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THE TASTE FOR GENERATIVITY

Leonardo Becchetti
Irene Maria Buso
Luca Corazzini
Vittorio Pelligra

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CRENOS – CAGLIARI
VIA SAN GIORGIO 12, I-09124 CAGLIARI, ITALIA
TEL. +39-070-6756397

CRENOS - SASSARI
VIA MURONI 25, I-07100 SASSARI, ITALIA
TEL. +39-079-213511

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Viale Bonaria 98 · 09125 Cagliari
Tel. 070/6848663 · info@arkadiaeditore.it
www.arkadiaeditore.it

The taste for Generativity

Leonardo Becchetti[†]
University of Rome "Tor Vergata"

Irene Maria Buso[‡, §]
University of Bologna

Luca Corazzini[**]
University of Milan-Bicocca

Vittorio Pelligra[††]
University of Cagliari & CRENoS

Abstract

Drawing from the psychological literature, we define generativity as the preference for the empowering impact of an agent's actions on others' prosociality. We experimentally test its role in determining subjects' choices and welfare by using several variants of the dictator game that either increase the number of direct recipients, implement a generative scenario in which the dictator gives money to a direct intermediate recipient who, in turn, has the opportunity to pass a fraction of this amount to an indirect final beneficiary, or provide the dictator with the option to choose between participating in a standard one-recipient dictator game and entering the generative scenario. Consistent with the concept of generativity, we find that the amount given by the dictator increases with the number of recipients, regardless of whether they benefit directly or indirectly (through the intervention of an intermediate recipient) from the transfer. We also show that the dictator strongly prefers to self-select into the generative scenario, and in this setting, gives an amount that positively depends on how much one expects the intermediate recipient to pass to the indirect final beneficiary. However, we also document a tendency for the intermediate recipient to deliberately embezzle part of the dictator's giving, passing on less than expected by the initial donor, which generates negative effects on the welfare of the indirect final beneficiary.

Keywords and phrases: generativity, extended dictator game, laboratory experiment
Jel Classification: D90, D91, D64

† Department of Economics and Finance, Via Columbia 2, 00133 Roma, Italy.
‡ Department of Economics, Piazza Scaravilli 2 40126, Bologna, Italy.
§ Corresponding author.
** Department of Economics, Management and Statistics, Piazza dell'Ateneo Nuovo 1, 20126 Milano, Italy.
†† Department of Economics and Business Sciences, Via Sant'Ignazio 17, 09123 Cagliari, Italy.

1 Introduction

There is ubiquitous experimental evidence that human beings are "systematically more benevolent than *homo oeconomicus*" (Engel, 2011, p. 584). Behavioral and experimental economics has produced a robust stream of evidence in this direction showing that people care about the well-being of other individuals, for a wide range of possible social, moral and psychological motives, including altruism (Becker, 1974; Andreoni, 1989), guilt aversion (Battigalli and Dufwenberg, 2007), fairness, reciprocity and efficiency concerns (Charness and Rabin, 2002; Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Cooper and Kagel, 2016).

Still, there is a lack of systematic evidence about social preferences when our giving is driven not only by direct motives but also by indirect ones. More specifically, previous research in economics has underexplored issues such as individuals' attitudes toward indirect beneficiaries compared to direct ones, despite the fact that many relevant actions and circumstances in our daily lives involve chains of giving that affect not only direct recipients but also those who, in turn, benefit from their prosociality. Prominent examples include voluntary contributions to public goods produced and distributed by third parties, such as donations to charities that act as intermediaries with beneficiaries, or when we privately fund medical research or social empowerment programs for the disadvantaged. There are also numerous actions aimed at benefiting future generations, ranging from bequests to environmental protection campaigns.

The motivation to care about people beyond a narrow definition of "neighbor" takes many forms, which psychologists summarize as prosociality. One particular aspect of this other-regarding attitude is known as *generativity*. According to its original proponent, (Erikson, 1994; Erikson and Erikson, 1998), generativity represents a later stage of human development, characterized by a concern for the continuity of life. In its purest sense, generativity is expressed through a parenting style that is open and supportive, yet not intrusive. However, it can also be understood as a broader sense of responsibility for the community and future generations. At this stage of psychological development, contributing positively to the welfare of the community and leaving a lasting, positive legacy for future generations becomes a key need for individuals. Typical examples of generative activities include teaching, mentoring, inspiring leadership, and other actions that contribute to a positive legacy for the future. In addition to the psychological aspects of generativity, there is a socio-cultural dimension that has been investigated, among others, O'Hanlon and Coleman (2004), which involves an individual's shift from the self-interested pursuit of success and happiness to giving back to society and leaving a legacy for others. "Essentially generativity describes the adult's need to assume social, work, and community responsibilities that will be advantageous to others" (p. 48). More generally, Magatti et al. (2019) views generativity as a characteristic of social life that fosters the creation of interpersonal relationships and institutions that are open and flexible,

rather than closed and rigid. In addition to Erikson's contribution, a second source of inspiration for the social and economic translation of the concept of generativity is the French philosopher Stiegler (2013). In his critique of consumerism and its new form, the "attention economy", conveyed and reinforced by ubiquitous handheld digital and social media devices, Stiegler proposes a way to overcome the limitations of the current economic model through a process he calls the "contribution economy". This model envisions a world of meaningful communal relationships capable of value creation, where "generative" individuals collaborate on common projects that have a positive impact not only within their immediate sphere — whether in terms of material benefits or self-fulfillment - but also on the natural and social environments they are part of.

The concept of generativity has already been used in empirical studies in economics, and its effects on well-being have been examined using observational data. For instance, the impact of generativity on life satisfaction has been empirically investigated by Jia et al. (2015, 2016), Shahen et al. (2019) and Becchetti and Conzo (2021), while the connection between generativity and environmental sustainability (i.e., its impact on future generations) has been explored by Matsuba et al. (2012) and Alisat et al. (2014). Additionally, the prosocial attitude toward future generations has been studied by Morselli and Passini (2015).

In this paper, we rely on a controlled laboratory experiment to study the causal effects of embedding choices in a generative architecture on individuals' prosocial behaviors. We focus on "socio-economic generativity" distinguishing it from well-known other-regarding motives such as pure altruism, impure altruism, and direct and indirect reciprocity. Operationally, we define the taste for socio-economic generativity as the preference for the total expected impact—both direct and indirect—of our actions on improving the well-being of other individuals.

As such, generativity differs from "pure altruism", which is defined as a preference for improving the lives of others irrespective of one's actions, as well as from "impure altruism" or "warm-glow", which refers to a preference for giving regardless of its total expected outcomes. Generativity also differs from direct reciprocity, which is the tendency to reward kind actions and punish unkind ones. In some respects, generativity is more closely aligned with indirect reciprocity. In this case, an individual (denoted by B) who initially experiences a kind action from another individual (A) may then behave kindly toward a third individual (C). Here, the prosocial motives are intended to account for B's actions.

Considering the same sequential structure of A, B, and C, generativity describes A's concern for the effect his/her action may have on B and, indirectly, on C. In this framework, A anticipates that the effect on C depends on the encouragement produced by his/her giving to B.

In summary, the context we are interested in is one where prosocial actions not only impact the direct beneficiary but also have the potential to affect the welfare of other individuals—directly or indirectly—by promoting others' prosocial behaviors.

In our study, we rely on a workhorse of experimental research: the dictator game (Forsythe et al., 1994), which we modify to create a generative scenario. We begin with *1-REC*, a standard dictator game in which the dictator can give to only one direct recipient. The second treatment, *2-REC*, simply extends the baseline to a setting in which the dictator chooses how much to give to two direct recipients separately. In *GEN-no-option*, the most important treatment for our purposes, the dictator chooses how much money to give to a direct recipient who, in turn, has the opportunity to pass part of this amount to a final indirect recipient (from the dictator's perspective).

By comparing the results of the three treatments, we can assess not only how the dictator's prosociality responds to the number of beneficiaries but also whether it depends on the nature of the recipients - direct or indirect. On one hand, the possibility that the dictator's action will benefit more agents than the single one can directly reach could stimulate prosocial behavior compared to the context without such a generative possibility. On the other hand, the motivation to act in favor of agents who cannot be directly reached may be lower than when acting for one who is directly affected; indeed, the donor may be more psychologically or morally disengaged from the well-being of indirect recipients compared to direct ones, due to greater social distance (Bohnet and Frey, 1999; Goeree et al., 2010) and risk of not reaching the beneficiary (Exley, 2016). Additionally, the dictator may be concerned about the effectiveness of his/her donation to the direct intermediate recipient in reaching the final indirect recipient, and thus about its actual distributive consequences. As a final step, to investigate the pure taste for generativity, we consider a fourth treatment, *GEN-option*, in which the dictator is initially given the choice between facing a single direct recipient (thus participating in *1-REC*) and entering the generative scenario (and participating in *GEN-no-option*).

Consistent with the virtuous prosocial implications of the concept of generativity, we find that the amount given by the dictator increases with the number of recipients, regardless of whether they can benefit directly or indirectly (through the intervention of the intermediate agent) from his/her choice. We also show that, in the extended settings, the dictators give an amount that positively depends on their expectations of what the intermediate direct recipient will pass to the final indirect recipient. Moreover, when focusing on the fourth treatment, they prefer to self-select into the generative scenario. While providing evidence in favor of the taste for generativity hypothesis, these empirical observations demonstrate that the final outcome of the interaction depends significantly on the dictator's trusting confidence that the direct intermediate recipient will fulfill his/her intention to reach the final indirect recipient. In contrast, we find that the welfare of the indirect final recipient in the generative setting is lower than that of the intermediate agent in the same setting, as well as that of the direct recipients in the other two variants of the dictator game. The weak link of generativity is represented by the tendency of the intermediate recipient to deliberately embezzle part of the dictator's donation, passing on less than what was expected

by the initial donor.[1]

The rest of the paper proceeds as follows. In Section 2, we present in detail the research questions and related literature that we aim to explore with our design, which is presented in Section 3. Section 4 discusses the results, and Section 5 concludes.

2 Related literature and research questions

Field evidence suggests a much more benevolent attitude among human beings than what the *homo oeconomicus* paradigm would imply. Donations serve as the most prominent and straightforward example of this attitude. The dictator game is the primary tool for studying donation behavior in a controlled setting. Meta-analytic summaries from years of laboratory investigations into giving (e.g., Engel, 2011; Doñate-Buendía et al., 2022) not only confirm a robust tendency to donate (with the majority of players deviating from the *homo oeconomicus* zero-donation Nash equilibrium) but also outline the situations in which we can expect this benevolent attitude to emerge. The identity and number of recipients are among the factors that most significantly affect donations. Deepening our understanding of changes in donation behavior when confronted with multiple recipients is important, not only because this is a relevant feature of many field settings — such as charitable giving, fundraising, and the provision of public goods — but also because it can illuminate the very nature and motivation behind prosocial behavior.

Still, not many theoretical and empirical contributions in economics specifically address how the number of recipients affects prosociality. Additionally, the conclusions among psychologists and economists seem to diverge. Psychologists have documented a phenomenon known as "compassion fade", which describes how, as the number of people in need increases beyond one, both affective and behavioral compassion begins to wane (Slovic, 2007; Markowitz et al., 2013; Västfjäll et al., 2014). This is why charities often solicit donations by focusing donors' attention on helping a single beneficiary. For instance, humanitarian organizations offer opportunities to "adopt" a single individual, while environmental organizations allow supporters to "adopt" individual animals or even trees. Focusing on a single beneficiary while mitigating compassion fade tends to evoke greater sympathy, guilt, and caring than does the presence of multiple beneficiaries (Sharma and Morwitz, 2016).

