WORKING PAPERS

N° TSE-592

July 2015

"What if women earned more than their spouse? An experimental investigation of work division in couples"

François Cochard, Hélène Couprie and Astrid Hopfensitz

Toulouse School of Economics

What if women earned more than their spouse?

An experimental investigation of work division in couples

François Cochard[*], Hélène Couprie[**] and Astrid Hopfensitz[‡]

July, 2015

Abstract

Female specialization on household work and male specialization on labor-market work is a widely observed phenomenon across time and countries. Gender differences regarding characteristics (preferences, productivity) and context (wage rates, social norms) are generally recognized to explain this fact. We experimentally investigate work division by true co-habiting couples participating in a newly developed specialization task. Efficiency in this task comes at the cost of inequality, giving higher earnings to the "advantaged" player. We compare behavior when men (or women) are in the advantaged position, which correspond to the traditional (or power) couple case where he (or she) earns more. We show that women do not contribute more than men to the household public good whatever the situation. This result allows us to rule-out some of the standard explanations of the work division puzzle.

JEL Codes: D13, C99, J16

Keywords: Experiment on couples, Time allocation, Work division

[*] Université de Franche-Comté (CRESE), fcochard@univ-fcomte.fr, 30 Avenue de l'observatoire, 25030 Besançon, France
[**] Université de Cergy-Pontoise (THEMA), helene.couprie@gmail.com. 33 Bd du Port, 95011 Cergy-Pontoise, France
[‡] Toulouse School of Economics, astrid.hopfensitz@tse-fr.eu, 21 Allee de Brienne, 31000 Toulouse, France

1. Introduction

Labor specialization by men and women is widely observed across time and cultures (Blau and Kahn, 2007). When living in a couple women, especially mothers, tend to withdraw from the labor market and focus on household work, whereas men tend to increase their hours of labor market work (e.g. Alger and Cox, 2012). Even in couples where the wife earns more than her husband, we usually still observe equal or even more investment by women in household public goods (Brines, 1994; Rizavi and Sofer, 2010; Sevilla-Sanz, Gimenez-Nadal, & Fernandez, 2011). This absence of gender neutrality with respect to work division is known as the "work division puzzle". Two factors could cause this phenomenon. Either net-benefits extracted from domestic work relative to labor market work differ between men and women.[1] Given this ratio of net-benefits, specialization would therefore be a sign of efficient resource allocation by the household. Or intrinsic gender norms lead women to contribute to the household public good (e.g. Greig and Bohnet, 2009). In this case policies aimed at increasing female labor participation might not be effective as long as they cannot overcome these norms.

Theoretical household models give a framework that details how available time can be transformed into individual net-benefits in couples. The main mechanism for this is the household production concept (Becker, 1981; Gronau, 1977; Sofer, 1985). Similar to a public good, household services are produced using family members' effort. However while public good dilemmas usually assume that the contribution of every member increases efficiency, this is not necessarily the case for household domestic goods. Productivity differences across household members might be causing the observed unequal work allocation in couples (e.g. Becker, 1981). Productivity at housework compared to labor market wages might be greater for women than for men. If women have a comparative advantage at home whereas their partners have a comparative advantage on the labor market, the efficient couples would choose a strongly gendered work division. In such a case, efficient allocation of resources in the household causes gender specialization. When interested in work division in families we therefore have to investigate how spouses interact in situations requiring task specialization.

Investigating the causes of gender specialization in families is naturally constrained by the availability of information on relative domestic productivity levels. While productivity on the labor market can be easily approximated by observed wage rates, domestic productivity is difficult to measure. One of the rare exception is domestic production in agricultural economies. In addition even in cases where productivity is measurable, this does not imply that the affected household members are actually aware of these differences. The additional impact of social pressure through neighbors, colleagues or family members, is

[1] Benefits can be material but might also be related to status or emotions. Benefits also have to be adjusted for either material or non-material costs.

even harder to control. Social pressure might indeed constitute a significant cost associated with deviations from gender norms. We therefore propose an experimental investigation into spouses' behavior in an environment where a household public good can be produced and relative advantages are such that efficiency requires specialization. Our 'specialization game' will allow us to investigate the counterfactual where women earn more from non-public good investment than men, which corresponds to the work division puzzle. We can further eliminate the impact of social pressure by allowing for choices in an anonymous environment. Tasks requiring specialization, as we propose it, have not yet been experimentally studied. Since our specialization game is structured such that efficiency comes at the cost of inequality, a strong concern for efficiency is required by the disadvantaged player to make contributions to the public good. Family economics assumes such a strong efficiency interest among spouses.[2]

The empirical evidence confirms that women contribute more to household public goods (for example childcare) than men (see Hoddinott and Haddad, 1995; Thomas, 1990, for developing countries; and Lunderg and Pollack, 1997, for the U.K.). Also women are often considered to be more caring, friendly and oriented towards cooperation than men (Balliet et al., 2011). Results from experimental social dilemma games among strangers sometimes supports this view and sometimes contradicts it. The reason seems to lie in a higher sensitivity to social context by women (Ledyard, 1995; Eckel and Grossman, 2008; Croson and Gneezy, 2009; Balliet et al., 2011). An important empirical question is, to which degree existing gender differences in social situations are shaped by society (through institutions, norms and social pressure) and to which degree they are internalized. The psychological costs of social pressure by being observed and judged, can have important consequences for behavior (e.g. Hoffman et al. 1994; Masclet et al., 2003). At the same time cognitive dissonance, due to not being able to comply with an internalized norm, can hurt the self-image and equally influence behaviors (e.g. Bénabou and Tirole, 2001; Murnighan et al., 2001). The origin of gender differences concerning altruism and cooperation has also been related to sociocultural or evolutionary arguments (Balliet et al., 2011; Alger and Cox, 2012). The general conclusion is that generalizable gender differences for behavior in social dilemmas are unlikely to exist and that an understanding of gender differences requires a separate analysis for different types of interactions and situations. Family interactions are both from an evolutionary and sociocultural perspective crucial for men and women. Controlled experiments on family interactions suggest so far that men care more for efficiency, whereas women tend to care more for equality (Cochard et al, forthcoming;

[2] The existence of efficiency concerns also among unrelated individuals has been suggested by Engelmann and Strobel, (2004) and Engelmann and Strobel (2006) and been discussed in Bolton and Ockenfels (2006) and Fehr et.al. (2006).

Beblo and Beninger, 2012; Kamas and Peston, 2012). Since in many experimental paradigms efficiency and equality are correlated, distinguishing these two motives requires a specific approach.

We study spouses' behavior in a novel specialization task and compare behavior to a situation involving a standard voluntary contribution mechanism (e.g. Isaac and Walker, 1988). In both cases investment in the private good contributes to an increase in own payoff whereas investment in the public good leads to the production of a good equally distributed among spouses. The specialization task creates an asymmetric situation in which returns from the private good are higher for one of the spouses compared to his/her partner.[3] The participant that will in the following be called "the advantaged player" will generate larger returns from private investment than from public good investment. If gender differences concerning public good contribution are internalized, we expect behavior in the experiment to reflect this and women to invest more in the public good, regardless of private returns. If gender differences do not concern public good contributions in general, but are rather related to efficiency and equality concerns, our design allows us to disentangle these. If however real world gender differences are mainly caused by external factors (differences in payoffs or social pressure), we expect that men and women will react in the same way to being in either the advantaged or disadvantaged position.[4]

Previous experimental studies on couples' behavior in social dilemmas have rejected the idea that maximal efficiency is achieved (Cochard et al., forthcoming; Iversen et al., 2011; Ashraf, 2009; Mani, 2008). Nevertheless relatively high efficiency levels are observed and a significant proportion of couples maximizes efficiency. However, by definition, social dilemmas are structured such that contribution to the public good implies maximization of efficiency. Our specialization game presents a situation where for the "advantaged" spouse, private investment is maximizing own payoffs but also efficient for the household. Thus our design eliminates the dilemma nature for the advantaged spouse if he aims at own payoff maximization and efficiency. However if spouses care at the same time for efficiency and for equality of earnings from the game, this creates a new sort of dilemma. The advantaged player has to trade-off maximizing household income or equalizing private payoffs for both partners. As previously discussed, spouses have been observed to show a concern for equality of earnings and might thus face this type of dilemma.

Our results show that couples react to inequalities concerning private returns in the expected way: namely the advantaged spouse (i.e. the one with higher private returns) reduces his/her investment in the public

[3] Specialization in couples has also been studied by Goerges (2015) however for a task where spouses jointly decide whether to specialize or not and who of the two partners should take the role of the 'advantaged' player.

[4] In other domains (Gneezy et al, 2009) it has been shown that gender differences can be inverted given different institutions. Specifically it was observed that the generally believed greater competitiveness of men disappears in a matriarchic culture.

good and increases his investment in the private good. We further observe that the inequality concerning private returns causes symmetric behavior dependent on whether either the man or the woman has a higher private return. Our results thus support in a lab setting the theoretical assumption that labor specialization by spouses is mainly driven by differences in net-benefits from labor market activity, and are not a result of gender specific preferences concerning public good contributions. We further observe a tendency for higher efficiency among men and for more equality among women. We test the robustness of our results by comparing behavior in an abstract task where contributions are defined by the allocation of points and a time allocation task, where contributions depend on actual time invested. Time allocation might provide a more intuitive context to the dilemma (e.g. Loomes, 1999) and thus increases the external validity of our results. Our results concerning gender differences are not affected by this framing however we observe overall higher efficiency levels under the time allocation framing.

2. Task and predictions:

To study the impact of comparative advantages for men or women we will introduce a "specialization task". In this two-player game, efficiency is reached when only one of the two players (the "disadvantaged" player) contributes his entire endowment to a public good. Since public good production is equally distributed on both players, efficiency leads to inequality in earnings. As a baseline we will use a standard two-person public good game that we will describe first.

2.1. Baseline: the symmetric public good game

In the baseline symmetric public good game spouses receive an initial endowment of 20 units and are asked to decide concerning its allocation on either a private or public account. Each unit invested in the public account returns 1.2 as much as one unit invested in the private account. Returns from the public account are equally split across the two spouses. Earnings of a player investing c_s (i.e. contribution by self) in the public good where the partner contributes c_p to the public good are calculated as follows[5]:

$$y_s = 10\ (20 - c_s) + 6\ (c_s + c_p) \qquad (1)$$

We present part of the game matrix in Figure 1.

As usual in these kinds of dilemmas, efficiency would be reached if players chose to cooperate, namely contributing all their endowment to the public good (c_s=20; c_p=20). The Nash-equilibrium predicts mutual defection for two selfish individuals (c_s=0; c_p=0) in a one-shot interaction and this corresponds to the

[5] We present here the actual point earnings also used in the experiment. To avoid calculations with fractions, each unit invested in the private account returns 10 experimental units, and each unit invested in the public good returns 6 experimental units to each of the two spouses.

lowest earnings for both players. Since even strangers present other-regarding preferences in these types of games, we expect this phenomenon to be even stronger for couples.[6] Indeed the maximization of joint earnings (implying that both spouses contribute to the public good) occurs more frequently in couples than when strangers play together (Cochard *et al.*, forthcoming). In the case of our symmetric game, predictions of individual behavior dependent on three extreme cases of social preferences are summarized in Table 1. An own-payoff maximizing agent (pure selfishness) would contribute nothing to the public good ($c_s = 0$). A player who aims at maximizing spouse's payoff (extreme altruism) would do the opposite ($c_s = 20$). Finally, a purely inequality averse agent would always act as he believes his/her partner to do in order to minimize the difference in earnings. Denoting self-beliefs about the partner's contribution: $\boldsymbol{\mathcal{B}}c_p$, he simply contributes: $c_s = \boldsymbol{\mathcal{B}}c_p$.

