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JEL codes:

C91, D01, D64, D91

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Abstract

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1 Introduction

The motivations driving moral behavior have long been debated in social science. Whereas some contend that genuinely prosocial motivations are relatively widespread,¹ others view apparently moral actions as impure altruism (Andreoni, 1990) and argue that they are actually motivated by hidden selfish goals. These self-interested ends may encompass various motivations, such as cultivating a positive social image or reputation (Bénabou and Tirole, 2006; Exley, 2018), sustaining one’s self-image (Grossman and Van der Weele, 2017), “warm glow” due to the mere

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¹Hobbes in *Leviathan* (1651) writes “No man giveth but with intention of good to himself” while several centuries before Aristotle considered the possibility of genuinely selfless ethical goals, in *Nicomachean Ethics* Aristotle (2009).

act of giving (Andreoni, 1990) and other similar factors. Emotions, whether positive or negative, or their anticipation, are often believed to play a pivotal role in sustaining these motivations. Negative emotions may discourage individuals from engaging in morally questionable behaviors when observed (Butera et al., 2022), as for shame, or not (Baumeister et al., 1994), as for guilt.² On the positive side, emotions such as pride can counterbalance the effects of shame, while self-esteem can serve as a counterpart to guilt (Ellingsen and Johannesson, 2008).

The question is not merely philosophical in nature: these different perspectives entail different models for social behavior and, by extension, different predictions for economic behaviors in various domains where social preferences matter. These domains include charitable giving, labor relations, and strategic interactions of pro-environmental behavior, among others (Fehr and Charness, 2023). For instance, the theoretical differentiation between intrinsic social preferences and aversion to shame or guilt generates distinct behavioral predictions (see, for instance, Saito 2015). Some empirical evidence even suggests that “impure” motivations can lead to apparently contradictory behavior when viewed from the perspective of intrinsic preferences. Dana et al. (2006) show that people prefer to incur personal costs to avoid situations where their altruism will be requested, and several studies find that the actual consequences of a benevolent action seem to matter less than the simple act of choosing this action (Crumpler and Grossman, 2008; Andreoni and Bernheim, 2009; Lazear et al., 2012; Andreoni et al., 2017).

In this article, our aim is to provide new empirical insights on this matter by employing *preferences on menus*, that is, opportunity sets. Important theoretical insights have been obtained in merging impure motivations and menus. The underlying premise of such models is that the meaning of an action (and the signal it conveys, either to oneself or others) crucially depends on the available but unchosen options. Dillenberger and Sadowski (2012) propose a model based on the idea that reducing the choice to the selfish option is a way to avoid negative feelings about one’s action, such as guilt or shame. A menu that offers both a selfish option and a generous one requires some trade-off between the benefit of the selfish option and the negative feelings of not choosing the generous ones, whereas the menu restricted to the selfish option alone provides the same monetary gain without generating these negative feelings. Conversely, a feeling of *warm glow*, that is an immediate emotional reward when giving, requires the “freedom to be selfish,” as argued by Evren and Minardi (2017). Joy or satisfaction is triggered by the feeling of “doing good”, which requires having had the choice between a generous option and a selfish one. In a more comprehensive perspective, Saito (2015) attempts to account for both effects in a single model. These theoretical advances highlight the role of impure motivations in shaping preferences on menus and provide the framework upon which we will rely to articulate *behavioral definitions* of these impure motivations.

To the best of our knowledge, there has been no empirical investigation of preferences on menus as a way to measure impure motivations. We aim to bridge this gap with an experiment designed to elicit individuals’ preferences on menus of social allocations. In essence, our experiment consists of dictator game tasks (similar to Engelmann and Strobel, 2004), but with an initial stage where dictators can choose menus. More specifically, the choice over menus revolves

²Note that there is a use of *guilt* in a slightly different sense in the literature called “guilt aversion”, which is defined as failing to behave according to others’ expectations. For a clarification of these notions, see Bellemare et al. (2019). In this paper, we will follow Baumeister et al. (1994) and use guilt in its most general acceptance.

around two options: an altruistic and a selfish one. If, for the allocations under consideration, the dictator favors the selfish option, we can observe whether acting selfishly is associated with a subjective cost (guilt or shame). If that is the case, the decision maker would choose to exclude the alternative option (the altruistic one), opting for her preferred (selfish) choice alone, thus absolving herself of responsibility for the final outcome. Conversely, an individual who experiences no psychological discomfort from being selfish would be indifferent between menus consisting only of the selfish option and one containing both the selfish and altruistic options. Similarly, if the decision maker prefers the altruistic option, she may derive some subjective benefit from acting altruistically (e.g., pride, self-esteem, or more generally warm glow) and thus choose the menu where the selfish alternative is also available.

Approaching the question of impure motivations with menus offers three significant advantages. Firstly, in contrast to the experiments mentioned earlier, it provides a more comprehensive context for decision making. Not only can selfish individuals avoid requests (by restricting their menu to the selfish option), but generous individuals can also express a desire for the opportunity to be selfish (by enhancing their menu). Secondly, it naturally facilitates testing the importance of self- and social image, as the public visibility of the menu can be easily varied exogenously. Thus, it allows not only the examination of the relative strength of positive or negative impure motivations (e.g. shame versus pride) but also the relative significance of social and self-image considerations (e.g. shame versus guilt, pride versus self-esteem). Although each of these dimensions has been studied independently, to the best of our knowledge, their interaction has not been systematically investigated experimentally. Lastly, the choice over menus is not so much about emotions *per se*, but rather about their anticipations by decision makers. As economics is not interested in emotions *per se* but in their *behavioral impacts*, this aspect is critical and may offer a major difference from other approaches that seek to measure emotions (either physiologically or through self-declaration).

Our experiment provides compelling evidence that impure motivations have a substantial influence on preferences on menus of social allocations, with important differences in menu choices between selfish and generous individuals. An important additional insight is the apparent asymmetry of this phenomenon. Indeed, the vast majority of individuals who opt for the selfish option display a strong inclination to reduce their choice set (choosing the selfish option only). This indicates a prominent effect of negative impure motivations. However, although they do expand the choice set, those who prefer the generous allocation only do so to a more moderate extent. This implies, at best, a weak effect of positive impure motivations and suggests a limited role for “warm glow” (Andreoni, 1990). The public or private nature of the decision has little effect overall, with a slightly more pronounced impact of being observed in Japan than in France. This could suggest a cultural context in Japan that is more oriented towards shame than guilt (Mead, 1937; Benedict, 1946). In both cases, we observe that the subjective cost of acting selfishly plays a more substantial role in determining menu preferences than the subjective benefit of acting altruistically. Negative impure motivations appear to have a stronger effect than positive ones. Interestingly, altruistic individuals seem to be more intrinsically motivated in their social preferences compared to selfish individuals, which might contradict intuition. In summary, our findings do not support the warm glow account for generosity, but highlight the

importance of avoiding negative social emotions in shaping behavior, even for apparently purely selfish subjects.

2 Experimental Design

The experiment is a two-stage dictator game, where decision makers first choose between menus and then select options within those menus. The experiment was carried out online with a standard pool of subjects (i.e. from the usual lab) in France and in Japan.³ The experiment is asynchronous in the sense that we first recruited dictators and collected their choices (participants A), and only then recruited the recipients (participants B), and implemented the dictators' choices. In that last stage, the recipients were randomly matched with one of the dictators. Although that procedure could increase the subjective impression of social distance, it had the great advantage of being more efficient and robust for an online experiment than a simultaneous one.⁴

2.1 Course of the Experiment

The experiment builds on a binary dictator decision, where participant 1 has to choose between a generous allocation, e.g. $g = (x_g^1, x_g^2)$ and a more selfish one $s = (x_s^1, x_s^2)$, with $x_g^1 < x_s^1$ (the dictator, referred to as participant 1, gets a lower payoff when choosing the generous allocation) and $x_g^2 > x_s^2$ (the recipient, referred to as participant 2, gets a greater payoff when 1 chooses the generous allocation). The main originality of our experiment is that the choice between social allocations is preceded by a choice over menus. That is, before choosing the allocation, the dictator can choose the menu, typically between $\{s\}$ and $\{g, s\}$, or between $\{g\}$ and $\{g, s\}$.

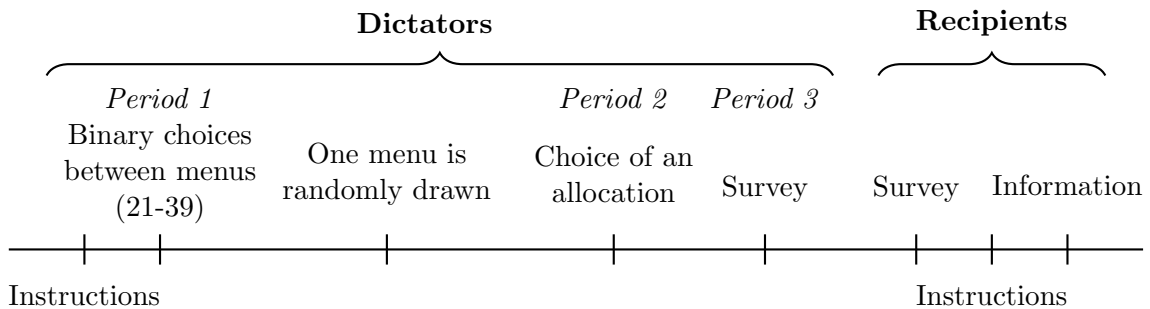


Figure 1: Timeline of the Experiment

Figure 1 exposes in detail the timeline of the experiment. After reading the instructions, the dictators' experimental procedure is divided into three periods. In the first period, they make a

³At the early stage of this project, we first planned, in France, to run a laboratory experiment. A few sessions were run, but the Covid-19 pandemic stopped the whole process. After a period of adaptation, we implemented the experiment online, in a simplified way, in both France and Japan. In both cases, we used subject pools from the university lab – experimental economics lab only. Although treatment *Public* is under-represented, we observe, in the incomplete lab sessions, tendencies – but not necessarily significant given the lack of power – that match the results we highlight in this paper.

⁴One of the issues in online experiments is the attrition, which is a major problem when the payment of a participant depends on an another participant's action.

series of choices between two menus of social allocations. Next, one of the chosen menus in the first period is randomly selected, and the second period involves choosing an allocation within this menu. In other words, the dictators make several choices between menus, but decide on an allocation within a menu only once. There are two reasons for this asymmetry: the first one is that our experiment is primarily interested in preferences on menus (being the first targeted to that particular topic), and the second one is that for impure motivations not to be present in the first stage of the experiment (or minimally so), a larger distance between choice over menus and choice within menus (in both dimensions of time and likelihood to occur) seemed appropriate. On this particular issue, we built on the theory developed by Noor (2011), who articulated this idea under plausible assumptions. Finally, the third period sees dictators fill in an exit survey about their beliefs, their ethical preferences, and social norms.⁵

Once all dictators have made their decisions, the recipients are invited to take part in two short experiments. The first experiment consists of a short survey about their ethical preferences and social norms, similar to the third period of dictators. They are then presented with the (short) instructions for the second experiment, which involves being the recipient of the dictator games already played by the previous subjects. That is, recipients simply receive a sum of money and, depending on treatments, are more or less informed about the dictators' menu and decision. In the *Private* treatment, the recipient receives no information about the origin of the money she receives. In the *Public* treatment, the menu from which the dictator chooses is revealed to the recipient (see Section 2.3), as well as the general structure of the dictator's task. This experimental variation allows us to test how self- and social-image may come into play, in relation with many studies related to impure motivations, for which the social aspect of the decision is important.

2.2 Binary Choices between Menus

Dictators face a series of binary comparisons of menus of social allocations. These allocations are composed of a payoff for the dictator and one for the "recipient", i.e. a participant randomly paired with the dictator. We first define six triplets of menus: $\{s\}$, $\{g\}$ and $\{g, s\}$, with s the more selfish option and g the more generous one. For each triplet, there are three binary comparisons: $\{s\}$ vs. $\{g\}$, $\{s\}$ vs. $\{g, s\}$, and $\{g\}$ vs. $\{g, s\}$. Table 1 reports this set of pairwise comparisons of menus. The first three triplets involve making a choice between (12, 8) and a selfish option, either (14, 6), (16, 4) or (18, 2). The amounts are in euros for France and hundreds of yens for Japan. For the three other triplets, the altruistic allocation is (10, 8) and the selfish option varies, with the recipient's payoff decreasing from 4 to 0, that is, (12, 4), (12, 2), or (12, 0). Based on a pre-test (and existing results, such as Engelmann and Strobel, 2004, Kerschbamer, 2015, or Krawczyk and Le Lec, 2021), we expect individuals to move from a selfish choice – when the selfish option is (12, 4) for instance – to a generous one – when the selfish option is (12, 0). That will give variation at the individual level and possibly room to study how the same individual is affected by different impure motivations when her intrinsic preference vary (from selfish to altruistic for instance). These tasks are referred to as the *unconditional choice tasks*.

⁵It was planned to analyze the effects of these measures on menu preferences. As it turns out, these results do not add anything to the results presented here.

# triplet	$\{g\}$	$\{s\}$	$\{g, s\}$
(1)	$\{(12, 8)\}$	$\{(14, 6)\}$	$\{(12, 8); (14, 6)\}$
(2)	$\{(12, 8)\}$	$\{(16, 4)\}$	$\{(12, 8); (16, 4)\}$
(3)	$\{(12, 8)\}$	$\{(18, 2)\}$	$\{(12, 8); (18, 2)\}$
(4)	$\{(10, 8)\}$	$\{(12, 4)\}$	$\{(10, 8); (12, 4)\}$
(5)	$\{(10, 8)\}$	$\{(12, 2)\}$	$\{(10, 8); (12, 2)\}$
(6)	$\{(10, 8)\}$	$\{(12, 0)\}$	$\{(10, 8); (12, 0)\}$

Earnings are given in euros; the numbers are multiplied by 100 for earnings in yens for Japanese subjects.

Table 1: Unconditional binary choice tasks in the experiment

In addition, dictators also engage in *conditional choice tasks*, which depend on their previous decisions. The purpose is to study how the subjective cost or benefit of the presence of an unchosen option varies with the properties of this unchosen option. The rationale is that the generosity or selfishness of the non-preferred option will trigger subjective benefits and costs of varying intensities. For instance, a generous decision maker may experience more positive feelings as the unchosen (here, selfish) option becomes more favorable to herself, increasing her perceived sacrifice. In contrast, a selfish dictator may feel even more guilt when choosing the generous option would only have meant a small pecuniary sacrifice to her while giving great benefits to the recipient. In the experiment, dictators preferring $\{(14, 6)\}$ to $\{(12, 8)\}$, will subsequently face a binary menu choice with, on the one hand, $\{(12, 8); (14, 6)\}$ and, on the other hand, $\{(10, 10); (14, 6)\}$. In this particular case, the goal is to see whether the subjective cost of acting selfishly is greater with $(12, 8)$ as the alternative allocation than with $(10, 10)$. Symmetrically, when the dictator prefers the altruistic option, that is, $\{(12, 8)\}$, rather than the selfish one, i.e. $\{(14, 6)\}$, then she will face a menu choice between $\{(12, 8); (14, 6)\}$ and $\{(12, 8); (16, 4)\}$, this time to see whether the subjective benefit is greater with $(14, 6)$ or with $(16, 4)$ as an alternative option. Some models, such as the one by Evren and Minardi (2017), imply that the disutility that stems from not choosing $(10, 10)$ is higher than that from not choosing $(12, 8)$. The argument is that the damage done to the other is (comparatively) greater and so should be the subjective cost (guilt, shame, etc.). In some other perspectives (e.g. Saito 2015, in one of his models), the subjective cost depends both on the damage done to the other but also on the sacrifice by the decision maker. The comparisons faced by the dictators are summarized in Table 2.

In all choice tasks, dictators are free to choose between three options: menu A , menu B or indifference between A and B . A screenshot of a typical choice task is displayed in the Appendix C alongside the instructions translated to English. To incentivize indifferent dictators to effectively choose the indifference option, they get an additional 0.10 euro, or 10 yen, if they choose indifference. Indifferent decision makers have an incentive to select indifference rather than any other option. We implemented this as indifference corresponds to an important benchmark case (intrinsic selfishness or altruism).