[1] In our generative setting, player B is not merely an intermediary for the donation. This feature distinguishes our setting from other experimental investigations on embezzlement in donations (Attanasi et al., 2019; Di Falco et al., 2020). The role of B as both the recipient of the dictator's donation and a potential intermediary to help the dictator reach C captures many real-world situations involving chains of donations and prosocial behaviors, making our setting particularly interesting to study. Indeed, as discussed in the last section, our setting provides insights that are especially relevant when legal obligations of the intermediate recipients in a donation chain do not exist or are difficult to enforce.

On the contrary, studies in economics document a non-negative relationship between generosity and the number of potential recipients. Bolton et al. (1998) investigate whether the perceived benefit to the dictator of donating 10 small amounts of money to 10 different recipients is lower than the perceived benefit of donating the total amount to a single recipient. They find no difference in the amount donated based on the number of recipients. However, the distribution among recipients turns out to be uneven, suggesting that fairness concerns are not the only motivation for increased donations as the number of recipients rises. Supporting the idea that fairness is not the sole motive for donations, Andreoni (2007) presents a theoretical framework in which the donor's utility depends on both the total and average amounts received by recipients. His experimental test considers a range of recipients from 1 to 9 and shows that donors care about both aspects: donations increase with the number of recipients, but at a decreasing rate, indicating that altruism is, to some extent, congestible. Similar results have been found in experimental studies using charities as recipients; Soyer and Hogarth (2011) vary the number of charities to 3, 8, and 16, discovering that donations increase with the number of recipients, but, as in Andreoni (2007), at a decreasing rate. Instead, Fehérová et al. (2022) provide respondents with either 1 or 3 charities and find no evidence of a significant effect of the number of charities on overall donations. These differing results across studies could be attributed to variations in design. Summarizing the existing studies through a meta-analysis that controls for many design differences, Engel (2011) provides evidence of an overall positive effect of the number of recipients on the average donation, indicating a 10% increase in generosity. Additionally, the presence of multiple recipients encourages extreme choices: dictators are more likely to either give nothing or give everything when faced with multiple recipients.

The first part of our study contributes to this body of literature on the effects of facing multiple recipients on donors' generosity. We begin by comparing the average and total donations of a dictator in a treatment with one recipient (*1-REC*) versus two direct recipients (*2-REC*) to address the following research questions:

- *Research Question 1a*: Does the dictator's giving increase when the number of recipients passes from 1 to 2?
- *Research Question 1b*: Does the average amount received by each beneficiary increase when the number of recipients passes from 1 to 2?

Based on previous evidence in the field of economics, drawn from settings similar to our own, we hypothesize a non-negative effect of the number of recipients on total donations. However, even within economics, the significance of a positive effect on both total and average donations appears to be an empirical issue that is closely dependent on the study's design. In our context, it is particularly important to control for the effect of multiple recipients on donations in order to

properly address the main research questions concerning dictators' donations to direct and indirect recipients.

Our main treatment allows the recipient to donate part of the endowment received from the dictator to another participant, resulting in the dictator having both a direct and an indirect recipient. The chain of donations implemented in this treatment (hereinafter *GEN-no-option*) is designed to elicit generativity attitudes related to indirect giving. The social psychology literature on generativity suggests that the willingness to impact individuals we can only reach indirectly is a strong psychological driver of many behaviors in this field. Indeed, the ability to create effects that extend beyond immediate outcomes is highly valued by individuals, and the desire to produce such effects represents a crucial stage in a person's psychological development (e.g., Erikson, 1994; Erikson and Erikson, 1998; Fisher, 1995; Aubin, 1992).

A prediction based on the existence of a taste for generativity related to indirect giving—i.e., generating effects beyond the direct ones—would be that the well-being of the indirect recipient should factor into the utility function of the donor. Although social psychology highlights the importance of the indirect effects that donations can generate, the economic literature lacks clear theoretical predictions regarding the role of indirect beneficiaries' well-being in the donor's preferences. While theories of pure and impure altruism do not preclude the possibility of the well-being of indirect recipients entering the dictator's utility function, they do not provide insights into the extent to which this occurs.

On the other hand, theories of social preferences that explain dictators' behavior using concepts related to fairness (e.g., Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) could account for greater donations when there are multiple recipients, potentially due to factors like inequality aversion (which has been shown to be a prominent element influencing dictator behavior compared to efficiency concerns and maximin preferences; see Korenok et al., 2018). However, when the donation must pass through the direct recipient to reach the indirect one, the dictator might exacerbate inequality by donating generously to the intermediate direct recipient, particularly if the latter embezzles part of the donation intended for the indirect recipient. Therefore, a dictator who is inequality-averse and cares about the well-being of the indirect recipient would critically depend on their expectations regarding the amount the direct recipient is likely to donate to the indirect one.

Another important consideration when predicting behavior in this potential generative context is that previous experimental evidence has documented an illusory preference for fairness (e.g., Dana et al., 2007). Specifically, at least part of the donations observed may not be driven by a true preference for fairness but rather by a desire to maintain social and self-image. When individuals have an excuse not to give — allowing them to act selfishly without damaging their social or self-image - donations tend to decrease. The indirect relationship with a recipient could serve as an

excuse to give less than to a direct recipient, due to the risk of embezzlement by the intermediate recipient. In fact, risk is often used as a justification for selfish behavior (Exley, 2016; Garcia et al., 2020).

Additionally, the indirect relationship with the recipient implies a greater social distance, which may make it more acceptable for donors to have a lower psychological engagement with the well-being of the indirect recipient.

Given previous evidence, whether and to what extent donors are interested in the well-being of those they can only reach indirectly with their donations remains an open empirical question. In our experiment, we aim to explore this issue by implementing a potentially generative setting (*GEN-no-option*) in which the dictator donates to a single direct recipient, knowing that the latter will have the opportunity to transfer part of the amount received to a third subject, representing the indirect recipient for the original dictator. By comparing donations made by the dictator with one direct recipient (*1-REC*), two direct recipients (*2-REC*), and one direct and one indirect recipient (*GEN-no-option*), we seek to answer the following research questions:

- *Research Question 2a*: Does the presence of an indirect recipient increase the dictator's giving?
- *Research Question 2b*: In the case of a positive answer to the previous question, to what extent does this occur: does donation in presence of an indirect recipient increase more, less or equally than then in presence of two direct recipients?

To address *Research Question 2a*, we compare the amount donated by the dictator when he/she face only the direct recipient (*1-REC*) with what he/she gives when he/she faces both a direct and an indirect recipient (*GEN-no-option*). If the dictator gives more in *GEN-no-option* than in *1-REC*, this suggests that the dictator cares to some extent about the well-being of the indirect recipient[2]. We then address *Research Question 2b* on the differential strength of caring of the dictator between a direct and an indirect recipient by comparing the dictator's overall donation to two direct recipients in *2-REC* with the donation to the direct recipient in *GEN-no-option*.

A lower donation in the latter treatment could be explained by two possible factors. On the one hand, the dictator might be less interested in the well-being of the indirect recipient compared to the direct one. On the other hand, it could be due to the dictator's expectations about the likelihood that his/her donation will effectively reach the final beneficiary, which depends on his/her trust

[2]Although we assume in the following discussion that a higher donation of the dictator mean that he/she cares about the well-being of the indirect recipient, this does not exclude a complementary mechanism to be in place: the indirect recipient is able to elicit other possible motives for dictators' donation as social and self image concerns. The following hypothesis *Research Question 2c* and, more generally, the belief analysis in the result section allow to shed light on this aspect.

in the direct recipient to pass along the money. It is crucial then to verify the dictator's beliefs regarding the behavior of the direct recipient. Specifically, if the direct recipient B embezzles part of the donation that A intends for C, this could result in an unfavorable redistribution of welfare for the indirect recipient. Anticipating that B might not reciprocate the dictator's generosity by fairly splitting the amount with the other recipient, the dictator could choose to donate less to the direct recipient in *GEN-no-option* than in *2-REC*, especially if the dictator is averse to inequality. To deepen the understanding of the dictator's donation behavior and welfare outcomes in *GEN-no-option*, we propose the following research question[3]:

- *Research Question 2c*: Does the dictator's giving positively depend on his/her expectation about how much the direct intermediate recipient will pass to the indirect final beneficiary?

Finally, to further investigate how prosociality is shaped by generativity, we consider a treatment in which the dictator has the possibility to self-select into the generative scenario, rather than opting for the *1-REC* setting. With this variant, we aim to measure the dictator's preference for the generative scenario and whether self-selection fosters the amount donated by the dictator in the first stage and by the direct intermediate recipient in the second stage.

- *Research Question 3a*: Does the dictator prefer the generative scenario to the setting in which he/she only faces a direct recipient?

- *Research Question 3b*: Does opting for the generative scenario foster the dictator's giving?

[3]Similar to our setting, Bahr and Requate (2014) investigate the behavior of a dictator in a sequential dictator game. The main difference in their study is the absence of a control treatment with two direct recipients: they compare the results of the sequential dictator game with those observed in a standard dictator game with one recipient. Consequently, they are unable to disentangle the impact of multiple recipients (two recipients versus one recipient) or investigate the differences between a direct and an indirect recipient (two direct recipients versus one direct and one indirect recipient). Their focus is instead on the existence of indirect reciprocity among intermediate recipients. Although this is not our primary research question, our work is also related to the literature on indirect reciprocity. Our design of the *GEN* treatment allows us to explore whether the intermediate recipient is willing to indirectly reciprocate the dictator's donation by passing it along to their direct recipient. We expect indirect reciprocity to emerge, but our investigation of this phenomenon presents some novel and interesting aspects: most previous experimental studies on indirect reciprocity propose a sequence of independent dictator games (Cason and Mui, 1998), or more generally, independence between the gift received in the past and the donation chosen in the dictator game (Becchetti et al., 2017). In contrast, we propose a proper sequential dictator game. Unlike Bahr and Requate (2014), who also implement a sequential dictator game, we elicit the intermediate recipient's donation choices using the strategy method, i.e., for every possible amount that the intermediate recipient might receive from the dictator. This allows for a more systematic overview of the emergence of indirect reciprocity and the extent of reciprocation. However, aside from investigating the emergence of indirect reciprocity, the strategy method used to elicit the intermediate recipient's choice and the dictator's and recipients' first- and second-order beliefs provides a deeper understanding of the dictator's concern for the well-being of the indirect recipient and the determinants of welfare distribution in a generative context.

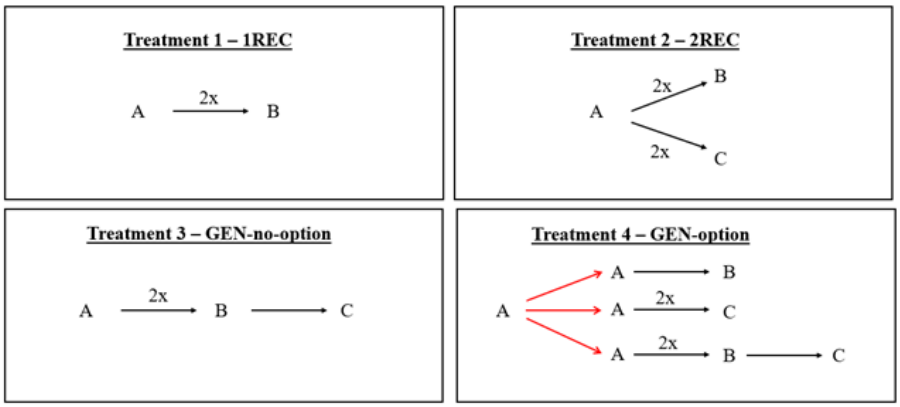

Figure 1: Treatments

- *Research Question 3c*: Does the direct intermediate recipient donate more to the indirect final beneficiary when he/she observes the dictator opting for the generative scenario?