2.2 Specialization game

The specialization game reflects the puzzle that occurs when a couple makes a work division choice. For one player, the "advantaged" one, the choice of not investing in the public good is efficient, the individual interest and the couples interest are thus aligned. This could be viewed as the choice of specializing in labor market work instead of contributing to household production when having a higher labor market wage rate.[7] On the contrary, the "disadvantaged" player will have to make a choice that leads to a dilemma between his/her self-interest and the couple's interest. This corresponds to the choice of specialization in household work for the partner who has lower labor market earnings. In this case efficiency and equality are in conflict. The efficient solution in the specialization game is also the most unequal one.

Concretely, as in the baseline game, each individual is endowed with 20 units that have to be allocated between a private and a public account. Earnings from the public account are the same as in the case discussed above. However, earnings from the private account are not the same for both partners. Specifically one of the two players is advantaged and earns from his private account 1.3 times more than the other player. Denoting c_s (*resp.* c_p), the contribution by self (*resp.* partner) to the public account, individual earnings are computed as follows:

[6] In a preceding article, we discuss how model predictions are affected when participants in the experiment are true couples. Efficiency is reached more easily because of two phenomena: a strong aversion to payoff inequality within the couple and the presence of a micro-norm of sharing which contaminates the way individual payoffs are transformed into individual welfare. Because couples have interactions outside of the laboratory (essentially consumption sharing habits) the control of individual payoffs remains imperfect and this generates a complexity in the analysis that we chose not to integrate in this article. The interested reader can refer to Cochard *et al.* (forthcoming) and consider that an income-pooling micro-norm would generate a preference for efficiency during the experiment.

[7] In real life, such specialization could also be due to lower household productivity or to social pressure inflicting additional costs.

$$\begin{cases} y_s^{advantaged} & = 13\,(20 - \ c_s) + \ 6\,(c_s + c_p) \\ y_p^{disadvantaged} & = 10\,(20 - \ c_p) + \ 6\,(c_s + c_p) \end{cases} \quad (2)$$

The game matrix is shown in Figure 2 and predictions according to different kinds of social preferences are presented in Table 1.

In the asymmetric case, an advantaged player that aims at maximizing the joint earnings of the couple (i.e. pure efficiency seeking) should invest all of his units in his private account ($c_s=0$). A disadvantaged partner that aims at maximizing joint earnings of the couple should still invest all units in the public account ($c_s=20$). In contrast, an own payoff maximizing agent will never contribute to the public good ($c_s=0$). A player who aims at maximizing his spouse's payoff would fully contribute ($c_s=20$).

A pure inequality averse agent will act in a way to minimize the difference in earnings (i.e. *min* $|y_s - y_p|$), thus acting in function of his/her beliefs of the partner's action, denoted $\boldsymbol{\mathcal{B}}c_p$. The advantaged spouse will in this case choose:

$$c_s = \frac{60}{13} + \frac{10}{13}\,\boldsymbol{\mathcal{B}}c_p \quad (3)$$

Thus an advantaged individual who is intra-household income inequality adverse contributes despite this solution being not efficient. A purely inequality adverse, disadvantaged spouse will choose:

$$c_s = \begin{cases} -6 + \frac{13}{10}\,\boldsymbol{\mathcal{B}}c_p & if\ \boldsymbol{\mathcal{B}}c_p > \frac{60}{13} \\ 0 & if\ \boldsymbol{\mathcal{B}}c_p \leq \frac{60}{13} \end{cases} \quad (4)$$

In other words: such a player will not contribute to the public good if he believes his partner's contribution will be too small (i.e. lower than 5).

We can imagine linear combinations of any combination of these four extreme strategies (selfish, altruist, efficiency seeker and inequality averse). In this case we might want to differentiate between preferences that give relative stronger weight to self (i.e. y_s) of the form:

$$\widehat{U_s} = \alpha\, y_s + \ \beta\,(y_s + y_p) - (1 - \alpha - \beta)|y_s - y_p| \quad (5)$$

and preferences that give relatively stronger weight to the other (i.e. y_p) of the form:

$$\widetilde{U_s} = \gamma\, y_p + \ \delta\,(y_s + y_p) - (1 - \gamma - \delta)|y_s - y_p| \quad (6)$$

with $0 \leq \alpha, \beta, \gamma, \delta \leq 1$, where α and γ indicate the weight of own (equation 5) and partners (equation 6) earnings, respectively. And where β and δ indicate the additional weight of joint earnings.

While it is difficult to distinguish between preference for equality and efficiency in general social dilemma games, our specialization task allows us to do so. Figure 3 illustrates strategies given an individual's beliefs about his partner's behavior for a player in either an advantaged or disadvantaged position. The shaded area in the left panel indicates belief-choice combinations that are consistent with a function of the form $\widehat{U}_s$ (i.e. some selfish concern). The shaded area in the right panel indicates combinations consistent with a function of type $\widetilde{U}_s$ (i.e. some altruism concern). To investigate the type of preferences in couples we also elicit beliefs among spouses about their partners' actions.

To investigate the symmetry and robustness of our results we will consider a 2 x 2 x 2 x 3 design. Two of these treatment variations are on a between subject level and will be described first. The others are on an in-subject level and will be discussed afterwards.

On a between subject level we will compare treatments where either the man or the woman is advantaged. This will allow us to compare a situation where men have a comparative advantage with the counterfactual where women have the comparative advantage concerning the private good. We will further compare behavior in a setting where from the beginning it was clear that decisions and earnings would remain anonymous and not be revealed to partners, with a situation where from the beginning spouses knew that their actions and earnings would at the end of the experiment be revealed to their partner. This treatment will serve us as control concerning the impact of anonymity on free riding. Treatments concerning who is advantaged (M or W) and whether earnings will be *public* or *private* are conducted in a between subject design (see Table 2).

In an in-subject design we further compare the baseline game with the specialization game described above. We observe three different framings of these games to control for their abstraction level. In the baseline treatment (*Time*), spouses decide how to allocate 5 minutes of time between two abstract work tasks (A and B), one leading to production of the private and the other of the public good. To observe the robustness of these results we compare them to an abstract treatment (*Abstract*), where spouses are asked to invest tokens in either a project A or B. A second control (*Effort*) investigates whether requiring effort in addition to time allocation alters results.

3. Experimental protocol

The experiment was conducted in June 2010 in the laboratory of experimental economics at the Toulouse School of Economics. Overall 86 couples participated in the experiment. The experiment was

computerized and the interface was programmed in Visual Basic. Participants were recruited by newspaper reports about the ongoing study, flyers and information provided on a website. The recruitment information specified that heterosexual couples, more than 20 years old were invited to participate in a study of economic decisions by couples. Couples were required to live together for at least one year (but did not need to be married) and invited to sign up jointly for one two-hour session. The announcements further specified that each couple would earn, dependent on its decisions and on chance, an amount between 60 and 120 Euros for participation.

Mean age by men and women was 35 and 36 years, respectively. Partners had been living together for an average of 9 years, 59% of our participating couples were married or under civil union (PACS) and 40% had at least one child living in their household. Summary statistics can be found in Table 3.

In total 18 sessions were conducted with at least 3 and at most 6 couples present. Great care was taken to explain each part of the instructions as simple as possible and screens were presented in a graphically intuitive way (see Appendices A and B).

Upon arrival participants were invited to a reception room that provided some refreshments and journals. When all couples had arrived, we announced that the study was about to begin and that participants should not communicate in the lab. Couples then entered the lab and were seated in cubicles. Men and women were seated in the front rows and the back rows, respectively. This ensured that partners could not communicate or observe each other during the study.

Couples participated in four experimental parts and a questionnaire part. The timeline of the different parts of the study is described in Table 4. Instructions to the different parts of the experiment were always read aloud. Participants were actively encouraged to ask questions if something was not clear to them. After instructions were read, a short summary of the instructions was displayed on screen and participants had to answer a short control question to test their understanding. When participants had finished reading the summary, and correctly answered the control question, they were invited to enter their decision on screen.

Initial instructions informed participants that they were about to participate in a study on decision making in which they have to take a number of decisions. It was explained that the study would consist of a number of separate parts, each part consisting of one or more decisions to be taken. Earnings from the experiment were calculated in an experimental currency: Francs Toulousains (FT), which were exchanged to euro at the end of the session (20 FT = 1 euro). It was stressed that decisions were individual, private and anonymous with respect to the experimenters and to other couples.

Depending on treatment, subjects were further informed about their payoff being revealed (treatment *public*) to their partner at the end of the session or that payoffs would remain private information and not be revealed to their partner (treatment *private*). Half of the participants were further in a treatment favoring men (M), the other were in a treatment favoring women (W). In the initial instructions it was made clear that the "advantaged" participants would throughout the experiment have higher earning possibilities.

The experiment consisted of three parts. In each of the three parts couples were presented with the decision problems described above concerning investment in either a public or private account. In the first part (treatment *Abstract*) investment was represented in an abstract way using points that could be allocated to either account, denoted A and B to participants. All participants had 20 points at their disposal. In parts two (*Effort*) and three (*Time*) investment was represented in a more concrete way using a time period of 5 minutes (20 intervals of 15 seconds) during which participants worked on a task associated with either account.

In each part the baseline and specialization task were presented. Investment in the private account lead to private earnings of the individual, investment in the public account lead to the production of a public good that was equally redistributed among the partners. In the baseline game each point / time interval invested in the private account earned 10 experimental currency units, and each point / time interval invested in the public account returned 6 experimental currency units to each partner. In the specialization game one of the two partners earned for each point / time interval invested in the private account 13 experimental currency units (i.e. the 'advantaged' player) while the other received only 10 experimental currency units. Earnings from the public account were the same as in the baseline game. The advantaged player was in all three parts either the man or the woman in the couple.

Parts two (*Effort*) and three (*Time*) consisted each of an allocation of work time on two tasks. The difference between the two parts consisted in the fact that in part two (*Effort*) a leisure task was available. This leisure task consisted in the option to surf the Internet. Inactivity in the effort tasks was considered as leisure and lead automatically to a web-browser allowing for Internet access.

The order of the three parts was always the same. The part including leisure was presented before the part without leisure to make participants as unsuspicious as possible about the presence of the leisure option. Specifically we wanted to ensure that participants felt that this environment was natural and that they would not feel inhibited to use the opportunity for leisure. In part three no leisure option was available, and therefore decisions by spouses only concerned the allocation of 5 minutes of time between the two options without imposing effort.

Concretely, in parts two (*Effort*) and three (*Time*), both tasks were identical and, as before, denoted as A and B. They both consisted of copying phone numbers from a list but corresponded to either a public or a private investment with different pay-offs for the individual and the couple. Payment for both tasks was by time spent on the task and not by quantity nor quality of the work done. By doing so we exclude productivity differences due to different ability levels. Specifically participants were paid by interval of 15 seconds, for a total endowment of 5 minutes (i.e. 20 x 15 seconds = 300 seconds). Participants could switch back and forth between tasks and payment was calculated by the total amount of time spend on either task. The task was rather easy and participants had a 3 minutes time interval to familiarize themselves with the task and the computer interface that allowed switching between the different options.

