Pre-Analysis Plan:
On the Spillover Effects of Social Image Concerns

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1 Motivation

Previous research identified an extensive range of social preferences, such as altruism (Becker, 1974), inequity aversion (Fehr and Schmidt, 1999), and warm glow (Andreoni, 1989). Benabou and Tirole (2006) pointed toward another motivator of prosocial action, namely social image concerns. Individuals behave prosocially because they want to be liked and respected by others (Benabou and Tirole, 2006; Bursztyn and Jensen, 2017) – at least they want to appear prosocial.

Previous research has focused on identifying static social image effects i.e., how does observability influence prosocial behavior at a given point in time e.g., in a single donation decision (Ariely, Bracha, and Meier, 2009; Exley, 2018; Bolton, Dimant, and Schmidt, 2021). There is scarce evidence on the effect of observability on prosocial behavior in repeated interactions. Our research question aims to fill this gap: Does observability affect prosocial behavior in repeated interactions, and more specifically in subsequent, unobserved situations? We hypothesize that observability increases immediate prosocial behavior. Furthermore, initial observability exerts positive and negative spillover effects on subsequent, unobserved behavior.

2 Study Design

Section 2 describes the study design (pre–survey, experiment, post–survey) and the organizational details.

2.1 Pre–Survey

We conduct a pre–survey to collect the following information from participants:

- Basic demographics like sex, age (in years), study subject, and past donation behavior.
- Cognitive Reflection Test (Frederick, 2005).
- Proxy for altruism, and preferences for consistency (following Cialdini, Trost, and Newsom, 1995).

Only individuals who complete the pre–survey are eligible to continue with the study.

2.2 Experiment

Our experiment is a repeated dictator game over 4 rounds. Each round consists of a real effort task followed by an individual donation decision. Figure 1 illustrates the experimental design.

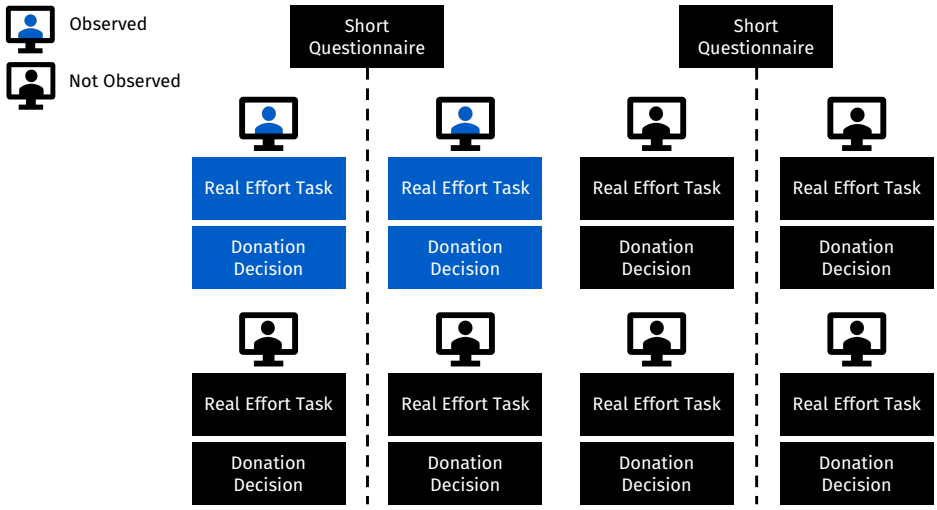

Figure 1. Illustration experimental design.

Figure 2. Example of a real effort task combination.

Real Effort Task. In the real effort task, participants are asked – under the time limit of one minute – to type repeatedly 5-digit letter and number combinations into a pre–defined field (our implementation follows closely Chapkovski and Kujansuu, 2019). Figure 2 shows one example combination. If they successfully enter four such combinations correctly within a minute, they earn an additional budget of $\overline{w}$. If they fail, participants earn an additional budget of $\underline{w}$. Consequently, the additional budget in any round is given by $w_t \in \{\overline{w}, \underline{w}\}$, with $\overline{w} < \underline{w}$. In our implementation, we set $\overline{w} = €7.00$ and $\underline{w} = 1/2 \times \overline{w} = €3.50$.

Donation Decision. Participants can freely donate any amount of the additional budget w_t that they earned in the real effort task to the charity ShareTheMeal. We employ a unit-donation scheme: Instead of donating a monetary amount, participants can donate a number of "meals", denoted by x_{it}.[1] With p being the price of a meal, participants can donate any $x_{it} \in [0, w_t p]$. Participants keep the remaining amount $(w_t - x_{it}/p)$ for themselves.

