment.
Oxfam	Rural Potential	Oxfam has been operating in Indonesia since 1957 and focuses on improving rural livelihood and income opportunities, equal access to resources, food security, and disaster relief.

## Appendix 2a

### Experimental Instructions – Donation

Today, you will be participating in a research study. Your performance in this study and the choices you make will determine the benefits to both you and a charity of your choice.

We will have a short explanation of how to do the task. Please pay attention to these instructions so you will understand how the study works.

During this study, it is important that you do not pay attention to other people's work or discuss your work with others. If you have any questions, or need assistance of any kind, please raise your hand and we will come to you.

You will be presented a list of charities and their descriptions. You will be asked to select a single charity. Based on your actions during the study, the charity you select can benefit from your decisions. Please note that you can choose only one charity from this list.

Once you have selected your charity, we can begin the study. You then will be able to earn money as you do the task. You will have one hour to work. At the end of the hour, you will be paid for each piece completed correctly. Then you will have the opportunity to donate any amount of your earnings to the charity you selected.

This study consists of rolling pieces of paper that can be used to make different types of products, such as key chains, fishing lures, etc. You have the opportunity to work to earn money for yourself for every piece you roll correctly and then you can decide how much to donate at the end to charity.

You have a box of supplies including one long rolling stick and two short rolling sticks, a tube of glue, an envelope full of pre-cut paper strips (1.5cm at the base), a plastic collection bottle for the beads, an envelope with your name and an envelope with the name of the charity you chose. The box will be used as a screen to shield your work from others.

You will have **1 hour** to do the task. Each bead should be placed in the plastic bottle upon completion. Each piece of paper rolled correctly is worth 1,000IDR. At the end of the hour, you will submit your work and you will be paid for those beads that are done correctly, and, you will be able to decide if you would like to contribute to charity. After this, you will complete a survey.

Total funds raised for the charities will be posted publicly in the village after the study and all charities will be presented with the contributions within 90 days.

To summarize:

1. You will roll paper pieces. Each one completed correctly is worth 1,000IDR.
2. Once 60 minutes have passed, the task is finished.
3. You are paid based on the number of correct beads completed in the time of the experiment
4. You will then decide how much you would like to donate to the charity of your choice (a donation is not required) by putting your donation in a separate envelope.
5. Then you will complete a survey questionnaire.

## Appendix 2b

### Experimental Instructions – Donation match

Today, you will be participating in a research study. Your performance in this study and the choices you make will determine the benefits to both you and a charity of your choice.

We will have a short explanation of how to do the task. Please pay attention to these instructions so you will understand how the study works.

During this study, it is important that you do not pay attention to other people's work or discuss your work with others. If you have any questions, or need assistance of any kind, please raise your hand and we will come to you.

You will be presented a list of charities and their descriptions. You will be asked to select a single charity. Based on your actions during the study, the charity you select can benefit from your decisions. Please note that you can choose only one charity from this list.

Once you have selected your charity, we can begin the study. You then will be able to earn money as you do the task. You will have one hour to work. At the end of the hour, you will be paid for each piece completed correctly. Then you will have the opportunity to donate any amount of your earnings to the charity you selected and we will match any amount that is donated to the charity of your choice.

This study consists of rolling pieces of paper that can be used to make different types of products, such as key chains, fishing lures, etc. You have the opportunity to work to earn money for yourself for every piece you roll correctly and then you can decide how much to donate at the end to charity and we will match your donation.

You have a box of supplies including one long rolling stick and two short rolling sticks, a tube of glue, an envelope full of pre-cut paper strips (1.5cm at the base), a plastic collection bottle for the beads, an envelope with your name and an envelope with the name of the charity you chose. The box will be used as a screen to shield your work from others.

You will have **1 hour** to do the task. Each bead should be placed in the plastic bottle upon completion. Each piece of paper rolled correctly is worth 1,000IDR. At the end of the hour, you will submit your work and you will be paid for those beads that are done correctly, and, you will be able to decide if you would like to contribute to charity. Anything you contribute to charity will be matched so double the amount will go to your charity. After this, you will complete a survey.

Total funds raised for the charities will be posted publicly in the village after the study and all charities will be presented with the contributions within 90 days.

To summarize:

1. You will roll paper pieces. Each one completed correctly is worth 1,000IDR.
2. Once 60 minutes have passed, the task is finished.
3. You are paid based on the number of correct beads completed in the time of the experiment.
2. You will then decide how much you would like to donate to the charity of your choice (a donation is not required) by putting your donation in a separate envelope.
3. We will match your donation to charity.
4. Then you will complete a survey questionnaire.

## Appendix 2c

### Experimental Instructions – Volunteer

Today, you will be participating in a research study. Your performance in this study and the choices you make will determine the benefits to both you and a charity of your choice.

We will have a short explanation of how to do the task. Please pay attention to these instructions so you will understand how the study works.

During this study, it is important that you do not pay attention to other people's work or discuss your work with others. If you have any questions, or need assistance of any kind, please raise your hand and we will come to you.

