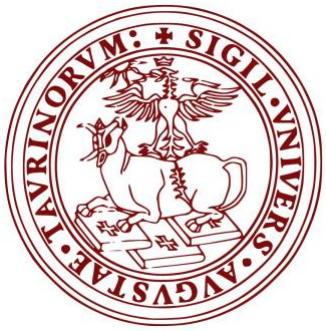

UNIVERSITÀ DEGLI STUDI DI TORINO

"Vilfredo Pareto" Doctorate in Economics

XXXIII Cycle

Essays in Behavioural and Experimental Economics

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Introduction

The goal of this doctoral thesis is to investigate relevant behaviours and provide empirically-based insights to help designing environments that facilitate efficient behaviours. Experimental economics represents the tool to study the specific behavioural aspects that cannot be isolated using existing data.

The thesis is composed by three chapters which exploit different experimental methods to study anomalies in behaviour. The first is based on a laboratory experiment and investigates preferences for competition. Gender differences in competitiveness are an important factor to explain the gender gap. Given the disparity in the society, where the presence of women in leading positions is scarce, it is useful to understand if being or not in top positions can influence competitive attitudes. Allocating randomly subjects to the positions, the experiment isolates this link.

The second chapter exploits a survey experiment to investigate protective behaviours during COVID-19 pandemic. Using informational treatments, it evaluates the effect of the presence of messages that remind the protection power of some protective behaviours on intention to adopt them and the effect of two framings. Behaviour is strongly influenced by information. During the pandemic various informational tools have been used to induce subjects to adopt virtuous behaviours (or avoid dangerous ones). This work tests the effect of using a positive or a negative frame for conveying the same concept.

The last chapter is based on a lab-in-the-field experiment and is about dishonest behaviour. Humans diffusely are not honest, but people are still more honest than a *homo oeconomicus* should be. Using a task where possible cheating is not detected nor punished, the chapter analyses the effect of the number of payoff-relevant tasks on the total amount over-claimed.

Chapter 1

Women and Motivation to Compete: The Role of Advantages

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This work investigates the stability of the gender difference in preferences for competition and tests a possible factor that influences it: the discrepancy in the distribution of advantages. Subjects play bargaining games where two roles differ by decision contest. In one role the subject has an advantageous position in terms of strategy and earnings, in the other s/he is on the disadvantaged side. Subjects are randomly assigned to be in the advantaged or disadvantaged role for all the experiment. Competition takes place between subjects who are in the same role and it is based on the payoff they obtain in the bargaining. By comparing competitive behaviour of subjects assigned to the advantaged role or not, the experiment identifies the effect of having advantages, given the remaining factors. The main result is that behaviour is more rational and does not differ by gender when in the advantaged position, while when disadvantaged the gender gap in competitiveness exists and it causes inefficiencies. Giving an advantageous role makes men with low performances in the game compete less and women with high performances compete more, closing down the total gender gap. This finding helps to explain the competitiveness gap and provides insights on which are the characteristics of the context that make competition detrimental for gender parity and also for efficiency.

1.1 Introduction

Gender gap is a term indicating "the differences between the way men and women behave or are treated in a society, especially in terms of opportunities, pay and status[1]". These differences are widespread and the attention paid to them has grown such that the term is nowadays of common use. Nevertheless, in the world gender parity will not be attained for the next 135.6 years (Global Gender Gap Report, 2021).

Comparing the estimated gender gap across countries, it sticks out that the margins for improvement lie in the sphere of economic and political participation. Notoriously, political and economic participation differs between men and women, both in terms of sectors and in terms of hierarchy. The lack of women in leadership positions is a well-known and long-lasting phenomenon, with just the 27% of all managerial positions assigned to women (Global Gender Gap Report, 2021). This picture is possibly worse considering that the data available for the 2021 report do not reflect the total impact of the pandemic.

At the same time evidence from laboratory and field experiments has consistently found a gender gap in competitiveness: men embrace competition while women shy away from it (Niederle and Vesterlund, 2007 and 2011, for replications see the literature review in Clot et al., 2020 and the references therein). This gender difference in competitive preferences notably matters for career choices and other labour market outcomes (Buser, Niederle and Oosterbeek, 2014 and 2021, Reuben et al. 2015) and it represents one of the possible explanations for the shortage of women in top – therefore often more competitive - positions in the society.

[1] https://www.macmillandictionary.com/dictionary/british/the-gender-gap?q=gender+gap

So far, the analysis has focused on the link from gender difference in the willingness to compete to the gender asymmetry in the distribution of economic and political key roles. This work aims to study the link in the opposite direction: how being in (dis)advantaged positions can affect the gender difference in the willingness to compete.

Moreover, the analysis of gender differences in competitiveness has focused on situations where competitive payment schemes apply to subjects' performances in a "solo" task, like summing up numbers or throwing tennis balls into baskets (Niederle and Vesterlund, 2007; Gneezy et al., 2009). People in organisations instead do not perform "solo" tasks, but there is an interplay between subjects with specific roles. Roles define (dis)advantages in terms of strategies, payoffs etc. This work uses a game to allow strategic interaction and variety in the roles, characteristics that help to better capture the essence of real-life situations.

The aim of this chapter is to analyse the effect that asymmetric roles in a strategic interaction have on the gender gap in competitiveness. By assigning subjects randomly to the advantageous role in the game, it evaluates the effect on the competitiveness of men and women of having such a role (with more power, responsibilities and potentially higher earnings). The controlled environment of the laboratory experiment allows to get rid of issues regarding self-selection in the position and confounding factors - culture, education etc. An advantaged position in a workplace can induce a change in preferences for competition, by both encouraging the ones who usually shy away from it (women who indeed have high ability) and discouraging the ones who use to compete too much (men who have low ability). With more power and higher stakes, the decision makers might be more careful and therefore behave more rationally, following their capability.

Understanding how competitiveness is affected by the position subjects hold sheds light on the context dependence of this preference and clarifies the motivations behind the gender gap.

Importantly, such a study provides insights on where and when competition is particularly harmful and therefore policy interventions can be more effective.

In the experiment subjects play two-player bargaining games having an advantaged role or not. Competition happens about the gains obtained in the bargaining and between subjects of the same role. Results indicate that the gender difference in competitiveness almost vanishes between the participants who have the advantaged role, while it remains consistent, and of a magnitude similar to that of other experiments, for those who were disadvantaged. When subjects are in the advantaged role, men with low payoffs compete less and females with high payoffs compete more. The result is robust considering not only the usual factors such as performances, self-confidence, risk and feedback aversion but also personality traits. Competition is harmful for gender parity and efficiency, but not for the subjects who have advantages.

Gender differences in competitiveness have been analysed at a length: in their laboratory experiment Niederle and Vesterlund (2007) find that 35% of women chose to compete compared to 73% of men, while there is no significant difference in performance. The difference persists controlling for factors like self-confidence and risk preferences. Moreover, they highlight that the high-performing women do not enter competition enough, while low-performing men do it too often. The gender gap in competitiveness represents therefore not only a problem of equity, but also of efficiency. Many works replicated their result in comparable conditions (about 20 experimental studies with the exception of Price, 2008). It has also been replicated with different pools of subjects, i.e., different ages, States and cultures (Booth, 2009; Dargnies, 2009; Sutter and Glätzle-Rützler, 2015; Carlsson et al., 2020) and in various contexts such as sports (Garratt et al., 2013) and academia (Bosquet et al. 2013; De Paola et al., 2015b) or with slightly different tasks such as throwing tennis balls into baskets (Gneezy et al., 2009), forecasting stock prices (Vandegrift and Yavas, 2009), using wording

and verbal exercises (Wozniak et al. 2010, Shurchkov, 2012) and solving mazes (Gneezy et al., 2003; Datta Gupta et al., 2013). Relevant exceptions are the experiments conducted in matrilineal societies (Gneezy et al., 2009; Andersen et al., 2013), with old subjects (Flory et al., 2018) and with professionals in consulting firms (Clot et al., 2020).

Several studies have looked for possible mediating factors, such as risk preferences and self-confidence (Niederle and Vesterlund, 2007), feedback (Ertac and Szentes, 2010), handedness (Buser et al., 2021), hormones (Wozniak et al., 2010), stress (Lowes, 2021), distributional preferences (Balafoutas et al., 2012), information about other's gender (Datta Gupta et al., 2013), uncertainty and ambiguity (Balafoutas and Sutter, 2019), observability (Buser, Ranehill and van Veldhuizen, 2021). Personality (Müller and Schwieren, 2012), in particular neuroticism, can explain the gender difference in competitiveness. This trait is more common among women (Feingold, 1994; Schmitt et al., 2008) and it influences negatively performance under a competitive payment scheme. Other studies have focused on tools that try to close the gap, like the use of quotas (Balafoutas and Sutter, 2012), priming subjects with empowering messages (Balafoutas et al. 2018) and the use of delegation for the decision to compete (Fornwagner et al., 2020). All the mentioned tools are found useful to eliminate the gender gap in competitiveness.

While the link from the gender differences in competition to the gender gap in occupation has been studied (Buser, Niederle and Oosterbeek, 2014 and 2021, Reuben et al. 2015), the one going in the opposite direction has not received attention yet. The idea that with advantageous roles subjects change behaviour and that this can influence the differences in the choice to compete has never been tested but some signals of the existence of this mechanism can be spotted in the literature. Clot et al. (2020) find that female consulting professionals do not shy away competition. This perhaps emerges because, differently from students, their subjects are already a selected sample of workers in a top position. Thorough random assignment of jobs

to subjects, the present work tests if competitive preferences of the same pool of subjects[2] are affected by being on the privileged side of a work relationship, getting rid of self-selection problems. Studies on cultural differences (Gneezy et al., 2009; Andersen et al., 2013) suggest indeed that where women are in advantageous positions – as it happens in matrilineal societies - there is no gender gap in competitiveness. Balafoutas et al. (2018) tested the usefulness of empowering: studying the effect that priming with power has on the competitiveness gap they find that it leads to constrict it. Their study focusses on the effect of messages aimed to make subjects feel powerful or not in a design with a "solo" task. Recently, Boneva et al. (2021) showed that being exposed to a successful female role model narrows the gender difference in competitiveness. The experiment proposed here, instead, tests the effect on the gender gap in competitiveness of having an advantage, i.e. different responsibilities, more power and higher earnings than a counterpart, and does it in a two-player game.