In part three (*Time*) payment was not dependent on effort (having actually worked and typed numbers) but solely on the time the participant chose to spend on the computer interface corresponding to either task. The whole time endowment was therefore allocated between the public or private account. In part two (*Effort*) this was not necessarily the case: specifically inactivity was considered as leisure and therefore not counted in either account.[8] While working, participants could see in real-time how much time they had left and how much time they had already spent on the two tasks.

Final earnings were determined by one randomly selected game out of each part.[9] Spouses could therefore not deduce from earnings the actions of their partner. In the treatment with common knowledge concerning earnings, partners knew from the beginning that their earnings and actions would be made known to their partner at the end. In the treatment with private information about earnings each player was privately informed about his/her earnings.

4. Results

4.1. Choices

We first focus on the sustainability of task specialization in the couple during the experiment. We start our analysis with observations from treatments involving time allocation (Time), see Figure 4. Average contributions to the public good in the baseline public good situation are 17.1 (5.7)[10]. As expected,

[8] After 15 seconds without entering a correct number, participants received a visual warning. After another 15 seconds without typing they were sent to the leisure task (in part three, there was only a visual warning but no sanction in the absence of typing).

[9] Before final payout participants entered a chat phase (Part 5, see Table 4). This phase allows us to observe possible transfers between partners after finishing the experiment. Specifically partners were given the option to decide to allocate part of their earnings to a common envelope if desired. Independent of their decision each participant received a private envelope, the content of which was not revealed to the partner.

[10] Standard deviations are in parentheses.

contributions are not different for advantaged or disadvantaged players (Mann Whitney by advantage,[11,12] women: p = 0.938, men: p = 0.552). In the specialization game players with low returns from the private good invest about 16.7 (6.6) of their available resources in the public good. By contrast advantaged players that have higher returns from their private good invest only about 4.4 (6.9) of their resources in the public good (see Figure 5 for individual distributions). As efficiency requires that the advantaged spouse does not contribute, this implies that in both games spouses reach a mean efficiency level[13] of about 80%. Efficiency is not different for advantaged or disadvantaged players (Mann Whitney by advantage, women: p = 0.553, men: p = 0.193). On a couple level more than 75% of couples have a mean efficiency level equal or above 70% (see Figure 6 for the distributions). The difference concerning efficiency in the baseline and specialization game is not significant (Sign test for matched pairs,[14] p = 1.000). Our first result is therefore the following:

Result 1: *Participants react to the asymmetry in returns from the private good. Advantaged players reduce their investment in the public good and increase their investment in the private good. As a result efficiency is at the same level in the baseline game and the specialization game.*

This result is surprising because, on average, the outcome therefore represents much higher intra-household earnings inequality in the specialization game than in the baseline. It has been shown that partners in a dictator game type allocation task tend to favor inefficient solutions for the couple when confronted with high levels of intra-household income inequality (Beblo et al., 2015). The acceptance of inequalities by spouses in this case, provides however support to the idea that implicit mechanism exist on the household level that allow for a redistribution of earnings. Such mechanism could be the presence of a micro-norm of sharing (Cochard et al., forthcoming).

We next question the gender neutrality of result 1. At first glance, Figure 4 suggests that there might be a gender difference in contribution to the public good. These apparent gender effects are in fact not significant (Mann-Whitney, advantaged spouses: p = 0.329, disadvantaged spouses: p = 0.112). This shows that men and women do not react differently to the fact of being in either the advantaged or

[11] Unless otherwise stated, tests are two-sided and we use a 5% threshold of significance to consider that the null hypothesis is rejected.

[12] It is not possible to treat all data (n = 172) as independent observations as each spouse's decision is clearly not independent from his/her partner's decision. Thus, we carry out tests on each sex separately (n = 86 observations for each).

[13] Efficiency for disadvantaged players is computed as their investment divided by 20. For advantaged players, efficiency equals (20 – their investment) / 20. The couple's efficiency rate is simply the mean efficiency rate of the spouses.

[14] The Wilcoxon signed-rank test is preferable whenever the distribution of the differences is symmetric around the median, since it takes into account the magnitude of the differences. However, the assumption of symmetry appears sometimes to be strong in our case, so that we focus primarily on the Sign test, which does not require symmetry. We shall nevertheless warn the reader if the Wilcoxon test gives a different conclusion.

disadvantaged position. Thus contrary to theories that ascribe specialization to internalized norms, we observe no evidence of women investing more in the public good than men. Both men and women contribute around 80% of their resources to the public good when in the disadvantaged position, and around 20% when in the advantaged position.

Result 2: *In the specialization game, men and women react in the same way to being in either the advantaged or disadvantaged position. We observe no gender differences concerning investment in the public good.*

Overall, these results are robust to the possibility of real leisure (treatment Effort). Contribution of time units in treatments Time and Effort is not significantly different (see Table 5 for descriptive statistics and Table 6 for tests). Indeed actual observed effort was high in treatment Time, even though only time intervals were remunerated. Across treatments men and women typed approximately eight ten-digit phone numbers per minute (i.e. about 80 keystrokes per minute). This seems close to the typing speed of non-trained two-finger typists (Brown, 1988). This suggests that subjects felt as much compelled to provide an effort in treatment Time than in treatment Effort, although no sanction actually existed in the former. In addition, subjects did not take much leisure in treatment Effort, which would have decreased efficiency with respect to treatment Time (the average time of leisure is of 3.13 seconds in the Baseline game, and of 3.49 seconds in the specialization game). As contributions do not differ much across the Time and Effort treatments, Result 1 and 2 are globally confirmed for the latter treatment.

Turning to the *Abstract* treatment, we note that overall efficiency levels are affected. We note that efficiency levels tend to be slightly higher in the *Time* treatments compared to the *Abstract* treatments (Table 5). This difference is significant at $p < 0.05$ in the symmetric public good tasks and in the specialization task for disadvantaged subjects (Table 6). We therefore see more efficient outcomes when decisions are framed in a more naturalistic and involving way. Time investment might have focused participants on the trade off between the two tasks by forcing them to switch during the 5 minutes time interval from one task to the other. Abstract investment on the other hand might be more abstract and give rise to some sort of aversion of zero investment in one of the two tasks.[15] Finally, it should be noticed that despite these differences, Result 1 and Result 2 are also verified for the Abstract treatment.

We finally observe that behavior is robust to earnings being *private* or *public* (see Table 5). Contributions to the public good (in both the public good game and the specialization game) are on average slightly

[15] Note that our time allocation paradigm cannot be necessarily compared to experiments using real-effort tasks to influence fairness norms (e.g. Kroll et al., 2007). While real-effort tasks introduce some property right framing to individual earnings, time allocation does not necessarily require effort and represents just another way to state preferences for the allocation of investment.

higher when earnings are public information. However this effect is very small and not significant. The fact that contributions and not efficiency is higher under public information however lends further support to the hypothesis that efficiency loss is not due to free riding but to other-regarding preferences, e.g. for equality of payouts. This interpretation would be also in line with earlier findings that indicate a concern for equality among spouses (Beblo et al., 2012).

4.2. Preferences

Choices lead in the specialization task as well as in the baseline, to efficiency levels of around 80%. We might however wonder whether this can be ascribed to preferences for efficiency or to preferences for equality given optimistic beliefs about the partner. Given that our results are qualitatively neither altered by the availability of information nor by the framing of investment, we will in the following concentrate on results from the Time treatment to investigate the relationship between beliefs and actions. The following results also hold when results from either of the other treatments are used.

Figure 5 confirms that a large proportion of participants (almost 70%) act in a fully efficiency maximizing way. About 20% of participants (i.e. 33 individuals) split their investment between the two investment options. We will use beliefs to investigate if these choices can be interpreted as stemming from inequality aversion. Beliefs are plotted against own actions for advantaged and disadvantaged players in Figure 7. The top panel shows results from the baseline task. Indeed we see that a large proportion of observations falls close to the 45° line. In this task, 64% contributed 20 and declared that they believed that their partner contributed 20. However since the baseline game is symmetric, this might be an indication of concerns for efficiency, for equality or alternatively be the result of a social projection bias (e.g. Glaeser et al, 2000; Sapienza et al., 2013). The projection bias is the belief that people close to us will act like us. The specialization task requires a bit more cognitive effort by the participant to understand the incentive situation of their partner. Our results (Figure 7, bottom panel) confirm that participants do not simply project their own actions on their beliefs about their partner. A large proportion of advantaged participants (42 out of 86) and disadvantaged participants (50 out of 86) reports beliefs that in combination with their own choice lead to maximal efficiency and that are largely asymmetric in actions.

The density distribution plots in Figure 7 also allow us a comparison with the characterization of preferences from Figure 3. We notice that the large majority of observations for advantaged players, 83.7%, fall in the area compatible with functions of type $\widehat{U}_s$ (combination of motives with some selfish concern). While the large proportion of observation for disadvantaged players, 87.2%, falls in the area that is consistent with a function of type $\widetilde{U}_s$ (combination of motives with some altruistic concern). Since the role of advantaged player was randomly allocated and equally distributed over the two sexes, it seems

unrealistic to assume that advantaged players are more selfish while disadvantaged players more altruistic. The more likely interpretation is that for both types of players a mix of efficiency and equality concerns influence behavior. This is in line with earlier results that observe a trade-of between efficiency and equality in couples.

5. Discussion and Conclusion

This paper presents experimental results concerning work division choices made by true couples. We observe behavior in a specialization task and compare choices to a baseline public good task. The specialization task is meant to simulate the dilemma between family and work life experienced by many couples. In addition, it allows us to study the counterfactual where men are in a disadvantaged position concerning their private earnings which occurs in some non-traditional "power couples" (Bloemen and Stancanelli, forthcoming). The efficient outcome is such that one member will increase his private earnings from choosing the efficient option (i.e. specializes into labor market work), whereas the other sacrifices private earnings in order to invest in the household public good (i.e. specializes into household work). We test the robustness of our results given different framings of the investment task (*time* allocation or *abstract*) and whether individual earnings are *private* or *public* within the couple.

Couples react in the expected way in the specialization task. Their behavior is largely compatible with the predictions. Efficiency levels are in the baseline and in the specialization task at about 80%. In particular, advantaged players reduce their contribution to the public good and disadvantaged players maintain their contributions largely unchanged. From comparing the public and private treatment, we did not find evidence of behavior being driven by selfish opportunistic concerns. The baseline versus specialization treatment did not show a change in efficiency despite the increase of inequality at the household level in the specialization game. This striking result is compatible with the existence of an intrinsic coordination mechanism among couples unrelated to inequality in earnings. An income-pooling micro-norm could play such a role (see Beblo and Beninger, 2012; Cochard et al., forthcoming). Besides this main result, some spouses also show clear concerns for equality in the experiment. Framing the task in abstract terms leads to a slight but significant loss in overall efficiency. The more naturalistic time allocation task therefore leads to higher overall earnings for the couple. Time allocation might be seen as a closer resemblance of actual investment decisions in couples and thus lends better external validity to our results.