You will be presented a list of charities and their descriptions. You will be asked to select a single charity. Based on your actions during the study, the charity you select can benefit from your decisions. Please note that you can choose only one charity from this list.

Once you have selected your charity, we can begin the study. You then will be able to decide as you do the task when you would like to earn money for yourself and when you would like to contribute that time to the charity you selected. At any point during the study you will be allowed to switch back and forth as often you like between working for yourself or volunteering your time for charity.

This study consists of rolling pieces of paper that can be used to make different types of products, such as key chains, fishing lures, etc. You have the opportunity to work to earn money for yourself for every piece you roll correctly or to volunteer your effort. There are containers marked "work for self" and "volunteer for charity" that allow you to switch between working for yourself and the charity selected earlier. As each bead is completed, deposit the bead into either the "work for self" or "volunteer for charity" container.

You have a box of supplies including one long rolling stick and two short rolling sticks, a tube of glue, an envelope full of pre-cut paper strips (1.5cm at the base), two plastic collection bottles – one marked "charity" and one unmarked – for the beads, an envelope with your name and an envelope with the name of the charity you chose. The box will be used as a screen to shield your work from others.

You will have **1 hour** to do the task. Each bead should be placed in the plastic bottle upon completion. Each piece of paper rolled correctly is worth 1,000IDR. At the end of the hour, you will submit the two containers and you will be paid for those beads that are done correctly in the "work-for-self" container, and, your charity will be paid for those beads done correctly in the "volunteer-for-charity" container. After this, you will complete a survey.

Total funds raised for the charities will be posted publicly in the village after the study and all charities will be presented with the contributions within 90 days.

To summarize:

1. You will roll paper pieces. Each one completed correctly is worth 1,000IDR.
2. You can decide between working for yourself or volunteering for your charity at any point in the experiment by putting the paper beads into either container.
3. Once 60 minutes have passed, all allocations are finalized.
4. You are paid based on the number of correct beads completed in the time of the experiment that you deposit into the 'work for self' container.
5. Any beads that were deposited in the 'volunteer for charity' container will result in proceeds going to the charity.
6. Then you will complete a survey questionnaire.

## Appendix 2d

### Experimental Instructions – Volunteer match

Today, you will be participating in a research study. Your performance in this study and the choices you make will determine the benefits to both you and a charity of your choice.

We will have a short explanation of how to do the task. Please pay attention to these instructions so you will understand how the study works.

During this study, it is important that you do not pay attention to other people's work or discuss your work with others. If you have any questions, or need assistance of any kind, please raise your hand and we will come to you.

You will be presented a list of charities and their descriptions. You will be asked to select a single charity. Based on your actions during the study, the charity you select can benefit from your decisions. Please note that you can choose only one charity from this list.

Once you have selected your charity, we can begin the study. You then will be able to decide as you do the task when you would like to earn money for yourself and when you would like to contribute that time to the charity you selected. We will match your contribution with an equal monetary donation to the charity of your choice. At any point during the study you will be allowed to switch back and forth as often you like between working for yourself or volunteering your time for charity.

This study consists of rolling pieces of paper that can be used to make different types of products, such as key chains, fishing lures, etc. You have the opportunity to work to earn money for yourself for every piece you roll correctly or to volunteer your effort. There are containers marked "work for self" and "volunteer for charity" that allow you to switch between working for yourself and the charity selected earlier. As each bead is completed, deposit the bead into either the "work for self" or "volunteer for charity" container.

You have a box of supplies including one long rolling stick and two short rolling sticks, a tube of glue, an envelope full of pre-cut paper strips (1.5cm at the base), two plastic collection bottles – one marked "charity" and one unmarked – for the beads, an envelope with your name and an envelope with the name of the charity you chose. The box will be used as a screen to shield your work from others.

You will have **1 hour** to do the task. Each bead should be placed in the plastic bottle upon completion. Each piece of paper rolled correctly is worth 1,000IDR. At the end of the hour, you will submit the two containers and you will be paid for those beads that are done correctly in the "work-for-self" container, and, your charity will be paid for those beads done correctly in the "volunteer-for-charity" container and we will match your effort with a donation on your behalf to the charity you selected. After this, you will complete a survey.

Total funds raised for the charities will be posted publicly in the village after the study and all charities will be presented with the contributions within 90 days.

To summarize:

1. You will roll paper pieces. Each one completed correctly is worth 1,000IDR.
2. You can decide between working for yourself or volunteering for your charity at any point in the experiment by putting the paper beads into either container.
3. Once 60 minutes have passed, all allocations are finalized.
4. You are paid based on the number of correct beads completed in the time of the experiment that you deposit into the 'work for self' container.
5. Any beads that were deposited in the 'volunteer for charity' container will result in proceeds going to the charity and we will match the amount donated.
6. Then you will complete a survey questionnaire.



## Working Paper Series

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1. Nelson, K. M., Schlüter, A., & Vance, C. (2017). Distributional preferences and donation behavior among marine resource users in Wakatobi, Indonesia. doi:10.21244/zmt.2017.001

## Working Paper Series

April, 2017

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