The present work provides evidence for the context dependence of the gender difference and isolates a possible mechanism that affects it. It also adds to the experimental design techniques by using a task that is also a priming strategy in the contest of competitive preferences analyses. Finally, it provides additional evidence on gender and bargaining.

The remainder of the chapter is organized as follows: Section 2 describes the experimental design and protocol; Section 3 presents the main findings; Section 4 is for discussion and conclusions.

[2] University students. Since for competitive preferences age counts as much as sex (Flory et al., 2018), the experiment involves similarly young subjects, who also are the ones for which the gap is deeper. Moreover, they are the ones who more likely aspire to jobs in top positions.

1.2 Experimental design and procedure

At the beginning of the experiment the male subjects (68) are block randomly assigned to be Takers or Respondents and so are females (66). The experimental set-up follows the design of Niederle and Vesterlund (2007). This widely used design represents the ideal starting point to analyse differences in competitiveness and its measure of competition represents a good predictor of students' future career (Buser, Niederle and Oosterbeek, 2014 and 2021, Reuben et al. 2015).

When there is competition, subjects face winner-takes-all tournaments. Comparing the payoffs within groups of subjects who belong to the same role, the one who has the highest payoff receives four times the payoff while the others receive noting[3]. Groups are formed by four subjects holding the same role, are stable for all the experiment and gender composition is balanced. Even if never made salient, the balance of participants in the lab session could possibly be spotted during the procedures of assignment to lab-stations.

In the experiment subjects play two-person bargaining games with asymmetry in the participants' roles, Power-To-Take games (Bosman and van Winden, 2002), instead of the original tasks of adding up sets of two-digit numbers for five minutes. This modification has the aim of introducing asymmetry in the roles such that there are subjects who have the advantage and subjects who do not. Moreover, the game mimics the interaction present in work environments, including the influence of emotions. It also has lower learning effects than the original math task since in the game there is interaction with different subjects every time and that payoffs are interdependent.

[3] In case of tie, the winner is randomly picked between the ones with the highest payoff.

In the game, payoffs of each participant depend on the actions of both. Subjects start with the same given endowment of 225 ECU (Experimental Currency Units, 100 ECU= 1 Euro). First movers, called Takers, can take any part they want from the partner's endowment, *t* (they are asked to report it as percentage, indicating an integer from 0 to 100 extremes included). Second movers, called Respondents, observe Takers' choice and decide whether to destroy any part of their own endowment before that Takers can pick what they decided to, *d*. A Respondent can at most have her/his whole endowment of 225 ECU (E_R) when the Taker takes nothing. A Taker can at least have her/his original endowment of 225 ECU (E_T) when the Respondent decides to destroy everything s/he has. The payoff functions are as follows.

Taker's payoff function: $\pi_T=E_T + t\,[(1-d)E_R]$.

Respondent's payoff function: $\pi_R=(1-t)(1-d)E_R$.

Theoretically the game has a unique solution where the Taker takes all and the Respondent never destroys. However, when played in experiments, the outcome differs as other factors are at work: subjects do not behave rationally but are influenced also by emotions (Bosman and van Winden, 2002) and by the gender of the partner (Sutter et al., 2009). Anyway, there is no evidence of systematic differences in the behaviour in the game between males and females in absence of competition while gender differences are observed in other games with asymmetric roles (Van Den Akker et al., 2020; Oosterbeek et al., 2004). This fact makes the game ideal for the experiment.

The inequality in the possible actions and in the outcomes generates a situation that mimics the interaction between workers holding a top position and the others: in the top position there is a strategic advantage and the earnings are potentially higher, but they depend also on others' responses to own incentives, which are not perfectly predictable. The Taker has the power to extract resources from the counterpart like a principal can extract effort from an employee.

This last is not totally passive but a reaction can be done only at his/her own expenses. The asymmetric interdependence allows to study competitiveness of subjects when their payoff is affected by another subject in a pro-active or reactive way.

Using such a game also allows to have subjects interacting already in the game previous to the competition (but with a separate pool of subjects), therefore it reduces the possibility that subjects decide not to compete in order to shy away interpersonal interaction by itself.

By assigning subjects to play one of the two roles the experiment aims to not only prime but to make subjects identify themselves with an advantaged principal (Taker) or with a disadvantaged agent (Respondent). In facts, it is not only a feeling, but the earnings and the action set reflect the position hold. The randomness in the assignment of subjects to the roles allows to pin down the effect of the position hold.

The experiment consists of four Stages: in the first three, subjects play the Power-To-Take game while in the last they just make a choice. Assignment of the subject to have the advantaged role (Taker) or not (Respondent) remains fixed for the whole experiment. Players are matched randomly to a partner of the opposed role in the first three stages. The procedure is repeated at the beginning of each stage within independent groups (Andreoni, 1988), in this way it is possible to account for the effect of facing specific partners.

The Stages differ in how incentives are structured. In Stage 1, subjects play the game and there is no competition, while in Stage 2, they play the game and there is competition. After that subjects have practiced the two cases, there is Stage 3 where is the decision of interest takes place: before playing, participants have to choose the scheme they want between the aforementioned two. The choice is an individual decision since in case of tournament the payoff is compared with others' payoff obtained in the previous tournament. Neither Takers nor Respondents know which scheme the counterpart chooses. In Stage 4, subjects do not play

but they choose the incentive scheme with which they want that the payoff they have obtained in Stage 1 will be paid this time. They can choose between the one of Stage 1 or the one of Stage 2. This measure reflects subject's reaction to everything that affects competition different from competition itself. Table 1.1 summarises the main characteristics of each stage.

Table 1.1: Summary of the stages.

	Play the game	**Incentives**	**Measure**
Stage 1	Yes	No competition	Control
Stage 2	Yes	Competition	Control
Stage 3	Yes	Choice	Variable of Interest
Stage 4	No	Choice	Control

Notes. For each stage it indicates whatever the game is played, which incentive scheme applies and the nature of the measure generated.

For each participant only one of these four stages is randomly selected for payment, in addition to a show up fee of five Euro (Charness et al., 2016). During the experiment subjects are informed about their own payoff, and consequently of their partner's (the subject playing in the opposite role), but never have feedback about their relative position or about competitors' payoffs (the other subjects in their same role). Belief about the partner's action are separately asked.

In this experimental setup the choice whether to compete generates two different challenges for the Takers and for the Respondents. The firsts by choosing to enter competition expose themselves to the risk of losing their endowment that otherwise would represent the lower limit for their payment. For the second instead the risk of losing everything always exists. This can generate a situation in which Takers of both genders compete less due to the fear of losing everything. If females are more risk averse then males (Croson and Gneezy, 2009; Charness and Gneezy, 2012), then the gender gap in competitiveness would be larger for Takers than for

Respondents. Since the results provide evidence of the opposite, for Takers the gap is smaller, the effect found represents a lower bound for the true effect.

Beliefs about own relative position in the tournaments are elicited just at the end of the experiment. These represent the confidence the subject has about his/her relative performance in the tournaments. Subjects are also asked to indicate their perception of partner's gender, the gender composition of the group and their opinion about the rationality of own and partner's choice. Subjects were not paid for the precision of their beliefs and for sharing their opinions since the objective was to elicit sincere answers (and not correct normative expectations) and also not to influence the main incentives in the game.

At the end of the experiment, the subjects completed a questionnaire on socio-demographic characteristics, questions about risk attitude (Dohmen et al., 2011) and social preferences (Bartling et al., 2009), the short version of the Big-Five Personality Questionnaire (Gosling et al., 2003) and of the Oxford Happiness Questionnaire (Hills and Argyle, 2002). The first (15 elements) allows to define participants' scores in five dimensions of personality (Costa & McCrae, 1992): neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. The second (8 questions) provides a measure of subjective wellbeing (Kahneman et al., 1999). Personality traits are relevant in the decision to compete (Müller and Schwieren, 2012), while subjective wellbeing matters in the bargaining game (Bosman and van Winden, 2002). Summary statistics are available in Appendix A.

The sample includes 136 subjects (68 males, 66 females, 2 gender undisclosed; mean age 24). Power calculations reveals that the sample size is adequate to detect an effect similar to

the result of Niederle and Vesterlund (2007)[4]. The experiment was run using *z*-tree (Fischbacher, 2007) at the Center for LabOratory Simulations and Experimental Research (CLOSER) of the University of Turin during spring and summer 2018. Recruitment happened via ORSEE (Greiner, 2004). Data analysis was made using STATA15. Two control questions about the understanding of the Power-To-Take game were asked and checked before the experiment started. In this occasion there was the possibility to ask for clarifications. Instructions were distributed in paper and read aloud, additional information on each stage was disclosed on screen just before the stage starts. Instructions are available in Appendix C. The participants were paid in private at the end of the experiment, which took around one hour and 15 minutes. The mean payment was 8.29 Euro for Takers and 6.01 Euro for Respondents, with the highest payments of 23 and 14 Euro respectively. Payoffs are designed such that the maximum possible for a Taker did not exceed the legal limit of 25,82 Euro.

1.3 Results

This section first reports the analysis of the behaviour of female and male subjects in the bargaining game: findings reveal that this does not differ. Successively it looks at the factors that can relate with the competitive choice, believes and personality. Finally, the focus is on the gender difference in willingness to compete. It details results about its relationship with efficiency concerns and the function of possible mediating factors. The analysis shows that the gap in competition is present only in the disadvantaged sample and that it represents an inefficient allocation. Mediating factors do not manage to alter the result.

[4] The experiment was pre-registered at https://osf.io/xem6z. Sample size is slightly lower than targeted (144) due to low showing up in one session.

1.3.1 Performance

Men and women do not differ in their behaviour in the game. As Table 1.2 illustrates, in Stage 1, males and females do not differ in their payoff nor for Takers (321.3 for males vs 313.51 for females, *p*-value 0.56) nor for Respondents (87.85 vs 87.91, *p*-value 0.99). In Stage 2 also there are no significant gender differences in payoffs either for Takers (304 vs 328.79, *p*-value 0.13) or for Respondents (73.79 vs 56.85, *p*-value 0.27)[5].