If selfish (preference for s)			
(a)	{(12, 8); s }	vs.	{(10, 10); s } with $s = (14, 6), (16, 4), (18, 2)$
(b)	{(10, 8); s }	vs.	{(10, 10); s } with $s = (12, 4), (12, 2), (12, 0)$
If generous (preference for (12, 8) or (10, 8))			
(c)	{(12, 8); (14, 6)}	vs.	{(12, 8); s' } with $s' = (16, 4), (18, 2), (20, 0)$
(d)	{(12, 8); (16, 4)}	vs.	{(12, 8); s' } with $s' = (18, 2), (20, 0)$
(f)	{(12, 8); (18, 2)}	vs.	{(12, 8); s' } with $s' = (20, 0)$
(g)	{(10, 8); (12, 4)}	vs.	{(10, 8); s' } with $s' = (14, 4), (18, 4)$
(h)	{(10, 8); (12, 2)}	vs.	{(10, 8); s' } with $s' = (14, 2), (18, 2)$
(i)	{(10, 8); (12, 0)}	vs.	{(10, 8); s' } with $s' = (14, 0), (18, 0)$

Earnings are given in euros; the numbers are multiplied
by 100 for earnings in yens for Japanese subjects.

Table 2: Conditional binary choice tasks in the experiment

2.3 Treatments and Information Given to the Subjects

The information received by the dictator and the recipient is critical to identify impure motivations behind pro-social behavior. The recipients have no information about the first period of the dictators' experiment, that is, they do not know that the dictators have the opportunity to choose between menus of allocations, and they have no particular reason to think there could be a first stage where dictators choose between menus. The information provided on the second period varies depending on the treatment. In the *Public* condition, the following information is provided: (1) the menu of allocation(s) that the dictator is free to choose from, and (2) the allocation chosen by the dictator. Thus, the recipients know their gain, that of the dictator and what both participants would have had if the dictator had made another choice. In the *Private* condition, the recipients receive minimal information: only their own gain. They are not informed about the course of the second stage of the experiment. They are just told that "the other participant with whom you are paired made some choices and your gain is of x euros". Although introducing a slight imbalance between treatments, this has been chosen in order to limit the recipient's ability to infer the dictator's actions. The framing is voluntarily ambiguous about the responsibility of the dictator in the outcome. For instance, if (18, 2) had been chosen, the recipient only knows that he receives 2 euros. In contrast, if she would have been informed that the final allocation is (18, 2), she would have been in a position to make inferences about the dictator's choice and responsibility.

Regarding the possible effect of the *Public* treatment, we consider, since the experiment is anonymous but also asynchronous and run online, that any effect of the *Public* condition is to be taken as a lower bound of the effect of the publicity of the menu. Indeed, the social distance between the dictator and the recipient can hardly be increased as dictators are anonymous, have left the experiment when receivers are informed about their choices, and are physically distant.

The information that the recipients receive is presented as transparently as possible to the dictators. First, they are explicitly told that recipients are not informed about the first period at all, including its mere existence, in both treatments. Second, in treatment *Private*, dictators are told that recipients only know about their final payoff, while in the *Public* treatment, dictators

are informed that recipients not only know the social allocation chosen but also the menu in which it was chosen. To make sure this information is well received, we detail it at length in the instructions and, in addition, it shows *on all the screens* where dictators have to make a choice. We also introduce control questions after the instructions to make sure that they are aware of which information circulates in the experiment.

2.4 Theoretical Predictions and Hypotheses

2.4.1 Model and Assumptions

Inspired by Saito (2015) and Dillenberger and Sadowski (2012), we propose a simple yet general model to take into account pure and impure motivations in (pro-)social preferences. The main difference between our model and Saito (2015)’s axiomatization, aside from some secondary assumptions about the scope of impure motivations, is that we allow for non-linear utility. The main interest of doing so is that it allows for interior solutions (which are much more tractable) and a wider spectrum of unchosen alternatives. Initially, we do not distinguish between self-image and social image, but we will later introduce how these two types of motivations combine.

Let X be a menu composed of social allocations (for two individuals) generically referred to as x, y, z , etc. All possible allocations form the set $\mathcal{X} \subset \mathbb{R}_+^2$. An allocation x represents the results (e.g., payments) of two individuals: $x = (x_1, x_2)$, where x_1 is the outcome for the decision maker (the dictator) and x_2 is the outcome for the recipient. We then assume that the preferences on allocations (within a menu) take into account three components: self-interest, intrinsic altruism, and impure motivations.

Assumption 1 (Three Components for the Utility Function) *The preferences are represented by a continuous utility function, made of three separable and additive components corresponding to self-interest, intrinsic altruism and impure motivations.*

All the components are assumed to be differentiable once. As is intuitive, the decision maker prefers more money than less, all things being equal. Denote v the self-interest component, it depends only on the decision maker’s payoff.

Assumption 2 (Self-Interested Component) *The self-interested component is increasing in x_1 .*

We also assume that the decision maker can be intrinsically altruistic, that is, genuinely interested in the recipient facing good consequences. In the “worst” case scenario though, the decision maker is not intrinsically altruistic at all.⁶ Denote w the intrinsic altruism component, which depends solely on the recipient’s payoff.

Assumption 3 (Intrinsic Altruism) *The intrinsic altruism component is positive and weakly increasing in x_2 .*

To determine impure motivations, one needs to compare the consequence of an actual choice with those of some alternative decision. A simple way to do that is to assume that for each

⁶We rule out cases where the decision makers would be intrinsically malevolent, so to speak.

party involved exists a reference to which the consequence of the actual choice will be compared. Denote these reference payoffs as r_1 for the dictator and r_2 for the recipient.

Assumption 4 (Impure Motivation and Distance to References) *An impure motivation component is a differentiable function m of two arguments, $r_1 - x_1$ and $r_2 - x_2$, which represents the difference between reference payments and actual consequences. Moreover, m_1 and m_2 being its partial derivatives, are such that $m_1 > 0$ (“pride” in Saito’s framework) and $m_2 < 0$ (guilt or shame). In addition, we assume that $m(0, 0) = 0$.*

The interpretation of this component is that impure motivation will depend positively on both what the dictator sacrifices in comparison with the reference ($r_1 - x_1$) and what she “gives”, in relative terms, to the other ($r_2 - x_2$). Note that in comparison with Saito’s (2015) model, we do not assume linearity of pride or shame: that gives us more flexibility to possibly account for the experimental data.⁷

Assumptions 1 to 4 imply that the decision maker’s preferences can be represented, for an allocation x and two reference payments r_1 and r_2 as follows:

$$u(x|r_1, r_2) = v(x_1) + w(x_2) + m(r_1 - x_1, r_2 - x_2) \quad (1)$$

Now, in order to have a utility function representing menu preferences, we assume that the utility of a set is simply the maximum utility of an element of that set, and apply u to the corresponding situation:

Assumption 5 (Reference Allocations and Utility of Menus) *The utility of a menu is given by the maximum utility given by its allocations, that is:*

$$U(X) = \max_{x \in X} u(x|r_1^X, r_2^X) \quad (2)$$

with $r_1^X = \max_{x \in X} x_1$ and $r_2^X = \max_{x \in X} x_2$.

This assumption is two-fold. The first refers to the utility of menus, while the second refers to the reference payments. For the first, a menu is worth the utility of its best element. This corresponds to Kreps’s (1979) axiom of Strategic Rationality in the context of preference for flexibility or the indirect utility approach exposed by Arrow (1995) in his work on the ranking of menus. The second relates to the fact that impure motivations depend heavily on reference payments. Within a menu, we assume that the selfish reference for the dictator is given by the larger payoff within the menu the dictator could receive. Likewise, for the recipient, the reference payment is the maximum payment the recipient could have received. For simplicity

⁷Note that the model can be extended to account for some additional impure motivations or anticipated emotions. For instance, Saito (2015) refers explicitly to *temptation* and *self-control*, which here would correspond to m_1 negative. The interpretation is that the altruistically motivated individual would feel tempted to choose the selfish option, and resisting it is costly in the sense of Gul and Pesendorfer (2001) even when the altruistic option is chosen in the end, or she will succumb to the temptation, even against her intrinsic preferences. In both cases, warm glow, understood as the momentary positive feeling or sentiment associated with an action, is not on the side of altruistic options, but rather those related to selfish monetary rewards. In this particular case, m_2 can be assumed to be null, as the situation of the other party is not relevant to that kind of emotion. m_2 positive would correspond to emotions and feelings related to malevolent action (perhaps sadism, controlling preferences), a phenomenon completely opposite to the impure motivation account of altruistic behavior.

(and in line with our experiment where such cases do not occur), we do not take into account how reasonable the allocation is for the recipient to get x_2 . In particular, in its current formulation, this assumption could easily not be supported by behaviors, as it seems very likely that some allocations favorable to the recipient would weigh unreasonably on the dictator (for instance, in $\{(0, 10), (5, 5)\}$). Again, as our experimental design is built to avoid such cases, we keep this simplification.⁸

These assumptions lead to the following definition of *Impurely Motivated Social Preferences*:

Definition 1 (Impurely Motivated Social Preferences) *We say that \succsim_m on $2^X \setminus \{\emptyset\}$ has an impurely motivated utility representation if there is a tuple (u, w, m) where $v : \mathbb{R}_+ \rightarrow \mathbb{R}$ is an increasing function, $w : \mathbb{R}_+ \rightarrow \mathbb{R}$ is a weakly increasing function, and $m : \mathbb{R}_+^2 \rightarrow \mathbb{R}$ is a differentiable function such that m is increasing in the first argument, and decreasing in the second argument, such that \succsim_m is represented by :*

$$U(X) = \max_{x \in X} [v(x_1) + w(x_2) + m(r_1^X - x_1, r_2^X - x_2)] \quad (3)$$

with $r_1^X = \max_{x \in X} x_1$ and $r_2^X = \max_{x \in X} x_2$.

We assume that, when comparing menus of allocations, the decision maker is sophisticated enough to correctly anticipate the effect of impure motivations related to the choice of an allocation within a menu.⁹ Therefore, her menu choices indicate the weight given to the impure motivations component in her preferences.

An important practical issue that we have left aside so far concerns the fact that the model assumes that the preferences on menus are not influenced by impure motivations, but only by their anticipation. That is, when choosing between $\{s\}$ and $\{g\}$, the dictator is not affected by impure motivations, for instance guilt here. In other words, we assume that individuals are not sophisticated enough to see that choosing between singletons, and menus in general, is like choosing between options within a menu. Although this is clearly a simplification, we can make two remarks in favor of this assumption. First, previous experimental studies on impure motivations (Dana et al., 2007; Andreoni et al., 2017) seem to indicate that this lack of sophistication is often observed, although not completely. Changing sidewalk to avoid the ask seems to do the trick for most people for instance (Andreoni et al., 2017).¹⁰ Second, the experimental design is likely to reduce the effect of sophistication by varying the consequences of decisions on menu and options within a menu. In the first period of the experiment, participants

⁸The most promising approach is likely to determine a fair allocation, and to use the distance of the dictator and recipient's payoff to that allocation to enter the impure motivations. This is beyond the reach of this paper, given the challenge of defining fairness in a sufficiently general context.

⁹In this sense, we rely on some rational expectation hypothesis. In the remainder of this paper, we do not distinguish anticipated impure effects from actual impure effects, but clearly the two could partly differ. However, even if relaxing the rational expectation hypothesis, menu preferences are still informative as it is their anticipation rather than impure motivations *per se* that may matter: an individual may overestimate guilt/shame when choosing between allocations, but the mere anticipation of guilt/shame is what drives behavior. Moreover, as we argue in the introduction, we are primarily interested in the behavioral effects of impure motivations, and not, for instance, sentiments.

¹⁰There is a major difference here between the self-image and the social image, as the potential observers do not have access to first stage (i.e. between menus) choices, while of course the decision maker has. If sophistication is widespread, we should observe differences between our two *Public* and *Private* treatments.

make many binary decisions between menus, and only one of them will be implemented, while they only face one between-option choice in the second period. The link between decisions and consequences being weaker in the former than in the latter, we then expect that impure motivations (guilt or warm glow) will be much stronger in the allocation choice (that will be implemented with certainty) than in menu choices. As a consequence, we believe that the distinction between the two stages with respect to impure motivations, although not absolute, can plausibly be strong enough to generate effects in the direction predicted by the model (which requires no impure motivations at play for choice over menus).

2.4.2 Predictions

In the remainder of the article, we will refer to the most generous option in a menu as g and the most selfish as s , that is, $g_1 < s_1$ and $g_2 > s_2$. Likewise, we will say that an individual is generous (resp., selfish) for some menu $\{g, s\}$ if she prefers $\{g\}$ to $\{s\}$ (resp., $\{s\}$ to $\{g\}$). This does not mean that the decision maker is generous or selfish for all pairs (g, s) , but only for the one under consideration.

Our theoretical goal is to figure out the role of impure motivations through preferences on menus. First, in the absence of impure motivations, we have, for all menus, $u(X) = \max_{x \in X} [v(x_1) + w(x_2)]$. That implies that if there is no impure motivation at work, then the utility is equal for all menus with the same best option. Rephrased differently, for any X :

$$X \sim_M \{x^*\} \quad \text{with} \quad x^* = \text{ArgMax}_{x \in X} [v(x_1) + w(x_2)] \quad (4)$$

That means a menu is only as good as its intrinsically best element. Rephrased, this gives the first proposition:

Proposition 1 (Absence of Impure Motivation) *In the absence of impure motivations, i.e. $m = 0$, preferences on menus reduce to preference over options, i.e. $X \succ_M Y$ if and only if $\{x^*\} \succ \{y^*\}$.*

This means that only intrinsic motivations are at play, either self-interest or some “genuine” altruistic component.

By extension, one can infer the presence of impure motivations when there exists at least one menu X such that either $\{x^*\} \succ_M X$ or $X \succ_M \{x^*\}$.

There are two distinct effects of impure motivation: (1) on menu preferences and (2) on the choice of an allocation. While (1) refers to the preference ranking between a menu and its best option, (2) is related to how the presence of impure motivations changes the preference between options *within a menu*. To see this, consider a dictator who prefers s to g . Although impure motivations are present, they may not be strong enough to push her to choose g rather than s in any context. Yet she may feel guilty about being selfish, yet not strongly enough to reverse her intrinsic choice: In such a case, $\{s\}$ will be preferred to $\{g, s\}$, as the former menu is not accompanied by negative impure motivations. While the choice of s within $\{g, s\}$ reveals selfish preferences, the preference for $\{s\}$ over $\{g, s\}$ reveals the presence of *impure* selfishness. In summary, examining preferences on menus provides a fine-grained measure of the weight of impure motivations in social preferences.

The following propositions describe the possible patterns of preferences when considering Assumptions 1 to 5.¹¹ These patterns correspond to some relatively intuitive *types* and differ in how the larger menu $\{g, s\}$ is compared to the preferred allocation, but also in how the decision maker chooses within the menu $\{g, s\}$. In these propositions, we restrict to cases where either $\{g\}$ or $\{s\}$ is strictly preferred to the other one.¹² Consider first generous individuals, who prefer $\{g\}$ to $\{s\}$. There are two types of altruism: intrinsic and impure. We define these patterns of preferences as follows:

Proposition 2 (Intrinsic and Impure Altruism) *Suppose Assumptions 1-5. If $\{g\}$ is strictly preferred to $\{s\}$, then the possible patterns of preferences are the following.*

- **Intrinsic altruism:** $\{g, s\} \sim \{g\}$ and the choice within $\{g, s\}$ is g .
- **Impure altruism:** $\{g, s\} \succ \{g\}$ and the choice within $\{g, s\}$ is g .

The pattern of *intrinsic altruism* is such that there is no impure motivation at work, as only the intrinsic preference between allocations has an impact. The pattern of *impure altruism* corresponds to altruistic individuals with positive impure motivation. Although the decision maker prefers the generous option to the selfish one, she also benefits from choosing the generous option when the selfish option is available for choice, which is due to feelings such as self-esteem, pride, or warm glow. That is why she always prefers the menu $\{g, s\}$ to $\{g\}$, since it allows her to choose the generous option while still having the opportunity to choose the selfish one. Note that if the decision maker prefers $\{g\}$ to $\{s\}$, the model never predicts that she will choose s from $\{g, s\}$.