To answer *Research Question 3a*, we will verify the proportion of dictators choosing the generative scenario in *GEN-option*. To address *Research Question 3b*, we will compare the donations of the dictators in *GEN-option* and in *GEN-no-option* (hereinafter we will rename the treatment *GEN* as *GEN-no-option* to distinguish it from the one where self-selection is possible). Finally, to answer *Research Question 3c*, we will compare the donations of the intermediate recipient in *GEN-option* and *GEN-no-option*, as in the first case, the intermediate recipient should be more convinced of the dictator's willingness to benefit the indirect recipient.

3 Experimental Design and Procedure

The experiment has four treatments which are all variants of the dictator game. Figure 1 summarizes the treatments in our experiment.

All treatments have two phases: in the first phase, the game is explained and implemented; in the second phase, beliefs are elicited through incentive-compatible procedures. The general instructions of the experiment, which are read aloud at the beginning, announce the two-phase structure and that just one phase will be randomly drawn for payment at the end of the experiment. Then, the instructions for each phase are read aloud at the beginning of each phase.

In the first phase, the game played changes depending on the treatment:

Treatment *1-REC*: the participants are assigned to groups of 2, and these are assigned to the role of dictator (labelled role A) or recipient (labelled role B). The dictator is endowed with 18 euros, and there is an efficiency factor of 2 on the amount transferred by the dictator to the recipient, i.e., the recipient receives 2 times the amount transferred by the dictator.

Treatment *2-REC*: the participants are assigned to groups of 3, and these are assigned to the role of dictator (labelled role A) or recipient (labelled role B and role C). Hence, the dictator has two recipients. The dictator is endowed with 18 euros. The dictator chooses the amount to transfer to each recipient, i.e., the dictator can choose to transfer different amounts to the recipients. The efficiency factor of 2 is applied to each amount transferred.

Treatment *GEN-no-option*: the participants are assigned to groups of 3, and these are assigned to the role of dictator (labelled role A) or recipient (labelled role B and role C). In this treatment the transfer occurs through a chain: A is endowed with 18 euros and chooses the amount to transfer to the B. The efficiency factor of 2 is applied to the amount eventually transferred by A to B. B chooses how much of the amount received, if any, to transfer to C. Note that the efficiency factor is not applied to the amount transferred from B to C. Hence, differently from treatment 2, in this case, C does not receive the transfer directly from A, but indirectly through B.

Treatment *GEN-option*: the participants are assigned to groups of 3, and these are assigned to the role of dictator (labelled role A) or recipient (labelled role B and role C). First, A, which is endowed with 18 euros, has to decide among 3 options. The first two options consist of playing a standard dictator game with one of the two recipients: A can choose to (i) transfer an amount to B, which will be multiplied by 2, and, in this case, C receives nothing, (ii) to transfer an amount to C, which will be multiplied by 2, and in this case B receives nothing. Instead, as in treatment 3, option (iii) consists of transferring an amount to B, which will be multiplied by 2, and then B can choose how to share the amount eventually received with C (the efficiency factor is not applied in this case). After choosing one of these options, A chooses the amount to transfer to B or C, depending on the option chosen.

In all treatments A can choose an integer amount between 0 and 18 euros to transfer to B and/or C. In treatment 2 A can choose an integer amount between 0 and 18 euros to transfer to C that must be compatible with the endowment left considered the transfer to B. When B has to choose the amount to transfer to C, i.e., in treatment 3 and treatment 4 when option (iii) is chosen by A, the choices of B are elicited with the strategy method: B is asked the amount to transfer to C for every possible amount received by A, except for 0 which would not allow for any transfer; hence, B is asked to take 18 choices. Note that in Treatment 4 B is asked to declare the amount to transfer to C for every possible amount received by A supposing that option (iii) is selected. Subjects are asked control questions at the beginning of phase one to check their understanding. From the instructions they are made aware that the actual choices will be revealed to all group members after the end of the second phase and before randomly drawing the paid phase. Also, the type of choices and incentives of participants with different roles in the group are common knowledge.

In the second phase, beliefs about the behaviors of the other group members in phase one are elicited though incentive-compatible procedures:

Treatment *1-REC*: B is asked to conjecture the amount transferred by A, while A is asked the second-order belief, i.e., A is asked to conjecture the amount that B expects to receive[4].

Treatment *2-REC*: B and C are asked to conjecture the amount transferred by A, while A is asked two second-order beliefs, both with respect to B's and C's expectations.

Treatment *GEN-no-option*: C is asked to conjecture what is the choice of A and what are the choices of B, expressing overall 19 beliefs. B is asked to conjecture the choice of A, and the beliefs of A and C on his/her choices, expressing overall 37 beliefs. A is asked to conjecture what are the choices of B, and the two beliefs on B's and C's expectations on the amount transferred to B, expressing overall 20 beliefs.

Treatment *GEN-option*: C is asked to conjecture the choices of A for each possible option that A might have chosen and the choices of B, expressing 21 beliefs. B is asked to conjecture the choices of A for each possible option that A might have chosen, and the beliefs of A and C on the his/her choices, expressing overall 39 beliefs. A is asked to conjecture what are the choices of B, two beliefs on B's expectations if first or third option is chosen, C's expectations if the second option is chosen, and C's expectations on the amount transferred to B if option 3 is chosen, expressing overall 22 beliefs[5].

At the end of phase 2, subjects were asked to answer a questionnaire, and they were made aware that their answers did not influence the final payment. Questions included the demographics (sex, age, field and year of study), the number of experiments in which they participated previously, and whether they received a salary, volunteered, or participated in political, cultural or religious associations. In addition, measures of self-reported risk (Dohmen et al., 2011) and trust[6] were collected, and the perceived closeness in social relationships for both close and non-close relationships (friends and acquaintances) was elicited following Gächter et al. (2015). Also, we measured empathy using the Empathy Quotient test (Baron-Cohen and Wheelwright, 2004) in the 40-item version.

After the questionnaire, the choices of phase one and the corresponding correctness of the beliefs expressed in phase two are displayed on the screen; then the assistant of the experimenter in the laboratory proceeded to toss a coin in front of the participant to randomly draw a phase. If the

[4]All conjectures to B and C players are asked in terms of amount transferred from A, not in terms of amount received, i.e., they have to state the amount transferred before this being multiplied by the efficiency factor.

[5]The conjectures on B's choices expressed by A and C can always being incentivized, while just one of C's conjectures on A choices can be incentivized depending on the actual option chosen by A, i.e., only 19 beliefs overall. Similarly, while just one of B's conjectures on A choices can be incentivized, i.e., only 37 beliefs overall.

[6]We use a question to measure general trust in others that is widely used surveys as the General Social Survey World Values Survey ("Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?") using a 0 (Do not trust) to 10 (Trust) scale.

second phase is selected, one of the conjectures is randomly drawn for payment, if multiple conjectures were expressed. To balance payments between the two phases and incentivize to answer accurately to all conjectures, if the conjecture relevant for payment is correct the payment is 10 euros, otherwise is 5 euros[7].

These four treatments were run between-subjects. The experiment was programmed in z-Tree (Fischbacher, 2007), and the original instructions and their English translation are available in the Appendix A. The experimental sessions were run between March and November 2023 at VeraLabEx, the experimental economics laboratory of the Department of Economics at Ca' Foscari University[8]. 360 subjects were recruited using ORSEE (Greiner, 2015): for treatment 1 we ran two sessions with 30 subjects; for treatments 2 and 3 we ran three sessions with 30 subjects each, and for treatment 4 we ran four sessions with 30 subjects each. The different numerosity of the participants in each treatment aims to have the same number of participants with the same role in each treatment[9]. The experiment lasted 1 hour including reading instructions and payment; the average payment was equal to 10 euros including the show-up fee of 3 euros, and all subjects were paid individually and in cash at the end of the experiment.

4 Results

4.1 The choices of the dictators (player A)

Table 1 illustrates how the average donation of players in role A changes across treatments. The amount transferred from A to B in treatment 1REC, 2.97, is strikingly lower than the amount transferred in treatment 2REC, 5.67, which is close to twice as much. Instead, the average amount donated to each single recipient is similar in 1REC, 2.97, and in 2REC, 2.84 for both B and C[10].

- *Result 1a*: increasing the number of recipients increases the donation of the dictator.

[7] If phase two is drawn for payment, the experimenter's assistant first shows to participants transparent envelops with numbered tickets, where the number of envelops and tickets vary depending on the treatments and the number of conjectures expressed in each role (A, B and C) in that treatment. Then each transparent envelop is covered by a black envelop and the assistant proceed to the random draw.

[8] The study plan was approved by the ethics committee of the University of Venice Ca' Foscari.

[9] For treatment 4 we want to ensure comparability in terms of number of observations between As' choices in treatment 3 and in the third option. Although we cannot know in advance exactly how many players A choose the third option treatment 3, we expect that running an additional session for this treatment would be enough to meet this requirement. We conduced the power analysis with G*Power 3 (Faul et al., 2007): our study is enough powered ($\beta = 0.2$, $\alpha = 0.05$) to detect large size effect (Cohen's d=0.8). We focus on large effect size not only because of its the relevance for policy implications, but also because this is the effect size detected for the number of recipients in the meta-analysis of Engel (2011).

[10] The donation of A to B in 1REC (avg. 2.97 in Table 1) is not statistically different the donation of A to B and from A to C in 2REC (avg. 2.84 in Table 1) according to both parametric (t-test, p-value=0.81) and non-parametric

Table 1: Donations of As' participants

Treatment GEN no-option	Treatment 1REC	Treatment 2REC		Treatment GEN-option		
Average donation of A to B	Average donation of A to B	Average donation of A to B	Average donation of A to C	Option 1 - Average donation of A to B	Option 2 Average donation of A to C	Option 3 Average donation of A to B
5.50	2.97	2.84	2.84	1.2	2.5	5.57
(0.72) [30]	(0.45) [30]	(0.28) [30]	(0.29) [30]	(0.46) [10]	(0.5) [2]	(0.48) [28]

Notes: This table reports average donations of A to B and/or C. Standard error in parentheses and the number of observations in square brackets.

- *Result 1b*: we do not find a difference in the average donation to each single recipient with one or two recipients.

Players in role B receive on average almost twice as much in the treatment GEN-no-option (5.50) and in the GEN-option (5.57), when option 3 is chosen, than in the other treatments where B has not the possibility to further donate to C, i.e., in 1REC (2.97). Also, A donates to B in the GEN-no-option and GEN-option treatments, almost the same amount donated overall to recipients B and C in treatment 2REC (5.67)[11].

- *Result 2a*: the amount donated by the dictator to the recipient is lower when the recipient has not the possibility to further donate.

- *Result 2b*: the amount donated by the dictator when there are two recipients does not change whether these recipients are direct or indirect ones.

Regression analyses in Tables 2 confirm Results 1a,1b, 2a and 2b and offer further insights: in this table the treatment effect is investigated by comparing the GEN-no-option treatment with the treatments where there are no further donation possibilities for B, i.e., 2REC and 1REC. Two double hurdle models are presented, Model 1 and Model 2; in the first double hurdle, the dependent variable of equation 2 is the total donation of A, that is, the total amount donated to B and C is considered for treatment 2REC. We cannot find a significant difference neither in the probability

tests (rank sum, p-value=0.98).