Table 1.2: Payoff distribution by role and gender in Stage 1 and Stage 2

	Takers		**Respondents**		**P-values**	
	Males	Females	Males	Females		
Stage 1 - No competition	321.38 (57.27)	313.51 (52.31)	87.85 (54.46)	87.91 (60.34)	0.56	0.99
Stage 2 - Competition	304 (65.35)	328.79 (67.5)	73.79 (59.47)	56.85 (66.18)	0.13	0.27
N Observations	34	33	34	33		

Notes. Mean payoff (and standard deviation) of male and female subjects assigned to be Taker or Respondent in the first and in the second stage, which differ by the presence of competition. *P*-values from two-sample t test comparing males and females in each situation.

When all the subjects participate in the competition (Stage 2), there is also no significant difference in the number of females and males who win for either of the two roles (8 males and 8 females of the 17 winners[6] for Takers, *p*-value 0.95; 10 males and 8 females of the 18 winners for Respondents, *p*-value 0.64).

[5] Payoff defines the amount obtained in the game, so before the eventual outcome of the tournament. Where not else stated, *p*-values are from two sample t-test.

[6] One winner did not specify gender.

In sum, the results confirm that overall women and men do not differ in how they perform in the game, as in Sutter et al. (2009). Also, there are no gender differences in the chance of success in the competition. These similarities in the behaviour of the two sexes corroborate the suitability of the game for the analysis of gender differences in competitive preferences.

Looking closer to the behaviour of subjects, around 50% of Respondents decided not to destroy, 35 (11 females) in Stage 1, 33 (11 females) in Stage 2 and 31 (11 females; 13 in tournament) in Stage 3. Subjects who decided to destroy everything were 4 (2 females) in Stage 1, 10 (4 females) in Stage 2, 15 (6 females; 8 in tournament) in Stage 3. Takers who choose not to take were 2 or 3 in each Stage. The ones who choose to take everything were 4 (1 female) in Stage 1, 16 (9 females) in Stage 2 and 15 (11 females; 5 in tournament) in Stage 3.

The average of take and destroy rates in Stage 1 and 2 are reported separately for females and males in Table 1.3.

Table 1.3: Behaviour by role and gender in Stage 1 and Stage 2

	Take rate		**Destroy rate**		**P-values**	
	Males	Females	Males	Females		
Stage 1 - No competition	57.15 (25.74)	50.91 (22.55)	15.15 (30.4)	24.75 (30.02)	0.29	0.2
Stage 2 - Competition	67.94 (29.8)	66.09 (28.51)	26.18 (40.88)	33.61 (36.85)	0.8	0.44
N Observations	34	33	34	33		

Notes. Mean take rate (and standard deviation) of male and female subjects assigned to be Taker and destroy rate for male and female Respondents in the first and in the second stage, which differ by the presence of competition. *P*-values from two-sample t test comparing males and females in each situation.

The average of take and destroy rates in Stage 3 for subjects choosing the competition or not are reported in Table 1.4, separately for females and males.

Table 1.4: Behaviour by role and gender in Stage 3 given their choice

	Take rate		**Destroy rate**		**P-values**	
	Males	Females	Males	Females		
No competition	58.69	75.59	37.31	35.15	0.04	0.74

	(26.87)	(26.07)	(45.34)	(36.61)		
Competition	61 (38.53)	66.09 (30.92)	34.72 (47.85)	52.14 (41.62)	0.87	0.41
P-values	0.84	0.36	0.88	0.3		

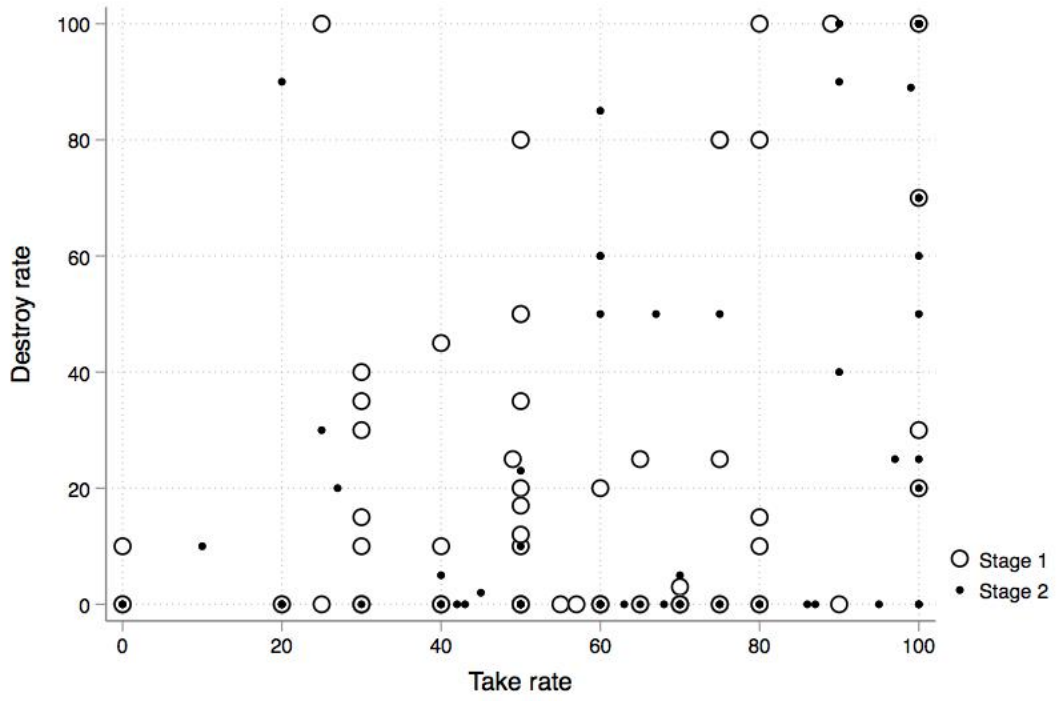
Notes. Mean take rate (and standard deviation) of male and female subjects assigned to be Taker and destroy rate for male and female Respondents in the third stage given their decision to compete or not. *P*-values from two-sample t test comparing males and females in each situation.

The strongest gender gap observed is on how much subjects take when they choose not to compete, in this case females do take more.

Looking at the conditional behaviour of subjects in the different stages and given their decision about competition, it can be observed that when there is competition, Takers more often take all and respondent more often do not destroy.

Figure 1.1 illustrates the joint behaviour of Takers and Respondents in Stage 1 and 2. Figure 1.2 illustrates it in Stage 3 according to the decision to compete or not

Figure 1.1: Relationship between Taker and Respondent decision in Stage 1 and Stage 2



Notes. Distribution of Take rates and Destroy rates in Stage 1 (white) and Stage 2 (black).

1.3.2 Choice, experience and believes

Choosing competition in Stage 3 is related to having a higher past payoff in Stage 2 only for Takers. Takers who choose to compete have a slightly higher payoff in Stage 2 (337 vs. 306, *p*-value 0.07). Moreover, only for Takers the competitive choice is related to believes about own ranking in the previous competition of Stage 2. Takers who chose the competitive setting are those who think to have performed better in Stage 2 (1.65 vs 2.44, *p*-value < 0.001, where 1 stays for first, 4 for last). There is no relation between choice to compete and payoffs in Stage 1, where indeed there was no competition.

Looking at men and women separately, the relation between the choice to compete and the past payoff in competition loses significance. Also, once separated by gender, the relation between the choice to compete and ranking believes remains statistically significant only between males (for males 1.45 vs 2.47, *p*-value < 0.005; for females 1.91 vs 2.41, *p*-value 0.36). Men and women in general do not differ in their assessment of the ranking in the competitions.

Briefly, the decisions of Takers are more responsive to measures of their performance - objective (their previous payoffs) or subjective (believes about their performance in competition).

1.3.3 Personality

The personality traits elicited in the questionnaire differ by gender. Females score higher in neuroticism (9.6 vs 8.6, *p*-value 0.37, on a scale from 3 to 15), consistently with the extant literature (Schmitt et al., 2008). Levels of happiness do not differ by gender.

Contrary to what expected (Müller and Schwieren, 2012), neuroticism does not play a role in the choice to compete, nor it influences the payoffs. This result may be due to the fact that the game is more complex than the task previously used (adding up numbers) and different factors, as for example emotions, can be involved. Moreover, also the scores in the other

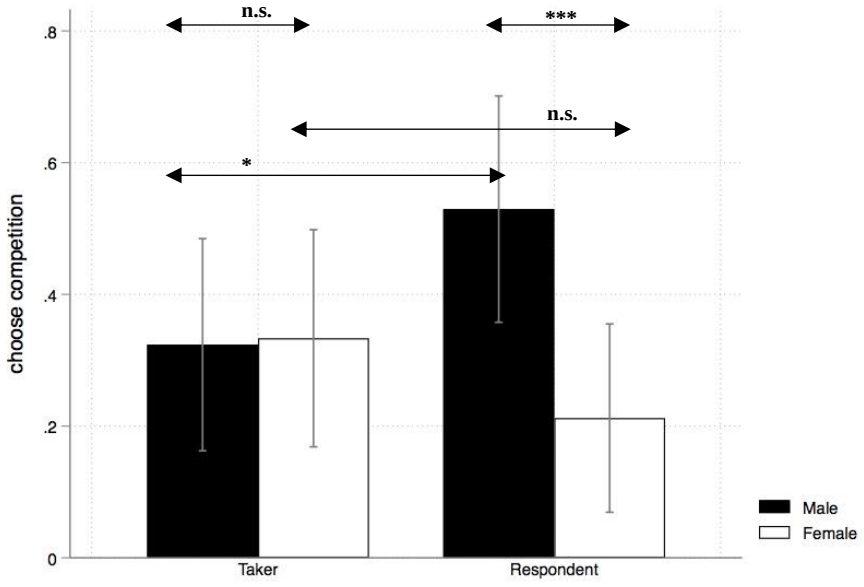
personality traits do not relate with the choice to compete or not and with the payoffs. The same applies for happiness levels.

Altogether, by themselves personality and happiness do not influence the choice to compete, nor they are related to the payoffs obtained in the games.

1.3.4 Gender differences in competitiveness

Considering the gender difference in competitiveness, looking at Takers the percentage of subjects who choose to compete does not differ between females and males (33% vs 32%, *p*-value 0.93). Looking at Respondents the gap is considerably large (21% vs 53%, *p*-value 0.01) and is comparable to the works replicating the study of Niederle and Vesterlund (see Saccardo et al., 2017 for a summary of the entity of the gap in replications of Niederle and Vesterlund). Figure 1.2 summarizes the differences in competitiveness between the different subsamples.