The next patterns of preferences concern selfish individuals. For selfish individuals, it is required to distinguish two cases regarding decisions within a menu: the case where impure motivations cannot overwhelm intrinsic utility components and the case where they can. In the first situation, two possibilities arise:

Proposition 3 (Indifferent and Impure Selfishness) *Suppose Assumptions 1-5. If $\{s\}$ is strictly preferred to $\{g\}$ and s is chosen when facing $\{g, s\}$, then the possible patterns of preferences are:*

- **Indifferent selfishness:** $\{g, s\} \sim \{s\}$ and the choice within $\{g, s\}$ is s .
- **Impure selfishness:** $\{s\} \succ \{g, s\}$ and the choice within $\{g, s\}$ is s .

Indifferent selfishness states that the decision maker prefers the selfish allocation to the generous one and she's not affected by any form of impure motivations. According to the pattern of *impure selfishness*, the selfish allocation is the preferred one, but the decision maker feels negatively about not choosing the generous option, due to guilt or shame. Therefore, she prefers not to have the opportunity to choose the generous option in order to avoid these negative feelings.

It is worth noting here that, by assumption, impure motivations are not strong enough to push the decision maker to choose g from $\{g, s\}$. However, this is possible, and the following proposition describes the two cases of such *overwhelming* impure motivations.

¹¹The proofs are put in the Appendix A.1.

¹²The case where $\{g\} \sim \{s\}$ is studied in the Appendix A.2.

Proposition 4 (Overwhelming Impure Motivations) *Suppose Assumptions 1-5. If $\{s\}$ is strictly preferred to $\{g\}$, then when g is chosen to s within $\{g, s\}$, the possible patterns of preferences are:*

- *Overwhelming negative impure motivations:* $\{s\} \succ \{g, s\}$ and the choice within $\{g, s\}$ is g .
- *Overwhelming positive impure motivations:* $\{s\} \prec \{g, s\}$ and the choice within $\{g, s\}$ is g .

The pattern of overwhelming negative impure motivations describes a selfish decision maker for whom the negative feelings associated with choosing s from $\{g, s\}$ are so strong that she prefers to choose g . That is, it may exist a decision maker for whom the value of s within $\{g, s\}$, $v(s_1) + w(s_2) + m(0, g_2 - s_2)$, is lower than that of g , $v(g_1) + w(g_2)$ (assuming no self-esteem/pride). Thus, the value of $\{g, s\}$ is that of g , which is itself lower than that of $\{s\}$.¹³ The last pattern is that of a *selfish individual with overwhelming positive impure motivation*, which typically corresponds to the warm glow account. Although intrinsically self-interested, she benefits positively from choosing g rather than s , and this benefit is sufficiently strong to exceed the gain of having s rather than g in pecuniary terms. Thus, $\{g, s\}$ is preferred to $\{s\}$ and $\{g\}$.

An important result of our model is that the types listed so far are the only possible ones:

Proposition 5 (6 types) *Suppose Assumptions 1-5, the only possible patterns of preferences on menus and choice within sets composed of a generous and a selfish option are those listed in Proposition 2, 3 and 4.*

This proposition provides a relevant guide to analyze experimental results as the frequency of each types is quite indicative of the importance of (negative or positive) impure motivations.

So far, we have not theoretically addressed the issue of publicity of the choice within menu (second period of the experiment). To do this, let $\mathcal{T} = \{T_{\text{private}}, T_{\text{public}}\}$ be the set of all treatments. There exists a function $\theta : \mathcal{T} \rightarrow \mathbb{R}_+$, which measures the differential role of impure motivations as a function of treatment. The value of $\theta(T_{\text{private}})$ reflects the importance of self-image in the individual preferences, i.e. *self-esteem* and *guilt*, while $\theta(T_{\text{public}})$ also captures social image, i.e. *pride* and *shame*. We assume $\theta(T_{\text{private}}) \leq \theta(T_{\text{public}})$, which means that impure motivations are at least as prevalent when the decision maker is observed than when she is not. The utility in Definition 1 may then be rewritten as:

$$U(X) = \max_{x \in X} \left[v(x_1) + w(x_2) + \theta(T)m(r_1^X - x_1, r_2^X - x_2) \right] \quad \text{with } T \in \mathcal{T}.$$

This implies the following:

Proposition 6 (Observability) *If $\theta(T_{\text{private}}) < \theta(T_{\text{public}})$, then the likelihood of exhibiting preferences reflecting impure motivations increases.*

One of our purpose is to determine the relative strength of self- and social-image in impure motivation. To that end, the role of social image in the choice between menus is measured

¹³Note that this pattern of preferences allows the decision maker to have positive impure motivation of choosing g , but to a relatively small extent.

Types	Private	Public	Menu choice	Choice within $\{g, s\}$
Altruism				
1	Intrinsic altruism		$\{s\} \prec \{g\} \sim \{g, s\}$	g
2	Impure altruism	Self-esteem + Pride	$\{s\} \prec \{g\} \prec \{g, s\}$	g
Selfishness				
3	Indifferent selfishness		$\{g\} \prec \{s\} \sim \{g, s\}$	s
4	Impure selfishness	Guilt + Shame	$\{g\} \prec \{s\} \succ \{g, s\}$	s
5	With overwhelming negative motivations	Guilt + Shame	$\{g\} \prec \{s\} \succ \{g, s\}$	g
6	With overwhelming positive motivations	Overwhelming self-esteem + Overwhelming pride	$\{g\} \prec \{s\} \prec \{g, s\}$	g

Table 3: Typology of preferences

by the difference between the *Public* and *Private* treatments. Note that by nature, impure motivations related to self-image cannot be exogenously canceled.

In conclusion, Table 3, which combines Propositions 6 and 7, summarizes the different attitudes we can theoretically expect in our experiment. It is worth noting that what is commonly referred to as warm glow corresponds to Type 6. However, the existing use of the concept is not always strongly associated to self- or social image, as the emotions it provokes can be related to only one or the other, or to both. Yet, independently of this, the warm glow theory of giving corresponds to the presence of overwhelming positive motivations, as the general idea is to explain giving (hence choosing the generous option) by positive impure motivations.

2.5 Procedures

French subjects were recruited using the pool of the Gate-Lab (University of Lyon 2, CNRS), using the HRoot platform (Bock et al., 2014). In total, 472 subjects participated in the French experiment. For Japanese subjects, they were recruited from two universities, Kansai and Waseda, for a total of 453 participants. The two Japanese sub-samples are socially similar, as both are mostly composed of students from higher education elite institutions. All subjects were paid by a bank transfer in similar conditions. The conversion rate between French and Japanese payments is €1 for ¥100, which is close to the exact conversion rate but also allows immediate comparisons. On average, dictators received €15 or ¥1,500 and recipients €7 or ¥700 on average, including a participation fee of €2 or ¥200. This difference in payment, due to the nature of the decision tasks and their asymmetry, also matches the difference in duration, as, except for surveys and questionnaire, recipients do not have to make any decision. For recipients, the duration was around 10 minutes, while the experiment lasted around 5 minutes more for dictators. The whole procedure was asynchronous in the sense that first all dictators made their decisions and only then could recipients participate. This was set to prevent recipients' attrition during

the experiment, which is often high in online studies.

The two country samples are slightly different in terms of age, occupation (student or not), and gender. There are more women in the French sample and the subjects are younger and more likely to be students in the Japanese sample. All subjects are students in the Japanese sample, while a quarter of the subjects in the French sample are not. These differences are shown in Table 4. They are statistically significant. In light of these composition differences, any interpretation of the difference in behavior, especially in relation to culture, should be taken with caution.

	France	Japan	<i>p</i> -value
Nb of dictators	236	227	
Female	59.75%	53.74%	0.193
Age (mean)	25.6	21.6	<0.001
Age (median)	23	21	
Student	76.79%	100%	<0.001

Table 4: Composition differences in French and Japanese samples

3 Results

We structure the exposition of the results in the following way. First, we study the subjects' plain social preferences, that is, how often subjects choose the generous or the selfish option in the relevant choice tasks. The purpose is to make sure we obtain results that are congruent with the vast literature on such payoff allocation tasks. We next focus on how preferences on menus are impacted by the underlying preferences over options and, by extension, by impure motivations. In other words, in the second step, we test whether we can observe the effects of impure motivations as stated in Proposition 1. By studying such information in more detail, we can estimate the relative frequency of the types presented in Proposition 5. To be exhaustive, this approach needs to be supplemented by studying choices within menus (on the sub-sample where it is possible), to see whether the theoretical types with overwhelming impure motivations are frequent, and more generally whether the warm glow account of giving is likely to be prevalent. Finally, we compare the relative strength of negative and positive impure motivations and test the robustness of the conclusion that a number of phenomena hint at stronger negative motivations. Moreover, at the very end, we engage in econometric estimations, conceived as robustness checks on our findings.

3.1 Preference over Singletons

Table 5 shows the dictators' preferences for all pairwise comparisons of singletons, that is, $\{g\}$ versus $\{s\}$. It reports the proportions of subjects preferring the generous or the selfish options for the whole sample, by treatment and country. We also provide the results of two-proportion Z-tests, that are performed to test differences in the percentage of subjects preferring the generous allocation between conditions and countries (columns *p*). We consider indifferent choices as 0.5. We use the same procedure in the remainder of the article, when comparing proportions.

Singletons		All		By treatment					By country				
<i>s</i>	<i>g</i>	<i>s</i>	<i>g</i>	<i>Public</i>		<i>Private</i>			France		Japan		
<i>s</i>	<i>g</i>	<i>s</i>	<i>g</i>	<i>s</i>	<i>g</i>	<i>s</i>	<i>g</i>	<i>p</i>	<i>s</i>	<i>g</i>	<i>s</i>	<i>g</i>	<i>p</i>
(18,2)	(12,8)	73.7	19.8	71.2	19.9	76.0	19.7	.599	66.2	26.6	81.5	12.8	< .001
(16,4)	(12,8)	71.8	18.3	72.1	17.6	71.1	18.9	.895	63.7	23.2	80.2	13.2	.001
(14,6)	(12,8)	69.0	15.5	67.2	15.0	70.6	16.0	.843	59.1	19.8	79.3	11.0	< .001
(12,4)	(10,8)	57.3	26.5	57.1	26.1	57.6	26.9	1	43.9	34.2	71.4	18.5	< .001
(12,2)	(10,8)	36.8	50.0	48.7	37.6	51.3	36.3	.728	37.1	46.0	63.4	27.3	< .001
(12,0)	(10,8)	39.9	50.8	38.9	52.2	40.7	49.6	.728	27.9	60.8.0	52.4	40.5	< .001

This table reports the percentages of subjects preferring s or g , for the whole sample, by treatment and country. The remaining percentages corresponds to indifference. Col. p reports the p -value for two-proportion Z-tests between treatments and countries for preference for $\{g\}$ to $\{s\}$.

Table 5: Proportion of selfish and generous choices in singleton comparisons

Table 5 calls for three observations. First, there is quite some heterogeneity in the type of options preferred. The proportion of selfish choices varies from 73.7% to 36.8%. In particular, when the selfish option varies from (12, 4) to (12, 0) when the generous option is (10, 8), the proportion of selfish choices varies from 57.3% to 36.8%.

These general results on preferences over allocations are in line with what we know about social preferences for such subject pools (Kerschbamer, 2015, or Krawczyk and Le Lec, 2021). Second, there is no significant difference between our two treatments (*Public* and *Private*) in terms of the proportion of generous/selfish choices. Since first-stage choices are not observed in either treatment, this result is to be expected. This suggests no difference in terms of (intrinsic) generosity, and by extension social preferences, between our two treatments. Last, French subjects seem to be more generous than Japanese ones.

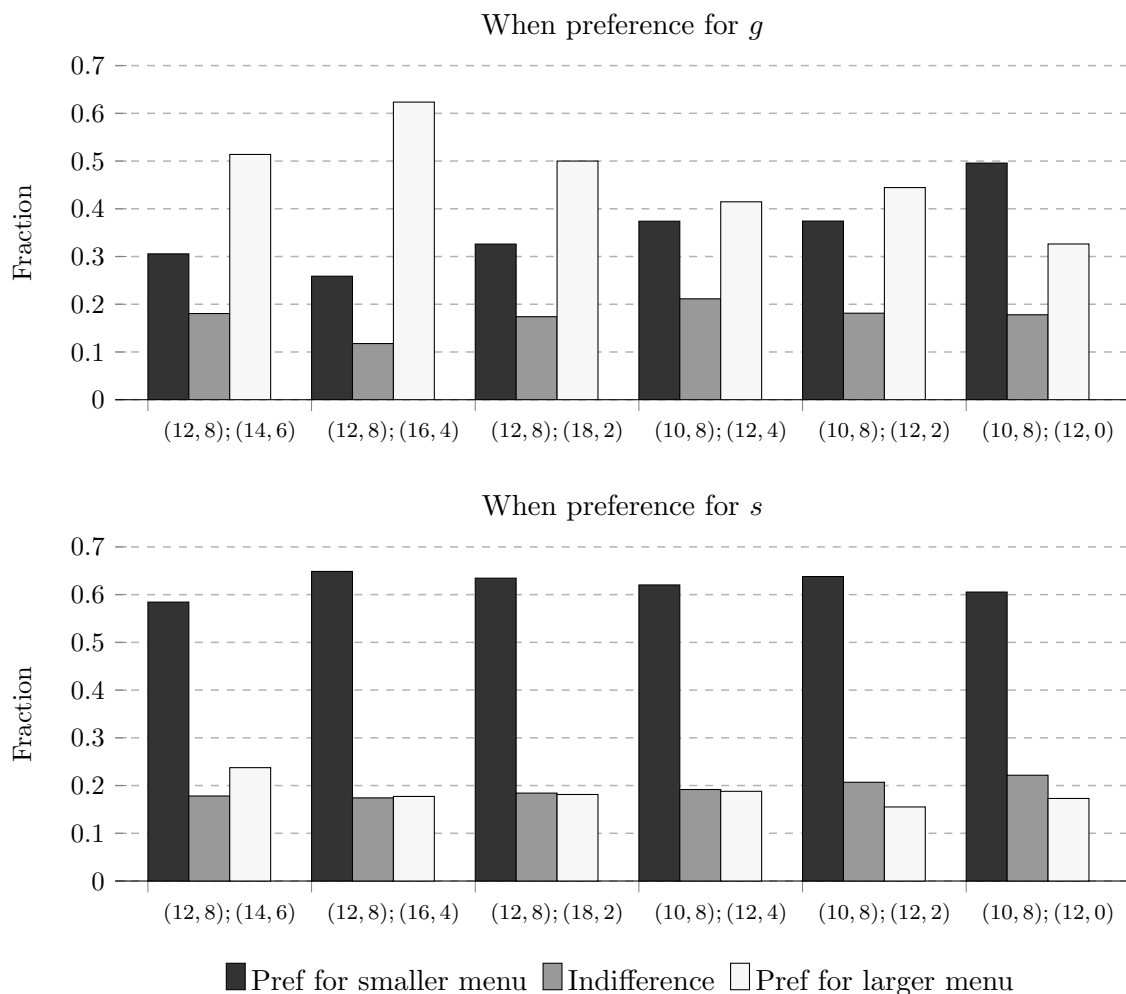
To test the robustness of these observations, we econometrically estimate the likelihood of making a selfish choice based on countries, treatments, and sociodemographic variables (gender, age, and occupation). The results are reported in Table A4 in the Appendix B.2. In sum, the experimental conditions do not affect the decisions over singletons in the first stage, while we also observe that Japanese subjects seem to opt more often for selfish options.¹⁴

3.2 Attitude to Larger Menus

We analyze here how subjects compare the two-allocation menu $\{g, s\}$ and its preferred allocation. First, it will allow to establish the presence or absence of impure motivations in menu choices (Proposition 1, and types 1 and 3 in Table 3). Second, it will also shed light on the prevalence of impure altruism (Proposition 2, and types 2 and 6 in Table 3) and impure selfishness (Proposition 3, types 4 and 5 in Table 3) among subjects. Finally, the difference between *Public* and *Private* treatments (Proposition 6) will be studied in Section 3.4.

Figure 2 reports the attitudes to larger menus conditionally on the preferred allocation, that is, for generous subjects (i.e. preferring $\{g\}$ to $\{s\}$) and for selfish ones (i.e. preferring $\{s\}$ to $\{g\}$). More details are provided in Table 6, with figures for the sample as a whole, by country and treatment.