Control and Treatment Group. We randomly assign the N subjects into a control (N_C) and treatment group (N_T). Participants in the control group ($i \in C$) play the four rounds of the dictator game unobserved. Participants in the treatment group ($i \in T$) are observed in the first two rounds of the multi-stage dictator game, and not observed in the last two rounds. Notably, participants in the treatment group are not informed in which of the four rounds they will be observed, and they are not informed about the total number of rounds.[2]

Interposed Questions. We will collect additional information after round 1 and round 3 of the experiment:

- Perceived cost of effort during the real effort task.
- Private self–awareness (as by the Situational Self–Awareness Scale of Govern and Marsch, 2001).
- Self-perception (Gneezy, Imas, Brown, Nelson, and Norton, 2012, p.182).

2.3 Post–Survey

We conduct a post–survey to collect the following information:

- Introspection about round–3 donation and non–observability.
- Personal views on licensing behavior.
- Recall of donation behavior (motivated forgetting).
- Beliefs about others' views on the social appropriateness of donating to ShareTheMeal.

We will use the data as control variables.

[1] Participants are informed about the charity and that a meal feeds a child for a day.

[2] The only information conveyed in the experimental instructions is that participants will play less than 6 rounds.

2.4 Organization of Study

Sample. We recruit $N = 320$ subjects from various disciplines from the subject pool at the Cologne Laboratory for Economic Research (CLER), Germany. We collect observations in waves with an equal split of $N_T = 160$ and $N_C = 160$. The experiment was programmed in oTree (Chen, Schonger, and Wickens, 2016).

Payoffs. Subjects are paid €y for the completion of the study. Following Charness, Gneezy, and Halladay (2016), we randomly select one round in the experiment to become payoff–relevant. We use the decision in this round to determine the participant's and charity's payoffs. Participants are informed in the experimental instructions that their donation decisions will be implemented automatically.

3 Data Analysis and Hypotheses

Section 3 introduces the notation, describes the data analysis and outlines the hypotheses. We denote the average round–t donations of the control and treatment group, respectively, as

$$\bar{x}_{C,t} \equiv \frac{1}{N_C} \sum_{\{i:i\in C\}} x_{it} \quad \text{and} \quad \bar{x}_{T,t} \equiv \frac{1}{N_T} \sum_{\{i:i\in T\}} x_{it}. \tag{1}$$

We denote the number of positive round–t donations of the control and treatment group, respectively, as

$$N_{C[x_{it}>0]} \equiv \sum_{\{i:i\in C\}} \mathbf{1}\{x_{it} > 0\} \quad \text{and} \quad N_{T[x_{it}>0]} \equiv \sum_{\{i:i\in T\}} \mathbf{1}\{x_{it} > 0\}. \tag{2}$$

Hypothesis 1: Social Image Concerns. We hypothesize that observability leads to:

(1a) A higher number of participants with positive (non–zero) donations

$$N_{T[x_{i1}>0]} > N_{C[x_{i1}>0]} \quad \text{and} \quad N_{T[x_{i2}>0]} > N_{C[x_{i2}>0]}. \tag{3}$$

(1b) Higher average donations

$$\bar{x}_{T,1} > \bar{x}_{C,1} \quad \text{and} \quad \bar{x}_{T,2} > \bar{x}_{C,2}. \tag{4}$$

We will use the difference between mean donations of the treatment and control group as estimator of the static social image effect in round t

$$\widehat{SI}_t = \bar{x}_{T,t} - \bar{x}_{C,t}. \tag{5}$$

Hypothesis 2: Spillover of Social Image Concerns. We hypothesize that observability has a spillover effect on subsequent, unobserved donation decisions:

(2a) The number of positive donations are higher in the treatment group (individuals who were observed in previous rounds)

$$N_{T[x_{i3}>0]} < N_{C[x_{i3}>0]} \quad \text{and} \quad N_{T[x_{i4}>0]} < N_{C[x_{i4}>0]}. \tag{6}$$

(2b) The number of positive (non–zero) donations in the treatment group is lower in unobserved rounds

$$N_{T[x_{i1}>0]} > N_{T[x_{i3}>0]} \quad \text{and} \quad N_{T[x_{i1}>0]} > N_{T[x_{i4}>0]} \tag{7}$$

$$N_{T[x_{i2}>0]} > N_{T[x_{i3}>0]} \quad \text{and} \quad N_{T[x_{i2}>0]} > N_{T[x_{i4}>0]}. \tag{8}$$