Figure 1.2: Competition by role and gender



Notes. Percentage of subjects allocated to be Taker (left panel) or Respondent (right panel) who choose competition by gender (males in black, females in white). P-values from t-test: *** p<0.01, ** p<0.05, * p<0.1, **n.s.** not significant.

Comparing the choices of subjects of the same gender allocated to the different roles the difference is stronger for males, who present significantly lower competitiveness when advantaged (32% for Takers vs 53% for Respondents, *p*-value 0.08), than for women (33% vs 21%, *p*-value 0.27).

Moreover, aggregating the data of Takers and Respondents some gap is still present (27% for females vs 43% for males, *p*-value 0.06), indicating that the different behaviours of advantaged and disadvantaged do not compensate.

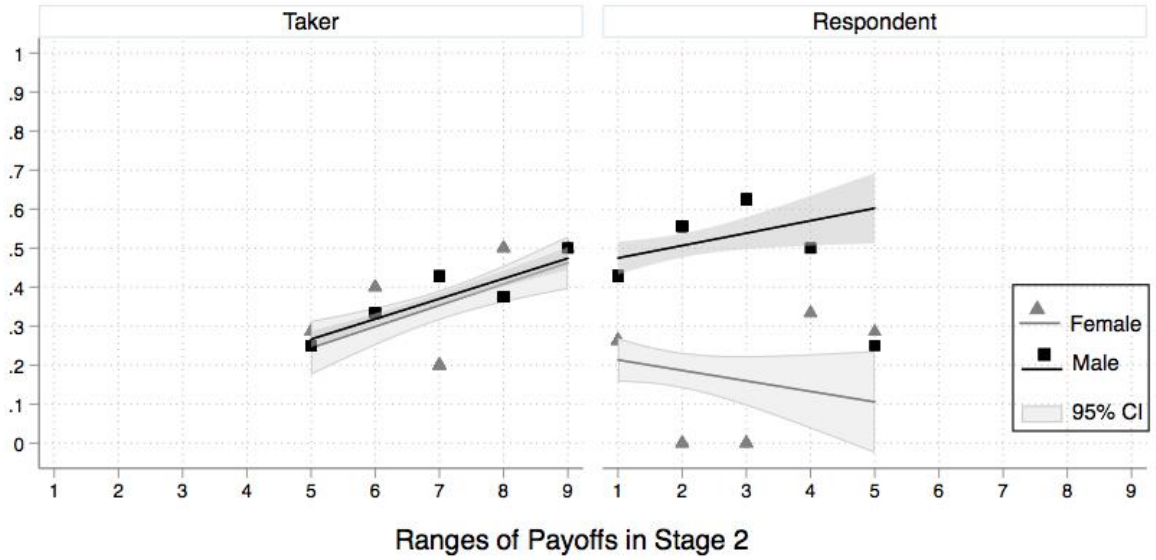
Result 1: between those with the advantaged role in the game, there is no evidence of a gender gap in the willingness to compete.

1.3.4.a Gender gap in competitiveness and rationality

The role played and the gender of the subject affect also how the decision of entering the competition correlates with previous payoffs in the game under the competitive payment scheme.

Figure 1.3 reports the distributions and linear approximations of the percentage of subjects who choose the competition in Stage 3 over ranges of payoffs in Stage 2, separately for males or females and for those in the role of Takers or of Respondents.

Figure 1.3: Correlation of choice to compete with previous payoffs in competition



Notes. Distribution and linear approximation of the frequency of subjects choosing the competition in Stage 3 (vertical) in ranges of payoffs obtained in the competition of Stage 2 (horizontal). Estimation is distinguished by sex (females in grey, males in black) and role (Takers on the left, Respondents on the right).

When assigned to the role of Taker, males and females behave in the same way: if they have high payoffs compete more, if they have low ones they do it less. When assigned to the role of Respondent, behaviours differ. The frequency of males in low ranges of payoffs who choose to compete is high. Low is instead the frequency of females choosing the competition in high ranges. Respondents' choices to compete are not positively correlated with their payoff in the previous round of competition.

Result 2: the decision to compete of the ones with the advantaged role is more rational and represents an improvement in efficiency as better performing subjects select the tournament.

1.3.4.b Gender gap in competitiveness and other factors

Factors other than gender or the assigned role can influence the preferences for competition. The experimental design allows to control for the payoff obtained in Stage 1, the difference

between the payoff of Stage 2 and of Stage 1, the level of self-confidence and other factors that characterize competitive environments that are not competition, like the presence of feedback and risk.

Table 1.5 shows marginal effects from Probit regressions of a dummy variable indicating choice to compete (1 if competition was chosen, 0 otherwise). As independent variables all the specifications include the gender (Female). The first specification adds as controls the payoff in Stage 1 (Payoff 1) and the difference between the payoff in Stage 2 and Stage 1 (Difference). This specification accounts for experience in the game. Note that feasible payoffs range from 225 to 450 ECU for Takers and from 0 to 225 ECU for Respondents. The second specification adds as controls the belief about own position in Stage 2 (Believed Rank, 1 if first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (Submit PR to T, 1 if yes, 0 otherwise). This accounts for self-confidence and other facets of competition that are not merely competition, for example risk and feedback aversion. The third specification adds the scores (going from 3 to 15) in five personality domains: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. This accounts for subject's personality traits, which can affect preferences for competition. All the specifications are run separately for observations of Takers and Respondents.

Table 1.5: Marginal effects from Probit regressions of the Choice to enter competition

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents
Female	-0.0343	-0.311***	-0.0787**	-0.330***	0.00757	-0.318***
	(-1.84)	(-4.25)	(-2.81)	(-5.83)	(0.09)	(-4.94)
Payoff 1	0.00135	-0.000117	0.000507	-0.0000950	0.00199*	-0.000270
	(1.17)	(-0.10)	(0.50)	(-0.07)	(2.37)	(-0.20)
Difference	0.0016***	0.000473	0.00164**	0.000220	0.00263*	0.000240
	(4.12)	(0.50)	(3.17)	(0.22)	(2.53)	(0.23)
Believed Rank			-0.164**	0.0202	-0.181**	0.0454*
			(-2.69)	(0.48)	(-2.96)	(2.26)
Submit PR to T			0.427***	0.286	0.516***	0.228
			(10.69)	(1.57)	(3.94)	(1.69)
Neuroticism					-0.0379**	0.00983
					(-2.80)	(0.46)
Extraversion					0.0324	0.0118
					(0.58)	(0.43)
Openness					-0.0104	-0.0164
					(-0.29)	(-0.82)
Agreeableness					0.0151	0.0461***
					(0.37)	(6.37)
Conscientiousness					-0.0756	-0.0241
					(-1.41)	(-0.93)
AIC	85.64	84.53	68.83	79.35	58.52	76.10
BIC	90.05	88.94	73.24	83.76	62.87	80.45
Observations	67	67	67	67	65	65

Notes. Marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).

Control variables: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T) and personality traits: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.

T statistics in parentheses: *** p<0.001, ** p<0.01, * p<0.05. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Two observations lost in the last specification due to incomplete questionnaires.

Regression estimates confirm the fact that females are less likely to choose the competition, but only when assigned to the role of Respondent. For Takers the marginal effect of being female is statistically significative only in one specification and is very small (8% at most). For Respondents the marginal effect is high and statistically significative in all the specifications, indicating a 33% lower probability of choosing the competition for females. Moreover, different domains of personality prevail in affecting the choice for Takers and Respondents. For the first neuroticism reduces the probability to compete (as in Müller and Schwieren, 2012),

while for the second agreeableness does increase it (as in Bartling et al., 2009). This is not surprising given that for Respondents being less agreeable is also a handicap in the game. Results are robust to the use of different specifications and various controls (reported in Appendix A).

The econometric analysis confirms that when subjects hold the advantaged position, no gender difference in terms of competitiveness emerges. In all specifications the explanatory variables other than gender influence the choice to compete for Takers more than for Respondents, indicating that, when the decision is heavier, both sexes think more rationally and then gender counts less.

1.4 Discussion and conclusion

The chapter analyses gender differences in competitiveness in an experiment where subjects are randomly allocated to two different roles in a bargaining game. One role has an advantaged position: has more power and potentially higher earnings. It finds that the gender gap in competitiveness is not substantial for the subjects in the advantaged role, but it is significative for the others. This result is robust considering subjects' performances and believes, but also other preferences and personality traits. Subjects assigned to the advantaged role behave more rationally - men with low payoff compete less and female with high payoff do it more - and therefore allocation to competition is overall more efficient. The results also confirm that, when gender is unknown, man's and women's behaviour in bargaining games does not differ (Solnick, 2001; Sutter 2009). Bargaining outcomes depend on gender only when gender is explicitly disclosed (Stuhlmacher and Walters, 1999).

This research poses new evidence in favour of the contextual dependence of the gender difference in competitiveness in the ever-growing debate on the innate or context-dependent

origin of this gap. The fact that giving a specific role in a game can cut down the gap between sexes, measured in a validated way, is a strong signal against the innate hypotheses. Just a change in the environment for the limited time of the experiment shifts behaviour of men and women. Recently, Buser et al. (2021) have attempted to find correlation between competitiveness with also another genetic factor, handedness, not reaching a robust conclusion. Boneva et al. (2021) instead has found clear correlation with environmental factors: the gap is deeper for subjects in a low economic status and is reduced by being exposed to female successful role models.

Last but not least, the experiment explores an important mechanism behind how the context influences competitiveness. Subjects allocated to the advantaged side of the interaction in a game do not exhibit gender differences in choosing to compete. Having few women in top positions therefore can be not only a consequence of gender differences in competitiveness but also a cause for them. The fact that being in an advantaged position closes the gender gap in competitiveness fits in the literature giving a common explanation to some patterns like why it is not present between professionals (Clot et al., 2020) or in matrilineal societies (Gneezy et al., 2009; Andersen et al., 2013).

In sum, the evidence provided in this work further emphasises the usefulness of policy interventions that exogenously modify the assignment to work positions and redistribute the advantages. Importantly, the results suggest that using competitive procedures for evaluations or selections when candidates are at early stage of the career, or whenever they are on the disadvantaged side, can be detrimental for gender parity and also inefficient.