¹⁴It is beyond the scope of this paper to investigate inter-cultural difference in pro-social behavior. It may be that the country is related to another omitted variable and is not the direct cause of this difference in social behavior.



This figure reports the subjects' preference between $\{g, s\}$ and their preferred element when the latter is g (top) and s (bottom).

Figure 2: Menu choices: $\{g, s\}$ vs the preferred allocation

First, subjects are rarely indifferent between $\{g, s\}$ and their preferred allocation. In all the cases reported in Figure 2, the frequency of indifference choices hardly ever exceeds 20%. Second, preferences on menus are strongly affected by the underlying preference on allocations (either the generous one, g , or the selfish one, s). In all comparisons, a large majority of subjects with selfish preferences (about two-thirds) have a preference for the smaller set. In contrast, about 55-60% of the subjects with generous preferences on singletons have a preference for the larger menu. Despite these general trends, there is some heterogeneity between tasks. More than 60% of the generous subjects prefer $\{(12, 8), (16, 4)\}$ to $\{(12, 8)\}$, while half opt for the commitment rather than $\{(10, 8), (12, 0)\}$. The differences between selfish and generous subjects of proportions of preference for larger menus are significantly different in almost all cases, and often strongly so (see Table 6). These findings do not appear to be related to the country of participants nor, perhaps more surprisingly, to the treatments.

These findings are robust to the explicit consideration of indifference choices. Table 7 shows

the percentage of selfish and generous subjects who opt for indifference in the choice tasks. First, the proportion of indifference is remarkably stable between 15% and 20%. Second, there is no significant effect of being selfish or generous. Third, more specific analyzes across countries and treatments do not reveal any pattern worthy of attention (only 3 comparisons of proportions, out of 30 tests, yield significant results without any particular pattern, 2 for treatment *Private* and 1 for treatment *Public*). Finally, it is worth noting that it is not just a completely negligible preference driven by (almost) indifferent subjects: participants are incentivized to choose indifference with a reward of €0.10 or ¥10 and any truly indifferent individual should opt for indifference when choosing between menus.

Overall, these findings strongly support the view that impure motivations are at work:

Result 1 (Presence of Impure Motivations in preferences on menus) *(a) On average, selfish and generous subjects exhibit impure social preferences. (b) Selfish subjects have a preference for the singleton $\{s\}$ over $\{g, s\}$. (c) Generous subjects are more likely to show a preference for $\{g, s\}$ over $\{g\}$ despite some heterogeneity across comparisons.*

There appear to be relatively few indifferent selfish subjects as well as few explicit intrinsic altruists, that is, altruists that chose indifference between menus (types 1 and 3 in Table 3). By choosing the singleton containing only the selfish option, selfish individuals revealed their anticipation of shame or guilt arising from behaving selfishly (types 4 or 5). In contrast, generous individuals more often select the larger set, suggesting that they expect positive rewards (self-esteem or pride) from choosing the generous option when the selfish one is available for choice (type 2). The variations across pairs of options suggest that generous people have feelings other than self-esteem or pride. For example, consider a decision maker who prefers (10, 8) to (12, 0), but for whom the preference is uncertain. She may consider choosing (12, 0), but in this case, as she anticipates feelings of guilt and shame, opting for $\{(10, 8)\}$ might be optimal.¹⁵ Note also that the observability of menus by the recipient (treatment *Public*) does not seem to have a strong effect though: the hypothesis that being observed increases these impure motivation effects finds little support in these figures.

¹⁵In addition, temptation is unlikely to explain such a variation. To see this, let us consider the comparison based on (12, 8) and (18, 2) and that based on (10, 8) and (12, 0). We would expect the degree of temptation to be higher in the former case than in the latter, implying that the preference for commitment would be greater in the former than in the latter. This contradicts our results shown in Figure 2.

Situations $s ; g$		% of subjects preferring $\{g, s\}$ to the preferred allocation and Z-tests															
		Av.	All			Japan			France			<i>Public</i>			<i>Private</i>		
			s	g	p	s	g	p	s	g	p	s	g	p	s	g	p
1	(14, 6) ; (12, 8)	37.8 (434)	32.7 (342)	60.4 (92)	<.001	25.3 (185)	54.0 (29)	.006	42.1 (157)	63.8 (63)	.016	31.6 (61)	60.3 (45)	.003	33.6 (181)	60.5 (47)	.003
2	(16, 4) ; (12, 8)	34.9 (418)	26.4 (333)	68.2 (85)	<.001	19.2 (182)	73.3 (30)	<.001	35.1 (151)	65.5 (55)	<.001	22.4 (163)	70.0 (40)	<.001	30.3 (170)	66.7 (45)	<.001
3	(18, 2) ; (12, 8)	33.9 (392)	27.3 (320)	58.7 (72)	<.001	22.7 (180)	63.8 (25)	<.001	32.8 (140)	56.3 (47)	.002	21.4 S (152)	52.2 (34)	<.001	32.6 (168)	64.9 (38)	<.001
4	(12, 4) ; (10, 8)	35.9 (389)	28.4 (266)	52.0 (123)	<.001	23.8 (162)	59.5 (42)	<.001	35.6 (104)	48.1 (81)	.116	23.3 (129)	54.2 (59)	<.001	33.2 (137)	50.0 (64)	.034
5	(12, 2) ; (10, 8)	37.6 (403)	25.9 (232)	53.5 (171)	<.001	20.5 (144)	56.5 (62)	<.001	34.7 (88)	51.8 (109)	.023	22.7 (110)	55.3 (85)	<.001	28.7 (122)	51.7 (86)	.001
6	(12, 0) ; (10, 8)	35.7 (421)	28.4 (185)	41.5 (236)	.007	25.5 (119)	45.7 (92)	.001	37.1 (66)	38.9 (144)	.927	22.7 (88)	42.8 (118)	.004	33.5 (97)	40.3 (118)	.380

This table reports the percentages of selfish subjects (col. s) and of generous ones (col. s) preferring $\{g, s\}$ to their preferred allocation for the whole sample, by treatment and country. The remaining percentages correspond to indifference. Col. p reports the p -value for two-proportion Z-tests between selfish and generous subjects when indifference is counted as 0.5.

Table 6: Preference for larger menu by country and treatment

Situations $s ; g$		% of subjects being indifferent between $\{g, s\}$ and the preferred allocation															
		Av.	All			Japan			France			<i>Public</i>			<i>Private</i>		
			s	g	p	s	g	p	s	g	p	s	g	p	s	g	p
1	$\{(14, 6)\} ; \{(12, 8)\}$	17.9 (434)	17.8 (342)	18.1 (92)	1.000	16.1 (185)	12.0 (29)	0.813	20.0 (157)	21.3 (63)	1.000	10.5 (61)	20.6 (45)	0.186	24.4 (181)	15.8 (47)	0.353
2	$\{(16, 4)\} ; \{(12, 8)\}$	16.3 (418)	17.4 (333)	11.8 (85)	.273	16.5 (182)	6.7 (30)	0.264	18.5 (151)	14.5 (55)	0.645	12.9 (163)	20.0 (40)	0.368	21.8 (170)	4.4 (45)	0.0138
3	$\{(18, 2)\} ; \{(12, 8)\}$	18.2 (392)	18.4 (320)	17.4 (72)	.940	19.5 (180)	17.2 (25)	0.977	17.2 (140)	17.5 (47)	1.000	15.5 (152)	20.0 (34)	0.626	21.0 (168)	14.9 (38)	0.465
4	$\{(12, 4)\} ; \{(10, 8)\}$	19.8 (389)	19.2 (266)	21.1 (123)	.752	19.1 (162)	14.3 (42)	0.616	19.2 (104)	24.7 (81)	0.475	12.4 (129)	23.7 (59)	0.080	25.5 (137)	18.8 (64)	0.378
5	$\{(12, 2)\} ; \{(10, 8)\}$	19.6 (403)	20.7 (232)	18.1 (171)	.608	20.1 (144)	16.1 (62)	0.631	21.6 (88)	19.3 (109)	0.822	14.5 (110)	18.8 (85)	0.545	26.2 (122)	17.4 (86)	0.185
6	$\{(12, 0)\} ; \{(10, 8)\}$	19.7 (421)	22.2 (185)	17.8 (236)	.320	21.8 (119)	13.0 (92)	0.142	22.7 (66)	20.8 (144)	0.897	11.4 (88)	19.5 (118)	0.167	32.0 (97)	16.1 (118)	0.010

This table reports the percentages of selfish subjects (col. s) and of generous ones (col. g) being indifferent between $\{g, s\}$ and their preferred allocation for the whole sample, by treatment and country. Col. p reports the p -value for two-proportion Z-tests between selfish and generous subjects.

Table 7: Proportion of indifference in menu choices.

Situations	$\{(12, 8)\}$	$\{(12, 8)\}$	$\{(12, 8)\}$	$\{(10, 8)\}$	$\{(10, 8)\}$	$\{(10, 8)\}$
g and s	& $\{(14, 6)\}$	& $\{(16, 4)\}$	& $\{(18, 2)\}$	& $\{(12, 4)\}$	& $\{(12, 2)\}$	& $\{(12, 0)\}$
Cohen's h	.56	.86	.65	.51	.57	.28

This table reports the non-directional Cohen's h for the two proportions of preference for larger menus, given a preference for $\{s\}$ or $\{g\}$. Indifference choices are counted as 0.5.

Table 8: Non-directional Cohen's h

Significance does not necessarily imply important effects, so we also report the size of the effect for the difference in proportions of menu choices between generous and selfish subjects. Table 8 provides Cohen's h (Cohen, 2013), which are the typical measures of effect size for proportions. The effect sizes vary from small (0.28) to large (0.86). It seems fair to conclude that on average the effect is of medium-size according to this metric, and is hence substantial.

All of our analyses are in agreement with the hypothesis that impure motivations have a substantial effect on preferences on menus. It seems that impure motivations, especially for selfish individuals, are vastly present, highlighting that types 4, 5 and 6, namely the guilty and shameful selfish (overwhelmingly or not) and the self-esteemed and proud selfish, are important categories. A key unresolved issue though is to know, within this category of selfish with impure motivations, which of these three types are the most relevant to describe subjects. That requires studying whether impure motivations can overwhelm intrinsic preferences. In other words, it is necessary to analyze menu choices, that is, what dictators choose when facing $\{g, s\}$.

3.3 Choices within Menus

Choices within menu are useful to identify situations when strongly impure motivations are at play. As highlighted in section 2.4, strong impure motivations, namely a substantial m component in Assumption 4, would lead to an apparently inconsistent behavior: subjects may choose the generous option within a menu, while opting for the selfish singleton rather than the set of both options.

For practical and design purposes, we only have one choice within a menu for each subject. That amounts to a total 463 choices within menu, among which 216 are not singletons only and provide a relevant measure of choices within menu. Once indifferent individuals are removed, it comes down to 187 decisions: 86 for *Public* and 101 for *Private*; 87 for Japan and 100 for France. Table 9 reports the proportion of consistent decisions, ie, $\{s\} \succ \{g\}$ and choosing s within $\{g, s\}$, or $\{g\} \succ \{s\}$ and choosing g within $\{g, s\}$, for the whole sample and sub-samples by country and by treatment.

Restricting attention to those who have chosen $\{s\}$ against $\{g\}$, we find that 86.6% of subjects chose s from $\{g, s\}$, with 78.6% in France and 93.6% in Japan. Regarding subjects who prefer $\{g\}$ to $\{s\}$, only 66.1% of them choose g when they have the choice.¹⁶ This difference, along

¹⁶This is on the low side of consistency, but this may be explained in at least two well-known phenomena. Firstly, there could be temptation issues, as already referred to in the theoretical model (see footnote 7). The experimental results obtained by Toussaert (2018) give some support to this explanation, although with quite different types of options. In our case, the temptation explanation means that the immediate reward is not of the overwhelming impure motivation type but of the monetary one. In other words, impure motivations compatible with our model seem secondary in within-allocation choices, contrary to the warm-glow hypothesis, which states that it is stronger than immediate monetary reward. Secondly, there is evidence that repeating generosity tasks

with the level of inconsistency in typical multiple task experiments, suggests that overwhelming impure motivations are not at play in our experiment.

These findings are not altered when focusing on subsamples, although there may be a difference between treatments. A two-proportion Z-test indicates a statistically significant difference in the number of inconsistent choices between *Private* and *Public* ($p = 0.002$). As the role of social image with impure motivations predicts, individuals who prefer the selfish singleton are more likely to choose the generous option in the *Public* condition (26%) than in the *Private* one (4.4%). Yet, the critical question here is to know whether we observe more inconsistencies for subjects that initially preferred the selfish singleton to the generous one. The answer is clearly no. This indicates that overwhelmingly impure types of motivation, i.e. types 5 and 6 in Table 3, are unlikely to be widespread.

However, to precisely measure the contribution of impure motivations in usually observed generous behaviors, i.e. in choices within menu, we need to compare overwhelming motivations (types 5 and 6) with intrinsic generosity (types 1 and 2). To do that, we calculate the number of generous options chosen within a set in general and separate them into two categories, those where $\{s\}$ is preferred to $\{g\}$, with apparent inconsistency due to strong impure motivations, and those where $\{g\}$ is preferred to $\{s\}$, which can be seen as “intrinsic” altruists. Given the relative scarcity of the data on choice within sets in our design, this is only a coarse estimate. Across treatments, we have 61 generous choices (out of 187) of which at best 26.2% (16) are overwhelmingly impure-motivated subjects and 73.8% (45) are intrinsic altruists.¹⁷ Another way to see these numbers is as the probability of preferring $\{s\}$ to $\{g\}$ conditional on choosing g within $\{g, s\}$. In order to establish how significant these numbers are, we calculate the probability of obtaining such an unbalanced frequency in our sample just by chance, under the assumption that impurely motivated generous choices are as frequent as intrinsic altruistic ones: it is less than .001, namely, 0.00013. It is important to note that, despite the fact that it is a coarse estimate of the frequency of overwhelming impure motivations, other phenomena (noise, inattention, lack of clear preferences, moral licensing, etc.) tend to imply that it is an upper bound. As a conclusion, it seems fair to state that less than 10% of our subjects may exhibit overwhelming impure motivation¹⁸ and that such types are very unlikely to explain the majority of generous choices within sets.

An secondary yet interesting question is to know the frequency of positive and negative impure motivations at play among the subjects with overwhelming impure motivations. To estimate this frequency, we calculate, for the 8.5% of overwhelmed decisions, the proportions of cases where $\{s\} \succ \{s, g\}$ and $\{s, g\} \succ \{s\}$. The first case corresponds to overwhelming negative impure motivations (guilt/shame), the second one to overwhelming positive impure motivations (self-esteem, pride, and warm-glow, in general). Unfortunately, we only have 16 decisions of this kind, which makes any serious inference fragile. However, we obtain 31.3% negative impure

leads to a form of moral licensing, which generates a tendency to less generous choices as time passes (Sachdeva et al., 2009). This could be at play here, as the decision within-menu always takes place at the end of the experiment. Yet, in both cases, the idea of a widespread phenomenon of impure motivation leading to a change in favor of the generous option in menu receives little support.

¹⁷That is a fraction of $1 - 0.87$ of inconsistent decisions for subjects who prefer $\{g\}$ to $\{s\}$ in Table 9 multiplied by 119 individuals, and 68 individuals who prefer $\{g\}$ to $\{s\}$ with a consistency rate of 0.66.

¹⁸32.2% of all choices within menu (61 out of 187) are generous and 26.2% of these choices are made by subjects preferring $\{s\}$ to $\{g\}$. Then: $0.326 \times 0.262 = 0.085$.

motivations versus 56.3% positive impure motivations, the rest being indifference between $\{s\}$ and $\{s, g\}$. The consequence is that warm glow giving only represents 14.8% of the generous choices in our experiment.