(2c) Average donations of participants who have been observed are higher than average donations of participants who have not been observed

$$\bar{x}_{T,3} > \bar{x}_{C,3}. \quad \text{and} \quad \bar{x}_{T,4} > \bar{x}_{C,4}. \tag{9}$$

(2d) Average donations of participants who have been observed and have positive donations in subsequent rounds are higher than average donations of participants who have not been observed and donate a positive amount

$$\frac{1}{N_{T[x_{it}>0]}} \sum_{\{i:i\in T \wedge x_{it}>0\}} x_{it} > \frac{1}{N_{C[x_{it}>0]}} \sum_{\{i:i\in C \wedge x_{it}>0\}} x_{it};\ t \in \{3,4\} \tag{10}$$

(2e) The spillover effect of being observed deteriorates over time i.e., the difference of average donations between observed and never–observed participants decreases from round 3 to round 4

$$\bar{x}_{T,3} - \bar{x}_{C,3} > \bar{x}_{T,4} - \bar{x}_{C,4}. \tag{11}$$

Hypothesis 3: Classification of Types. In a first step, we will test whether round–3 and round–4 donation distributions are significantly different between treatment and control groups. In a second step, we aim to classify behavior in the treatment group (with and without controlling for the perceived cost of effort).

- **Positive Spillover Type:** We classify participants as positive spillover types if their donations in subsequently unobserved rounds are close to the donations in observed rounds. A potential classification rule: An individual is classified a spillover–type if

$$x_{it} \in \left[\frac{x_{i1}+x_{i2}}{2} - |x_{i1}-x_{i2}|, \frac{x_{i1}+x_{i2}}{2} + |x_{i1}-x_{i2}|\right];\ t \in \{3,4\}. \tag{12}$$

  We will classify participants as reinforced positive spillover types if their donations in subsequently unobserved rounds is even higher than in observed rounds i.e.,

$$x_{it} \geq \frac{x_{i1}+x_{i2}}{2} + |x_{i1}-x_{i2}|;\ t \in \{3,4\}. \tag{13}$$

- **Negative Spillover Type:** We classify participants as negative spillover types if their donation in the unobserved rounds is substantially below their donation in rounds where they have been observed. A potential classification rule: An individual is classified a negative spillover type if

$$x_{it} \leq \max\left\{0, x_{ik} - \left(\widehat{SI}_k + se\left(\widehat{SI}_k\right) \times 1.96\right)\right\};\ k \in \{1,2\}, t \in \{3,4\}. \tag{14}$$

  where $se\left(\widehat{SI}_k\right)$ denotes that standard error of the estimated social image effect.

- **Standard Type:** We classify participants as standard types if their non–observed donation decisions satisfy

$$x_{it} \in \left(\max\left\{0, x_{ik} - \left(\widehat{SI}_k + se\left(\widehat{SI}_k\right) \times 1.96\right)\right\}, \frac{x_{i1}+x_{i2}}{2} - |x_{i1}-x_{i2}|\right);\ k \in \{1,2\}, t \in \{3,4\}. \tag{15}$$

We will use the proxy for altruism (collected in the pre–survey) to refine our classification. Specifically, we will investigate whether the proxy is correlated with the classification of types.

(3a) There is a spillover effect of observability on donations. Consequently, we hypothesize that the distribution of round-3 and round-4 donations in the treatment group will be different from the distribution of round-3 and round-4 donations in the control group.

(3b) Most participants will be classified as negative or positive spillover-types.

(3c) The share of positive (negative) spillover types is larger among participants who have never donated before. The quantitative spillover effect is larger among participants who have never donated before.

Hypothesis 4: Correlation Survey Measures and Typology. We will analyze potential correlations between measures obtained in the surveys (pre–survey, interposed questions, post–survey) and the choice–based typology. We hypothesize that positive (negative) spillover types:

(4a) Have a higher (lower) value in the cognitive reflection test, and a higher (lower) value of the preferences for consistency measure.

(4b) Perceive more (less) social pressure.

(4c) Perceive themselves to be less (more) helpful.

(4d) Have a higher (lower) value on the private self–awareness scale.

(4e) Indicate that licensing is more (is less) appropriate.

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