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Chapter 2

A Simple Message and Two Framings to Enhance Protective Behaviours Adoption in a Pandemic

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The chapter tests the effect of a simple message and its framing on personal protective behaviours. The message contains basic information about the correlation between behaviours and virus diffusion - in a positive or a negative frame. The study is based on a survey experiment sent by email during the Italian lockdown. Findings reveal that, for washing hands and using a face cover, intentions to comply are higher with the message and do not differ by message type. For physical distance there is no difference due to the introduction of any message. In general, compliance is higher for females and increases with age. Looking separately at males, a treatment effect exists: the negatively framed message is more effective. In a follow up survey, a subsample of subjects reports their actual engagement. Even for these more committed subjects, both treatments appear to have triggered intentions in the present but not behaviour in the future. The gap is the largest relative to physical distance. In sum, a simple message increases the willingness to adopt the behaviour in the moment, showing that it is possible that people forget the consequences in terms of contagion of their own behaviours also in a pandemic. To be useful a message has to be timing, but it is sufficient that it reminds a simple point. The frame of the message has limited importance in general, but it appears to matter for the less willing to comply.

2.1 Introduction

In a pandemic, especially before vaccines or therapies are accessible or in presence of many variants, preventive behaviours aimed to limit the spread of a contagious viral disease are essential. Measures like lockdowns and quarantines are hard to implement for long periods and are not acceptable by vaccinated subjects. In case of aerial diffusion of the pathogen agent, the tools that do not override normal life are isolation of the infected, social and physical distancing, wearing masks in public, increasing hand washing, avoiding face touching, practicing physical distancing and ventilating often closed spaces[7]. Unluckily, these personal protective behaviours (PPB) are not costless, they rely almost entirely on citizens' compliance and are not easy to enforce. A major goal for social sciences in a pandemic is therefore to understand the specific factors that influence people's behaviour and compliance with rules and advices. Crucially, research in the field can help to develop new patterns of behaviour in preparation for future pandemics (West et al., 2020; Van Bavel et al., 2020; Habersaat et al., 2020).

Studies conducted during an advanced phase of the pandemic are still focusing the attention on PPB. Gould et al. (2021) looks at factors affecting compliance during the mass gathering events after lockdown finding that, even if compliance was generally high, it was lower in absence of reminders from persons or signals and decreased over time. Shi et al. (2021) investigate the factors that influence protective behaviour during the post-COVID-19 period in China finding that emotions play a significant role. Petherick et al. (2021) study the phenomenon of "pandemic fatigue" finding that changes in adherence to the PPB happened differently by behaviour type.

[7] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

The present study inquires whether messages to boost the adoption of three different PPB work. Information can indeed play a crucial role in shaping compliance: individuals are more willing to protect themselves from risks the more information they have (West et al., 2020). Feeling that the measures are effective increases compliance (Jørgensen et al., 2020). Other studies have focused on the type of information provided. Capraro and Barcelo (2020) compares reasoning and emotional priming, finding effective the first. Falco and Zaccagni (2021) compare messages that differ in defining which can be the subjects hurt by non-complying finding effectiveness on intentions but not on behaviour. Lunn et al. (2020a) find positive effects from informing about the risks of transmission for vulnerable people and the exponential growth of the contagion.

The present analysis aims at testing whenever highlighting the benefit instead of the cost can be more successful for the specific behaviours of interest, once established the existence of effects from a simple message (nudge) used to stress the expected effects of the PPB in general. Two different frames for the same content are evaluated: one is positive and highlights the benefits of adopting the protection; the other, instead, is negatively framed and stresses the costs of non-using the protection. The reason behind such a choice is that positive frames can be more effective in increasing compliance with some healthy behaviours, in particular when these are preventive (Gallagher and Updegraff, 2012). Several studies have inquired how message framing affects individuals' choices, especially in the context of public health, which may be affected by the problem of free-riding: the restrictions imposed to people are costly for individuals, although they have positive effects in terms of collective outcomes. Some experiments show that, in these contexts, free-riding emerges, even if it is not pervasive and may be limited by different strategies: Iturbe-Ormaetxe et al. (2011) find that subjects' contribution is higher in a loss than in a gain public goods game; Chaudhuri et al. (2016) show that highlighting the benefits, instead of the costs, increases trust between players, so that they

behave cooperatively and the social surplus is maximised. Böhm and Theelen (2016) show that positive framing in a public goods experiment increases cooperation significantly (between 43% and 63%).

Through the investigation of the same attitude towards different behavioural facets in the same context, the paper allows to study the existence and the malleability of the possible spillover effects between them. The three measures under analysis are washing hands, using face masks and maintaining physical distance. These are relevant since they all provide protection against the virus (West et al., 2020) and for all of them compliance is hard to control, as only some violations can be observed. However, individuals may feel that adopting some, instead of all, can suffice to avoid contagion. Recent research on how the adoption of one or more protections affects the use of others shows mixed evidence: on the one hand, Seres et al. (2021) find that people using face masks are more likely to keep physical distance than individuals non-complying with the recommendation of using face masks. Aranguren (2021) presents the opposite result: people are less likely to keep physical distance, when the others wear face masks. Finally, Blanken et al. (2021) use a natural field experiment (visitors' behaviour at an art fair) to show that wearing masks does not affect physical distance.

As behaviours depend on subjective characteristics, the inquiry accounts for heterogeneous effects between individuals. The effectiveness of behavioural cues during the pandemic has been found to depend on characteristics of the context, like institutions and culture (Yan et al., 2020) and of the individuals, such as gender (Capraro and Barcelo (2020) and Nivette et al., (2020) find that men are in general less willing to wear face covers). Adoption of precautions relative to SARS-CoV-2 contagion has also been linked to two main factors: pro-sociality, which is established as determining factor in cooperative settings (Capraro et al., 2021), and risk aversion, which differs across ages and between genders (Fujimoto and Park, 2010 and

Guenther et al., 2021), with the presence of social benefits increasing men's cooperation more than women's.

Shading light on the effectiveness of the different messages to promote protective behaviours is important from a practical point of view: knowing whether messages with very simple content can have non-negligible effect and if a small change in the frame can induce a significant change in behaviour can help shaping mass communication campaigns like those going on during the pandemic. Moreover, agreement on the effectiveness of information campaigns has not yet been reached, as two recent paper exemplify. Dudás and Szántó (2021) compare the effectiveness of nudging and regulation about mask use, hand washing and physical distancing using a representative sample of the Hungarian population. According to their findings, regulation and informational nudging are equally effective in leading people to comply with the recommended use of protections. Bokemper et al. (2021) show that providing information about the benefits of wearing masks is ineffective to foster the adoption of such a protection by Italians. The strategy used in this paper to evaluate the effectiveness of nudging on the adoption of protective behaviours differs from previous experimental works (see Bokemper et al., 2021 and Dudás and Szántó, 2021) under at least two aspects: first it analyses three different recommendations (wearing masks, keeping social distance and washing hands). Second, different framings of the same message are compared to understand whether presenting facts differently may influence the willingness to adopt protections.

The study was run in Italy at the beginning of COVID-19 pandemic and uses a survey methodology with an experimental procedure: interviewees belonging to the same population received questionnaires which are identical except for the formulation of the messages. The message about the general consequences of using the PPB of interest is presented to them either in a positive fashion, the benefit of practicing them, or in a negative way, the cost of non-using them; in a third treatment, no message is present. Interviewees were asked to report their

intentions with respect to the adoption of the three measures of interest. Later, subjects belonging to each treatment who left their email address were interviewed again to report their actual behaviours to see if these were influenced by intentions and by the treatments.

The results show that just reminding the usefulness of the measures increases the willingness to comply with both legal obligations and recommendations, without any difference linked to the framing used. This may happen because subjects forget about personal protective behaviours' usefulness and any message serves as reminder. The empirical analysis shows also that the effect is stronger for prosocial types and for females, while it finds that the men are more susceptible to the negative frame. The analysis of self-reported behaviour reveals that there is a difference between self-reported intentions and behaviours, but it is based on a small subsample of respondents. The general suggestion from these results is that, in the short run, a message can serve as reminder for some preventive behaviours and that the frame of the message has marginal importance, but the negative frame influences more the one less willing to comply and less respondent to the cue.

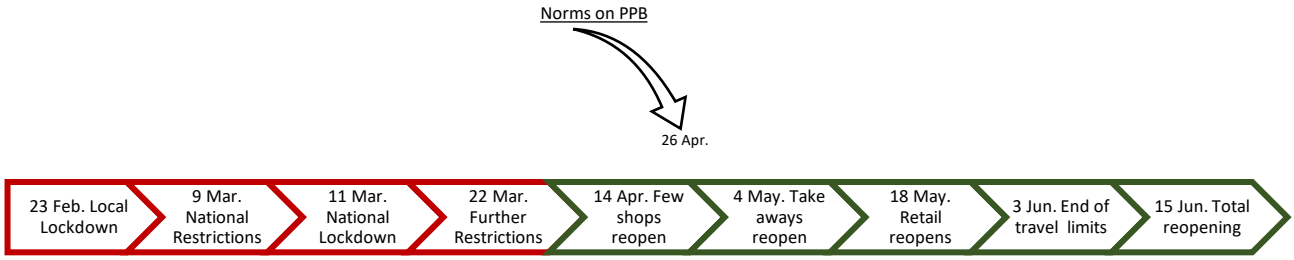
The reminder of the chapter is structured as follows: section 2 describes the institutional and health situation where the study took place; section 3 describes the data and the process used for data collection; section 4 presents and comments the main results; finally, section 5 draws conclusions.

2.2 Institutional and health situation of Italy during the early stages of the pandemic

Italy started acting against the COVID-19 pandemic at the beginning of 2020. The response of the Government ranged from closing all non-essential activities to make the use of personal

protective devices mandatory. The following timeline (Figure 2.1) summarises the actions implemented by the Italian government during the first wave of the epidemic.

Figure 2.1: Timeline of the response to COVID-19 epidemic by the Italian government



Notes. Timeline of the different restrictions adopted in Italy during the first wave of the pandemic. The introduction of norms on preventive behaviours, like using a face cover, are also indicated.

Since few days after the first cases of COVID-19 were detected, the Government started to enforce measures to stop the contagion: first, complete isolation and lockdown of the cities where the fist cases were recorded (23rd of February), then national bans on gatherings and travel limitations (9th of March), closure of non-essential activities (11th of March), finally tightening these measures by closing other activities and furtherly limiting individual movements (22nd of March). Since mid-April, reopening gradually started by shops selling only books, children clothes or toys (13th of April); subsequently, bars and restaurants were allowed to sell food for take away and home delivery only (4th of May); then all kinds of shops reopened (18th of May); finally, travel limitations ended (3rd of June) and all the remaining activities reopened (15th of June).