[11]The donation of A to B in the GEN-no-option (avg. 5.50 in Table 1) is not statistically different from the donation of A to B in the GEN-option (avg. 5.57 in Table 1) according to both parametric (t-test, p-value=0.93) and non-parametric tests (rank sum, p-value=0.83). Also, the donation of A to B in the GEN-no-option is not statistically different from the donation of A to B in the 2REC treatment (avg. 5.67) according to both parametric

of donating (equation 1), nor in the overall amount donated (equation 2) by A to recipients B and C in 2REC and to recipient B in GEN-no option. Instead, the amount donated by A to B is lower (p-value=0.002) in 1REC than in GEN-no-option. In the second hurdle model reported in Table 2, the dependent variable of equation 4 is the average donations of player A to each direct recipient, that is, in treatment 2REC the dependent variable is the average donation to B and C; we can see that the difference in the amount donated to each recipient is significantly lower in treatment 2REC than in GEN-no-option.

To summarize the answer to the first two research questions, we can say that the amount donated by player A when there are two recipients does not change whether these recipients are direct or indirect ones. Hence, players in role A are not discouraged from donating and/or are less willing to donate to an indirect recipient with respect to a direct one, and the level of their donation suggests that they care equally for the welfare of direct and indirect recipients. However, a closer look at the beliefs further helps in shedding light on the relevance of the well-being of the indirect recipient for the dictator

Table 2: Hurdle Regression on A-players' Donations

Treatments: GEN-no-option, 2REC, 1 REC

	Model 1 total donation of A		Model 2 average donation of A	
	(1)	(2)	(3)	(4)
Treatment "GEN" (base-level)				
Treatment "2REC" Treatment "2REC"	0.12	-0.20	0.12	-4.44***
	(0.46)	(0.89)	(0.46)	(1.04)
Treatment "1REC" Treatment "1REC"	-0.52	-3.29**	-0.52	-3.21**
	(0.43)	(1.06)	(0.43)	(0.99)
Constant	-2.09	7.59***	-2.09	7.75***
	(2.74)	(1.91)	(2.74)	(1.99)
Demographic Controls	✓	✓	✓	✓
Observations	90	90	90	90

Notes: Regressions (1-3) and (2-4) are the first and second hurdle of a double hurdle model. The dependent variables in (1-3) and (2-4) are respectively dummy variables equal to 1 when donation is positive, and the level of donation; in (3) is considered the sum of donations of A to B and C in Treatment 2REC, while in (4) the average donation to B and C in Treatment 2REC. Regressors. Treatment is a categorical variable equal to 1 (base-level) if GEN-no-option, 2 if 2REC, and 3 if 1REC. Demografic controls are sex, age, year and field of study, experience with experiments. Table 1C in the appendix report the regression with demographic controls.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

(t-test, p-value=0.85) and non-parametric tests (rank sum, p-value=0.1).

4.2 The Beliefs of the dictators (player A)

From Table 3, which presents the beliefs of A on the expectation of recipient(s) on the amount donated, we can see that these assume values close to the choices of A[12]. Regressions reported in Table 4 confirm the significance of this relation, except for treatment 1REC. To the extent these relations between A-players' beliefs and choices can be considered at least partially as evidence of a causal relationship, i.e., the willingness to meet the recipients' expectations[13], this suggests that subjects in the GEN-no option and GEN-option treatments care not only for the expectation on their direct recipient, B, but also for the expectation of the indirect recipient C.

The amount donated by A to B is generally in line, or even better than Bs' expectations: in treatment GEN-no-option Bs' expect that A transfer on average 4.67, which is not statistically different from the amount donated, 5.5 (t-test, p-value=0.42; rank sum, p-value=0.32)[14]. Similarly, in treatment GEN-option B expects that A transfers on average 5.75 when option 3 is chosen, which is not statistically different from the amount actually donated in this case, 5.57 (t-test, p-value=0.81; rank sum, p-value=0.82)[15]. In treatment 2REC B and C expect to receive 2.27 and 1.8, respectively, which for player C is just marginally significantly lower than what on average A donates to C, i.e., 2.83 (t-test, p-value=0.02; rank sum, p-value=0.02). Also, in treatment 1REC B expects to receive 3.8 which is not statistically different from the amount actually received (t-test, p-value=0.26; rank sum, p-value=0.35). This evidence on recipients' expectations suggests that in the treatment with indirect recipients, the fact that A should care about the welfare of the indirect recipients is also the expectation of B, the direct recipient, and C, the indirect recipient.

[12]Note that in the GEN-option treatment beliefs are closer to choice values when considering beliefs for the option actually chosen. This might due to the greater relevance for players' A of these beliefs for their choice, which might then imply greater effort and attention in formulating such beliefs, although these are all equally incentivized.

[13]This correlation might be due to the false consensus bias, but also it can be rationalized as the outcome of a standard belief updating process under some assumptions about individual characteristics (see Vanberg, 2019).

[14]Bs' expectations are lower, but not significantly, also of the second order belief of A, that is 5.7, and to the belief of C on the amount donated by A to B, that is 5.

[15]Bs' expectations are lower, but not significantly, also of the second order belief of A when the third option is chosen, that is 5.92, and to the belief of C on the amount donated by A to B, that is 6.05.

Table 3: Beliefs of As' participants

Treatment GEN-no-option		Treatment 1REC	Treatment 2REC		Treatment GEN-option			
Average second order belief of A on B's exp	Average belief of A on C's exp on donation of A to B	Average second order belief of A on B's exp	Average second order belief of A on B's exp	Average second order belief of A on C's exp	Option 1 Average second order belief of A on B's exp	Option 2 Average second order belief of A on C's exp	Option 3 Average second order belief of A on B's exp	Option 3 Average belief of A on C's exp on donation of A to B
5.70 (0.68) [30]	5.50 (0.71) [30]	3.36 (0.68) [30]	2.83 (0.41) [30]	2.43 (0.35) [30]	5.32 (0.54) [40]	5.40 (0.56) [40]	5.90 (0.51) [40]	5.80 (0.54) [40]
					Avg. belief of A on B's or C's expectation depending on the option chosen			
					3.4 (1.7) [10]	2 (2)[2]	6.53 (0.42) [28]	6.39 (0.44) [28]

Notes: This table reports average beliefs of A on the expectation of B and/or C. Standard error in parentheses and the number of observations in square brackets.

Table 4: Regressions on A-players' Donation: Beliefs of A on B and C expectations

	GEN-no-option (1)	GEN-no-option (2)	2REC (3)	2REC (4)	1REC (5)	GEN-option (6)	GEN-option (7)
Sob A on B	0.53*		0.48***		0.099	0.76***	
	(0.20)		(0.10)		(0.13)	(0.18)	
Belief A on C		0.73***		0.6***			0.53*
		(0.14)		(0.10)			(0.20)
Constant	-36.34*	-23.90*	1.11	0.74	9.64	-1.72	-2.60
	(17.60)	(13.75)	(0.96)	(0.81)	(6.05)	(5.27)	(6.37)
Demographic Controls	✓	✓	✓	✓	✓	✓	✓
Observations	30	30	30	30	30	28	28

Notes: All Regression are linear OLS regression. In all regression the dependent variable is the amount donated by A to B, except for Regression (4) where it is the amount donated by A to C; in regression (6) and (7) it is the donation to B only when the third option is chosen. Regressors: Sob (second order belief) of A on B is the belief of A on the conjecture of B on the amount transferred to B by A. Belief of A on C is the belief of A on the conjecture of C on the amount transferred to B by A in all regressions, except for regression (4) where it is the belief of A on the conjecture of C on the amount transferred by A to C. Demografic controls are sex, age, year and field of study, experience with experiments. Table 2C in the appendix report the regression with demographic controls.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Still, note that the most important belief to consider in order to understand the donation behavior of the dictator in the generative setting is the one that he/she holds on B's donation, as stated in *Research Question 2c*. We then now turn to the behavior of B and the beliefs on B's behavior: players in role B make choices in the GEN-no-option and GEN-option treatment. As reported in Table 5, 2.93 and 2.50 are the amount donated to C by B on average in the two treatments, and these do not differ statistically (t-test, p-value=0.65; rank sum, p-value=0.73). Also, we can see from Table 5 that Bs' choices clearly disappoint As' expectation: As' expect 5.11 in GEN-no option and 3.88 in GEN-option to be donated on average[16]. C players do better than A players in guessing Bs' choices: Cs' expectations are closer to actual B choices in both treatments, 3.50 and 3.00[17], which are indeed not statistically different from actual values. The second order beliefs of B on As' and Cs' expectations suggest that Bs' are aware that they are donating to B less than expected

[16]The difference between the As' expectations and Bs' choices are significantly different in the GEN-no option (5.11 vs 2.93, t-test, p-value=0.03; rank sum, p-value=0.006) and in the GEN- option treatment (3.88 vs 2.50, t-test, p-value=0.08; rank sum, p-value=0.02).

[17]The difference between the Cs' expectations and Bs' choices are not significantly different in GEN-no option (3.50 vs 2.93, t-test, p-value=0.60; rank sum, p-value=0.37) and in GEN- option (3.00 vs 2.50, t-test, p-value=0.55; rank sum, p-value=0.46).

Table 5: B's choices, A's and C's expectations, B's second order beliefs

	GEN-no-option	GEN-option	overall
Donation of B to C	2.93 (0.72)	2.50 (0.60)	2.72 (0.47)
A's belief on B's donation	5.11 (0.65)	3.88 (0.51)	4.49 (0.41)
C's beliefs on B's donation	3.50 (0.80)	3.00 (0.58)	3.25 (0.50)
Second order belief of B on A	4.42 (0.76)	3.33 (0.54)	3.87 (0.46)
Second order belief of B on C	4.23 (0.83)	3.70 (0.61)	3.96 (0.51)

Notes: The donation of B to C is the average choice of B corresponding to the actual endowment transferred by A to B (i.e., only when option 3 is chosen in GEN-option) . A's and C's beliefs on B's donation are the average values of these beliefs for the actual endowment transferred by A to B (i.e., only when option 3 is chosen in GEN-option). The second order belief of B on A and C is the guess of B on A's and C's expectation on the amount donated to C the actual endowment transferred by A to B beliefs for the actual endowment transferred by A to B (i.e., only when option 3 is chosen in GEN-option).

by other players. Table 6 shows that the donation of A to B has a significant positive relationship with the amount A expects that B will donate to C in both GEN-no-option and GEN-option.

Table 6: Regressions on A-players' Donation – Beliefs of A on B's donation

	GEN-no-option (1)	GEN-option (2)
Belief A on B	0.80***	0.64**
	(0.18)	(0.21)
Constant	-42.62**	-1.01
	(14.93)	(6.04)
Demographic Controls	✓	✓
Observations	30	28

Notes: All Regression area linear OLS regression. In all regressions the dependent variable is the amount donated by A to B; in regression (2) is the donation to B only when the third option is chosen. Regressors. Belief of A on B is the belief of A on the amount transferred by B to C. As the beliefs of A on B's choices are elicited for every possible amount that A has transferred to B, in this analysis we consider only the belief of A for the amount actually transferred to B. Demografic controls are sex, age, year and field of study, experience with experiments. Table 3C in the appendix report the regression with demographic controls.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The distribution of welfare that results from A and B choices is the following: in GEN-no-option A earns on average 12,5 euros, as A donates on average 5.5 euros to B. B receives 11 euros. Hence, considering the efficiency factor of 2, A chooses to take 54% of the overall wealth, and the 2 recipients receive the 46%. As reported in Table 5, A expects the two to equally split this amount. This division of welfare is similar to those of the other 2 treatments with 2 recipients, 2REC and

GEN-no-option[18]. Note, however, that the welfare of C varies a lot depending on whether C is a direct or indirect recipient of A; this is due not to a different level of A, but to the behavior of B: B donates a fixed proportion of the endowment received - around 25% to C and takes for herself/himself a share around 75% instead of equally splitting the endowment as A would expect. Hence, B embezzles part of the donation that A aimed to transfer to C. This happens even when the caring of A for C's welfare is made clearer to B by the self-selection of A into the generativity scenario, i.e., when choosing option 3 in GEN-no option. The behavior of B in the generativity scenarios is similar to that of a standard dictator with one recipient gives around 30% of the wealth donation to the recipient. Indeed, also in our treatment where there is just one recipient instead, i.e., in treatment 1REC, player A takes for himself around 70%, considering the efficiency factor.

