Reliably quantifying the value an individual assigns to giving a stranger money

Andrew S Fox, Nate Vack, Liz Vanderwerff & Richard J Davidson

Center for Investigating Healthy Minds, Waisman Center, Department of Psychology, University of Wisconsin-Madison

Background

Most individuals recognize the value of both selfish and other-oriented motivations, and it is clear that there are large individual differences in these motivations between individuals. Although quantifying and increasing other-oriented behavior is of great societal interest, little is known about how to reliably measure other-oriented preferences. In order to address this question we developed a novel economic game to quantitatively measure individual differences in willingness to give to others. Specifically, we developed a website which allows subjects to choose between keeping money for themselves or giving money to a stranger. By altering the amounts of money we offered to each subject, we were able to estimate the specific value of a dollar to another person.

Technique

Step 1: Participant makes a choice.

We gave 132 subjects 200 forced choice monetary decisions between money for themselves ($0-$10) and money for a stranger ($0-$10). To precisely quantify the amount of money an individual was willing to sacrifice to give a dollar to a stranger (i.e. their indifference point or "IP"), we adaptively altered the ratio of the two offers.

Step 2: Estimate an indifference point (IP).

$$\mathbf{C_{[1:t]}} = \frac{1}{1 + e^{(\alpha + \beta \times (\ln(OR_{[1:t]})))}}$$

$C_{[1:t]}$ is a vector of indicator variables {0,1} for each choice from the first trial through the current trial (t), where ones indicate choices for self. OR is the offer ratio for trial t. Using this model, we estimate α & β. α is the parameter estimate to a constant. β is the parameter estimate of interest, and represents the weight applied to the offer ratio. Using these parameters, we estimate indifference points from ln(-3) to ln(3).

$$\hat{\mathbf{IP}} = \frac{-\alpha}{\beta}$$

Step 3: Pick a ratio based on a normal distribution centered around the participant's indifference point (IP).

$$\mathbf{OR_{t+1}} \sim \mathcal{N}(\mu = \hat{IP}, \sigma^2 = .25)$$

$$= P(\mathbf{OR_{t+1}}) = \frac{1}{.25\sqrt{2\pi}} e^{-(x-\hat{IP})^2/2\times.25^2}$$

In order to discourage gaming of the system, we also draw from a normal distribution centered around 0 ~50% of the time.

$$\mathbf{OR_{t+1}} \sim \mathcal{N}(\mu = 0, \sigma^2 = .25)$$

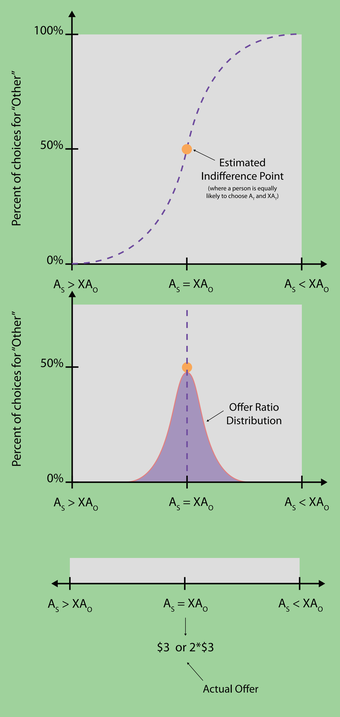
$$= P(\mathbf{OR_{t+1}}) = \frac{1}{.25\sqrt{2\pi}} e^{-(x)^2/2\times.25^2}$$

Step 4: Randomly pick amounts to offer based on this ratio to present to the participant.

$$\mathbf{A_{Self,t+1}} \sim \mathcal{U}\left(\frac{.01}{min(1, OR_{t+1})}, \frac{10}{max(1, OR_{t+1})}\right)$$

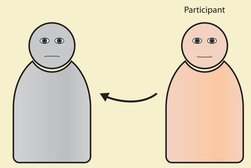
$$\mathbf{A_{Other,t+1}} = A_S \times OR_{t+1}$$

Repeat this process with the next offer, $A_{Self,t+1}$ or $A_{Other,t+1}$.



Experiment

You get to choose. Either you get $1 or a stranger gets $5. What do you



No deception was used. In order to observe real giving behavior, we did not use any deception. Participants were fully aware of the game's rules, and understood that payouts would be determined based on their choices.