We observe no significant gender differences. Men and women react almost the same to being in either the advantaged or disadvantaged position in the specialization task. Hence, our results support in an abstract laboratory setting the theoretical assumption that labor specialization by spouses is driven by differences in net-benefits from labor market activity. Contrary to real-life, the work-division puzzle does

not appear in the experiment: when the woman out-earns her spouse ("power" couples) she generally continues to bear the largest part of domestic work. Both the value that men and women attribute to the specific service produced at home (e.g. education of a child) and social pressure with respect to gender norms could matter in the persistence of nowadays work division among couples. Our experiment shows however, that women *do not* have a higher preference for investing in the public good in a household.

Acknowledgements

We would like to acknowledge financial support from the ANR-DFG project TIPI ANR-08-FASHS-018 (French-German co-operation program) and the ANR project TIES ANR-2010-JCJC-1803-01. We are indebted to Klenio Barbosa, Kene Bounmy, Stéphane Cezerra and Marion Podesta for excellent research assistance. All errors remain our own.

References

Alger, I. and D. Cox (2012). The Evolution of Altruistic Preferences: Mothers versus Fathers. LERNA Working Paper, 12.

Andreoni, J. (1990). Impure altruism and donations to public goods: a theory of warm-glow giving. *The Economic journal*, *100*(401), 464-477.

Andreoni, J., and J. Miller (2002). Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica*, *70*(2), 737-753.

Apps, P. and R. Rees (2009). *Public Economics and the Household*. Cambridge University Press.

Ashraf, N. (2009). Spousal Control and Intra-Household Decision Making: An Experimental Study in the Philippines. *American Economic Review*, 99(4): 1245-1277.

Balliet, D., Li, N. P., Macfarlan, S. J. and M. Van Vugt (2011). Sex differences in cooperation: A meta-analytic review of social dilemmas. *Psychological Bulletin*, *137*(6), 881.

Beblo, M., and D. Beninger (2012). Do husbands and wives pool their incomes? Experimental evidence. (No. 2012-10) Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg.

Beblo, M., Beninger, D., Couprie, H. Cochard, F. and A. Hopfensitz (2015). Efficiency-Equality Trade-offs in French and German Couples, *Annales d'Economie et de Statistiques*, 117/118: 233-252.

Becker, G. (1981). *A treatise of the family*. Cambridge, MA: Harvard University Press.

Bénabou, R., and J. Tirole (2006). *Incentives and prosocial behavior*. *American Economic Review*, vol. 96(5), pages 1652-1678.

Blau, B. and F. Kahn (2007). Changes in the labor supply behavior of married women: 1980-2000. *Journal of Labor Economics*, 25(3), 393-438.

Bloemen, H. and E. Stancanelli (forthcoming), Toyboys or Supergirls? An analysis of partners' employment outcome when she outearns him. *Review of Economics of the Household*. DOI 10.1007/s11150-013-9212-y.

Bolton, G. E. and A. Ockenfels (2000). ERC: A theory of equity, reciprocity, and competition. *American Economic Review*, 166-193.

Bosman, R., M. Sutter and F. van Winden (2005). The impact of real effort and emotions in the power-to-take game. *Journal of Economic Psychology*, 26, 407-429.

Brouillette, D. and B. Fortin (2008). Impact de la Prime au travail sur l'effort au travail : une approche expérimentale. CIRANO Project Reports, 2008rp-01, CIRANO.

Brown, C. M. (1988). Human-computer interface design guidelines. Norwood, NJ: Ablex Publishing.

Brüggen, A. and M. Strobel (2007). Real effort versus chosen effort in experiments, *Economics Letters*, 96, 232-236.

Charness, G., and M. Rabin (2002). Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, *117*(3), 817-869.

Cherry, T.L., P. Frykblom and J.F. Shogren (2005). Hardnose the dictator, *American Econommic Review*, 92(4), 1218-1221.

Cochard, F., Couprie, H., Hopfensitz, A. (forthcoming). "Do spouses cooperate? An experimental investigation", *Review of Economics of the Household*, DOI 10.1007/s11150-014-9276-3.

Croson, R., and U. Gneezy (2009). Gender differences in preferences. *Journal of Economic Literature*, 448-474.

Eckel, C. C., and P. J. Grossman (2008). Differences in the economic decisions of men and women: Experimental evidence. *Handbook of experimental economics results*, *1*, 509-519.

Falk, A., and U. Fischbacher (2006). A theory of reciprocity. *Games and Economic Behavior*, *54*(2), 293-315.

Fehr, E., and K. M. Schmidt (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 817-868.

Goerges, L. (2015). The power of love: A subtle driving force for unegalitarian labor division? *Review of Economics of the Household*, 13, 163-192.

Hoffman E., K. McCabe, K. Shachat and V. Smith (1994). Preferences property rights and anonymity in bargaining games. *Games and Economic Behavior*, vol. *7*(3), 346-380.

Glaeser E. L., D. I. Laibson, J. A. Scheinkman and C. L. Soutter (2000). Measuring Trust. *The Quarterly Journal of Economics,* 115(3): 811-846.

Gneezy U., L. L. Kenneth and J. A. List (2009). Gender Differences in Competition: Evidence From a Matrilineal and a Patriarchal Society. *Econometrica*, vol. 77(5), 1637-1664.

Greig, F. and I. Bohnet (2009). Exploring gendered behavior in the field with experiments: Why public goods are provided by women in a Nairobi slum. *Journal of Economic Behavior & Organization*, vol. *70*(1), 1-9.

Gronau, R. (1977). Leisure, home production and work - the theory of the allocation of time revisited. *Journal of Political Economy*, 85(6), 1099-1123.

Hoddinott, J., and L. Haddad (1995). Does female income share influence household expenditures? Evidence from Côte d'Ivoire. *Oxford Bulletin of Economics and Statistics*, *57*(1), 77-96.

Isaac, R. M., and J.M. Walker (1988). Group size effects in public goods provision: The voluntary contributions mechanism. *The Quarterly Journal of Economics*, *103*(1), 179-199.

Iversen, V., Jackson, C., Kebede, B., Munro, A., and A. Verschoor (2011). Do spouses realise cooperative gains? Experimental evidence from rural Uganda. *World Development*, *39*(4), 569-578.

Kroll, S., T.L. Cherry and J.F. Shogren, (2007). The impact of endowment heterogeneity and origin of contributions in best-shot public games. *Experimental Economics*, 10, 411-428.

Loomes, G. (1999). Some lessons from past experiments and some challenges for the future. *The Economic Journal*, *109*(453), 35-45.

Lundberg, S. J., Pollak, R. A., and T. L. Wales (1997). Do husbands and wives pool their resources? Evidence from the United Kingdom child benefit. *Journal of Human Resources*, 463-480.

Mani, A. (2008). Mine, your or ours? The efficiency of household investment decisions: an experimental approach. University of Warwick.

Masclet, D., Noussair, C., Tucker, S., and M.C. Villeval, (2003). Monetary and nonmonetary punishment in the voluntary contributions mechanism. *The American Economic Review*, *93*(1), 366-380.

Murnighan, J. K., Oesch, J. M., and M. Pillutla (2001). Player types and self-impression management in dictatorship games: Two experiments. *Games and Economic Behavior*, *37*(2), 388-414.

Sapienza, P., A. Toldra-Simats, and L. Zingales (2013). Understanding trust. *The Economic Journal*, 123, 1313–1332.

Sofer, C. (1985). *La division du travail entre hommes et femmes*, Economica.

Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of human resources*, 635-664.

Van Vugt, M., De Cremer, D. and D. P. Janssen (2007). Gender Differences in Cooperation and Competition The Male-Warrior Hypothesis, *Psychological Science*, vol. *18*(1), 19-23.

Zelders, M. (1993). Inefficient dissolutions as a consequence of public goods: the case of no-fault divorce. *The Journal of Legal Studies*, 22(2), 503-520.

Tables and Figures

FIGURE 1: Pay-off matrix baseline game.

Partner / Self	$c_p = 0$	$c_p = 1$	…	$c_p = 19$	$c_p = 20$
$c_s = 0$	400 200 200 **0**	402 196 206 10	…	438 124 314 90	440 120 320 100
$c_s = 1$	402 206 196 10	404 202 202 **0**	…	440 130 310 80	442 126 316 90
…	…	…	…	…	…
$c_s = 19$	438 314 124 90	440 310 130 80	…	476 238 238 **0**	478 244 234 10
$c_s = 20$	**440** 320 120 100	**442** 316 126 90	…	**478** 244 234 10	**480** 240 240 **0**

Upper left numbers indicate household payoff (maximized by pure efficiency seeking, best responses of self marked in blue). Lower right numbers indicate the absolute difference in payoffs (minimized by pure inequality aversion, best responses marked in red).

FIGURE 2: Pay-off matrix, specialization task (when self is advantaged)

Partner / Self	$c_p = 0$	$c_p = 1$	$c_p = 2$	$c_p = 3$	$c_p = 4$	$c_p = 5$	$c_p = 6$	$c_p = 7$	...	$c_p = 19$	$c_p = 20$
$c_s = 0$	460 200 260 60	462 196 266 70	464 192 272 80	466 188 278 90	468 184 284 100	470 180 290 110	472 176 296 120	474 172 302 130	...	498 124 374 250	500 120 380 260
$c_s = 1$	459 206 253 47	461 202 259 57	463 198 265 67	465 194 271 77	467 190 277 87	469 186 283 97	471 182 289 107	473 178 295 117	...	497 130 367 237	499 126 373 247
$c_s = 2$	458 212 246 34	460 208 252 44	462 204 258 54	464 200 264 64	466 196 270 74	468 192 276 84	470 188 282 94	472 184 288 104	...	496 136 360 224	498 132 366 234
$c_s = 3$	457 218 239 21	459 214 245 31	461 210 251 41	463 206 257 51	465 202 263 61	467 198 269 71	469 194 275 81	471 190 281 91	...	495 142 353 211	497 138 359 221
$c_s = 4$	456 224 232 8	458 220 238 18	460 216 244 28	462 212 250 38	464 208 256 48	466 204 262 58	468 200 268 68	470 196 274 78	...	494 148 346 198	496 144 352 208
$c_s = 5$	455 230 225 5	457 226 231 5	459 222 237 15	461 218 243 25	463 214 249 35	465 210 255 45	467 206 261 55	469 202 267 65	...	493 154 339 185	495 150 345 195
$c_s = 6$	454 236 218 18	456 232 224 8	458 228 230 2	460 224 236 12	462 220 242 22	464 216 248 32	466 212 254 42	468 208 260 52	...	492 160 332 172	494 156 338 182
$c_s = 7$	453 242 211 31	455 238 217 21	457 234 223 11	459 230 229 1	461 226 235 9	463 222 241 19	465 218 247 29	467 214 253 39	...	491 166 325 159	493 162 331 169
...	...	...	...	...	...	...	...	...	...	...	...
$c_s = 19$	441 314 127 187	443 310 133 177	445 306 139 167	447 302 145 157	449 298 151 147	451 294 157 137	453 290 163 127	455 286 169 117	...	479 238 241 3	481 234 247 13
$c_s = 20$	440 320 120 200	442 316 126 190	444 312 132 180	446 308 138 170	448 304 144 160	450 300 150 150	452 296 156 140	454 292 162 130	...	478 244 234 10	480 240 240 0

Upper left numbers indicate the household payoff (maximized by pure efficiency seeking, best responses marked in blue). Lower right numbers indicate the absolute difference in payoffs (minimized by pure inequality aversion, best responses marked in red).