- *Result 2c*: The donation of the dictator is positively related to the amount that he/she expects the intermediate recipient will donate to his/her own indirect recipient, and on average the dictator expects an equal split of the amount received by the intermediate recipient. The welfare of the indirect recipients is lower than the welfare of direct recipients since intermediate recipients embezzle part of the donation for themselves. The intermediate recipients behave like a dictator with one recipient, instead of equal splitting as A would expect.

While Table 5 considers choice and beliefs for the actual amount donated by A, we can additionally analyze the amount that B donates to C for each possible amount received by A since Bs' choices are elicited via the strategy method, which deepens the path of indirect reciprocity. Figure 2 presents the average donation of B and beliefs of A and C for every possible amount that A might transfer to B. Note that what clearly emerges is that B chooses to donate a fixed proportion (around 25%) of the amount received by A; also, A and C expect the donation of B to be a fixed proportion of the amount received, despite this expected proportions tend to be higher than the actual one. The second order beliefs of B represented in the same figure confirm Bs' awareness of donating less than expected by others' players.
To sum up, B disappoints the expectations of A and C is aware of it. Further details on the conditional choices and beliefs of the B-players in GEN-no-option and GEN-option are provided in Appendix B.

4.3 Preference for the generativity setting

In the GEN-option treatment we have the possibility to investigate behaviors of those that self-select into a donation scenario where B has the further possibility to donate, that is the third option, and compare their behaviors with those assigned to this scenario, i.e., treatment GEN-no-

[18]When there is just one recipient instead, i.e., in treatment 1REC, player A take for himself a greater proportion, around 70%.

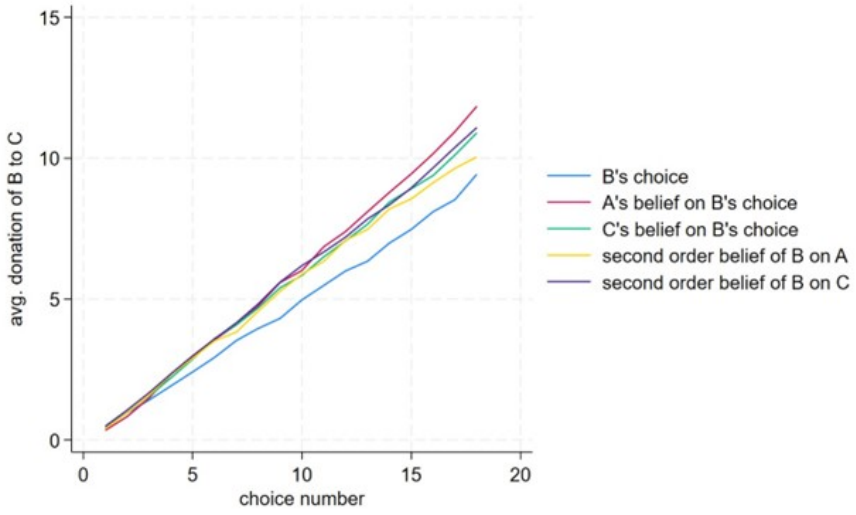

Figure 2: Bs' choices and beliefs on B's choices in GEN-no option and GEN-option

option. The third option is selected by 70% of players (28 out of 40) in the GEN-option treatment; this evidence suggests that the majority of subjects are interested in the welfare of both recipients, trying to give both a positive earning; as already noticed in Table 1, Table 7 confirms that there is not on average a significant difference in the amount donated in the two treatments. Also, the donations of players selecting option 3 in GEN-option tend to be strikingly greater than the donations of those selecting options with one recipient as shown Table 1 and further illustrated by Figure 3. Also, the choices of the intermediate recipient reported in Table 5 do not show relevant differences.

- *Result 3a*: most participants, around 70%, prefer the potentially generative scenario.
- *Result 3b*: the donation behavior of the dictator and the intermediate recipient is not affected by self-selection into the generative scenario.

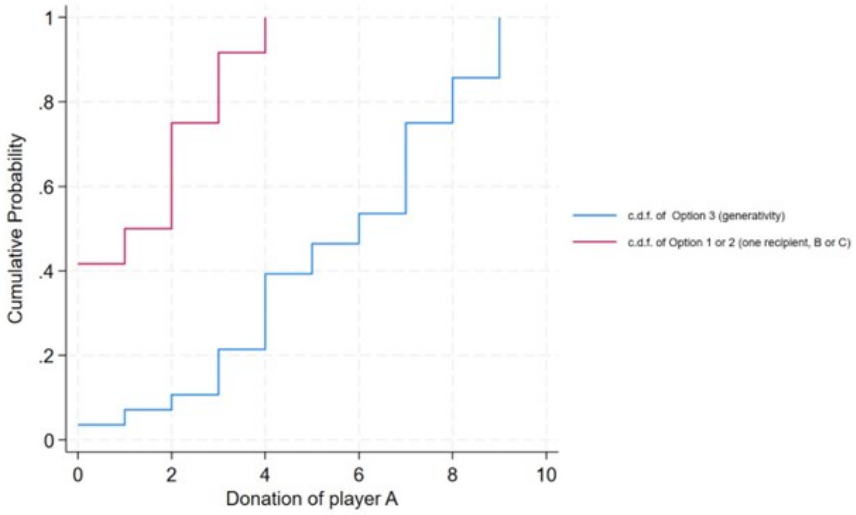

Figure 3: Cumulative distribution function of Donation in treatment GEN-option by option

Table 7: Hurdle Regression on A-players' Donations

Treatments Gen-no-option and Gen-option option (iii)		
	(1)	(2)
Treatment "GEN-no-option" (base-level)		
Treatment "GEN-option"	1.59	-1.18
	(0.96)	(0.95)
Constant	8.90	-5.94
	(2.63)	(6.75)
Demographic Controls	✓	✓
Observations	58	58

Notes: Regressions (1) and (2) are the first and second hurdle of a double hurdle model. The dependent variables in (1) and (2) are respectively dummy variables equal to 1 when donation is positive, and the level of donation; Treatment is a categorical variable equal to 1 (base-level) if GEN-no-option, 4 if GEN-option. Demografic controls are sex, age, year and field of study, experience with experiments. Table 4C in the appendix report the regression with demographic controls.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5 Discussion and implications for future research

In this paper, we report the results of an experiment designed to investigate the taste for generativity hypothesis, defined as a preference for the direct and indirect positive outcomes of one's giving on others' prosocial behaviors, in an extended dictator game setting. Relative to what is observed in a standard dictator game with a single recipient, we find that: i) the dictator's giving increases with the number of receivers, regardless of whether they are direct or indirect; ii) the more the dictator expects the direct intermediate recipient to give to the indirect final recipient in the generative scenario, the higher his/her giving; and iii) when given the choice of which setting to participate in, the dictator significantly prefers the generative scenario with two beneficiaries—one direct and one indirect—over the standard game with a single direct recipient.

Result i) demonstrates a taste for the enhanced consequences of personal actions, specifically the growth in the number of recipients. This differs from the pure enjoyment of the quantitative increase in the total amount given (more akin to a warm glow) and relates to the pleasure of having more individuals as beneficiaries of personal actions. Result ii) specifically addresses the taste for the indirect positive outcome of the dictator's giving (related to the receiver's giving) and thus differs from the warm glow associated with personal giving, irrespective of the total final outcome. According to our definition, in a warm glow perspective, the dictator should care only about the amount of her giving, regardless of whether it produces indirect reciprocity. Therefore, giving in *1-REC* should not differ from giving in *GEN-no-option*, and the dictator should be indifferent when choosing between the two settings. Result iii) provides further evidence in favor of the dictator's taste for generativity; when allowed to choose, he/she is much more inclined to participate in *GEN-no-option* than in *1-REC*.

A question we may pose is about the specific component of generativity related to the taste for indirect giving. In this regard, in addition to the strong preference expressed by the dictator for the generative scenario in *GEN-option*, we also document a significantly higher amount given by the dictator in *GEN-no-option* compared to *1-REC*. This allows us to affirm that, despite the implicit risk of being exploited by the direct recipient in the generative scenario, the possibility of benefiting the indirect final beneficiary represents a strong driver of the dictator's giving.

These findings provide additional insights into the existing evidence that demonstrates a preference for giving among human beings. When we compare our results with those of Harbaugh et al. (2007), which show through revealed preferences and neural imaging that individuals, *ceteris paribus*, prefer to give more, we identify an additional preference for the number of direct recipients and for the indirect giving of the receivers. This distinction helps us disentangle the concepts of warm glow and generativity. In this context, generativity does not exclude the hypothesis that it may encompass a preference for indirect reciprocity, which can be considered one of the drivers of receiver giving.

A somewhat surprising result is the "embezzling" behavior of the direct intermediate recipient in the generative treatment, whereby he/she deliberately chooses to give less than what he/she believes the dictator expects him to give. This finding echoes what is generally observed in trust investment games, where generous choices made by the trustor in the first stage often do not pay off in terms of the amount sent back by the trustee and fall short of his/her expectations. In this respect, Our findings evoke a possible rationale for a regulation of transparency and destination rules regarding intermediaries' behavior when receiving large amounts of funds through private donations. Although our experiment does not exactly reflect real-life situations where individual donors "intermediate" their giving to third parties through NGOs and specialized organizations, rules preventing embezzling behavior by the latter could help mitigate disappointment and reduce the flow of donations when a sequential giving game involving individual donors, NGOs, and third parties becomes multiperiod. However, it is important to note that, unlike in the reality of donors and NGOs, recipients in our experiment do not have a legal obligation to use the money received to increase the well-being of third parties, even though dictators in our lab experiments expect them to do so.

Our study suggests directions for further research. Future laboratory experiments could test the robustness of our results across cultures and over different periods of time, while field experiments may assess their external validity. Alternative experimental designs can be proposed and implemented to better disentangle the preference for generativity from pure altruism and other forms of other-regarding preferences. Additionally, the connections between generativity, indirect reciprocity, and guilt aversion could be explored in greater depth.

Our main conclusion is that our findings shed light on a little explored dimension of individual preferences and behavior. Individuals exhibit a strong inclination toward generativity, influenced by societal expectations. This inclination leads them to make generative decisions that often disappoint their expectations in terms of indirect reciprocity (the giving behavior of the receiver). This combination of inclination, expectations, and unexpected future disappointment is a powerful force driving human giving and social dynamics.

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Replication files

The data and code for replicating the results of this paper are available online in the following repository: https://osf.io/ygkm4/?view$_only = 8c38730aaf6e4de7bd0cea124fa8766d$

Appendix

A Instrucions

The Italian version of the instructions which comprise the figures that illustrate the structure of the choices to the participants are available in the Supplementary Material.

GENERAL INSTRUCTIONS TREATMENT 1 REC

Instructions

Welcome to this experiment. Thank you for coming. These Instructions are to help you to understand what you are being asked to do during the experiment, and how you can earn money from it. This will be paid to you in cash after you have completed the experiment.

Do not talk with others for the duration of the experiment. If you have a question, please write in the chat and one of the experimenters will answer your question in private. These rules hold for all participants.