Sample	Pref. over singleton	Nb of cases	Proportion of consistent decisions
All		187	79.1%
All	$\{s\} \succ \{g\}$	119	86.6%
All	$\{g\} \succ \{s\}$	68	66.1%
France		100	73.5%
France	$\{s\} \succ \{g\}$	56	78.6%
France	$\{g\} \succ \{s\}$	44	68.2%
Japan		87	85.0%
Japan	$\{s\} \succ \{g\}$	63	93.6%
Japan	$\{g\} \succ \{s\}$	24	62.5%
Public		86	72.1%
Public	$\{s\} \succ \{g\}$	50	74.0%
Public	$\{g\} \succ \{s\}$	36	69.4%
Private		101	85.1%
Private	$\{s\} \succ \{g\}$	69	95.6%
Private	$\{g\} \succ \{s\}$	32	62.5%
Stage 1 $\{g, s\}$ vs. $\{g\}/\{s\}$ or $\{g, s\}$ vs. $\{g', s'\}$		61	75.4%
Stage 1 $\{g, s\}$ vs. $\{g\}$ or $\{g, s\}$ vs. $\{g', s'\}$	$\{s\} \succ \{g\}$	32	81.2%
Stage 1 $\{g, s\}$ vs. $\{s\}$ or $\{g, s\}$ vs. $\{g', s'\}$	$\{g\} \succ \{s\}$	29	69.0%

Table 9: Proportion of inconsistent decisions in between-singleton and within-menu choices.

Yet, these estimations possibly suffer from some bias: having the choice between a generous and a selfish option in the second stage is partly endogenous. Indeed, selfish subjects may be overrepresented in the singleton final choice. Hence, an independent test is to focus on second-stage situations where having such a choice would not be related to preferences. These situations are those in which a selfish (respectively, generous) dictator has the choice between $\{g, s\}$ and $\{g\}$ (respectively, $\{s\}$) and those in which she has the choice between two pairs. When restricting our attention to these particular cases, we obtain proportions similar to those in the general case (Table 9, lines 16-19). And, as a robustness exercise, if we calculate the proportion of subjects who are generous due to strong impure motivations in these restricted situations, we obtain 32% of generous choices being motivated by impure motivations at best, and slightly less than 10% of subjects, in this restricted sample, satisfying the conditions to enter the types of strong impure motivations. These numbers are very close to those obtained on the whole sample, and the possible bias evoked here does not seem to play a role in our conclusions.

These robust findings can hence be summarized as follows:

Result 2 (Infrequent impure motivations generosity) *The relatively high consistency between singleton choices and within-menu choices suggests that impure motivations are not strong enough to explain most generous decisions.*

As a consequence, it seems fair to conclude that overwhelming impure motivations are not very widespread. In particular, the idea of warm glow giving, which has received quite some attention in the literature, finds very little support from our data. In other words, types 5 and 6 in Table 3 seem to represent together around 10% of the sample, while altruists (types 1 and 2) around 30%, the rest being selfish types (3 and 4), with a majority of them with impure motivation (type 4).

3.4 Effect of Treatments

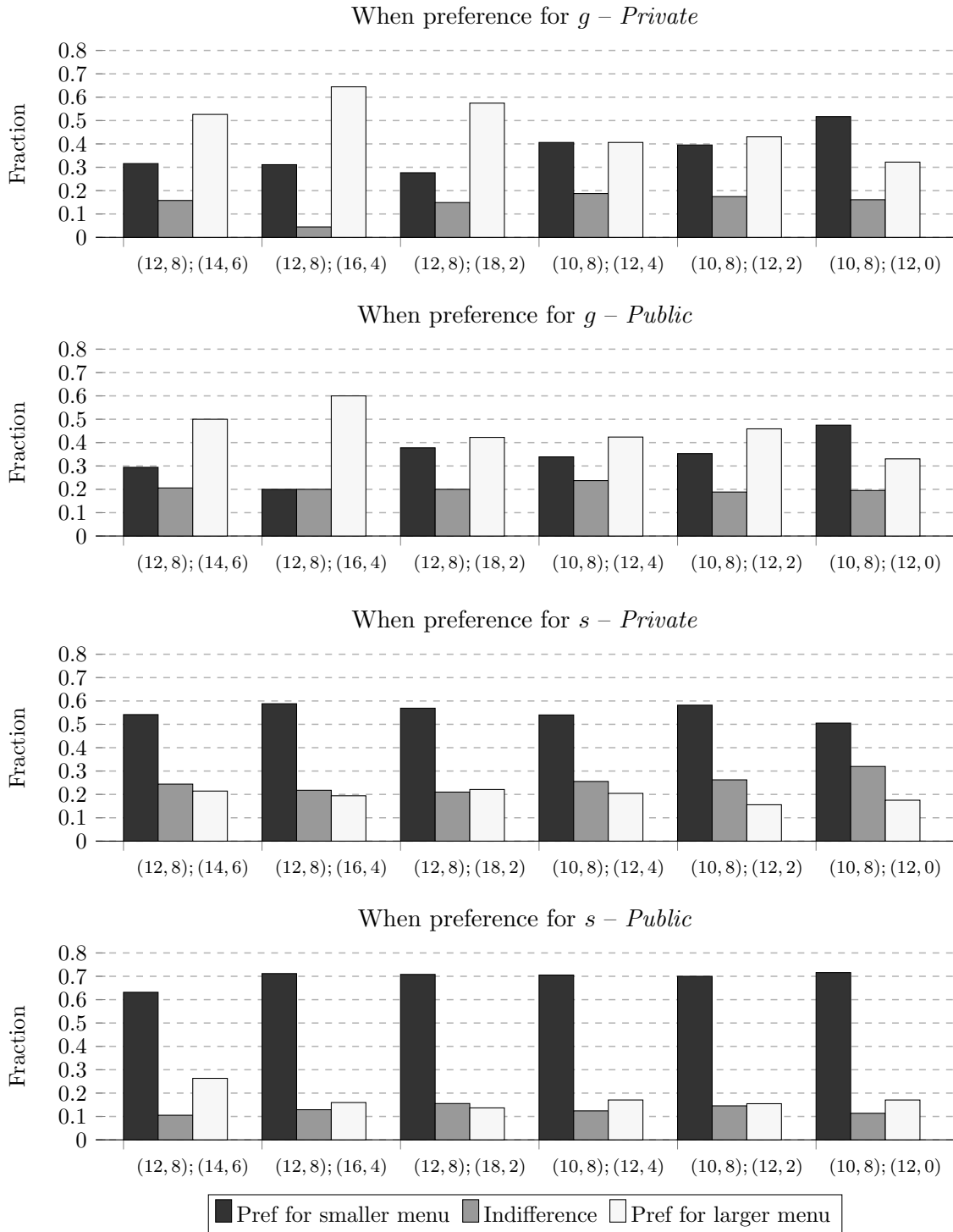
An important question about impure motivations is whether they depend on being observed or not. In Proposition 6, we state that the likelihood of exhibiting impure preferences is expected to be higher when observed. Thanks to our treatment variation, the comparison between *Private* and *Public* provides an estimate of the relative impact of social image concerns (shame and pride) and the self-image concerns (guilt and self-esteem). As argued in the theory section, any differences between treatments should reflect how subjects care about their social image, since self-image concerns are present in both treatments.

Figure 3 shows the distribution of menu choices, according to whether the preferred singleton is $\{g\}$ or $\{s\}$, and according to treatments. There seem to be at best little differences in the case of generous preferences, while we may have some systematic increase in the frequency of choosing the small menu in the *Public* treatment for selfish subjects. This is supported by a series of two-proportion Z-tests (again treating indifference as 0.5). The p -values are often significant: 0.010 for $\{g, s\} = \{(12, 8); (14, 6)\}$, 0.025 for $\{(12, 8); (16, 4)\}$, 0.129 for $\{(12, 8); (18, 2)\}$, $p < 0.001$ for $\{(10, 8); (12, 4)\}$, 0.083 for $\{(10, 8); (12, 2)\}$, and 0.005 for $\{(10, 8); (12, 0)\}$. Overall, the average proportion of decisions in favor of the smaller menu, including indifference as 0.5, varies roughly from 68% to 76% between the two treatments for subjects with a preference for the selfish singleton. The difference between the two treatments can only be attributed to shame in this case, as guilt applies to both treatments, and other impure motivations do not apply for selfish preference. Hence, this significant difference, of a moderate size though, can only be the result of the anticipation of shame.

Our results may be summarized as follows:

Result 3 (Effect of Observability) *Selfish (and only selfish) participants are affected by the treatment. They are more likely to restrict their menu when observed.*

Symmetrically and quite interestingly, we do not observe any effect of pride. In other words, altruistic decision makers do not choose more often the larger choice set in treatment *Public* than in treatment *Private*. Again, this gives support to the idea that negative impure motivations have a stronger effect than positive ones, as at best positive ones are weak, independently of treatments.



This figure reports the subjects' preference between $\{s, g\}$ and their preferred element when the latter is g and s , for treatments *Private* and *Public*.

Figure 3: Menu preference depending on altruistic/selfish decisions and treatment

3.5 Are Negative Motivations Stronger than Positive Ones?

Our findings systematically suggest that negative impure motivations are stronger than positive ones, which happen to be weak in our analyses. First, the preference for smaller menus

among selfish individuals appears more pronounced than the preference for larger menus among generous individuals: the figures in Table 6 imply that 28.74% of choices when the preferred option is selfish are for the smaller set while only 52.53% of choices when the preferred option is generous are for the larger set. The preference for smaller menus is quite marked for selfish individuals, while it is hardly different from random choice for generous ones. Second, we observe that the warm glow account of giving (overwhelming positive impure motivations) is very infrequent, casting doubt on positive impure motivations as a strong motivation. And third, we only observe an effect of treatment (*Public/Private*) for negative impure motivations as if positive impure motivations were not at work. This subsection presents some additional results on the asymmetry between positive and negative impure motivations. It also provides a discussion of the robustness of this difference, as well as some investigation on how other psychological and cognitive phenomena may affect our evaluation of positive and negative impure motivations.

3.5.1 Some Evidence of an Asymmetry Between Negative and Positive Impure Motivations

To assess the strength of positive and negative impure motivations more in depth, a first step is to compare the proportion of menu preferences influenced by impure motivations when individuals are selfish and when they are generous with the benchmark of random choice. Indeed, in the absence of impure motivations, people should be indifferent between options (see Proposition 1). This may have two alternative behavioral implications: subjects choose indifference explicitly, as one could expect if our mechanism of incentivization of indifference choice works; or, in the opposite case, subjects randomly choose between the small and the large menus. One possibility is that there are random perturbations that lead a given subject to temporarily prefer one of the two menus to the other. In the second case, we should observe balanced frequencies between the two menus.

With this in mind, we reanalyze the proportions provided in Table 6, adding a series a one-proportion Z-test against 50%. The results are quite striking (Table 10): While all proportions for smaller menus are strongly significantly different from 50% for selfish individuals, only two of them (out of 6) are significant for the proportions of larger menu choices for generous individuals. Among those two, one corresponds to a proportion lower than 50%, in the opposite direction of the theoretical prediction for positive impure motivations. In sum, the evidence for the frequency of choice for larger menu being greater than 50% is very weak. The conclusion is straightforward: Under the assumption that no other phenomenon is at play on menu preferences, the behavior of selfish individuals is affected by negative impure motivations, such as guilt and shame, whereas no robust effect of positive impure motivation can be observed on generous individuals. Overall, assuming the absence of some underlying choice attitude, negative impure motivations play a much larger role than positive ones, as the latter do not appear convincingly in the data.

3.5.2 The Case Where $\{s\} \sim \{g\}$

Another way to test whether there is an asymmetry between positive and negative impure motivations is to focus on cases where the dictator is indifferent between $\{g\}$ and $\{s\}$. In

	Situations	Prop. of pref. for larger menu			
		s	p	g	p
1	$\{(14, 6)\} ; \{(12, 8)\}$	32.7 (342)	<.001	60.4 (92)	.125
2	$\{(16, 4)\} ; \{(12, 8)\}$	26.4 (333)	<.001	68.2 (85)	.001
3	$\{(18, 2)\} ; \{(12, 8)\}$	27.3 (320)	<.001	58.7 (72)	.118
4	$\{(12, 4)\} ; \{(10, 8)\}$	28.4 (266)	<.001	53.0 (123)	.718
5	$\{(12, 2)\} ; \{(10, 8)\}$	25.9 (232)	<.001	53.5 (171)	.444
6	$\{(12, 0)\} ; \{(10, 8)\}$	28.4 (185)	<.001	41.5 (236)	.011

This table reports the proportions of larger menu choices over singletons (%) for selfish (col. s) and generous (col. g) dictators. Indifference choices are counted as 0.5. The columns p report the p values for a Z test with one proportion against 50%.

Table 10: Preference for larger menu in comparison with a benchmark of equal odds.

this case, and perhaps contrary to intuition, negative impure motivations do not play a role.¹⁹ If negative impure motivations are present, then there are two cases: either positive impure motivations are present or not. If not, then when choosing between g and s , g should be chosen (as s , which is otherwise equivalent to g , will produce negative motivations). If positive impure motivations are present, the same happens as not only s generates negative motivations, but g also produces positive ones. In all cases, g should be chosen in $\{g, s\}$, hence the negative impure motivations of choosing s from $\{g, s\}$ never come into play. When $\{g\} \sim \{s\}$, there are only two possible cases in terms of menu preferences: either $\{g, s\} \succ \{g\}$, if positive impure motivations are at play (that is, $m_1 > 0$) or $\{g, s\} \sim \{g\}$ if not (see Appendix A.2 for formal proofs). This allows us to test whether positive impure motivations play an important role in menu preferences: If they do, we should observe a preference for $\{g, s\}$ rather than any of the singletons, and if they do not, we should see no preference for the larger menu. Moreover, when comparing to dictators that have a preference for either $\{s\}$ or $\{g\}$, it should imply a difference in the case of a preference for the selfish option, but not in the case of the generous one. Indeed, in the case of a preference for the selfish option, negative impure motivations will tend to make dictators prefer $\{s\}$ to $\{g, s\}$, while in the case of a preference for the generous option, the positive impure motivations will play exactly the same role as if the dictator was indifferent between $\{g\}$ and $\{s\}$.

The frequencies of choices when dictators are indifferent between $\{g\}$ and $\{s\}$ are shown in Table 11. The pattern of difference between selfish and generous dictators on the one hand and indifferent ones on the other hand is remarkably congruent with the predictions of the model:

¹⁹See Appendix A.2 for a proper formal treatment.

	Situations $s ; g$	Proportions of preference for larger menu							
		Indiff.	p (vs .50)	s	p (vs s)	Indiff.	p (vs .50)	g	p (vs. s)
1	$\{(14, 6)\} ; \{(12, 8)\}$	52.1 (72)	.72	32.7 (320)	.003	67.4 (72)	.003	60.4 (72)	.488
2	$\{(16, 4)\} ; \{(12, 8)\}$	46.7 (46)	.66	26.4 (333)	.007	70.6 (46)	.005	68.2 (85)	.930
3	$\{(18, 2)\} ; \{(12, 8)\}$	76.7 (30)	.003	27.3 (342)	<.001	50.0 (30)	1	58.7 (92)	.534
4	$\{(12, 4)\} ; \{(10, 8)\}$	48.7 (75)	.82	28.4 (266)	.001	66.0 (75)	.005	53.0 (123)	.075
5	$\{(12, 2)\} ; \{(10, 8)\}$	48.4 (61)	.80	25.9 (232)	.001	61.5 (61)	.073	53.5 (171)	.355
6	$\{(12, 0)\} ; \{(10, 8)\}$	52.3 (43)	.76	28.4 (185)	.004	59.3 (43)	.22	41.5 (236)	.046

This table reports the proportions in % of larger menu choices for selfish and generous decisions, in comparison with indifferent dictators. *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$, based on one-proportion tests against .50 and two-proportion tests.