FIGURE 3: Illustration of strategies given beliefs for linear combinations of the different preferences.

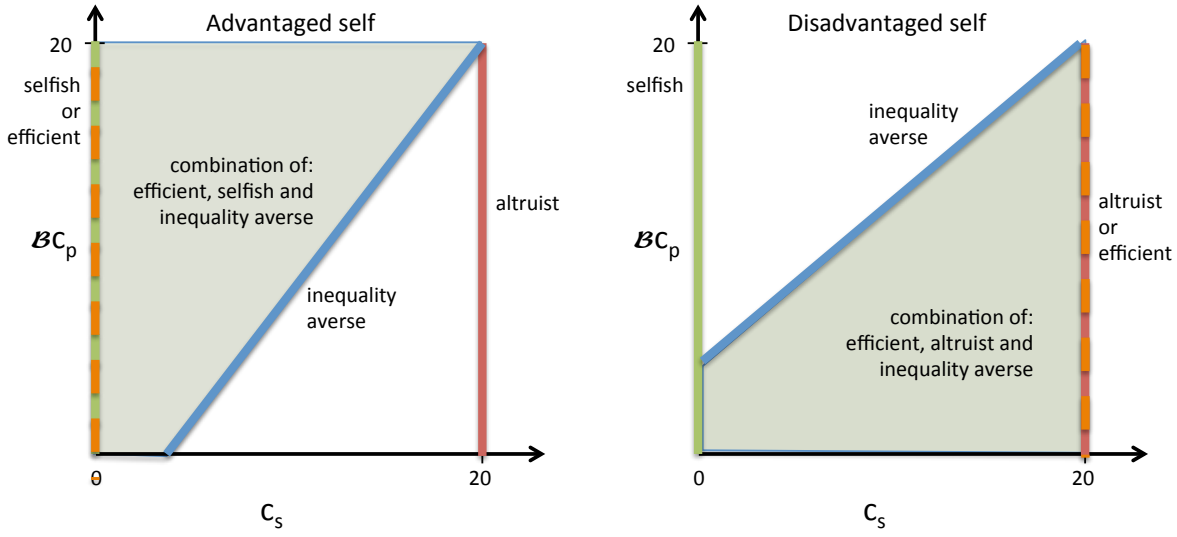
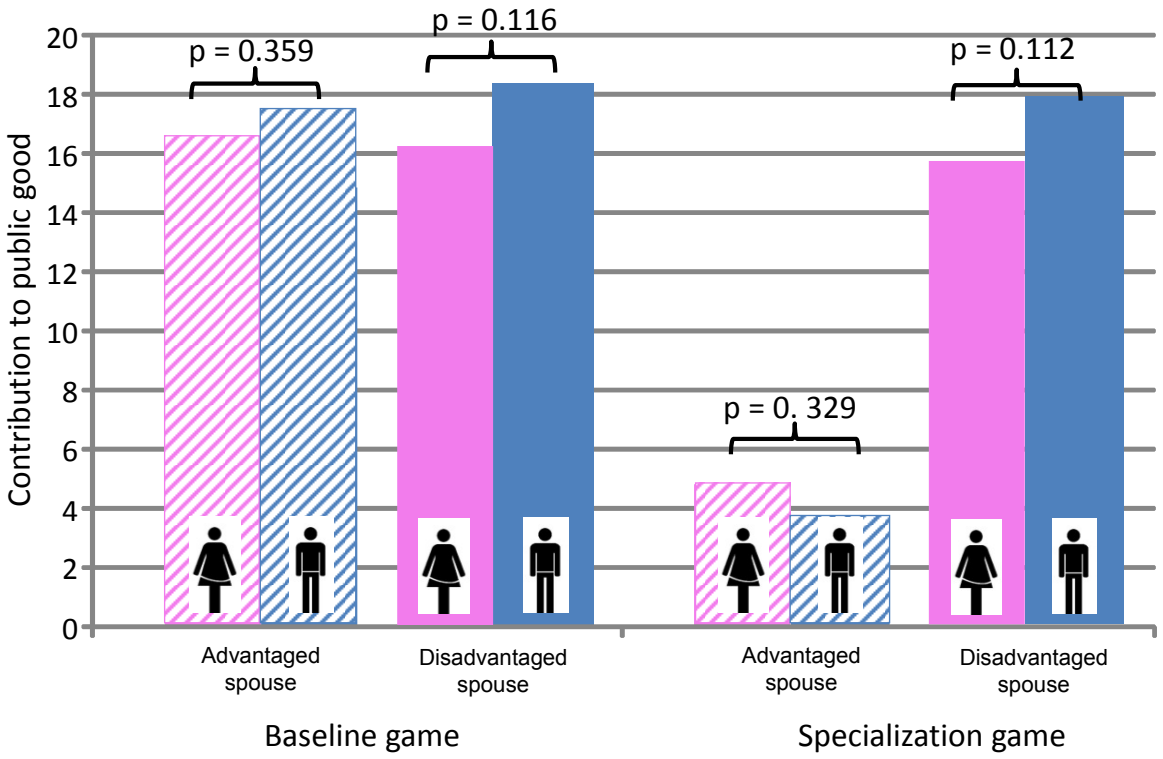


FIGURE 4: Contributions to public good by gender in baseline and specialization task. (treatment *Time*)



Results correspond to the time treatment (part 3 of the experiment). Note that in baseline no player was advantaged but that nevertheless one of the two players knew that he would be advantaged throughout the experiment.

FIGURE 5: Histogram of time investment by advantaged and disadvantaged players in specialization task (treatment *Time*)

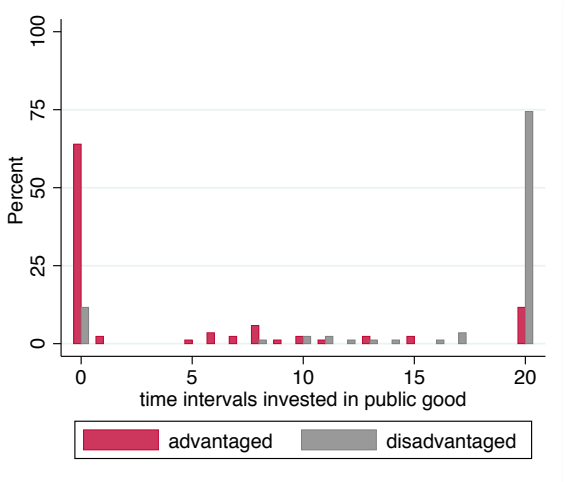
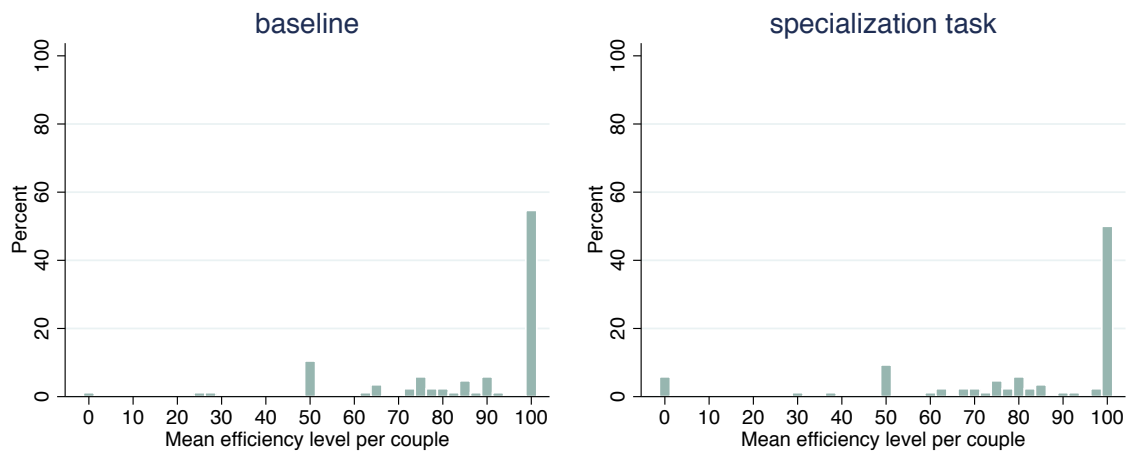


FIGURE 6: Distribution of mean efficiency reached by couples in baseline and specialization task. (treatment *Time*)



Note: Efficiency for disadvantaged players is computed as their investment divided by 20. For advantaged players, efficiency equals (20 – their investment) / 20. The couple's efficiency rate is simply the mean efficiency rate of the spouses.

FIGURE 7: Actions versus beliefs concerning partners' actions for advantaged and disadvantaged players (treatment *Time*).