In this experiment there is a participation fee of 3 euros, which will be added to whatever you earn in the experiment.

General rules

This experimental session will comprise two consecutive phases: phase 1 and phase 2. One of the two phases will be randomly drawn for payment at the end of the experiment tossing a coin. The instructions of phase 2 will be distributed at the end of phase 1.

At the beginning of the experiment, the computer will randomly assign you to a group of 2 participants. The identity of the other participants in your group will not be revealed to you either during the experiment or after. After forming the group, the computer will assign each participant to one of two possible roles, A or B. The random assignment of the roles will guarantee that every participant in the group has a different role. All the choices you will make in your role will remain anonymous: neither the participants in your group nor the experimenter will be able to connect your identity to your decisions.

PHASE 1 INSTRUCTIONS TREATMENT 1 REC

In this phase A will have to choose how to split 18 euros equal to 18 with B. In particular, A will have to choose an integer number of euros between 0 and 18 (0,1,2 and so on until 18 euros) to transfer to B. Given A's choice, B will receive 2 times the amount transferred by A.

Calculation of earnings in phase 1

The earnings of A will be equal to

18 euros- amount transferred to B.

The earnings of B will be equal to

2 x amount transferred by A.

The choices made by A, as well as the corresponding earnings of A and B, will be communicated to the two participants in the group at the end of phase 2. If this phase will be drawn for the final payment, you will receive an amount of euros determined according to the rules described above in addition to the 3 euros for participating in the experiment.
Before proceeding with phase 1, you will have to answer the questions that will appear on the screen to check your understanding of the instructions of this phase. If at any point you have questions, click on the icon "Salvagente" on the top right of the screen and one of the organizers will come to assist you.

PHASE 2 INSTRUCTIONS 1REC

Phase 2

In this phase you will be asked to guess the choices or expectations of the other participant in your group in phase 1. If phase 2 will be drawn for final payment, your earnings in this phase will depend on the correctness of your guess. In particular, if your guess is correct your earnings in this second phase will be equal to 10 euros; if this is not correct, your earnings will be equal to 5 euros.

B will be asked to guess the choice of A: B have to guess how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 1).
A will be asked to guess the conjecture of B: A will be asked to guess the expectation of B on how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 2).
All the guessing expressed in this phase must be integer number between 0 and 18: 0,1,2, and so on until 18. All conjectures refer to the amount before being multiplied by 2.

GENERAL INSTRUCTIONS TREATMENT 2 REC

Instructions

Welcome to this experiment. Thank you for coming. These Instructions are to help you to understand what you are being asked to do during the experiment, and how you can earn money from it. This will be paid to you in cash after you have completed the experiment.
Do not talk with others for the duration of the experiment. If you have a question, please write in the chat and one of the experimenters will answer your question in private. These rules hold for all participants.
In this experiment there is a participation fee of 3 euros, which will be added to whatever you earn in the experiment.

General rules

This experimental session will comprise two consecutive phases: phase 1 and pha se 2. One of the two phases will be randomly drawn for payment at the end of the experiment tossing a coin. The instructions of phase 2 will be distributed at the end of phase 1.
At the beginning of the experiment, the computer will randomly assign you to a group of 3 participants.

The identity of the other participants in your group will not be revealed to you either during the experiment or after. After forming the group, the computer will assign each participant to one of three possible roles, A, B or C. The random assignment of the roles will guarantee that every participant in the group has a different role. All the choices you will make in your role will remain anonymous: neither the participants in your group nor the experimenter will be able to connect your identity to your decisions.

PHASE 1 INSTRUCTIONS TREATMENT 2 REC

In this phase A will have to choose how to split 18 euros equal to 18 with B and C. In particular, A will have to choose an integer number of euros between 0 and 18 (0,1,2 and so on until 18 euros) to transfer to B, and an integer number of euros between 0 and 18 (0,1,2 and so on until 18 euros) to transfer to C. Given A's choice, B will receive 2 times the amount transferred by A to B, and C will receive 2 times the amount transferred by A to C.

Calculation of earnings in phase 1

The earnings of A will be equal to

18 euros- amount transferred to B - amount transferred to C.

The earnings of B will be equal to

2 x amount transferred by A to B.

The earnings of C will be equal to

2 x amount transferred by A to C.

The choices made by A, as well as the corresponding earnings of A, B, and C, will be communicated to the three participants in the group at the end of phase 2. If this phase will be drawn for the final payment, you will receive an amount of euros determined according to the rules described above in addition to the 3 euros for participating in the experiment.

Before proceeding with phase 1, you will have to answer the questions that will appear on the screen to check your understanding of the instructions of this phase. If at any point you have questions, click on the icon "Salvagente" on the top right of the screen and one of the organizers will come to assist you.

PHASE 2 INSTRUCTIONS 2REC

Phase 2

In this phase you will be asked to formulate one or two conjectures on the choices or expectations of the other participants in your group in phase 1. If phase 2 will be drawn for final payment, your earnings in this phase will depend on the correctness of your guess. If you have expresses two conjectures in this phase, one of the two will be randomly drawn for payment. In particular, if the selected guess is correct your earnings in this second phase will be equal to 10 euros; if this is not correct, your earnings will be equal to 5 euros.

C will be asked to guess:

1. the choice of A: C have to guess how much of the initial 18 euros A has transferred to C in phase 1 (see Figure 1).

B will be asked to guess:

1. the choice of A: B have to guess how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 1).

A will be asked to guess:

1. the conjecture of B on A's choice: A will be asked to guess the expectation of B on how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 2).

2. the conjecture of C on A's choice: A will be asked to guess the expectation of C on how much of the initial 18 euros A has transferred to C in phase 1 (see Figure 2).

All the guessing expressed in this phase must be integer number between 0 and 18: 0,1,2, and so on until 18. All conjectures refer to the amount before being multiplied by 2.

GENERAL INSTRUCTIONS TREATMENT GEN-NO-OPTION AND GEN-OPTION

Instructions

Welcome to this experiment. Thank you for coming. These Instructions are to help you to understand what you are being asked to do during the experiment, and how you can earn money from it. This will be paid to you in cash after you have completed the experiment.
Do not talk with others for the duration of the experiment. If you have a question, please write in the chat and one of the experimenters will answer your question in private. These rules hold for all participants.
In this experiment there is a participation fee of 3 euros, which will be added to whatever you earn in the experiment.

General rules

This experimental session will comprise two consecutive phases: phase 1 and pha se 2. One of the two phases will be randomly drawn for payment at the end of the experiment tossing a coin. The instructions of phase 2 will be distributed at the end of phase 1.
At the beginning of the experiment, the computer will randomly assign you to a group of 3 participants. The identity of the other participants in your group will not be revealed to you either during the experiment or after. After forming the group, the computer will assign each participant to one of three possible roles, A, B or C. The random assignment of the roles will guarantee that every participant in the group has a different role. All the choices you will make in your role will remain anonymous: neither the participants in your group nor the experimenter will be able to connect your identity to your decisions.

PHASE 1 INSTRUCTIONS TREATMENT GEN-NO-OPTION

Phase 1

In this phase A will have to choose how to split 18 euros equal to 18 with B. In particular, A will have to choose an integer number of euros between 0 and 18 (0,1,2 and so on until 18 euros) to transfer to B. Given A's choice, B will receive 2 times the amount transferred by A.

B will have to choose how to split the amount received with C. In particular, B will have to choose an integer number of euros between 0 and the amount received by A to transfer to C. Given A's and B's choices, C will receive the amount transferred by B.

Calculation of earnings in phase 1

The earnings of A will be equal to

18 euros- amount transferred to B.

The earnings of B will be equal to

2 x amount transferred by A – amount transferred to C.

The earnings of C will be equal to

amount transferred by B.

B will make his/her choice before knowing the amount transferred by A. In particular, B has to choose the amount to transfer to C for every possible amount that A might have chosen (1,2,. . . ,18 euros). Since there are 18 possible cases, B has to make 18 choices. It is not necessary for B to make any choice for the case where A has chosen to transfer 0 to B; in this latter case indeed B could not transfer any amount to C. Out of the 18 choices made by B, only the one which corresponds to the actual amount transferred by A will be used to determine the earnings of this phase.

All choices must consist of an integer amount.

The choices made by A and B, as well as the corresponding earnings of A, B, and C, will be communicated to the three participants in the group at the end of phase 2. If this phase will be drawn for the final payment, you will receive an amount of euros determined according to the rules described above in addition to the 3 euros for participating in the experiment.

Before proceeding with phase 1, you will have to answer the questions that will appear on the screen to check your understanding of the instructions of this phase. If at any point you have questions, click on the icon "Salvagente" on the top right of the screen and one of the organizers will come to assist you.

PHASE 2 INSTRUCTIONS TREATMENT GEN-NO-OPTION

Phase 2

In this phase you will be asked to guess the choices and expectations of the other participants in your group in phase 1. If phase 2 will be drawn for final payment, one of the guesses will be randomly selected and your earnings in this phase will depend on the correctness of your guess. In particular, if the guess selected is correct your earnings in this second phase will be equal to 10 euros; if this is not correct, your

earnings will be equal to 5 euros.

C will have to guess:

1. The choice of A: C has to guess how much of the initial 18 euros A has chosen to transfer to B in phase 1 (see Figure 1);
2. The choices of B: C has to guess the amount that B has chosen to transfer to C in phase 1 for every possible amount received by A (see Figure 2);

B will have to guess:

1. The choice of A: B has to guess how much of the initial 18 euros A has chosen to transfer to B in phase 1 (see Figure 3);
2. The conjectures of A on B's choices: B has to guess how much A expects that B has transferred to C in phase 1 for every possible amount received by A (see Figure 4).
3. The conjectures of C on B's choices: B has to guess how much C expects that B has transferred to C in phase 1 for every possible amount received by A (see Figure 5).

A will have to guess:

1. The conjecture of B on A's choice: A has to guess how much B expects that A has transferred to B in phase 1 of the initial 1 euros (see Figure 6).
2. The conjecture of C on A's choice: A has to guess how much C expects that A has transferred to B in phase 1 of the initial 1 euros (see Figure 7).
3. The choices of B: A has to guess the amount that B has chosen to transfer to C in phase 1 for every possible amount received by A (see Figure 8);

All the guessing expressed in this phase must be integer number.

PHASE 1 INSTRUCTIONS TREATMENT GEN-OPTION

Phase 1

In this phase A will have to choose how to split 18 euros with another participant.
There are 3 Options among which A will have to choose:

- Option 1: A can split 18 euros with B, and C receives nothing.
- Option 2: A can split 18 euros with C, and B receives nothing. .
- Option 3: A can split 18 euros with B. B can split with C the amount received by A.

Hence, A will then have to:

1. Select either Option 1, Option 2 or Option 3 (Figure 1).
2. Choose an integer number of euros between 0 and 18 (0,1,2, and so on until 18 euros) to transfer to B if A has chosen Option 1 (Figure 2) or Option 3 (Figure 3); choose an integer number of euros between 0 and 18 (0,1,2, and so on until 18 euros) to transfer to C if A has chosen Option 2 (Figure 4).

Calculation of Earnings in phase 1 with Option 1
If A selects Option 1 the earnings will be determined as follows:
Given the choice of A, B will receive an amount of euros equal to 2 times the amount transferred by A, while C will receive nothing.

The earnings of A will be equal to
18 euros- amount transferred to B.

The earnings of B will be equal to
2 x amount transferred by A.

The earnings of C will be equal to 0 euros.

Calculation of Earnings in phase 1 with Option 2
If A selects Option 2 the earnings will be determined as follows:
Given the choice of A, C will receive an amount of euros equal to 2 times the amount transferred by A, while B will receive nothing.