Even if the seriousness of the situation was evident, some characteristics of the virus undermined the compliance with personal protective measures. Evidence on SARS-CoV-2 showed that droplets represent the most common way of interpersonal transmission (WHO, 2020); moreover, about 40% of affected people are asymptomatic (He et al., 2021) or with mild symptoms (Kamal et al., 2021), but asymptomatic people can transmit the virus (Li R. et al.,

2020). SARS-CoV-2 lives on surfaces at most ~3 days and for a few hours as aerosol, its contagiousness begins ~2 days before the onset of symptoms and the median duration of viral shedding is 12 days[8].

In such a setting, for the measures to be effective all the people must take precautions, independently of the subjectively perceived risk. In practice, people may not notice the risk they represent, as they may feel healthy or underestimate mild symptoms, and avoid taking precautions.

It is noteworthy that at the time of the first survey, there was some uncertainty about the policies to be adopted to contain the pandemic. Nevertheless, past experience (namely the Spanish flu pandemic) had already taught that social distancing, hand sanitation and respiratory protection are the best non-pharmaceutical measures to limit the spread of the pandemic (WHOWG, 2006). Consequently, the recommendations and actions adopted were trustable and scientifically supported already in the first wave of the pandemic.

To promote optimal social behaviours, beyond introducing mandatory measures and distributing recommendations, authorities have been using different kinds of nudges, looking for an immediate way to enhance compliance with preventive behaviours, given that enforcement was impossible. Behavioural scientists promptly evaluated the effectiveness of different messages on (self-reported) compliance with protective behaviours, mainly focussing on social distancing and staying at home (i.e. Falco and Zaccagni, 2021; Heffener et al., 2021, Lunn et al., 2020a) and looked for tools to make them more effective (i.e. Banerjee et al., 2020).

[8] See Li Q. et al. (2020), Young et al. (2020), Wu and McGoogan (2020), Zhou et al. (2020), van Doremalen et al. (2020).

2.3 Data

The survey has been designed to evaluate the effects of the message and its different framings on the intentions to adopt the three protective behaviours of interest – hand washing, using face covering and keeping social distance. It was run between 22 and 29 April 2020, during the Italian lockdown. Three versions of the survey have been used. These differ in how the question about intentions to engage in each protective measure is framed. In the **Baseline Survey** subjects answer, on a scale from 0 (never) to 10 (always), the question "How often do you intend to __ over the next 7 days?", where __ was "wash your hands correctly" or "cover your nose and mouth" or "keep a safe distance of at least 1 meter from other people". In the **Positive Treatment Survey** the same question was preceded by the sentence "__ decreases the spread of the virus..."; this formulation is defined "positive" as it emphasises the benefits of engaging in the behaviour of interest. In the **Negative Treatment Survey** the question was preceded by the sentence "Not __ increases the spread of the virus...". It is defined "negative" as it emphasises the costs of not engaging in the behaviour.

It is noteworthy that the differences between the formulations are small. Being the adoption of the protective measures a preventive behaviour, the hypothesis is that the Positive Treatment fosters intentions more than the Negative (Gallagher and Updegraff, 2012). As both treatments remind about the correlation between protective behaviours and the epidemic, a further hypothesis is that in both the treated groups intentions are stronger than in the control.

The questionnaires comprises seven sections. The first asks questions about the subject's current situation, for example where and with whom they spent the lockdown. The second section contains questions about subject's perceptions and opinions about the pandemic and the related public measures. The next section is about subject's and relatives' habits and behaviours in the house. The fourth set of questions collects information about purchases

during the lockdown. Questions about subject's habits and behaviours outdoor follows; the sixth group of questions contains the ones about the use of protections. Finally, subjects provide information about their socio-demographic characteristics, social preferences and risk aversion.

The administered questionnaires were identical for all the groups of interviewees, but the sixth part, that about intentions, which was framed as explained before. It was not possible to modify responses of one part of the survey after incurring in subsequent parts. Filling in the questionnaire took no more than 10 minutes. The English translation of the survey is available in Appendix D.

The subjects were recruited among the students registered in the ORSEE platform of CLOSER, Center for LabOratory Simulations and Experimental Research, the experimental laboratory of the University of Torino. The database includes 2,950 email registered addresses (68% females, 100% students at the moment of registration). Students were randomly assigned to one of the experimental conditions. A total of 719 people completed the survey. Participation was voluntary and not remunerated. The sample is almost balanced between the different treatments: 227 observations in the control group, 264 in the Positive Treatment and 228 in the Negative[9]. Part of the attrition may be due to subjects ignoring the invitation or to the presence of email addresses no longer active in the database. Since receiving the invitation, respondents were allowed one week to complete the questionnaire.

To study whether influencing participants during the lockdown phase, when they could have more time and higher exposition to media, had any effect also during the reopening, when compliance was even more important, we surveyed behaviour. A follow-up questionnaire,

[9] Positive Treatment has slightly more observations.

which had only one version was sent to the participants who indicated their email address at the end of the first questionnaire (a total of 479 persons). This new survey took place between 18 and 25 May, one week after that some lockdown restrictions were loosened, i.e. when outdoor activities were somewhat allowed, but living with the virus was still a new situation.

In the follow-up questionnaire subjects disclosed, again on a scale from 0 (never) to 10 (always), "How often did you __ over the last 7 days" where __ included or "wash your hands correctly" or "cover your nose and mouth" or "keep a safe distance of at least one meter from other people".

Few other questions were also asked: some were identical to those already presented in the first questionnaire (the section about perceptions and opinions and questions about the time spent out of house), others were different (i.e. pre-lockdown habits, prediction for post lockdown habits, number and type of persons met and knowledge about face masks). This structure was meant to collect data on differences in behaviours and perceptions, while distracting the attention from the main question of interest. Filling in the follow up questionnaire took no longer than 5 minutes. The English translation is available in Appendix D.

A total of 150 subjects completed the new questionnaire (ten were impossible to match due to wrong ID); this sample is again almost balanced across treatments (38 observations in the control, 55 in the Positive Treatment and 47 in the Negative treatment)[10].

[10] Positive Treatment has slightly more observations.

2.4 Results

This section presents the comparison of the different treatments in the first survey and the comparison between the first and the second survey for a given treatment. The first comparison allows to highlight if the simple messages proposed are useful and if there is a different effect due to a positive or negative framing. The second aims to evaluate if the possible effect of the messages is limited to the contextual answer to the first survey or it is durable.

2.4.1 Framing effects in the first survey

In the first survey, the subjects assigned to the different treatments (Control, Positive and Negative) are comparable with respect to factors such as personal characteristics, opinions and conditions, as Table 2.1 shows.

Table 2.1: Randomisation test.

	Control	Positive	Negative	*P*-value C vs P	*P*-value C vs N	*P*-value P vs N	*P*-value joint orthogonality
Worriedness	6.467	6.612	6.671	0.443	0.304	0.736	0.547
	(0.151)	(0.118)	(0.129)				
Scared for self	4.282	4.403	4.544	0.603	0.286	0.544	0.556
	(0.174)	(0.155)	(0.173)				
Scared for others	7.348	7.548	7.649	0.345	0.165	0.613	0.359
	(0.161)	(0.138)	(0.145)				
State response ok	6.584	6.563	6.877	0.914	0.125	0.092	0.187
	(0.141)	(0.132)	(0.129)				
Health workers as heroes	6.692	7.148	7.101	0.064	0.115	0.839	0.129
	(0.192)	(0.157)	(0.173)				
Delivery workers as heroes	5.930	6.414	6.469	0.050	0.039	0.816	0.062
	(0.193)	(0.158)	(0.175)				
Health workers unprepared	5.079	5.346	5.294	0.219	0.341	0.813	0.443
	(0.157)	(0.149)	(0.162)				
Delivery workers unprepared	5.978	5.973	6.013	0.985	0.884	0.869	0.984
	(0.172)	(0.169)	(0.169)				
Had COVID-19	0.084	0.076	0.096	0.745	0.645	0.420	0.720
	(0.018)	(0.016)	(0.020)				
Acquittances had COVID-19	0.742	0.777	0.733	0.820	0.952	0.737	0.948
	(0.123)	(0.096)	(0.088)				
Essential worker	0.110	0.070	0.082	0.160	0.366	0.645	0.354
	(0.023)	(0.017)	(0.020)				
Acquittances essential worker	2.300	2.669	2.643	0.266	0.158	0.939	0.426
	(0.156)	(0.277)	(0.185)				
Acquittances health worker	1.378	1.884	1.540	0.278	0.469	0.454	0.431
	(0.172)	(0.408)	(0.144)				
Rooms Nr	4.251	4.152	4.439	0.561	0.316	0.100	0.255
	(0.129)	(0.112)	(0.135)				
Housemates Nr	2.387	2.922	2.404	0.486	0.933	0.492	0.628
	(0.166)	(0.698)	(0.116)				
Open spaces available	1.260	1.163	1.211	0.234	0.551	0.562	0.490
	(0.059)	(0.056)	(0.059)				
City size	2.264	2.285	2.311	0.838	0.650	0.794	0.903
	(0.075)	(0.070)	(0.072)				
Region	11.718	11.373	11.715	0.085	0.987	0.083	0.125
	(0.144)	(0.138)	(0.139)				
Lives with family	0.780	0.779	0.807	0.994	0.473	0.454	0.705
	(0.028)	(0.026)	(0.026)				
Usual house	0.892	0.849	0.854	0.213	0.278	0.886	0.421
	(0.023)	(0.025)	(0.026)				
Risk	5.932	5.771	5.851	0.419	0.692	0.681	0.714
	(0.146)	(0.135)	(0.140)				
Prosocial	0.934	0.877	0.876	0.034	0.036	0.978	0.067
	(0.017)	(0.020)	(0.022)				
Envy	0.712	0.690	0.705	0.591	0.870	0.714	0.858

	(0.030)	(0.029)	(0.031)				
Will use tracing app	1.662	1.703	1.744	0.340	0.057	0.309	0.164
	(0.032)	(0.028)	(0.029)				
Mask mandatory	0.418	0.357	0.380	0.213	0.458	0.633	0.456
	(0.036)	(0.033)	(0.036)				
Used mask	1.590	1.555	1.544	0.578	0.491	0.865	0.769
	(0.045)	(0.044)	(0.050)				
Washes hands first	0.930	0.935	0.930	0.797	0.990	0.807	0.959
	(0.017)	(0.015)	(0.017)				
Washes hands well	0.719	0.721	0.754	0.970	0.522	0.528	0.768
	(0.040)	(0.036)	(0.037)				
Kept distance	0.930	0.932	0.943	0.929	0.558	0.605	0.820
	(0.017)	(0.016)	(0.015)				
Times out in a week	1.097	1.190	1.096	0.352	0.997	0.347	0.542
	(0.071)	(0.070)	(0.070)				
Time out in mean	1.429	1.298	1.354	0.111	0.379	0.496	0.279
	(0.059)	(0.056)	(0.060)				
Male	0.220	0.242	0.272	0.563	0.202	0.456	0.438
	0.028	0.026	0.030				
Age	25.097	25.567	24.991	0.367	0.822	0.302	0.483
	0.294	0.411	0.365				

Notes. Mean and standard deviation (in brackets) of the measures elicited in the Control, Positive and Negative treatment and *p*-values from t-test and joint comparison (F-test).