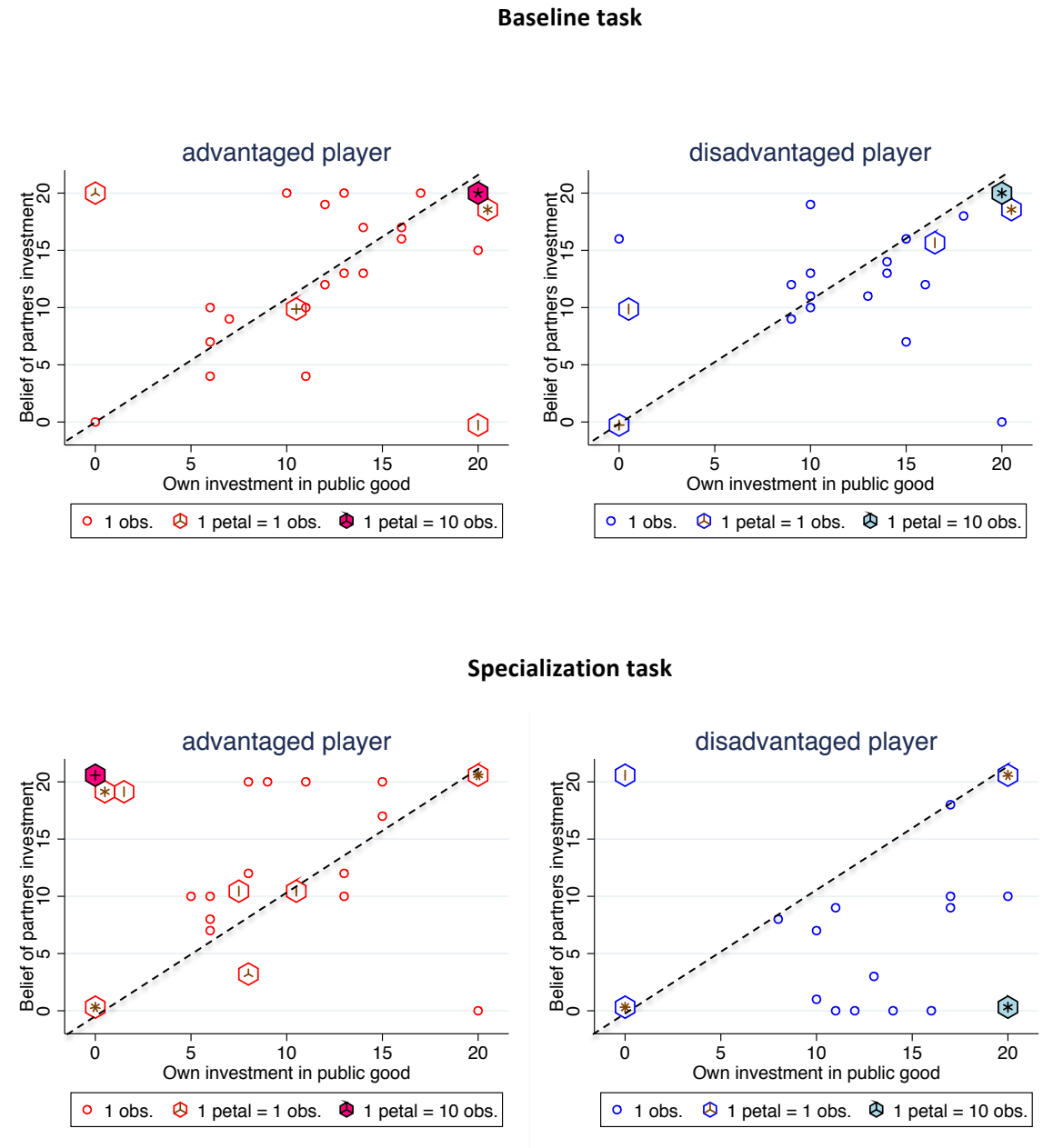


TABLE 1: Predictions dependent on preferences

	selfishness	**altruism**	**efficiency seeking**	**inequality aversion**
	$max\ y_s$	$max\ y_p$	$max\ (y_s + y_p)$	$min\ \lvert y_s - y_p \rvert$
Baseline task				
	$c_s = 0$	$c_s = 20$	$c_s = 20$	$c_s = \mathcal{B}c_p$
Specialization task				
If advantaged:	$c_s = 0$	$c_s = 20$	$c_s = 0$	$c_s = 60/13 + (10/13)\mathcal{B}c_p$
If disadvantaged:	$c_s = 0$	$c_s = 20$	$c_s = 20$	$c_s = \begin{cases} -6 + (13/10)\mathcal{B}c_p \text{ if } \mathcal{B}c_p > 60/13 \\ 0 \qquad\qquad\qquad \text{if } \mathcal{B}c_p \leq 60/13 \end{cases}$

y_s denotes the pay-off for self, y_p partner's pay-off and $\mathcal{B}c_p$ the belief concerning spouse's contribution.

TABLE 2: Overview of between subject treatments

	Public *final earnings public information in couple*	**Private** *final earnings private information in couple*	
M *men favored*	11 couples *(sessions 12, 19)*	32 couples *(sessions 6, 8, 10, 14, 16, 20)*	43 couples
W *women favored*	11 couples *(sessions 13, 21)*	32 couples *(sessions 9, 11, 15, 17, 18, 22)*	43 couples
	22 couples	64 couples	86 couples

Note: Other sessions were carried out but due to software problems results are not reported here.

TABLE 3: Socio-demographic variables of participants (86 couples)

Household variables:	Mean	(std dev)			
Married (dummy)	0.42	0.49			
Civil contract (dummy)	0.17	0.38			
Years as couple	9.45	10.82			
Children living in household (dummy)	0.4	0.49			
Joint account (dummy)	0.59	0.49			
Individual variables:	Women	(std dev)	Men	(std dev)	Correlation
Age	34.69	11.01	36.26	11.19	0.93
Employed (dummy)	0.69	0.47	0.70	0.46	0.37
If employed: hours worked per week	23.83	17.16	25.12	18.26	0.27
Individual monthly net income	1429.18	634.01	1706.27	671.00	0.16
Lived in couple before (dummy)	0.35	0.48	0.28	0.45	0.21
Individual bank account (dummy)	0.85	0.36	0.74	0.44	0.66

TABLE 4: Timeline of experimental sessions

Welcome and general instructions
Part 1: Abstract
situation 1. Baseline: *i)* action, *ii)* beliefs
situation 2. Specialization task: *i)* action, *ii)* beliefs
Familiarization with time allocation task
Part 2: Effort
situation 1: Baseline: *i)* action, *ii)* beliefs
situation 2: Specialization task: *i)* action, *ii)* beliefs
Part 3: Time
situation 1: Baseline: *i)* action, *ii)* beliefs
situation 2: Specialization task: *i)* action, *ii)* beliefs
Part 4: Individual decision task(*)
i) actions, *ii)* beliefs partner, *iii)* beliefs population
Part 5: Chat phase in couple
Socio-demographic questionnaire
Payout (private or public) and good bye

(*) Part 4 is not used in this paper.

TABLE 5: Average investment levels (out of 20 units) in public good across all treatments

Baseline:

Advantaged player:			
	Public (n=22)	Private (n=64)	All (n=86)
Abstract	16.68	15.45	**15.77**
Effort	16.64	16.23	**16.34**
Time	17.82	16.75	**17.02**
All framings	**17.05**	**16.15**	**16.38**
Disadvantaged player:			
	Public (n=22)	Private (n=64)	All (n=86)
Abstract	16.82	15.30	**15.69**
Effort	17.73	16.55	**16.85**
Time	17.95	16.88	**17.15**
All framings	**17.50**	**16.24**	**16.56**

Specialization task:

Advantaged player:			
	Public (n=22)	Private (n=64)	All (n=86)
Abstract	4.55	5.63	**5.35**
Effort	5.09	3.34	**3.79**
Time	4.73	4.23	**4.36**
All framings	**4.79**	**4.40**	**4.50**
Disadvantaged player:			
	Public (n=22)	Private (n=64)	All (n=86)
Abstract	16.68	15.31	**15.66**
Effort	17.00	16.28	**16.47**
Time	17.55	16.41	**16.70**
All framings	**17.08**	**16.00**	**16.28**

TABLE 6: The effect of investment framing on the efficiency of decisions

		Advantaged (n = 86)	**Disadvantaged** (n = 86)
baseline game	Abstract vs. Effort	78.8% - 81.7% (p = 0.081)	78.4% - 84.2% (p = 0.054)
	Abstract vs. Time	78.8% - 85.1% (p = 0.041)	78.4% - 85.8% (p = 0.031)
	Effort vs. Time	81.7% - 85.1% (p = 0.136)	84.2% - 85.8% (p = 0.648)
specialization task	Abstract vs. Effort	73.3% - 79.4% (p = 0.059)	78.3% - 81.7% (p = 0.461)
	Abstract vs. Time	73.3% - 78.2% (p = 0.060)	78.3% - 83.5% (p = 0.027)
	Effort vs. Time	79.4% - 78.2% (p = 0.383)	81.7% - 83.5% (p = 0.096)

In parentheses: p-values of the sign tests on two matched samples (two sided).

Note that in the specialization game, for advantaged players, more efficiency means less contribution to the public good.

APPENDIX A: Instructions (translated from French)

Welcome

The study in which you are going to participate aims at studying economic behavior. More precisely, we are interested in economic decisions in couples.

During this study, we will ask you to respond to questions or to do simple tasks. To do so, we will give you little by little instructions. These instructions are simple. If you pay attention, you can win a significant amount of money. Your earnings will be paid out to you in cash at the end of the study.

This study is financed by a public research funding agency. Please note that there are no right or wrong answers for the questions we will pose you. We just wish to observe how you and your partner behave.

This study consists of multiple parts that have some differing "rules of the game". In each part you will be successively exposed to multiple situations. Each of them will be explained to you in detail, you will then take a decision, answer a question or do a task. Each of your actions will allow you to earn Francs Toulousains (FT for short). Your earnings in Francs Toulousain depend also on the decisions of your partner, boy-friend, girl-friend, husband, wife,... From now on we will simply call him your 'partner'.

At the end of the study, one situation from each part will be randomly drawn by the computer for your payout.

Treatment "private":

You will thus learn about your total earnings in FT for the whole study.

Treatment "public":

You will thus learn for each situation that was randomly selected: your own earnings in FT as well as your partners earnings and decisions.

Your total earnings in FT will be converted to euros and paid out to you. The exchange rate between FT and euros is:

1 euro for 20 FT

We inform you that in this study the earning possibilities in the different situations will be either the same for the man and the woman, or there will be an advantage for the *[treatment "women advantaged" : woman]* *[treatment " men advantaged": man]*.

Treatment "private":

Please note that your decisions and thus your earnings are individual, private and anonymous. Your earnings will be paid out to you individually, in secret, at the end of this study. Specifically your partner will have to possibility to find out about your decisions and your earnings. The same holds for any other participant in this study.

Your decisions and your earnings will be perfectly anonymous. To preserve your anonymity, a personal identification number has been allocated to you: you find this number on the small piece of paper on your table. The link between this number and your name will be used only once, in your presence, at the moment of payout. In fact, you will have to present this number at the end of the study to receive your payment. We will thus have no means to later link the information collected during this study with a name, since we will only keep your personal identification number in our files. You should thus feel free to take any decision you want, without fear that it will be revealed to whoever, not even your partner.

Treatment "public":

Please note that the decisions taken by yourself and your partner are private and anonymous. Your earnings, together with the earnings of your partner, will be paid out to you, at the end of this study. The other participants in this study will have no possibility to find out about your decisions and your earnings.

Your decisions and your earnings will be perfectly anonymous. To preserve your anonymity, a personal identification number has been allocated to you: you find this number on the small piece of paper on your table. The link between this number and your name will be used only once, in your presence, at the moment of payout. In fact, you will have to present this number at the end of the study to receive your payment. We will thus have no means to later link the information collected during this study with a name, since we will only keep your personal identification number in our files. You should thus feel free to take any decision you want, without fear that it will be revealed to whoever, with the exception of your partner.

Furthermore, we placed on your tables a while sheet of paper. You can use it at any moment for notes. We remind you that you are not allowed at any moment during the study. If you have a question or if something is not clear to you, please raise your hand.

We will now start with the first part of the study. We ask you to click on "next" if you have not already done so.

Part 1

We will start the first part that will consist of two situations. Lets start with situation 1.

Situation 1

In this first situation, we will allocate to each of you 20 tokens, thus 40 tokens for each couple. These tokens can be used to earn some FT. For this you will have to take a simple and abstract investment decision. You have the choice of investing your tokens, or part of them in an option A and/or in an option B. Your earnings in FT will depend on your own investment decision but also on the decision of your partner.

The earnings generated by each option will be shown on your computer screen in a few minutes.

You will have to take your decision, which means the number of tokens to invest in the option A and/or in the option B, without communi cating with your partner. And thus without knowing what he or she will choose. We will later ask you what you believe that your partner did.

Treatment "private":

For the previously mentioned privacy reasons, you will not be able to find our about the decisions of your partner, not even at the end of the study. Equally, your partner will have no way to know your decision, even at the end of the study.

Treatment "public":

The decisions of your partner will be revealed to you at the end of the study.

We remind you that we are here in the first situation of the first part, and that at the end of the study one situation from each part will be randomly selected for your payment (that means that your earnings in FT from that situation will be converted to euros). Each of your decisions is thus important since it can be selected for payment.

You will now see a summary of the instructions and of the earnings of each option on your screen. We will now distribute a sheet with an understanding question. Please answer to this question with respect to this first situation. Take your time to respond. Do not hesitate to ask questions. Please wait for us to pass at your table before clicking on the button '"next".

Summary on screen:

You and your partner have each 20 tokens. You and your partner can invest the number of tokens you want in an option A and/or an option B.