The earnings of A will be equal to
18 euros- amount transferred to C.

The earnings of B will be equal to 0 euros.

The earnings of C will be equal to
2 x amount transferred by A.

Calculation of Earnings in phase 1 with Option 3

If A selects Option 3 the earnings will be determined as follows:
Given the choice of A, B will receive an amount of euros equal to 2 times the amount transferred by A. B will have to choose an integer number of euros between 0 and the amount received by A to transfer to C. Given A's and B's choices, C will receive the amount transferred by B

The earnings of A will be equal to
18 euros- amount transferred to B.

The earnings of B will be equal to
2 x amount transferred by A- amount transferred to C.
The earnings of C will be equal to
amount transferred by B.

Note that before communicating to B and C the option chosen by A and the amount transferred, B will be asked to choose the amount to transfer to C for every possible positive amount that he/she could receive from A (1,2,. . . ,18 euros) as if A would have chosen Option 3. As there are 18 possible cases, B has to make 18 choices (Figura 5).It is not necessary for B to make any choice for the case where A has chosen to transfer 0 to B; in this latter case indeed B could not transfer any amount to C. If A choose Option 3, out of the 18 choices made by B, only the one which corresponds to the actual amount transferred by A will be used to determine the earnings of this phase. All choices must consist of an integer amount.
The choices made by A and B, as well as the corresponding earnings of A, B, and C, will be communicated to the three participants in the group at the end of phase 2. If this phase will be drawn for the final payment, you will receive an amount of euros determined according to the rules described above in addition to the 3 euros for participating in the experiment.
Before proceeding with phase 1, you will have to answer the questions that will appear on the screen to check your understanding of the instructions of this phase. If at any point you have questions, click on the icon "Salvagente" on the top right of the screen and one of the organizers will come to assist you.

PHASE 2 INSTRUCTIONS TREATMENT GEN-OPTION

Phase 2

In this phase you will be asked to guess the choices and expectations of the other participants in your group in phase 1. If phase 2 will be drawn for final payment, one of the guesses will be randomly selected and your earnings in this phase will depend on the correctness of your guess. In particular, if the guess selected is correct your earnings in this second phase will be equal to 10 euros; if this is not correct, your earnings will be equal to 5 euros.

C will have to guess:

(i) how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 1C), assuming that A has chosen Option 1.

(ii) how much of the initial 18 euros A has transferred to C in phase 1 (see Figure 2C), assuming that A has chosen Option 2.

(iii) how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 3C), assuming that A has chosen Option 3.

(iv) the amount that B has transfered to C in phase 1 for each possible amount received by A, assuming that A has chosen Option 3 (see Figure 4C).

If this phase will be drawn for payment, the conjecture that will be used to determine the earnings of C will be selected in the following way: if A has chosen Option 1, one of the conjecture (i) and of the 18 conjectures (iv) will be randomly drawn and used to determine the payment of C for this phase; if A has chosen Option 2, one of the conjecture (ii) and of the 18 conjectures (iv) will be randomly drawn and used to determine the payment of C for this phase; finally, if A has chosen Option 3, one of the conjecture (iii) and of the 18 conjectures (iv) will be randomly drawn and used to determine the payment of C for this phase.

Note that the conjectures (iv) can always be used for payment of C in this phase because in phase 1 B has chosen how much to transfer to C for every possible amount received by A (18 choices) before knowing the Option actually chosen by A e the amount actually transferred by A to B. Remember that the choices of A and B in phase 1 will be revealed just at the end of phase 2.

B will have to guess:

(i) how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 1B), assuming that A has chosen Option 1.

(ii) how much of the initial 18 euros A has transferred to C in phase 1 (see Figure 2B), assuming that A has chosen Option 2.

(iii) how much of the initial 18 euros A has transferred to B in phase 1 (see Figure 3B), assuming that A has chosen Option 3.

(iv) the amount that C expects to receive from B for every possible amount received by A, assuming that A has chosen Option 3 (see Figure 4B).

(v) the amount that A expects that B transfers to C for every possible amount received by A, that is the conjecture of A, assuming that A has chosen Option 3 (see Figure 5B).

If this phase will be drawn for payment, the conjecture that will be used to determine the earnings of B will be selected in the following way: if A has chosen Option 1, one of the conjecture (i), of the 18 conjectures (iv) and of the 18 conjectures (v) will be randomly drawn and used to determine the payment of C for this phase; if A has chosen Option 2, one of the conjecture (ii), of the 18 conjectures (iv) and of the 18 conjectures (v) will be randomly drawn and used to determine the payment of C for this phase; finally, if A has chosen Option 3, one of the conjecture (iii), of the 18 conjectures (iv) and of the 18 conjectures (v) will be randomly drawn and used to determine the payment of C for this phase.

Note that the conjectures (iv) and (v) can always be used for payment of B in this phase because these referes to the conjectures expressed by A and C on the choices of B in phase 1. Indeed, remember that B has chosen how much to transfer to C for every possible amount received by A (18 choices) before knowing the Option actually chosen by A e the amount actually transferred by A to B: the choices of A and B in phase 1 will be revealed just at the end of phase 2.

A will have to guess:

(i) the amount that B expects to receive from A, that is the conjecture expressed by B, assuming that A has chosen Option 1 (see Figure 1A).

(ii) the amount that C expects to receive from A, that is the conjecture expressed by C, assuming that A has chosen Option 2 (see Figure 2A).

(iii) the amount that B expects to receive from A, that is the conjecture expressed by B, assuming that A has chosen Option 3 (see Figure 3A).

(iv) the amount that C expects that B receives from A, that is the conjecture expressed by C, assuming that A has chosen Option 3 (see Figure 4A).

(v) the amount that B has transfered to C for every possible amount received by A, that is the choices of B, assuming that A has chosen Option 3 (see Figure 5A).

If this phase will be drawn for payment, one of the 22 conjectures expressed by A will be randomly drawn to determine the earnings of A.

Note that all conjectures expressed by A can always be used for payment of A in this phase because conjectures (i), (ii), (iii), (iv) referes to the conjectures expressed by B and C in this phase before knowing the Option actually chosen by A e the amount actually transferred by A to B; conjectures (v) refers to the choices of B in phase 1 on much to transfer to C for every possible amount received by A (18 choices) before knowing the Option actually chosen by A e the amount actually transferred by A to B. Remember

that the choices of A and B in phase 1 will be revealed just at the end of phase 2.

All the guessing expressed in this phase must be integer number.

B Bs' choices

The choices are elicited via the strategy method, so we can then analyze the amount Bs' wants to donate to C for each possible amount received by A. B chooses to donate to C on average 5.21 euros in treatment GEN-no option and 4.38 euros in treatment GEN-option, which correspond respectively to a proportion of endowment received equal to 27% and 23%. Although the amount that Bs on average choose to donate in GEN-no-option is slightly higher than in GEN-option, the difference narrows down when considering the actual amount donated according to choices implemented based on As' decisions, i.e., 2.93 and 2.50, which are the one reported in Table 5 (*cfr.* Table 1B). Detailed figures on B choices and related expectations are reported in the following tables (Tables 2B and 3B), as well as graphic representations.

Table 1B: Donations of Bs' participants

GEN-NO-OPTION																			
Endowment of B	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	**Avg.**
Donation to C	0.50	1.10	1.63	2.2	2.77	3.33	3.93	4.53	4.7	5.43	6.16	6.66	7.07	7.57	8.07	8.57	9.17	10.43	**5.21**
	(.09)	(.17)	(.24)	(.32)	(.39)	(.46)	(.54)	(.62)	(.70)	(.75)	(.79)	(.83)	(.89)	(.95)	(1.06)	(1.16)	(1.22)	(1.34)	**(.66)**
Avg. Donation to C	**2.93 (0.72)**																		
GEN-OPTION																			
Donation to C	0.45	0.87	1.25	1.7	2.15	2.62	3.22	3.52	4.02	4.62	4.97	5.5	5.8	6.55	7.02	7.75	8.05	8.67	**4.38**
	(0.08)	(0.12)	(0.18)	(0.24)	(0.31)	(0.35)	(0.49)	(0.49)	(0.57)	(0.64)	(0.69)	(0.80)	(0.86)	(0.92)	(1.02)	(1.09)	(1.18)	(1.24)	**(0.60)**
Avg. Donation to C	**2.50 (0.60)**																		

Notes: This table reports the average donation of B to C for each possible endowment, i.e., the amount received by A, in treatment GEN-no option and GEN-option. The average donation which is the choice corresponding to the actual endowment received (i.e., only when option 3 is chosen in GEN-option) by A is also reported for each treatment.

Table 2B: Expectations of A and C on Bs' choices

GEN-NO-OPTION																			
Endowment of B	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	**Avg.**
Expectation of A	0.40 (.09)	0.97 (.17)	1.6 (.22)	2.43 (.30)	3.07 (.36)	3.8 (.43)	4.47 (.51)	5.17 (.57)	6.23 (.59)	6.70 (.72)	7.63 (.76)	8.07 (.82)	8.83 (.86)	9.57 (.91)	9.87 (0.99)	10.33 (1.10)	11.07 (1.15)	12 (1.21)	**6.23 (.62)**
Expectation of A for actual Endowment	**5.11 (0.65)**																		
Expectation of C	0.4 (.09)	0.87 (.17)	1.33 (.24)	2 (0.32)	2.63 (0.40)	3.4 (.45)	3.8 (.48)	4.6 (.56)	4.97 (.60)	5.53 (.71)	6.2 (.79)	6.83 (.92)	7.63 (.98)	8.5 (1.05)	8.83 (1.21)	9.4 (1.30)	9.9 (1.39)	10.77 (1.47)	**5.42 (.68)**
Expectation of C for actual Endowment	**3.5 (0.80)**																		
GEN-OPTION																			
Expectation of A	.3 (.08)	.72 (.14)	1.4 (.19)	2.22 (.25)	2.85 (.31)	3.37 (0.35)	3.8 (.42)	4.45 (.48)	5.1 (.54)	5.5 (.62)	6.27 (.67)	6.9 (.74)	7.55 (.79)	8.2 (.85)	9.12 (.96)	10.02 (1.01)	10.85 (1.07)	11.72 (1.13)	**5.57 .56**
Expectation of A for actual Endowment	**3.88 (0.51)**																		
Expectation of C	0.4 (.09)	0.87 (.17)	1.33 (.24)	2 (0.32)	2.63 (0.40)	3.4 (.45)	3.8 (.48)	4.6 (.56)	4.97 (.60)	5.53 (.71)	6.2 (.79)	6.83 (.92)	7.63 (.98)	8.5 (1.05)	8.83 (1.21)	9.4 (1.30)	9.9 (1.39)	10.7 (1.47)	**5.71 (0.64)**
Expectation of C for actual Endowment	**3.00 (0.58)**																		

Notes: This table reports the expectations of A and C on the amount donated by B to C in treatment GEN-no option and GEN-option for every possible endowment received by A. Their expectations for the choice corresponding to the actual endowment received (i.e., only when option 3 is chosen in GEN-option) by A is also reported for each treatment.