Table 11: Preference for larger menu of indifferent dictators

selfish dictators are clearly more oriented towards $\{s\}$ than indifferent dictators when comparing $\{g, s\}$ to $\{s\}$, but generous dictators seem to have similar preferences between $\{g, s\}$ and $\{g\}$ than indifferent dictators. We only observe two significant differences, one only weakly so, for six comparisons. It corresponds roughly to the predictions of the model under negative impure motivations. It is also worth noting that these aggregated figures hide relatively high levels of indifference, when comparing $\{g, s\}$ to both $\{g\}$ and $\{s\}$, which range from 33% to 62%, with indifference between both sets being the modal choice. Again, this is predicted in the case of no positive impure motivation. Yet, although not a large effect, we still observe some additional tendency to choose the larger menu in the case that the dictator is indifferent than in the case she is generous. Indeed, on average, 63.8% of the decisions are in favor of a larger menu when dictators are indifferent to be compared with 52.6% when they are generous. When comparing the individual proportions of choosing the larger set rather than either the generous option or the selfish option alone with a paired Student t -test (or likewise a Wilcoxon signed-rank test), the results are very significant ($p = 0.001$ for both tests). This moderate yet significant difference cannot be accounted for by the model. We also observe that the frequency of choosing the larger menu is significantly different from .50 only when dictators are indifferent and when comparing $\{g, s\}$ to $\{g\}$ (4 comparisons out of 4 yield strongly significant results). This could be seen as evidence for some positive impure motivations, but then we should observe the same phenomenon when comparing $\{g, s\}$ to $\{s\}$, which is not the case. A possible explanation for both effects is the asymmetry of noise with respect to social preferences. Clearly, in Section 3.3, it appeared that noise is stronger in favor of the selfish option than in favor of the generous one, probably related to some form of temptation. If this is at play, at the moment of choosing between $\{g, s\}$ and $\{g\}$, dictators, even though indifferent, may be tempted by s , leading them to choose $\{g, s\}$ more often than expected by our model based on impure motivations. In general, the patterns shown in the cases where $\{s\}$ and $\{g\}$ are indifferent are consistent with the model when assuming strong negative impure motivations associated with moderate to low positive

impure motivations.

3.5.3 The Potential Role of Intrinsic Choice Attitude

The two approaches above assume that there is no underlying choice attitude. Indeed, it could be that individuals intrinsically, that is, independently of impure social preferences, prefer smaller menus (choice aversion) or larger menus (choice-seeking preferences). There are a number of works that suggest such preferences may exist: preference for flexibility (Kreps, 1979), preference for autonomy (Bartling et al., 2014; Ferreira et al., 2023), choice aversion (Le Lec and Tarrow, 2020), or preferences for smaller menus due to temptation/self-control issues (Toussaert, 2018; Gul and Pesendorfer, 2001). For fairly straightforward reasons, any underlying choice attitude that would favor a preference for larger menu would not undermine our conclusions. Indeed, if anything, it would suggest that the negative impure motivations are even larger than those we estimated based on the assumption of indifference (and a pattern of random choice between options), and symmetrically the positive impure motivations are lower than estimated. In fact, there is not much room for a strong preference for choice, as the frequency of choices for larger menus when preferring $\{g\}$ sets a relatively low bound (around 60%) as shown Tables 10 and 11. However, it could be that individuals have an aversion to choice due to the presence of various decision costs, expected regret, or fear of making a mistake (Le Lec and Tarrow, 2020). This would cast doubt on our conclusions. Indeed, consider the following utility function: $U(X) = \max_{x \in X} [v(x_1) + w(x_2) + m(r_1 - x_1, r_2 - x_2)] + c(X)$ where c would decrease with the size of the set to include aversion to choice. Under this assumption, combined with the absence of negative impure motivation ($m_2 = 0$), we would have selfish dictators choosing more often $\{s\}$ than $\{g, s\}$ because of c , but generous dictators being more or less indifferent between $\{g\}$ and $\{g, s\}$ because the positive impure motivations would counterbalance c . In other words, some negative underlying choice attitude combined with a strong positive impure motivation could explain our main finding.

Yet a number of more specific findings cast doubt on the possibility for choice aversion and strong positive impure motivations to explain the whole set of phenomena observed in our data. First, we only observe a treatment effect for selfish dictators: being observed increase the frequency with which $\{s\}$ is preferred to $\{g, s\}$, but not that of $\{g, s\}$ being preferred to $\{g\}$ for generous dictators. So, in order to be congruent with our findings, the choice aversion account would require a mix of strong positive impure motivations and low negative impure motivations when not observed (strong self-esteem and low guilt) but strong negative impure motivations and low positive impure motivations when observed (strong shame but low pride). Although possible in principle, the likely continuum of impure motivations between conditions render this explanation quite implausible (or at least not very parsimonious). A second issue for this explanation is that if choice aversion were to be strong, it should be observed in some of the choices made by the dictators. Indeed, a strongly choice averse dictator mildly preferring $\{s\}$ to $\{g\}$ could prefer $\{g\}$ to $\{g, s\}$, or likewise, a dictator moderately preferring $\{g\}$ to $\{s\}$ could prefer $\{s\}$ to $\{g, s\}$. This can be checked in the data. We observe on average a preference for the larger set of 66.2% for the generous cases but 88.3% for the selfish cases. Although the relatively low preference for larger set for generous dictators could be evidence of choice aversion,

the alternative explanation of our findings based on choice aversion would require the same for selfish dictator. Typically, almost 90% of consistency observed for selfish subject corresponds to the typical level of noise in lab experiments. That hints to, at best, a low level of choice aversion that does not seem compatible with a baseline of more than 70% preferring $\{s\}$ to $\{s, g\}$ that is typically observed for selfish dictators (see Table 6). The relatively low preference for larger sets observed for generous dictators is plausibly related to the already mentioned asymmetry of noise in option preference, most likely induced by temptation. The third element that may challenge the presence of intrinsic choice aversion in our experiment is the fact that the existing experimental literature on choice aversion seems to indicate that the value of non-preferred alternatives play a particularly important role: choice aversion appears more strongly with menus with non-preferred options of low values (Le Lec and Tarrow, 2020). The effect of the value of non-preferred option is pronounced enough to even induce a *preference for choice* when the added options are of similar values of the best element, i.e. indifferent or almost indifferent to the best element (Freundt et al., 2023). This would imply, when the dictators are indifferent between the selfish and the generous options, that no choice aversion should be at work (or even a preference for choice should be present). This is not compatible with our results as it would imply that positive impure motivations disappear when the two options are indifferent (Table 11). Overall explaining our results by a combination of intrinsic choice aversion, low negative impure motivations and strong positive impure motivation fails to account for several patterns in our data, and appears to be both unlikely and far-fetched explanation.

3.5.4 Temptation, Self-Control and Commitment

Another phenomenon that may generate a preference for smaller menus independently of impure motivations is the presence of temptation and costs of self-control (Toussaert, 2018; Gul and Pesendorfer, 2001). A number of observations seem to point to an effect of temptation and self-control considerations as (partial) reasons for generous individuals to choose a smaller choice set. First, temptation indeed seems to be at work given the asymmetry in noise over option preferences, a preference for a generous option being apparently less robust than the one for the selfish option (see Subsection 3.3 and Subsection 3.5.3). For instance, only 66% of the dictators who prefer $\{g\}$ to $\{s\}$ are consistent when choosing within $\{g, s\}$, compared to 86.6% for people who prefer $\{s\}$ to $\{g\}$ (Table 9). If decision makers anticipate this, they may lead them to commit to the generous option and hence prefer $\{g\}$ to $\{g, s\}$. Such a commitment is unlikely to be present for selfish decision makers: it seems counterintuitive to hypothesize that the generous option may be tempting. Typically, the presence of temptation and a preference for commitment is expected to be asymmetrical as it would only affect decision makers with a preference for $\{g\}$ against $\{s\}$. In other words, commitment mechanisms, if at play, would not challenge our conclusion that negative impure motivations are strong. It could though lead to an alternative interpretation for the relatively weak impure motivations that we observe. Perhaps, strong impure motivations are present but counterbalanced by a preference for commitment. It could well be that the relatively balanced frequency of choices between $\{g\}$ and $\{g, s\}$ with 52.5% of preference for the larger menu (Table 6) hides some heterogeneity among generous dictators. The distribution, across all choice situations in Table 6, gives 38.6% who prefer the

smaller menu, possibly seeking commitment to avoid temptation, whereas 43.7% prefer the larger one for reasons related to positive impure motivations. Rather than a lack of effect of positive impure motivations, the interpretation could be that positive impure motivations are present but neutralized or even counteracted by commitment.

In any case, the presence of commitment motivation does not undermine most of our conclusions: impure motivations have a strong effect, possibly even greater than estimated on the positive side, yet these effects are not strong enough to be overwhelming, and the publicity of decisions has an impact. The only finding that could be reinterpreted is that positive impure motivations are weak. Although a plausible way to interpret part of our findings, the temptation/commitment explanation for the lack of observed positive impure motivations suffers from some weakness. First, commitment should not be sensitive to treatment, and the lack of treatment effect for generous subjects would suggest that self-esteem is present but not pride. This is possible but not necessarily the most straightforward explanation, given that we observe the presence of both types of negative impure motivations (guilt and shame). Second, as shown in the Appendix B.1, the choices regarding conditional tasks, although disappointingly not very relevant to identify impure motivations do not provide strong support for the commitment hypothesis. Indeed, for the generous subjects, in the tasks where the additional option s' is unambiguously more tempting, that is, when the dictator's payoff increases but not that of the receiver, we observe a very strong preference for adding the most tempting option (see Table A2): between 78.7% and 90.8% of decision makers prefer to have the most (non-preferred) tempting option present, when controlling for the underlying option preferences (cases g4.a, g4.b and g5.b). Although not definitive, this suggests that temptation avoidance may not have a massive impact on preferences on menus in our context.

3.6 Regression Analysis

To check the robustness of our findings, we conduct a series of econometric estimations. We run an ordered logistic regression on the choice of menu, coding 0 for preference for the smaller menu, 0.5 for indifference, and 1 for the larger menu. We restrict our attention to choice tasks involving nonconditional questions (in order to prevent selection bias) and where the preferred element is present in both menus. To account for the non-independence of observations at the subject level, we cluster standard errors at the individual level (results without clustering present the same significance patterns). In the two main specifications, we use as independent variables the preference over allocation (generous, indifferent, and selfish), experimental variations (treatment, country, period, or order of menu presentation), interaction between item preference and treatments. In the third one, we add dictator and receiver's payoffs in line with the theoretical insights (see Subsection 2.4): the difference between the maximum payoff and the minimum one that the dictator and the receiver can obtain, interacted with the dictator's preference over allocation.

Table 12 reports the regression estimates. The results confirm the generic findings put forth above. First, selfish dictators are significantly less likely to select the larger menu. As for Subsection 3.5.2, we do not observe any difference between generous and indifferent dictators. Second, our findings with respect to treatment effects in Section 3.4 seem to be robust: shame seems to

play a role as the estimated coefficient related to the interaction of the dummy “Pref. option is selfish” and “Treatment *Private*” is significantly different from 0, but as already observed the effect is relatively moderate. We also note no effect of treatment *Private* suggesting that generous dictators. These suggest that our findings are not related to some possible experimental confounds (e.g., order of tasks or period).

In addition, the regression estimates show two additional points. First, as displayed in column (2), Japanese subjects are more likely to choose a smaller choice set, indicating that they may be more concerned with negative impure motivations than French subjects. Second, estimates reported in column (3) allow us to observe the effect of the differences between the decision maker and the recipient’s payments. As theoretically expected, the effects are exactly the opposite between selfish and generous preferences. For generous preferences, the larger the difference between the dictator’s payments, the greater the sacrifice made by the decision maker, and the better the image when the choice set is large. On the other hand, for selfish preferences, the smaller the difference between the decision’s maker payments, the greedier the dictator looks, and the more eager she should be to hide this by choosing the smaller set.

Overall, results 1, 2 and 3 find supports in this robustness exercises, that integrates some additional controls.

4 Conclusion

This paper aims to shed light on the impure motivations behind social preferences using individual preferences on menus of payoff allocations. Building on a parsimonious model based on those developed in the literature (Dillenberger and Sadowski, 2012; Saito, 2015; Evren and Minardi, 2017), we conduct a two-stage experiment, in which (1) a decision maker (dictator) first selects a menu containing one or more payoff allocations between herself and a recipient, and (2) chooses an allocation from the initially selected menu. Eliciting how dictators compare a two-allocation menu and the singleton containing the preferred option, we can identify the existence of negative impure motivations (shame and guilt) as well as positive ones (warm glow, self-esteem, and pride). If an individual prefers a selfish option to a generous one, but also anticipates guilt or shame for being selfish, she will prefer the menu with only the selfish option to the menu with both options. Likewise, a generous individual may prefer to face the menu with both options to signal, either to someone else or to herself, her generosity.

Our results suggest a substantial effect of impure motivations, with preferences on menus strongly impacted by the preferred option of the decision maker. This effect is asymmetric and seems to be mostly driven by negative impure motivations such as guilt and shame, while positive impure motivations seem to have a moderate, if not negligible, effect. An alternative interpretation can also be that positive impure motivations are compensated by a preference for commitment to avoid temptation and the exertion of self-control. Independently of this, our pattern of findings suggests that warm glow and other impure motivations are unlikely to explain prosocial behavior. Indeed, on the one hand, individuals do not anticipate a rush of immediate utility when choosing the generous option, especially in comparison with the one brought about mere monetary reward. On the other hand, very few individuals among those who prefer $\{s\}$ to $\{g\}$ see their preferences overturned by a warm glow effect when choosing within a menu.

	Ordered logit regression		
	(1)	(2)	(3)
<i>Option Preferences</i>			
Pref. option is generous	ref.	ref.	ref.
Indiff. between options	0.0272 (0.1791)	0.0372 (.1860)	-0.5794 (0.3530)
Pref. option is selfish	-1.4625*** (0.2120)	-1.3972*** (0.2166)	-1.6959*** (0.3423)
<i>Experimental characteristics</i>			
Treatment <i>Private</i>	-0.0310 (0.2427)	-0.0427 (0.2471)	-0.0521 (0.2527)
Japan		-0.3415*** (0.1225)	-0.3367*** (0.1238)
Period		0.0021 (0.0053)	0.0007 (0.0052)
Order of menu presentation (dummy)		-0.0916 (0.0691)	-0.0827 (0.0690)
<i>Option Preferences × Treatment</i>			
Indiff. between options × <i>Private</i>	0.3164 (0.2631)	0.3092 (0.2682)	0.3307 (0.2725)
Pref. option is selfish × <i>Private</i>	0.5370* (0.2969)	0.5586* (0.2998)	0.5683* (0.3048)
<i>Payoffs</i>			
Diff. dict.'s payment			0.1471*** (0.0495)
Diff. recip.'s payment			-0.1570*** (0.0393)
Diff. dict.'s payment × Indiff. between options			-0.0703 (0.0657)
Diff. recip.'s payment × Indiff. between options			0.1352*** (0.0475)
Diff. dict.'s payment × Pref. option is selfish			-0.1760*** (0.0572)
Diff. recip.'s payment × Pref. option is selfish			0.1315*** (0.0446)
Likelihood r. χ^2 (df)	367 (5)	391 (8)	425 (14)
p -value	< .001	< .001	< .001
Pseudo- R^2	.126	.134	.145
Nb of obs.	3 111	3111	3111
Nb of clusters	464	464	464

Note: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$, with a binomial test against $p = 0.50$.

Table 12: Ordered logit regression on menu choices.

Finally, we observe that the effect of being observed is moderate and again asymmetrical in the sense of shame being present but not pride. Although this effect clearly appears, it seems

relatively secondary compared to guilt.

In sum, while a common view of prosocial behavior is that generosity is selfishness disguised by impure motivations (such as pride and warm glow), our experimental evidence suggests a somewhat different picture. Generous dictators seem to be less sensitive to impure motivations than selfish ones, and as a result generous preferences seem more intrinsic than often assumed. In line with this finding, selfish dictators seem to be quite affected by guilt and shame, with relatively few selfish individuals seemingly capable of enjoying their decision fully. Our results echo those of Andreoni et al. (2017). Using a field experiment conducted in a mall, they give evidence that a significant proportion of shoppers (between 25% and 33%) “avoid the ask” of a Salvation Army solicitor. As for our experimental results, it suggests that selfish individuals prefer to avoid the guilt or shame of not giving. Although our experiment does not put dictators in direct contact with their recipients, the psychological explanation they suggest is close to our interpretation in terms of impure motivations.²⁰

Our findings may have valuable implications in several domains, but most prominently in the domain of charitable giving. First, our findings tend to give support to the marketing studies that have concluded that appealing to shame and guilt is an effective strategy to encourage charitable giving (Bennett, 1998; Hibbert et al., 2007). Second, the importance of negative impure motivations we observe suggests that even if *behaviorally* and *financially* no effect is directly observed, it may be that charitable requests may have a substantial subjective cost. Given the large size of the charitable giving market,²¹ many individuals may be solicited even though they are unwilling to give, leading, as our experiment suggests, to important psychological costs as suggested by DellaVigna et al. (2012) and Butera et al. (2022).