The elicited variables are relative to respondents' perception of the situation: how much the respondent is worried, scared for him/her self, scared for other people, if s/he sees health and delivery workers as heroes or unprepared to face the emergency. There are also variables about the health situation of the respondents, their familiars and their acquaintances, characteristics of house and place of residence, respondents' attitudes about risks, pro-sociality, envy, willingness to use mobile apps for tracing and personal positions relative to the use of protective devices and behaviours.

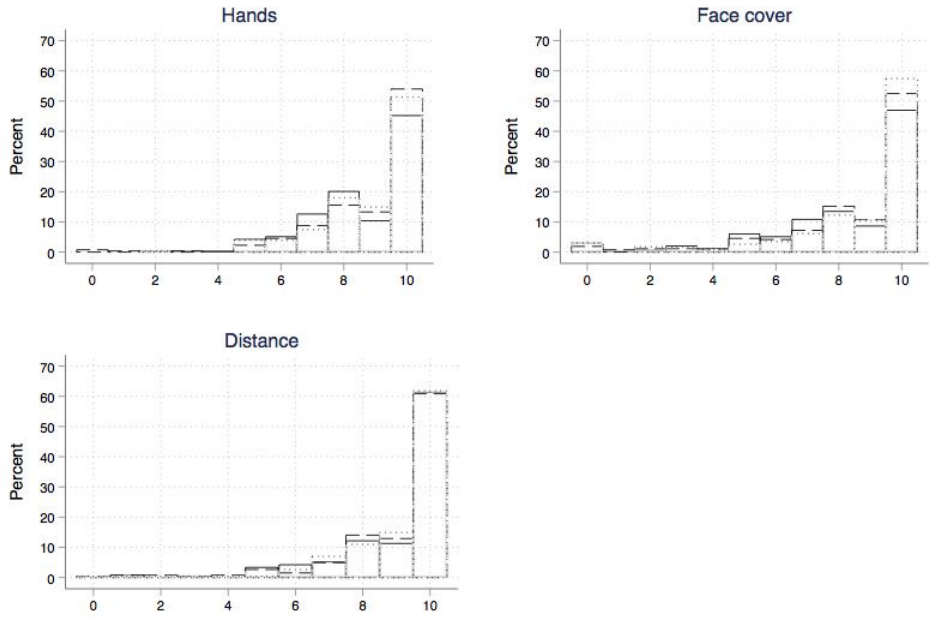
The only difference that is statistically significant is that on pro-sociality: subjects in the control group are more prosocial then both the ones in the positive and in the negative treatment. Since such an attitude is an important predictor of compliance with health measures in COVID-19 pandemic (Campos-Mercade et al., 2020), in the control group compliance levels might be higher. The analysis will control for such a possibility. Anyway, given the hypothesis that the treatments should increase compliance levels, a positive effect could be then interpreted as a lower bound of the true one.

As expected, the three protective measures in analysis are positively correlated, with the stronger positive relation between the use of face mask and the distance (0.55, p-value < 0.001). This fact represents a point in favour of the complementarity between face masks and physical distancing (Seres et al., 2021).

Relative to the comparison of results in the three different surveys, intentions relative to hand washing and using face cover are significantly stronger in the Positive and Negative treatments than in the Control (for hand washing Positive 8.86 vs Control 8.58, p-value 0.022 and Negative 8.88 vs Control 8.58, p-value 0.053; for face cover Positive 8.5 vs Control 8.14, p-value 0.089 and Negative 8.57 vs Control 8.14, p-value 0.012), with no statistically significant difference between the Positive and the Negative treatment (relative to hand washing p-value 0.71; relative to face cover p-value 0.32). Intentions about physical distancing

do not differ by frame and display the highest values between the three measures considered (Positive 9.01 vs Control 9.02, *p*-value 0.99; Negative 9.12 vs Control 9.02, *p*-value 0.69; Positive 9.01 vs Negative 9.12, *p*-value 0.69)[11,12]. Figure 2.2 illustrates the distribution of the intentions about the three personal protective behaviours in analysis (hand washing, using face covers and keeping distance) in each treatment (Control, Positive, Negative). We can observe that very low or zero values are more common relative to face masks and less for hand washing, following the degree of consolidation of the relative social norm.

Figure 2.2: Distribution of the intentions about washing hands, using face covers and keeping distance in each treatment (Control, Positive, Negative)



Notes. Percentage of respondents in each level of reported intentions to engage in the behaviour, from 0 to 10, relative to washing hands, the use of face covers and keeping at least one-meter distance, for samples in each survey (Control - solid, Positive - dash, Negative - dot).

[11] *P*-values from Two-sample Wilcoxon Mann-Whitney tests.

[12] Power calculations reveal that we are able to detect an effect of size 0.05 at 5% confidence level with more than 80% power.

These results highlight that reminding the effectiveness of the protective measures increases the willingness to comply, but this effect does not depend upon how the message is framed. Results are weaker for the use of face covers, which was a mandatory measure in many situations. Subjects have very high expectations about their intentions to comply with social distancing. During the lockdown people went outdoor for few reasons and the possibly crowded places (such as lines at supermarkets) were controlled and this might have altered perceptions about physical distancing.

Considering the extreme compliance with the behaviours (i.e. the maximum value on the response scale, 10), the Positive and Negative treatments increase significantly the probability of reporting maximal compliance with the recommendation of washing hands and using face covers, but not with that of keeping distance. Table 2.2 reports marginal effects form ordered probit regressions of the self-reported level of engagement in each of the three measures. Effects are relative to level 10 of the Positive and the Negative treatments, gender and age. Appendix B presents estimation coefficients and cut points.

Table 2.2: Ordered probit of the intentions about washing hands, using face cover and keeping distance – marginal effects relative to the probability of reporting 10.

Hands					
	dy/dx	Std. Err.	*P*-value	[95% Conf. Int.]	
Positive	0.086	0.013	0.000	0.060	0.112
Negative	0.085	0.019	0.000	0.049	0.122
Male	-0.108	0.009	0.000	-0.126	-0.091
Age	0.009	0.001	0.000	0.007	0.011

Face Cover					
	dy/dx	Std. Err.	*P*-value	[95% Conf. Int.]	
Positive	0.071	0.020	0.000	0.033	0.110
Negative	0.109	0.018	0.000	0.075	0.144
Male	-0.181	0.013	0.000	-0.206	-0.157
Age	0.003	0.001	0.000	0.001	0.004

Distance					
	dy/dx	Std. Err.	*P*-value	[95% Conf. Int.]	
Positive	-0.001	0.020	0.953	-0.040	0.038
Negative	0.027	0.017	0.121	-0.007	0.061
Male	-0.101	0.014	0.000	-0.128	-0.073
Age	0.006	0.001	0.000	0.003	0.008

Notes. Marginal effects relative to the prediction of the maximum outcome (10) from an ordered probit of the willingness to adopt each protective behaviour separately for washing hands, using face covers and keeping distance. Variables include dummies for the treatments (Positive, Negative), gender (Male) and Age, in years. Standard errors are clustered at regional level.

Besides the positive effect of the two treatments, we can see that males have a lower probability of complying with each protective measure. This result is in line with Capraro and Barcelo (2020) who find that men are less likely to wear masks. Males are also less likely to comply with the other two protective measures. Probability of total compliance is stronger the older the subject is, even in our relatively young sample. Both risk of contagion and severity of the symptoms increase with age. In addition, older people are less likely to believe in conspiracy and negation theories (Allington et al, 2020).

It is important to note that the positive effect of the treatments is mainly driven by female response to treatments' cues: for women both treatments increase the probability of reporting a high level of compliance of around 10%, while for men the effect is smaller or negligible. Moreover, for men the negative treatment is indeed more effective[13]. This fact highlights another important difference in the behaviour of men and women: not only women are more likely to adopt personal protective behaviours, but they are also more sensitive to cues aimed at promoting them. Even if overall the two treatments seem interchangeable, for men, who are in general less likely to comply, the negative treatment is more effective.

Self-reported prosocial attitudes are also associated with a higher probability of complying with the measures, in line with Campos-Mercade et al. (2020) and have the expected effect of slightly increasing both Positive and Negative treatment effects. Intentions about keeping distance are again not influenced[14].

Looking at the effect of the treatments on the other high values reported, we find that both the Positive and Negative treatments reduce the probability of reporting 8 or 9 out of 10 for

[13] Regression estimates are available in Appendix B.

[14] Regression estimates are available in Appendix B.

face cover use but again have no effect on keeping distance. This might suggest that the ones more sensitive to the intervention are the one already more compliant. Anyway, looking instead at the probability of reporting a value higher or equal to 8, we find positive and significant effect of both treatments for the two aforementioned measures[15].

In sum, reminding people the positive or negative consequences of using or not the protective measures can be effective to increase compliance with them. However, this is not the case for the suggestion of keeping a minimum distance from other people, perhaps because of already strong intentions about it. Interestingly, not only prosocial subjects are more sensible to the messages, but also females. Differences between the two framing are present only for males who in general are less likely to comply.

2.4.2 Effects in the follow up survey

In the second survey, which took place just after the lockdown, subjects declared to practice outdoor activities more often (on average twice a week in the second vs once in the first, *p*-value < 0.0001) and for a longer time (2.7 hours vs 2.1, *p*-value < 0.0001). This confirms that outdoor activities were more likely and therefore the necessities to take precautions more common. Moreover, subjects' perception of the situation did not change drastically. The only difference was in how they perceived health workers: slightly less heroes than during the lockdown (6.21 vs 6.58 *p*-value 0.01 for health) and more unprepared (5.75 vs 5.3, *p*-value 0.05)[16].