Table 3B: Second order beliefs of B on A and C

GEN-NO-OPTION																			
Endowment of B	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	**Avg.**
Second order belief of B on A	0.46 (.10)	1 (.16)	1.7 (.24)	2.33 (.33)	2.83 (.40)	3.6 (.46)	3.87 (.53)	4.57 (.61)	5.07 (.69)	5.7 (.78)	6.2 (.86)	6.8 (.94)	7.33 (1.03)	8 (1.11)	8.43 (1.21)	9.03 (1.30)	9.43 (1.39)	9.87 (1.55)	**5.35 (.73)**
Second order belief of B on A for actual endowment	**4.42 (0.76)**																		
Second order belief of B on C	0.53 (.10)	1.13 (.19)	1.77 (.20)	2.27 (.37)	2.9 (.45)	3.43 (.55)	4.07 (.63)	4.7 (.72)	5.33 (.79)	5.9 (.87)	6.43 (.95)	6.9 (1.05)	7.63 (1.13)	8.2 (1.20)	8.97 (1.27)	9.67 (1.37)	10.43 (1.44)	11.03 (1.54)	**5.63 (.81)**
Second order belief of B on C for actual endowment	**4.23 (0.83)**																		
GEN-OPTION																			
Second order belief of B on A	.35 (.08)	.92 (.14)	1.5 (.2)	2.3 (.26)	2.95 (.32)	3.45 (.37)	3.8 (.40)	4.57 (.48)	5.42 (.56)	6.02 (.64)	6.45 (.71)	7.3 (.75)	7.57 (.84)	8.35 (.88)	8.65 (.95)	9.2 (1.01)	9.8 (1.06)	10.17 (1.16)	**5.48 (.56)**
Second order belief of B on A for actual endowment	**3.33 (0.54)**																		
Second order belief of B on C	.45 (.09)	1 (.15)	1.6 (.22)	2.4 (.28)	3.05 (.36)	3.7 (.42)	4.25 (.46)	4.92 (.55)	5.8 (.60)	6.4 (.71)	6.85 (.74)	7.42 (.79)	8 (.8)	8.45 (.87)	8.92 (.93)	9.65 (.99)	10.35 (1.05)	11.12 (1.12)	**5.79 (.5)**
Second order belief of B on C for actual endowment	**3.70 (0.61)**																		

Notes: This table reports the expectations of B on the expectations of A and C on the amount donated by B to C in treatment GEN-no option and GEN-option for every possible endowment received by A. Their expectations for the choice corresponding to the actual endowment received (i.e., only when option 3 is chosen in GEN-option) by A is also reported for each treatment.

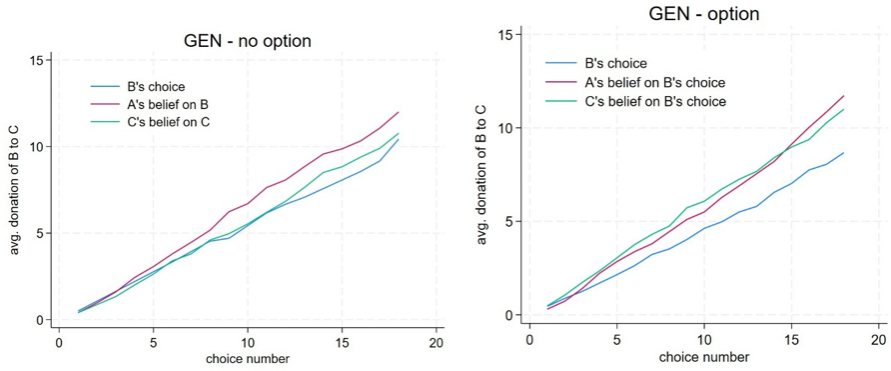

Figure 1B: As' and Cs' expectations on B choices in GENno option and GEN-option

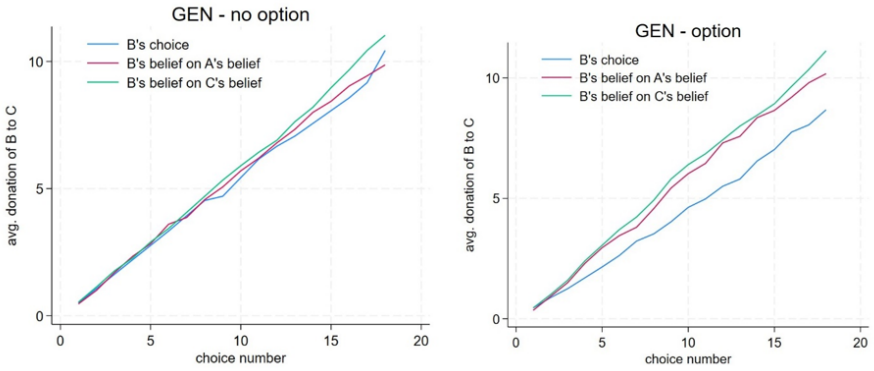

Figure 2B: Bs' expectations on A's and Cs' expectations on B choices in GEN-no option and GEN-option

C Regressions with demographics

Table 1C: Hurdle Regression on A-players' Donations

Treatments: GEN-no-option, 2REC, 1 REC

	Model 1 total donation of A		Model 2 average donation of A	
	(1)	(2)	(3)	(4)
Treatment "GEN" (base-level)				
Treatment "2REC" Treatment "2REC"	0.12	-0.20	0.12	-4.44***
	(0.46)	(0.89)	(0.46)	(1.04)
Treatment "1REC" Treatment "1REC"	-0.52	-3.29**	-0.52	-3.21**
	(0.43)	(1.06)	(0.43)	(0.99)
Male	-0.82*	0.26	-0.82*	0.76
	(0.36)	(0.93)	(0.36)	(0.94)
Age	0.16	0.04	0.16	0.02
	(0.12)	(0.06)	(0.12)	(0.06)
Bachelor	0.79	0.52	0.79	0.47
	(0.50)	(0.83)	(0.50)	(0.86)
Economics	-0.31	-0.59	-0.31	-0.48
	(0.41)	(0.90)	(0.41)	(0.89)
Experience	-0.10	-2.60	-0.10	-2.41
	(0.51)	(1.39)	(0.51)	(1.37)
Constant	-2.09	7.59***	-2.09	7.75***
	(2.74)	(1.91)	(2.74)	(1.99)
Observations	90	90	90	90

Notes: Regressions (1-3) and (2-4) are the first and second hurdle of a double hurdle model. The dependent variables in (1-3) and (2-4) are respectively dummy variables equal to 1 when donation is positive, and the level of donation; in (3) is considered the sum of donations of A to B and C in Treatment 2REC, while in (4) the average donation to B and C in Treatment 2REC. Regressors. Treatment is a categorical variable equal to 1 (base-level) if GEN-no-option, 2 if 2REC, and 3 if 1REC. Male is a dummy variable equal to 1 if male, 0 otherwise. Age is expressed in years. Bachelor is a dummy variable equal to 1 if bachelor student, 0 otherwise. Economics is a dummy variable equal to 1 if a student of economics, 0 otherwise. Experience is a dummy variable equal to 1 if already participated in an experiment, 0 otherwise.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2C: Regressions on A-players' Donation: Beliefs of A on B and C expectations

	GEN-no-option (1)	GEN-no-option (2)	2REC (3)	2REC (4)	1REC (5)	GEN-option (6)	GEN-option (7)
Sob A on B	0.53*		0.48***		0.099	0.76***	
	(0.20)		(0.10)		(0.13)	(0.18)	
Belief A on C		0.73***		0.6***			0.53*
		(0.14)		(0.10)			(0.20)
Male	1.23	0.73	-0.66	-1.12*	-0.02	-0.33	-1.20
	(1.61)	(1.17)	(0.54)	(0.46)	(1.10)	(0.92)	(1.11)
Age	1.48*	0.97	0.044	0.06**	-0.23	0.097	0.23
	(0.67)	(0.53)	(0.02)	(0.02)	(0.273)	(0.21)	(0.25)
Bachelor	4.04	3.40	0.09	-0.40	1.12	1.09	0.96
	(2.64)	(2.06)	(0.49)	(0.41)	(1.16)	(1.22)	(1.45)
Economics	0.80	-0.73	0.16	0.19	-0.79	-0.25	-0.10
	(1.43)	(1.09)	(0.60)	(0.50)	(1.16)	(0.87)	(1.04)
Experience	3.80	2.65	-0.68	-0.64	-2.44	-0.47	-0.61
	(2.75)	(2.12)	(0.82)	(0.69)	(1.42)	(0.88)	(1.04)
Constant	-36.34	-23.90*	1.11	0.74	9.64	-1.72	-2.60
	(17.60)	(13.75)	(0.96)	(0.81)	(6.05)	(5.27)	(6.37)
Observations	30	30	30	30	30	28	28

Notes: All Regression area linear OLS regression. In all regression the dependent variable is the amount donated by A to B, except for Regression (4) where that considers the amount donated by A to C; in regression (6) and (7) it is consider the donation to B only when the third option is chosen. Regressors. Sob (second order belief) of A on B is the belief of A on the conjecture of B on the amount transferred to B by A. Belief of A on C is the belief of A on the conjecture of C on the amount transferred to B by A in all regressions, except for regression (4) where this is the belief of A on the conjecture of C on the amount transferred by A to C. Male is a dummy variable equal to 1 if male, 0 otherwise. Age is expressed in years. Bachelor is a dummy variable equal to 1 if bachelor student, 0 otherwise. Economics is a dummy variable equal to 1 if a student of economics, 0 otherwise. Experience is a dummy variable equal to 1 if already participated in an experiment, 0 otherwise.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3C: Regressions on A-players' Donation – Beliefs of A on B's donation

	GEN-no-option (1)	GEN-option (2)
Belief A on B	0.80***	0.64**
	(0.18)	(0.21)
Male	0.84	0.71
	(0.87)	(0.15)
Age	1.55*	-0.01
	(0.56)	(0.13)
Bachelor	4.47*	0.36
	(2.22)	(0.79)
Economics	1.03	-0.88
	(0.69)	(0.57)
Experience	6.16*	-0.16
	(2.41)	(0.55)
Constant	-42.62**	-1.01
	(14.93)	(6.04)
Observations	30	28

Notes: All Regression area linear OLS regression. In all regressions the dependent variable is the amount donated by A to B; in regression (2) is the donation to B only when the third option is chosen. Regressors. Belief of A on B is the belief of A on the amount transferred by B to C. As the beliefs of A on B's choices are elicited for every possible amount that A has transferred to B, in this analysis we consider only the belief of A for the amount actually transferred to B. Male is a dummy variable equal to 1 if male, 0 otherwise. Age is expressed in years. Bachelor is a dummy variable equal to 1 if bachelor student, 0 otherwise. Economics is a dummy variable equal to 1 if a student of economics, 0 otherwise. Experience is a dummy variable equal to 1 if already participated in an experiment, 0 otherwise.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4C: Hurdle Regression on A-players' Donations

Treatments Gen-no-option and Gen-option option (iii)		
	(1)	(2)
Treatment "GEN-no-option" (base-level)		
Treatment "GEN-option"	1.59	-1.18
	(0.96)	(0.95)
Male	-5.71	1.19
	(263)	(1.04)
Age	-0.12	0.53*
	(0.35)	(0.27)
Bachelor	-1.24	2.27
	(1.21)	(1.39)
Economics	0.19	-0.41
	(0.78)	(0.93)
Experience	0.11	-0.92
	(1.09)	(1.18)
Constant	8.90	-5.94
	(2.63)	(6.75)
Observations	58	58

Notes: Regressions (1) and (2) are the first and second hurdle of a double hurdle model. The dependent variables in (1) and (2) are respectively dummy variables equal to 1 when donation is positive, and the level of donation; Treatment is a categorical variable equal to 1 (base-level) if GEN-no-option, 4 if if GEN-option. Male is a dummy variable equal to 1 if male, 0 otherwise. Age is expressed in years. Bachelor is a dummy variable equal to 1 if bachelor student, 0 otherwise. Economics is a dummy variable equal to 1 if a student of economics, 0 otherwise. Experience is a dummy variable equal to 1 if already participated in an experiment, 0 otherwise.

Significance of coefficients: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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