Each token invested by yourself in the option A generates for you 10 FT. Each token invested by your partner in the option A generates for him/her 10 FT. Each token invested in the option B generates for you 6 FT and generates 6 FT for your partner. Each token invested by your partner in the option B generates for you 6 FT and generates 6 FT for your partner.

Decision screen (for detailed layout see Appendix B):

option A: ___ option B: ___

Questionnaire screen after decision:

What do you think: how much has your partner put in: option A: ___ option B: ___ (10 FT for each correct answer, plus/minus 2 tokens)

Situation 2

We will now start the second situation of the first part. This situation is similar to the preceding one. You will have again 20 tokens each, that means 40 tokens per couple. But the earnings associated with the investment decision A are now more advantageous for the *[treatment "women advantaged" : women]*

[treatment " men advantaged": men]. Those associated with the investment decision B have not changed. The details of the earnings from each option will be shown on your screen in a moment.

We remind you that we are here in the second situation of the first part, and that at the end of the study one situation from this part will be randomly selected for final payment.

Treatment "private":

We also remind you that you will not be able to find out about the decision of your partner, not even at the end of the study.

The details concerning the earnings from each option appear now on your screen. Please respond to the understanding questions concerning the second situation on the sheet that we distributed to you. Please wait that we pass by your place before clicking on "next".

Summary on screen:

You and your partner have each 20 tokens. You and your partner can invest the number of tokens you want in an option A and/or an option B.

If you are a man (*dependent on treatment: woman*): Each token invested in the option A generates for you 13 FT. If you are a woman (*dependent on treatment: man*): Each token invested in the option A generates for you 10 FT. Whether you are man or woman, each token invested in the option B generates for you 6 FT and generates 6 FT for your partner.

Decision screen (for detailed layout see Appendix B):

option A: ___ option B: ___

Questionnaire screen after decision:

What do you think: how much has your partner put in:

option A: ___

option B: ___

(10 FT for each correct answer, plus/minus 2 tokens)

Part 2

We start the second part that will also consist of two situations. However there will be no more tokens. From now on, we will give you the opportunity to work to gain FT. This "work" is simple and abstract.

We start with the first situation.

Situation 1

You and your partner will have the possibility to work on two identical tasks that however generate different earnings: task A and task B. You will each have 5 minutes time and will be paid in proportion to the time that you will spend on either task.

Concretely the work will consist in typing phone numbers that will be shown on your screen. The gains from each task are the following:

> If you work on task A, you earn 40 FT per minute.
>
> If you work on task B, you earn 24 FT per minute and your partner will also earn 24 FT per minute.

We remind you that you will be paid based on the total amount of time that you will spend on each task during these 5 minutes and not based on the number of phone numbers that you type.

You also have the possibility to distract yourself, which does not lead to any earnings in FT. On your screen you have several entertainment activities at your disposition. For example games, journals and a web browser. We inform you that you can not use the web browser for communication.

Your partner is in exactly the same situation as you and can work on the tasks A, B or distract himself.

We will now distribute a short summary of these instructions, with a understanding question. Please take your time to read these and to respond to the question.

--

To summarize, you and your partner will have the possibility to work leading to payment or to use a distraction. Note that you will be in fact paid by rounded intervals of 15 seconds. If you work for example for 8 seconds or more on a task, we will consider that you worked for 15 seconds. If you work for 7 seconds or less on a task we will consider that you did not work.

You will have to act without communicating with your partner, and thus without knowing what he or she will choose. We will afterwards ask you what you think that your partner did in this situation.

Treatment "private":

For the previously mentioned privacy reasons, you will not be able to find our about the decisions of your partner, not even at the end of the study. Equally, your partner will have no way to know your decision, even at the end of the study.

Treatment "public":

The decisions of your partner will be revealed to you at the end of the study.

You will now have a few minutes to familiarize yourself with the different tasks: task A, task B and the distraction task. This test period will not lead to earnings. Click on the different buttons on the left to explore each of the options: try to type some numers, look at the different distraction options. Notice that you can switch at any moment between the different options and come back to the same multiple times.

Before this test period a screen with a summary of these instructions will appear on your screen. Look at these instructions by clicking on "next" to start the test period.

Summary on screen:

You have 5 minutes. You can work on task A, on task B or use the distraction task. You will be paid proportionally to the time that you will spend on each of the two tasks. Your partner is in the same situation as you.

Working on task A generates for you 40 FT per minute. Working on task B generates for you 24 FT per minute and generates 24 FT per minute for your partner.

Decision screen (for detailed layout see Appendix B):

task A: task B: distraction task:

Questionnaire screen after decision:

What do you think: how much time did your partner spend on: task A: ___ task B: ___ distraction task: ___ (10 FT for each correct answer, plus/minus 20 seconds)

Situation 2

The second situation is similar to the previous. You have again 5 minutes time to work on task A, B or to use the distraction. Careful: the earnings in FT generated by task A are now more advantageous for the *[treatment "women advantaged" : women]* *[treatment " men advantaged": men]*. Those associated with task B have not changed. The details of the earnings from each option will be shown on your screen in a moment.

The distraction task does not generate any earnings.

We remind you that we are here in the second situation of the second part, and that at the end of the study one situation from this part will be randomly selected for final payment.

Treatment "private":

We also remind you that you will not be able to find out about the decision of your partner, not even at the end of the study.

The details concerning the earnings from each option appear now on your screen. When you are ready click on "next" to start.

Summary on screen:

The situation is the same as previously. You have 5 minutes but the earnings changed.

If you are a man (*dependent on treatment: woman*): Working on task A generates for you 52 FT per minute. If you are a woman (*dependent on treatment: man*): Working on task A generates for you 40 FT per minute. Whether you are man or woman, working on task B generates for you 24 FT per minute and generates 24 FT per minute for your partner.

Decision screen (for detailed layout see Appendix B):

task A: task B: distraction task:

Questionnaire screen after decision:

What do you think: how much time did your partner spend on: task A: ___ task B: ___ distraction task: ___ (10 FT for each correct answer, plus/minus 20 seconds)

Part 3

We start the third part that will also consist of two situations. This part will be very similar to the previous, however you will no longer have the possibility to use the distraction task. You and your partner have each 5 minutes and you will be paid proportional to the total time you spend on either task.

We start with the first situation.

Situation 1

The gains from each task are the following:

If you work on task A, you earn 40 FT per minute.

If you work on task B, you earn 24 FT per minute and your partner will also earn 24 FT per minute.

We remind you that we are here in the first situation of the third part, and that at the end of the study one situation from this part will be randomly selected for final payment.

Treatment "private":

We also remind you that you will not be able to find out about the decision of your partner, not even at the end of the study.

The details concerning the earnings from each option appear now on your screen. When you are ready click on "next" to start.

Summary on screen:

You have 5 minutes. You can work on task A or on task B. You will be paid proportionally to the time that you will spend on each of the two tasks. Your partner is in the same situation as you.

Working on task A generates for you 40 FT per minute. Working on task B generates for you 24 FT per minute and generates 24 FT per minute for your partner.

Decision screen (for detailed layout see Appendix B):

task A: task B:

Questionnaire screen after decision:

What do you think: how much time did your partner spend on:

task A: ___

task B: ___

(10 FT for each correct answer, plus/minus 20 seconds)

Situation 2

The second situation is similar to the previous. The earnings in FT generated by task A are now more advantageous for the *[treatment "women advantaged" : women]* *[treatment " men advantaged": men]*. Those associated with task B have not changed.

The details concerning the earnings from each option appear now on your screen. When you are ready click on "next" to start.

Summary on screen:

The situation is the same as previously. You have 5 minutes but the earnings changed.

If you are a man (*dependent on treatment: woman*):

Working on task A generates for you 52 FT per minute.

If you are a woman (*dependent on treatment: man*):

Working on task A generates for you 40 FT per minute.

Whether you are man or woman, working on task B generates for you 24 FT per minute and generates 24 FT per minute for your partner.

Decision screen (for detailed layout see Appendix B):

task A:

task B:

Questionnaire screen after decision:

What do you think: how much time did your partner spend on: task A: ___ task B: ___ (10 FT for each correct answer, plus/minus 20 seconds)

Part 4

We now start the 4th part in which you will no longer have to work. You will simply have to take a series of decisions.

The instructions will appear on the screen. I will read them out loud. Please read them at the same time and not to click on "next" immediately.

You will take a series of decisions.

Each numbered line, proposes two possible divisions of FT between you and your partner.

For each line, you have to choose one of the two divisions: the option A or the option B.

Take for example the first line. In option A, both partners earns 100 FT. In option B, you earn 300 FT for yourself and your partner earns 0 FT.

For each line, you will thus have to check one of the boxes. At the end of the study, we will randomly select on of the line for final payment. We will then randomly select which of the two decisions in a couple (the division chosen by the man or by the woman) will be applied.

Please take now your decision. Please do not hesitate to ask us questions.

Part 5

The computer will now make the random draws concerning each part of the study to calculate your individual earnings.

Treatment "private":

Your individual earnings will appear on the screen.

Treatment "public":

The earnings will appear on the screen. You have a few minutes to look at them. Please do not click on "next" immediately.

Treatment "private":

You now know your individual earnings. Your partner will not be informed about them.

Treatment "public":

You now know your individual earnings and the individual earnings of your partner.

Your earnings are individual: you will receive your earnings separately in individual envelops. However, you have the possibility to decide to transfer your individual earnings or part of them to a joint envelope that is given to the couple. We call this the "common account".

You can now discuss with your partner the contributions of each to this common account.

To do so you have access to a "chat" tool. Concretely you can write messages for your partner in a window on your screen. He or she can then respond to you with the same tool. Each of you can, whenever he wants, fill in the amount that he or she wishes to transfer to the common account.

When you want, you fill in the amount that you want to transfer to the common account and your partner will do the same. We will then ask you if you agree with the proposal by your partner. The chat phase will continue until you agree on the amount to transfer to the common account.

All of this is summarized on the following screen. Click on "next" to access the chat.

End

The study is now finished.

We now ask you fill out this final questionnaire that will allow us to have more information about you. These information are very important for the scientific quality of the study. If certain questions seem too indiscreet, we prefer that you do not respond to them than to respond falsely. However rest assured that your responses stay completely anonymous and private. Even your partner will not be informed of them. You will receive 100 FT for taking the time to respond to this questionnaire.