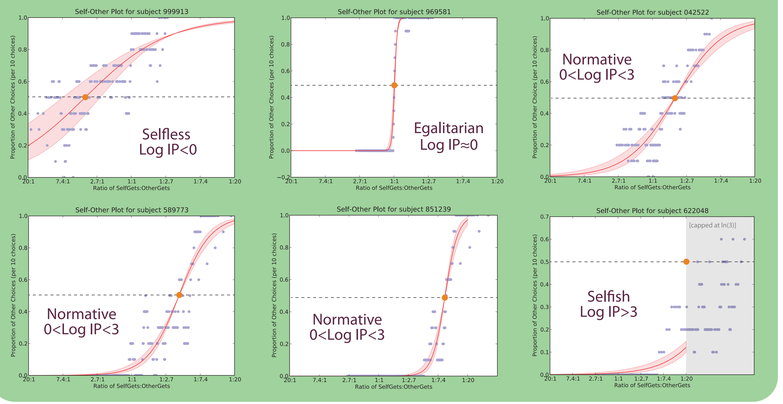
Real money was used. Subjects made 200 choices and 6 trials were randomly chosen for payout.

There was no opportunity to return the favor. Participants who made choices were not the "other" for another person, excluding r3ciprocity and eputation building as a motivations for giving.

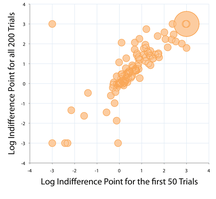
All interactions were anonymous. Games were played online without any knowledge of who the other people were, preventing interpersonal or external factors from influencing giving.

Model Fits

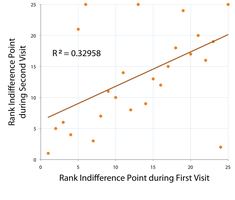
Six randomly chosen individual subjects sorted by self-other Indifference Point (IP).



Self-Other Indifference Points can be estimated in ~50 trials.



Test-retest of Indifference Point remains significant when ranked.



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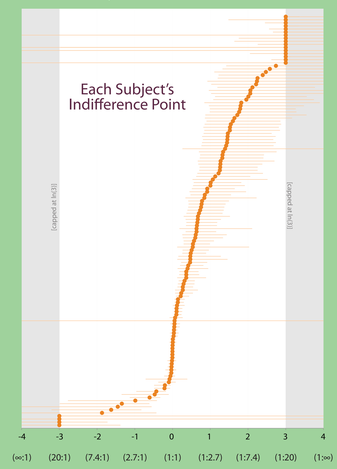
Results

Results demonstrated substantial variability in self-other indifference point (IP) across subjects (μ=.85, σ2=1.31), suggesting that the majority of individuals do not behave purely selfishly or altruistically. Additionally, we observed that self-other IPs were significantly correlated with related constructs such as self-reported willingness to donate to a stranger (r=-.23, p=.05).

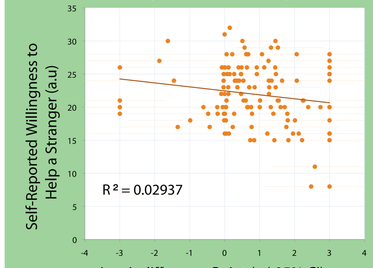
In addition to willingness to help a stranger, self-other IP also correlated negatively with self-reported donations in the last year. Correlations with willingness to help a stranger and donations in the last year were also signficant using spearmans rho (p's<.05). Moreover, correlations remained significant when controlling for the Marlow-Crowne social desirability questionnaire (MCSD). Self-Other IP was not significantly correlated with MCSD (r=.01, n.s.).

We further demonstrated the reliability of self-other IP as a measure of individual differences by re-testing 28 subjects between 2 and 14 weeks after their original test, in the same task. We observed significant correlations between IPs across time, (r=.61, p=.0006; ICC=.61) suggesting that individual differences in IP are reliable. This finding remains significant when examining the rank IP across time.

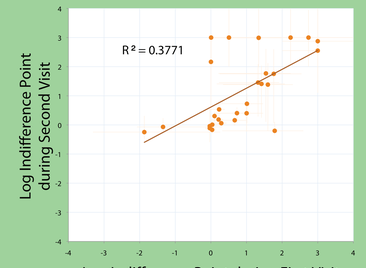
Variability of Self-Other Indifference Point



Self-Other Indifference Point and Self-Reported Willingness to Help a Stranger



Test Retest of Self-Other Indifference Point



Try it yourself!
http://webtasks.keck.waisman.wisc.edu/self_other_demo

The value an individual assigns to giving a stranger money varies across subjects. Although some people behave selfishly (i.e. Log IP>=3) or economically efficiently (i.e. Log IP=0), it is more common for participants to behave as though they understand both of these motivations (0<Log IP<3). We further validated our technique by showing that it is correlated with willingness to help a stranger, and moderately stable