From a methodological perspective, our paper also demonstrates the power of menu choices to study individuals’ preferences and motives. While there is now a well-established theoretical framework (Kreps, 1979; Gul and Pesendorfer, 2001; Sarver, 2008; Ortoleva, 2013; Dillenberger and Sadowski, 2012; Saito, 2015; Evren and Minardi, 2017; Noor and Ren, 2023), there are various avenues for further research on social preferences, temptation, and self-control (Toussaert, 2018), general attitude toward choice (Le Lec and Tarrow, 2020; Arlegi et al., 2022) or choice autonomy (Ferreira et al., 2023). Our results in this respect go beyond the mere question of measuring impure motivations as they show that double-stage experiment (choosing menus and choosing within a menu) seem to provide a sound way to measure preferences on menus.

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²⁰In the absence of verbal request by a solicitor, an individual can look away while the trade-off between empathy and selfishness is made more salient by our experimental design.

²¹List (2011) reports that it exceeds 2% of the gross domestic product in a typical year in the US.

Lab Review Board for ethical standards in research for data collection in France (reference code 2019-008), and by the Ethics Review Committee on Research with Human Subjects of Waseda University (reference code 2021-266) and that of the Research Institute of Socio-network Strategies at Kansai University (reference codes 2021018 and 2021019) for data collection in Japan (Waseda and Kansai).

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ONLINE APPENDIX

Impure motivations in social preferences: Experimental evidence from menu choices

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A Theoretical Developments

A.1 Proof of Propositions 2, 3, 4 and 5

The generic value for a menu is given by (see Definition 1):

$$U(X) = \max_{x \in X} [v(x_1) + w(x_2) + m(r_1^X - x_1, r_2^X - x_2)]$$

To show that the only possible cases are those listed in Table 3 (and in Propositions 2, 3 and 4), we will show that the other cases are not possible, and then provide some specifications of u for which we obtain the listed cases. We drop the cases where $\{g\} \sim \{s\}$, it is easy to extend our argument to this specific case (see subsection A.2 for a specific treatment of indifference among options).

First, for Proposition 2 (or Table 3, lines 1 and 2), consider the case where $\{g\}$ is strictly preferred to $\{s\}$. Then $\{g\} \succ \{g, s\}$ requires $m(s_1 - x_1, g_2 - x_2)$ to be negative, which contradicts Assumption 4. If $x = g$, $m(s_1 - g_1, 0)$ is always positive, since $m(0, 0) = 0$, $m_1 > 0$ and $s_1 - g_1 > 0$. The decision maker cannot prefer s in $\{g, s\}$ if she prefers $\{g\}$ to $\{s\}$. Indeed, $\{g\} \succ \{s\}$ implies $U(\{g\}) = v(g_1) + w(g_2) > U(\{s\}) = v(s_1) + w(s_2)$ whereas s chosen in $\{g, s\}$ implies $U(\{g, s\}) = u(s|s_1, g_2) = v(s_1) + w(s_2) + m(0, g_2 - x_2) > u(g|s_1, g_2) = v(g_1) + w(g_2) + m(s_1 - g_1, 0)$. Given that $m(0, g_2 - x_2) < 0$ and $m(s_1 - g_1, 0) > 0$, these two are contradictory. Likewise, it is never the case that $\{s\}$ is preferred or indifferent to $\{g, s\}$. It would mean that $U(\{g, s\}) = u(g|s_1, g_2) = v(g_1) + w(g_2) + m(s_1 - g_1, 0) < U(\{s\}) = v(s_1) + w(s_2)$, with $m(s_1 - g_1, 0) > 0$ by assumption, whereas $U(\{g\}) = v(g_1) + w(g_2) > U(\{s\}) = v(s_1) + w(s_2)$. Hence, a contradiction. So, of the 9 cases where $\{g\} \succ \{s\}$, only two are possible and correspond to those listed in Proposition 2.

Second, for Propositions 3 and 4 (lines 3 to 6 of Table 3), consider that $\{s\}$ is preferred to $\{g\}$. All types of ranking between $\{g, s\}$ and $\{s\}$ (\succ , \sim , \prec) are possible depending on the value of m . The same applies to the choice of g within $\{g, s\}$. However, it cannot be that $\{g\}$ is strictly preferred to $\{g, s\}$. For this to be true, the utility of $\{g\}$ should be greater than both the utility of choosing g in $\{g, s\}$ and the utility of choosing s in $\{g, s\}$: $U(\{g\}) = v(g_1) + w(g_2) > u(g|s_1, g_2) = v(g_1) + w(g_2) + m(g_1 - s_1, 0)$ and $U(\{g\}) = v(g_1) + w(g_2) > u(s|s_1, g_2) = v(s_1) + w(s_2) + m(0, g_2 - s_2)$. The utility of choosing g in $\{g, s\}$ is never less than the utility of $\{g\}$, since the presence of s increases m when g is chosen. That implies that the 3 cases where $\{g\} \succ \{g, s\}$ are not possible. There remains two cases that are not in Table 3 as line 5 counts for two given the \succsim relation in the third column, but lines 4 and 5 only change with respect to what is chosen in $\{g, s\}$. These two cases are those where $\{g, s\} \sim \{g\}$. Taking the case where $\{g, s\} \succ \{s\}$, we have, by the usual properties of preference/indifference relations,

	ω	α	β	$U(\{g\})$	$U(\{s\})$	$U(\{g, s\})$	Choice in $\{g, s\}$
Altruism							
1	$\frac{2}{3}$	0	0	5.35	5.19	5.35	g
2	$\frac{1}{3}$	1	0	5.35	5.19	11.35	g
Selfishness							
3	0	0	0	3.46	4.24	4.24	s
4	0	0	0.1	3.46	4.24	3.64	s
5	0	0	0.2	3.46	4.24	3.46	g
6	0	0.5	0	3.46	4.24	6.46	g
	0	0.3	0.2	3.46	4.24	5.26	g

Levels of utility given by $\{g\}$, $\{s\}$ and $\{g, s\}$ for $s = (18, 2)$ and $g = (12, 8)$.

Table A1: Typology of preferences

that $\{g\} \succ \{s\}$, a contradiction. The last case is that where $\{g, s\} \sim \{g\}$ and $\{s\} \sim \{g, s\}$. By transitivity of \sim , this leads to a contradiction.

We have shown that all cases but those listed in Table 3 are not possible. It is left to show that the six cases in Table 3 exist, that is, there are some specifications u and some allocations g and s that satisfy our assumptions (1-4) and generate the patterns of behaviors of Table 3.

In order to do that, consider the following utility function:

$$u(x|r_1, r_2) = \sqrt{x_1} + \omega\sqrt{x_2} + \alpha \max(r_1 - x_1; 0) - \beta \max(0; r_2 - x_2)$$

with $\alpha \geq 0$ and $\beta \geq 0$. Suppose $s = (18, 2)$ and $g = (12, 8)$. We illustrate the different types shown in Table A1:

- If $\alpha = 0$ and $\beta = 0$, then U describes standard social preferences: altruism if ω sufficiently important (Type 1, *intrinsic altruism*); “indifferent” selfishness if ω small or null (Type 3, *indifferent selfishness*).
- If α is strictly positive (with $\beta = 0$ and $\omega = 0$), choosing g within $\{g, s\}$ should be preferred to choosing g within $\{g\}$: $u(g|s_1, g_2) = \sqrt{g_1} + \alpha(s_1 - g_1) > u(g|g_1, g_2) = \sqrt{g_1}$ (Type 2, *impure altruism*). This implies $U(\{g, s\}) > U(\{g\})$.
- If α is large enough, an intrinsic selfish person may prefer g when facing $\{g, s\}$: $u(g|s_1, g_2) = \sqrt{g_1} + \alpha(s_1 - g_1) > u(s|s_1, s_2) = \sqrt{s_1}$ (Type 6, *selfishness with overwhelming positive motivations*). Thus, $U(\{g, s\}) > U(\{s\})$.
- If β is strictly positive (with $\alpha = 0$ and $\omega = 0$), the choice of s is preferred in the singleton rather than within $\{g, s\}$: $u(s|s_1, g_2) = \sqrt{s_1} + \beta(g_2 - g_2) > u(s|s_1, s_2) = \sqrt{s_1}$ (Types 4 and 5, *impure selfishness* and *selfishness with overwhelming negative motivations*). Thus, $U(\{g, s\}) < U(\{s\})$. If β is not too large, she also chooses s within $\{g, s\}$ (Type 4). Beyond a certain limit of β , choosing g is preferred to choosing g within $\{g, s\}$: $u(g|s_1, g_2) = \sqrt{g_1} > u(s|s_1, g_2) = \sqrt{s_1} - \beta(g_2 - s_2)$ (Type 5).

A.2 The Case Where $\{s\} \sim \{g\}$

The case of indifference between singletons is not studied in the standard approach, as on the one hand it is likely to be a rather infrequent case, and on the other hand as it would unnecessarily complicate the typology. Yet, this case is interesting at least for two reasons: first, between 15 to 20% of decisions correspond to indifference between the two singleton, and that provides an additional subsample to study, and second, the model predicts perhaps counterintuitive results.

First, a trivial proposition in the case where impure motivations are null ($m = 0$):

Proposition A1 *If $\{g\} \sim \{s\}$, and $m = 0$, then $\{g, s\} \sim \{g\} \sim \{s\}$.*

Proof: It is straightforward as $\{g\} \sim \{s\}$ implies $v(g_1) + w(g_2) = v(s_1) + w(s_2)$. \square

Proposition A2 (Positive Impure Motivations) *If $\{g\} \sim \{s\}$, $m_1 > 0$, then $\{g, s\} \succ \{g\} \sim \{s\}$.*

Proof: Since $v(g_1) + w(g_2) = v(s_1) + w(s_2)$, and $U(s, \{g, s\}) = v(s_1) + w(s_2) + m(0, g_2 - s_2) < U(g, \{g, s\}) = v(g_1) + w(g_2) + m(s_1 - g_1, 0) = v(s_1) + w(s_2) + m(s_1 - g_1, 0)$, as $m(0, g_2 - s_2) \leq 0$ and $m(s_1 - g_1, 0) > 0$ by assumption. Hence, $U(\{g, s\}) = v(g_1) + w(g_2) + m(s_1 - g_1, 0) > U(\{g\}) = v(g_1) + w(g_2)$. \square When both impure motivations are at play, we have the following result:

Proposition A3 (Negative Impure Motivations Only) *If $\{g\} \sim \{s\}$, $m_1 = 0$ and $m_2 < 0$, then $\{g, s\} \sim \{g\} \sim \{s\}$.*

Proof: $U(s, \{g, s\}) = v(s_1) + w(s_2) + m(0, g_2 - s_2) < U(g, \{g, s\}) = v(g_1) + w(g_2) + m(s_1 - g_1, 0) = v(s_1) + w(s_2) + m(s_1 - g_1, 0)$, as $m(0, g_2 - s_2) < 0$ by assumption. Hence, $U(\{g, s\}) = v(g_1) + w(g_2) = U(\{g\}) = U(\{s\})$. \square

Finally, when only negative motivations are involved, we have the following:

Proposition A4 (Both Types of Impure Motivations) *If $\{g\} \sim \{s\}$, $m_1 > 0$ and $m_2 < 0$, then $\{g, s\} \succ \{g\} \sim \{s\}$.*

Proof: The proof is straightforward from the proofs of the last two propositions. \square

A.3 Conditional Choice Tasks

In addition to direct comparisons between sets and singletons, our experimental design has subjects choosing between menus of two options where the characteristics of the dominated option varies. This allows us to investigate how impure motivations are formed based on unchosen alternatives. We first report on the basic predictions. In all the following considerations, there are two basic options s and g (as in the framework of Subsection 2.4), to which can be added a more selfish option s' with $s'_1 > s_1$ and $s'_2 < s_2$ and a more generous option g' with $g'_1 \leq g_1$ and $g'_2 > g_2$.

First, a trivial consequence of the absence of impure motivations:

Proposition A5 (Variation in the dominated option without impure motivations)

Suppose $m = 0$. If $\{s\} \succ \{g\}$ and $\{s\} \succ \{g'\}$, $\{s, g\} \sim \{s, g'\}$. If $\{g\} \succ \{s\}$ and $\{g'\} \succ \{s\}$, $\{s, g\} \sim \{s', g\}$.

For the selfish dictators, the predictions can be summarized as follows:²²

Proposition A6 (Variation in the Dominated Option for Selfish Dictators)

If $\{s\} \succ \{g\} \succ \{g'\}$, the presence of negative impure motivations ($m_2 < 0$) and not overwhelming positive impure motivations implies $\{s\} \succ \{g, s\} \succ \{g', s\}$.

Proof: The presence of non-overwhelming impure motivations implies that the dictator chooses s within $\{g, s\}$ and within $\{g', s\}$. As $m(0, 0) = 0$ and $m_2 < 0$, $v(s_1) + w(s_2) + m(0, g_2 - s_2) > v(s_1) + w(s_2) + m(0, g'_2 - s_2)$, which implies $\{g, s\} \succ \{g', s\}$. \square

The next predictions for generous subjects:²³

Proposition A7 (Variation in the Dominated Option for Generous Dictators)

If $\{g\} \succ \{s\} \succ \{s'\}$, the presence of positive impure motivations ($m_1 > 0$) implies: $\{g, s'\} \succ \{g, s\} \succ \{g\}$.

Proof: Our assumptions imply: $U(\{g\} = v(g_1) + w(g_2)) > U(\{s\} = v(s_1) + w(s_2))$ and $U(\{g\} = v(g_1) + w(g_2)) > U(\{s'\} = v(s'_1) + w(s'_2))$. Hence, $U(\{g, s\} = v(g_1) + w(g_2) + m(0, g_2 - s_2)) > v(g_1) + w(g_2) = U(\{g\})$. Likewise, $U(\{g, s'\} = v(g_1) + w(g_2) + m(0, g_2 - s'_2)) > v(g_1) + w(g_2) = U(\{g\})$. Moreover, as by assumption 4 $m(0, g_2 - s'_2) > m(0, g_2 - s_2)$, $U(\{g, s'\}) > U(\{g, s\})$. \square

B Additional Analyses

B.1 Conditional Tasks and Variation in the Dominated Allocation

An additional test for the existence of impure motivations consists in studying how the variation in the dominated allocation affects the dictators' menu choices. It may also shed light on the strength of these motivations. Indeed, in addition to direct comparisons between two-allocation menus and singletons, subjects have to choose between menus of two options where the characteristics of the dominated option vary. This allows us to investigate how impure motivations are formed based on unchosen alternatives. We provide here the frequency of choices between menus, first for generous subjects (choice between $\{g, s\}$ and $\{g, s'\}$) in Table A2, and

²²We restrict to cases where $\{s\} \succ \{g'\}$, which is not guaranteed. It may well be that intrinsic preferences are not single-peaked and hence g' is more attractive than g and s even though s is preferred to g (see Levati et al. 2014 for evidence against the universality of single-peakedness of other-regarding preferences). In that case, the situation is obviously more complex. For most conditional tasks, we are able to check whether the dictator's preferences over singleton satisfy this hypothesis (which is the most frequent case). Likewise, we do not consider overwhelming impure motivations, as their role has been established to be weak.

²³Again, we restrict to cases where $\{s\} \succ \{s'\}$, which is not necessary. Indeed, the situation implies more complex predictions if it is not the case. Yet, again, in most conditional tasks, we can control whether the preferences of the dictators satisfy this requirement.

second for selfish subjects (choice between $\{s, g\}$ and $\{s, g'\}$) in Table A3. From the point of view of identifying impure motivations, the results are quite disappointing.