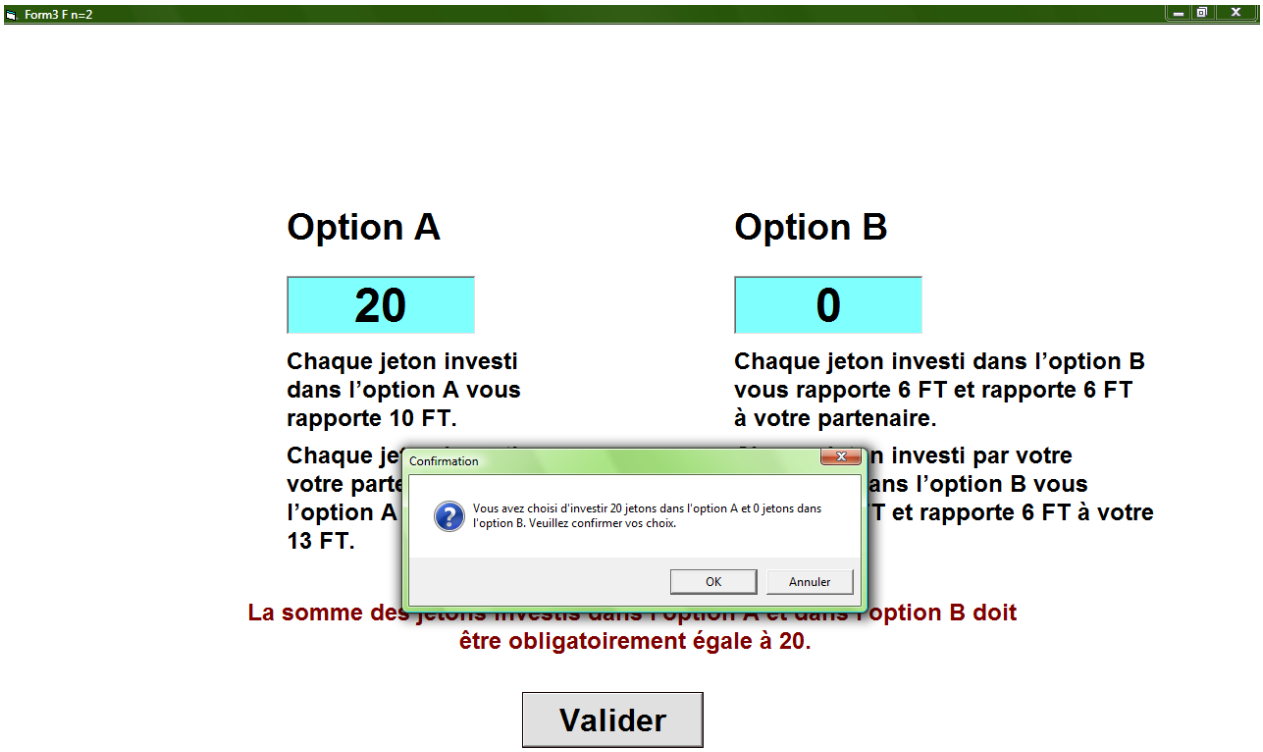
When you are finished with the questionnaire, you can return to the reception room to wait for final payout. Make sure to keep your personal identification number with you.

We will call you one by one to give you your payment and to ask you to sign a receipt. If you wish you can stay after payout to lean more about this research project and the questions we want to investigate in this study.

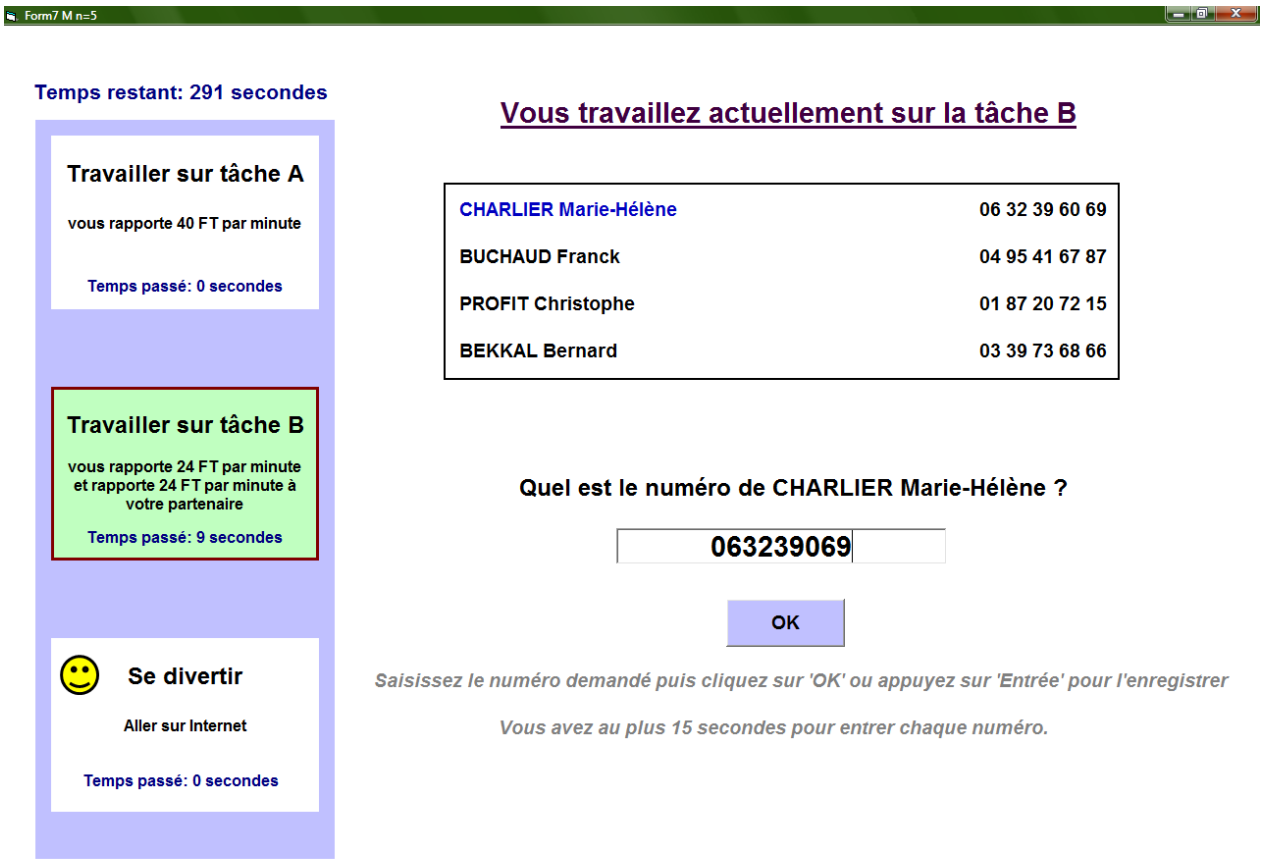
Thank you very much for your participation.

APPENDIX B: Decision screens

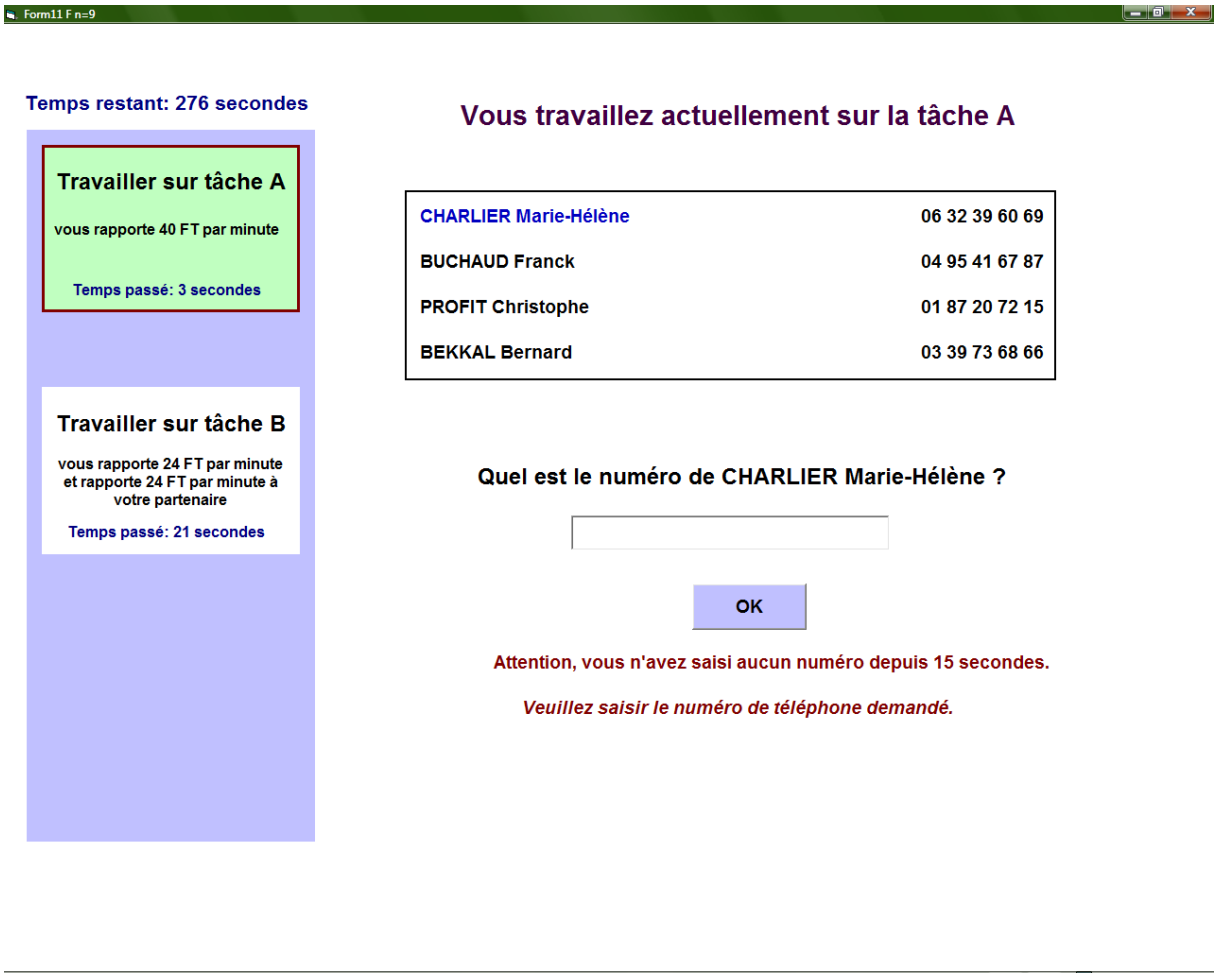
Specialization task: Abstract treatment



Specialization task: Effort treatment



Specialization task: Time treatment



Payout screen in treatment: public

Vos gains individuels

L'ordinateur a procédé au tirage au sort des différents jeux qui sont pris en compte dans vos gains:

Partie	Jeu tiré au sort	Décisions (vous / votre partenaire)	Votre gain (incluant les gains de prédictions)	Gain de votre partenaire (incluant les gains de prédictions)
1 (jetons)	Jeu n° 3 Option A : Homme 10 FT - Femme 13 FT par jeton Option B : 6 FT par jeton	Option A : 10 / 10 jetons Option B : 10 / 10 jetons	260 FT	230 FT
2 (tâche internet)	Jeu n° 2 Tâche A : Homme 52 FT - Femme 40 FT par minute Tâche B : 24 FT par minute	Tâche A : 30 / 29 s Tâche B : 29 / 1 s Internet : 241 / 270 s	42 FT	38 FT
3 (tâche)	Jeu n° 2 Tâche A : Homme 40 FT - Femme 40 FT par minute Tâche B : 24 FT par minute	Tâche A : 0 / 300 s Tâche B : 300 / 0 s	140 FT	380 FT
4 Répartition (homme/femme)	Ligne n° 3 de l'homme Répartition A: Vous : 100 FT - Partenaire : 100 FT Répartition B: Vous : 150 FT - Partenaire : 150 FT	Répartition A / B	150 FT	150 FT
Gain total (incluant les gains de prédictions)			592 FT	798 FT

Suite

Chat screen in treatment public (male version)