	Choice between $\{g, s'\}$ & $\{g, s\}$							Only when $\{g\} \succ \{s'\}$			
	g	s	s'	$\{g, s\}$	\sim	$\{g, s'\}$	n	$\{g, s\}$	\sim	$\{g, s'\}$	n
g1.a	(12,8)	(14,6)	(16,4)	44.4	26.4	29.2	72	54.2	25.0	20.8	48
g1.b	(12,8)	(14,6)	(18,2)	52.8	20.8	26.4	72	58.5	18.9	22.6	52
g1.c	(12,8)	(14,6)	(20,0)	68.1	12.5	19.4	72				
g2.a	(12,8)	(16,4)	(18,2)	50.6	21.2	28.2	85	64.3	14.3	21.4	56
g2.b	(12,8)	(16,4)	(20,0)	58.8	16.5	24.7	85				
g3	(12,8)	(18,2)	(20,0)	56.5	20.7	22.8	92				
g4.a	(10,8)	(12,4)	(14,4)	11.5	21.3	67.2	122	4.3	17.0	78.7	47
g4.b	(10,8)	(12,4)	(18,4)	13.9	13.9	72.1	122	1.5	7.7	90.8	65
g5.a	(10,8)	(12,2)	(14,2)	8.2	18.1	73.7	171				
g5.b	(10,8)	(12,2)	(18,2)	12.3	12.9	74.9	171	4.8	6.0	89.3	84
g6.a	(10,8)	(12,0)	(14,0)	8.5	22.5	69.1	236				
g6.b	(10,8)	(12,0)	(18,0)	7.6	17.8	74.6	236				

Table A2: Frequency (percentages) of choices in conditional choice tasks, by generous subjects.

Indeed, for the generous dictators, the results are mixed. Whereas for comparisons g1a to g3, there is a tendency to prefer the presence of a less selfish allocation. Yet, for comparisons g4.a to g6.b, the exact opposite pattern seems to occur, as dictators clearly exhibit a tendency to choose the presence of a more selfish allocation. The results are even reinforced when the analysis is restricted to subjects who have shown a preference for $\{g\}$ to $\{s'\}$. Likewise, for selfish dictators we observe an apparently inconsistent pattern: for comparisons s1-s3, we rather observe a preference for adding the less generous option, while for s4.a to s6.b we see a mix of indifference and a preference for adding the more generous option. Overall, these patterns of behaviors do not seem to be very informative in terms of impure motivations and are difficult to rationalize within our framework. The most convincing explanation is that impure motivations are secondary in these choices and that some other concerns take precedence. In particular, the preference form that can rationalize these series of choices is that subjects choose the sets based on the preference for the second-best. Indeed, as the best option stays constant, it seems that dictators focus on the other option, perhaps in case they would change their mind, and choose the option that they preferred. This pattern can explain the switches observed for both selfish and generous dictators.

B.2 Econometrics of Preferences over Singletons

We first use an ordered logit model with the dependent variable being the choice made (altruistic, selfish, or indifference) for each decision in the 6 unconditional binary comparisons of allocations, and then we regress, with a standard OLS procedure, the proportion of selfish choices for each individual. As control variables, we include treatment, country, gender, age, a dummy indicating whether the individual is a student. For the ordered logit regression, we also include some variable about the other options, namely the difference in payoffs between the selfish option and the altruistic one, for the dictators as for the recipients. Whether or not we include this additional variable does not substantially influence the estimates related to our main variables

	s	g	g'	Choice between $\{s, g'\}$ & $\{g, s\}$							
				Selfish subj.				Only when $\{s\} \succ \{g'\}$			
				$\{g, s\}$	\sim	$\{s, g'\}$	n	$\{g, s\}$	\sim	$\{s, g'\}$	n
s1	(14,6)	(12,8)	(10,10)	66.5	22.1	11.5	331				
s2	(16,4)	(12,8)	(10,10)	64.3	25.2	10.5	333				
s3	(18,2)	(12,8)	(10,10)	60.5	26.3	13.2	342				
s4.a	(12,4)	(10,8)	(10,10)	14.7	33.2	52.1	266	16.3	37.3	46.4	209
s4.b	(12,4)	(10,8)	(10,12)	24.4	32.0	43.6	266	26.8	32.7	40.5	220
s5.a	(12,2)	(10,8)	(10,10)	18.5	36.2	45.3	232	19.8	40.7	45.8	188
s5.b	(12,2)	(10,8)	(10,12)	25.5	39.1	35.3	184	22.3	41.0	36.7	166
s6.a	(12,0)	(10,8)	(10,10)	15.2	41.8	42.9	184	16.5	42.1	41.5	164
s6.b	(12,0)	(10,8)	(10,12)	21.7	39.7	38.6	184	23.0	39.7	37.4	174

Table A3: Frequency (percentages) of choices in conditional choice tasks, by generous subjects.

of interest (country and treatment), but it shows that the tendency to choose the altruistic or selfish option varies with the specific allocations, especially the payment of the recipient.

B.3 Robustness at the Individual Level and Possible Composition Effects

The generic result that participants who chose $\{s\}$ rather than $\{g\}$ tend to prefer $\{s\}$ to $\{g, s\}$, and the fact that those who chose $\{g\}$ rather than $\{s\}$ are almost indifferent between the two menus, is naturally interpreted as evidence that negative impure motivations are a more powerful driver of preferences on menus than positive one. Yet, an alternative interpretation could be that impure motivations are not distributed equally between selfish and altruistic people. It could well be that altruistic individuals have no impure motivation (neither positive nor negative) and selfish ones have equally strong positive and negative impure motivations, but we fail to observe the former, as the choices between menus are endogenous. This explanation may contradict some other findings, especially the very small proportion of inconsistencies that would result from strong positive impure motivations such as warm glow (see subsection 3.3), but it is still possible. In plain words, this result could stem from an individual selection effect, with generous and selfish people having different preferences on menus.

One of the interests of our design is to provide data to test this hypothesis. Indeed, we have allocations that vary systematically to identify individuals who are only weakly altruistic. Three menus allow the same individual to change her preferred option from selfish to generous one: $\{(10, 8), (12, 4)\}$, $\{(10, 8), (12, 2)\}$, and $\{(10, 8), (12, 0)\}$. In practice, this experimental manipulation worked in the sense that the percentage of subjects who chose $\{s\}$ in the first case is 57.3% (see Table 5 for details) to 39.9% for the latter. To see whether the pattern of behavior we observe in terms of menus depends on individuals or on the preferred singleton, we first restrict our analysis to the individuals who chose $\{(12, 4)\}$ in the $\{(10, 8)\}$ versus $\{(12, 4)\}$ comparison but $\{(10, 8)\}$ in the $\{(10, 8)\}$ versus $\{(12, 0)\}$ one. The subsample consists of 33 subjects. The results, only for $\{(10, 8), (12, 2)\}$, are displayed in Table A5.

These figures are perfectly in line with those observed on the full sample, perhaps slightly attenuated, but they present the same phenomenon: when subjects prefer the selfish option, they tend to opt for smaller menu, while when they prefer the generous option, they favor the

	Individual proportion of selfish choices (OLS)	Choices: 1 (generous) to 3 (selfish) (Ordered logit)
<i>Private</i>	.01 (.03)	.04 (.13)
Japan	.15*** (.03)	.71*** (.15)
Gender	-.07** (.03)	-.39*** (.14)
Age	-.006 (.002)	-.025*** (.001)
Student	.002 (.054)	.02 (.22)
Period		-.008** (.003)
Diff. Payoff D.		.0001 (.0002)
Diff. Payoff R.		.0015*** (.0001)
R^2 or Pseudo- R^2	0.097	0.149
F test	$F = 11.0$ $p < .001$	
LR test		$\chi^2 = 868$ $p < .001$
Nb of obs.	463	6585
Nb of clusters		463

Col. 1 reports the OLS estimates for the individual proportion of selfish choices. Col. 2 reports the ordered logit estimates when the dependent variable is the nature of choices (generous, indifferent, selfish) made for each of the 6 unconditional binary comparisons of allocations. Standard errors are clustered at the individual level. Significance level: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$.

Table A4: Regression estimates for the preference over singletons

larger set. None of the statistical tests is significant, but that is to be expected given the low power for this specific subsample. In sum, we have no reason to consider that the pattern of preferences observed for menus would be related to individual types of menu preferences that would be correlated with social preferences.

C Experimental Instructions and Screen Shots

Typical screen

A typical screenshot (from the French version) is shown below.

	situations $s ; g$	Prop. of a pref. for larger menu			
		s	p	g	p
Weakly selfish	$\{(12, 4)\}; \{(10, 8)\}$	36.4 (33)	.164		
Whole sample	$\{(12, 4)\}; \{(10, 8)\}$	28.4 (232)	<.001		
Weakly selfish	$\{(12, 2)\}; \{(10, 8)\}$	39.3 (14)	.593	53.3 (15)	1.000
Whole sample	$\{(12, 2)\}; \{(10, 8)\}$	25.9 (232)	<.001	53.5 (171)	.444
Weakly selfish	$\{(12, 0)\}; \{(10, 8)\}$			53.3 (33)	.828
Whole sample	$\{(12, 2)\}; \{(10, 8)\}$			41.5 (232)	.011

This table reports the proportion in % of larger menu choices for weakly altruistic subjects (columns s and g). In columns p , we report p -values for one-proportion Z-tests against $p = 0.50$.

Table A5: Preference for larger menus for for weakly altruistic subjects

Tour 11

You have the choice between the two following menus.

Vous avez le choix entre les deux menus décrits ci-dessous.

Menu A

14 € pour vous et 6 € pour B

12 € pour vous et 8 € pour B

Menu B

12 € pour vous et 8 € pour B

Menu A

Indifférent entre menu A et menu B

Menu B

We remind you that the menus available and your choice will not be communicated to participant B.

Nous vous rappelons que les menus disponibles et vos choix ne seront pas communiqués au participant B.

Le bouton valider apparait au bout de 5 secondes.

VALIDER

Figure C1: A typical screen presented to the participant.

Instructions

As the experiment was run online, there are no instructions understood as a text read aloud by the experimenter. The instructions are presented as screens on-line with the most important

information as well as the clearest possible way. The instructions were first written in French, then translated into English by the two French-speaking coauthors, then translated to Japanese by an external translation firm, with corrections from the three Japanese-speaking coauthors, and then backtranslated to English by an external translation firm. The instructions presented here are those for dictators (“Participant A”) in the case of the *Private* treatment. The presentation for the recipients is just an automatic adaptation (depending on the treatment), while in the *Public* treatment, all mentions of the type “Your decisions in the second part will not be communicated to the B participant” are reversed to “Your decisions in the second part will be communicated to the B participant”.

SCREEN 1

General description of the experiment (1/2)

In this experiment, there are two types of participants : A participants and B participants.

You are an A participant.

You will have this role for the whole experiment.

Likewise, B participants will have that rôle for the whole experiment.

SCREEN 2

General description of the experiment (2/2)

The experiment consists of 2 parts.

Part 1 of the experiment:

This part consists of **45 rounds at a maximum.**

During this part, you will make decisions between menus made of options that will influence your gain and that of the B participant.

Your decisions in this first part will not be communicated to the B participant. He or she does not even know that you will have to make this type of choice.

Part 2 of the experiment:

At the beginning of this part, one of the menus you have chosen in part 1 will be picked at random.

In the part 2 of the experiment, you will have to choose from the available options.

Your decisions in this second part will be communicated to the B participant.

SCREEN 3

Description of the part 1 of the experiment (1/2)

For each round, you are paired with one B participant.

At each round, you will be offered the choice between **two menus of options**. An option corresponds to payoffs for you and for the B participant. An option will be presented in the following way:

Option 1 : 18 € for you and 2 € for B

For this option, your gain is 18 € and that of the B participant is 2 €.

A **menu** is a list of options among which you can choose one, and only one, option, in part 2 of the experiment. A menu will be presented to you in the following way:

Menu A
Option 1 : 18 € for you and 2 € for B
Option 2 : 16 € for you and 4 € for B

SCREEN 3 CT'D

The choice between 2 menus will be presented as in the following example :

Menu A	Menu B
Option 1 : 18 € for you and 2 € for B	Option 1 : 18 € for you and 2 € for B
Option 2 : 16 € for you and 4 € for B	Option 3 : 10 € for you and 10 € for B

You will be asked to choose between these two menus. You will be asked to indicate if you choose Menu A, Menu B or if you are indifferent between these two menus.

Your choice can determine the menu to which you will have access in the part 2 of the experiment.

- If you choose one of the menus (Menu A or Menu B), you will have access to this menu in part 2.
- If you are indifferent between these two menus, you will have 1 chance out of 2 to have Menu A and 1 chance out of 2 to have menu B, in part 2.

If you choose « I am indifferent between the two menus » you will get an additional payoff of 0,10 € if this round is randomly picked for payment.

SCREEN 4

Description of the part 1 of the experiment (2/2)

The decisions you make in part 1 will be **private**.

It means that, for each round, **your decisions will not be communicated to the participant B to whom you are paired**. In other words, **participant B does not know that you will have the choice between these two menus**, and, in effect, **does not know these two menus**.

During part 1 of the experiment, B participants will make **decisions that will not have any influence on your payoff nor on theirs**.

Moreover, they will not receive **any additional gains others than the initial 3 € show-up fee and the payoffs that will depend on your decisions**.

SCREEN 5

Description of part 2 of the experiment (1/2)

In part 2 of the experiment, you will have to choose a division of a sum of money between you and the participant B to whom you are paired.

At the beginning of this part, one of the menus you have chosen in part 1 is selected. More specifically, one of the rounds of part 1 is randomly picked knowing that each round has the same chance to be chosen. The menu you have selected at this round will be proposed to you.

You then have to choose an option among those available in this menu.

The option you choose determine your payoff as well as that of the B participant.

SCREEN 5 CT'D

For example, in part 1 of the experiment, you have selected the following menu:

Menu A
Option 1 : 18 € for you and 2 € for B
Option 2 : 16 € for you and 4 € for B

You have the opportunity to choose one of the two options, or neither one or the other.

- If you choose Option 1, then your payoff for that round will be 18 €, the payoff of the other participant will be 2 €.
- If you choose Option 2, then your payoff for that round will be 16 €, the payoff of the other participant will be 4 €.
- If you are indifferent, one of the 2 options will be randomly selected: there is 1 chance out of 2 that Option 1 is picked and 1 chance out of 2 that Option 2 is picked.

It can happen that only one option is available. In that case, no decision will be required from you. The only available option will automatically apply.

SCREEN 6

Description of part 2 of the experiment (2/2)

The decision you make in part 2 will be **known by participant B**.

More specifically, the following pieces of information will be communicated to participant B:

- The **available option(s)** in part 2.
- **Your decision**.

SCREEN 7

Participants' payoffs

Your payoff as well as that of the participant B will then be communicated to you.

The decision you have made in part 2 of the experiment determines **your gain as well as that of the B participant**.

Moreover, if that round is randomly picked and you chose « I am indifferent between the two menus », then your payoff will be increased of 0,10 €.

SCREEN 8

Example

In part 1 of the experiment, at round 7, you have the choice between the two following menus:

Menu A	Menu B
Option 1 : 20 € for you and 2 € for B	Option 3 : 18 € for you and 6 € for B
Option 2 : 16 € for you and 8 € for B	

Suppose this round is randomly picked at the beginning of part 2 of the experiment. That means that the menu you have chosen determine the available options part 2.

If **you have chosen Menu A**, then, in part 2, you have the choice between Option 1 and Option 2.

- If you choose Option 1, your payoff is 20 € and that of participant B is 2 €.
- If you choose Option 2, your payoff is 16 € and that of participant B is 8 €.

If **you have chosen Menu B**, then in part 2, you have no decision to make. Your payoff is 18 € and that of the B participant is 6 €.

SCREEN 8 CT'D

If **you have chosen « I am indifferent between the two menus »**, one of the two menus is randomly picked and each of the menus has the same chance, that is 1 chance out of 2, to be randomly picked.

- If the Menu A is picked, then, in part 2, you have the choice between Option 1 and Option 2.
- If the Menu B is picked, then, in part 2, you have no decision to make.

Moreover, since you **chose « I am indifferent between the two menus »**, you will get an additional payoff of 0,10 €.

Recall that participant B has no information about your decisions in part 1 of the experiment. For part 2, participant B has the information of the option chosen and those available, as well as your decision.

For instance :

- If you choose Menu A in part 1 then Option 1 in part 2:
 - Participant B will not know that you had the choice between Menu A and Menu B;
 - He or she will know that you had the choice between Option 1 and Option 2.
- If you choose Menu B in part 1:
 - Participant B will not know that you had the choice between Menu A and Menu B;
 - He or she will know that you had no choice but option 1.

SCREEN 9

Summary of the experiment

Part 1

For each round : decision among menus of options

Each option corresponds to payoffs for you and participant B

The available menus and your decisions will not be communicated to participant B

45 round at maximum

Part 2

One of the menus you have chosen in part 1 is randomly picked

Choice between the available options in the menu

The available options and your decision will be communicated to participant B

Communication of your final payoff

Your final payoff = the gains obtained during the experiment