[15] Regression estimates are available upon request.

[16] *P*-values from paired t tests.

With respect to keeping distance, which was the measure with the higher values in the first survey, the intentions stated in the first survey strongly differ from the self-reported behaviour in the follow-up: on average intentions rated 1 point higher than the corresponding behaviour (9.2 vs 8.28, *p*-value < 0.0001). For hand washing the gap is smaller (8.83 vs 8.61, *p*-value 0.07) and for face cover the difference is not statistically different from zero (8.48 vs 8.13, *p*-value 0.49)[17]. Table 2.3 shows the entities of the differences between the values of the second and the first survey for the different treatments and compares them.

The figures shown in Table 2.3 suggest that no difference between intentions and behaviours exists in the control group, when measures concerning hand sanitation and face protection are considered. Instead, they were apparently unable to keep the prescribed distance, in spite of the very good intentions. The situation is much different when analysing the two treated groups. Here, the distance between intentions and behaviours is larger than 0 for all the three behaviours considered. The table suggests that the positive effect of reminding people the existence of the pandemic and the cost/benefits of protective behaviours relative to intentions hardly translates into practice. While the intention behaviour gap is limited to the physical distance in the Control, in the Positive and Negative treatments intentions are diffusely higher than behaviours.

[17] *P*-values from Wilcoxon matched-pairs signed-ranks test.

Table 2.3: Intention-behaviour gaps by type of first survey

	Control	Positive	Negative	*P*-value C vs P	*P*-value C vs N	*P*-value P vs N
Hands	-0.03 (0.26)	0.34 (0.27)	0.29 (0.22)	0.59	0.82	0.39
Face Cover	-0.05 (0.4)	0.81 (0.4)	0.23 (0.41)	0.64	0.09	0.19
Distance	0.84 (0.38)	1.23 (0.36)	0.62 (0.31)	0.36	0.42	0.95
Obs.	38	55	47	–	–	–

Notes. Entities of intention behaviour gap in each survey (Control, Positive and Negative) and for each behaviour (washing hands, using face covers and keeping distance). *P*-values from Two-sample Wilcoxon Mann-Whitney test for the pairwise comparison between surveys, for each measure.

It is to underlie that this last analysis has some limitations. First there is relevant attrition between the first and the second survey. Around 20% of subjects took part also in the second survey, with no difference between the treatments. The second, which descends from the previous, is that the sample size is consequently small, limiting the statistical power of the analysis. Third, as Table B.4 in Appendix B reveals, the subjects that answered the second survey are more risk-averse than the average of the full sample. These three limitations may induce to cast some doubts on the results presented in the table and discussed in this sub-section. Nevertheless, a couple of considerations explain why Table 2.3 is in the paper. On the one hand, people who respond the second wave of a survey signal to be, on average, more cooperative and compliant than the full sample. On the other hand, as mentioned before, those who kept responding are more risk averse than the average sample. Taken together these aspects would suggest that people who participated in both waves should be more compliant with the protective measures than, on average, the full sample. Therefore, the differences detected between intentions and behaviours may still be of interest, as they suggest that, even in a self-selected sub-sample of compliant and risk-averse individuals, virtuous intentions may

not translate into equally virtuous behaviours. However, risk-averse individuals may be more sensitive to the messages reminding them the risks of non-protecting than the benefits of complying with rules and recommendations.

Although these last reflections should be taken cautiously, they may suggest that informative campaigns could be ineffective to promote virtuous behaviours among the population, even when they help developing compliant intentions. The effectiveness on intention to comply of messages is limited to the short run and the timing of reminders could play a significant role for behaviour and reporting.

2.5 Conclusion

This chapter focusses on the effect that messages may have on the adoption of protective measures during an epidemic. The experimental design uses two frames: one is positive and emphasises the benefits of acting, the other is negative and highlights the costs of not acting. The questionnaires collected self-reported intentions during the lockdown and behaviours after the first wave of reopening. Differently from previous research, the results show that just reminding the usefulness of the protective measures is effective to increase compliance, however the different frames used do not seem to be have different degrees of effectiveness. Gender differences are present as women are more willing to adopt the protective measures, especially after the cue, and men are more convinced by the negative frame. Finally, frames appear to affect the intention-behaviour gaps, but the sample of those who responded the follow-up survey is small and this may hinder the detection of statistically significant effects. Therefore, this last aspect needs investigating more, using other data to know if the effect of this kind of reminders persists over the time.

Stressing the consequences may foster the intentions to adopt protective behaviours, at least momentarily, as if, in the middle of a pandemic, people needed to know why they have to wash their hands or use a face cover and being reminded about it. Beyond all the biases that can make people blind in a pandemic (Zatta and Braut, 2020), the fact that they might underestimate or forget the general consequences of their behaviours is prominent. Fortunately, reminders can be easily diffused, but knowing how much time their effect lasts and if subjects respond to their repetition is fundamental for such policies to be effective.

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Chapter 3

How does dishonesty split? Testing singular vs. multiple incentives

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We experimentally test which are the differences in over-reporting when the incentives are concentrated or spread. In our experiment, subjects have to roll a die in private five times and report the outcomes. In LAST treatment, only subjects' fifth report determines the payoff, whereas in SUM treatment all five reports affect the payoff. The minimum and maximum payoffs are the same in both cases and the expected payoff in the two treatments are comparable. The two treatments differ in the distribution of payoffs and in the number of opportunities for profitable misreporting. We find that subjects report significantly higher numbers in LAST compared to the average report in SUM. Looking at the total of reports, it does not differ by treatment. We find that dishonesty splits as there are more opportunities, having the positive effect of reducing the total profit of cheating, but the negative effect of spreading lies across all the opportunities. Anyway, the total amount of cheating made remains stable across conditions.

3.1 Introduction

Dishonest behaviour has severe consequences for societies, with costs up to several billions of Euro every year (e.g., European Commission, 2014). Small acts of dishonesty - like overreporting the number of hours worked or stealing from the office supply cabinets - are extremely costly for the society (Mazar and Ariely, 2006) and can undermine people's trust, leading to further erosion of honesty (Bucciol and Montinari, 2019). Unfortunately, dishonesty is a complex phenomenon to fight. According to Becker (1968), we have two main tools for this goal: reducing the benefit of the dishonest action and increasing the probability of punishment. More recently, behavioural economics has shown that there is a larger set of individual and contextual factors that also affects the likelihood of dishonesty (Abeler et al. 2019; Heck et al. 2018; Pierce and Balasubramanian, 2015).

This work focuses on self-reporting of outcomes which are not individual effort but are anyway determinant for payments, i.e. reporting the number of clients who answered promotion calls. Self-reporting is a common tool in organizational monitoring and it represents the setting where cheating is studied the most, as demonstrates the large diffusion of studies using the die-under-the-cup experimental paradigm (Abeler et al. 2019).

We test if the behaviour when only one reporting opportunity is incentivized differs from when a same incentive is spread across all the opportunities. In any setting where self-reporting is required multiple times, it is always possible to change the payoff-relevance of the specific reports. Finding that the same monetary incentive has different effects depending on how it is distributed, without altering the number of reports to be done, can provide a costless tool to change (dis)honest behaviour. In the analysis we focus both on the effect on the reports and on the profits that come from, which are two related but different outcomes that can be affected by the change in the incentive scheme.

We run a lab-in-the-field experiment with 217 university students who play a modified version of the die-under-the-cup paradigm (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al. 2011). Our two main treatments differ in the number of reports that are payoff-relevant: payoffs depend only on one die roll (the last of five) or on five die rolls (their sum). In both treatments, subjects are asked to report the outcome of a roll five times. In this way we keep constant the variability of the outcomes observed[18] and therefore the possible justifications to be dishonest (Shalvi et al., 2012). More importantly, it is of interest knowing the value of each report. In different treatments, we also manipulate the frame of the task (gain vs. loss frame) and the size of the incentives (small, medium, large) to see how variations in the experimental design affect reporting.

We find that subjects claim higher payments when the incentive is only for one report. In SUM the mean of the five incentivized reports is lower than the mean of the single incentivized report in LAST. When we instead compare the total of all reports made, we find that it does not differ by treatment. The amount of cheating is overall the same, but differently distributed. Following the monetary incentives subjects cheat a little in each opportunity or a lot in the only one. Finally, regression analysis confirms that the frame of the task, the size of the incentives and personal characteristics are not driving our result.

Our work is related to the lab experiment of Casal and Filippin (2020). The authors compare one-shot and repeated reporting tasks designed to measure dishonesty. Contrary to our result, Casal and Filippin (2020) find no difference in reporting between a treatment where subjects have to report a single number and one in which they report the sum of numbers. The authors

[18] Subjects had the possibility to roll their die and familiarize themselves with the task before the first payoff relevant roll.

suggest that this result is the balancing of the effect of observing many outcomes (positive) with the effect of reputational concerns (negative). However, in our experimental design subjects report each single number whereas in theirs subjects report only once the sum of all the numbers. This peculiarity can make a significant difference since changes the number of cheating acts to be done. Also, in our design subjects see five outcomes in both treatments whereas in theirs, the number of outcomes is not hold constant. Rilke et al. (2016) first analysed a similar problem in the context of monitoring subjects' performance, comparing two policies: one with a series of reports and one with an overall report. They find that a one-by-one monitoring policy resulted in more cheating than an all-at-once policy, in line with their predictions but not with people's intuition elicited in a separated sample in an incentivized manner. Our work differs from their paper since in our treatments we change the way payment are made and not the way reporting is done. Also, we use a die rolling game instead of a trivia game. Subjects cheat differently when it is about effort or about luck (Kajackaite, 2018). Moreover, in our case cheating cannot be detected at individual level but an *a priori* distribution of outcomes exists (and is the same for each subject).

Our experiment compares two situations where the reporting opportunities and the size of the incentives are identical, but the relation between reports and incentives is changed. Finding evidence that this type of intervention can have a positive effect opens a new path to find tools to fight dishonesty.

3.2 Experiment

Our sample includes 217 subjects frequenting the University (39% females, mean age 23) that took part in a modified version of the "die under cup" experiment (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al., 2011). The experiment took place as a lab-in-the-field in the

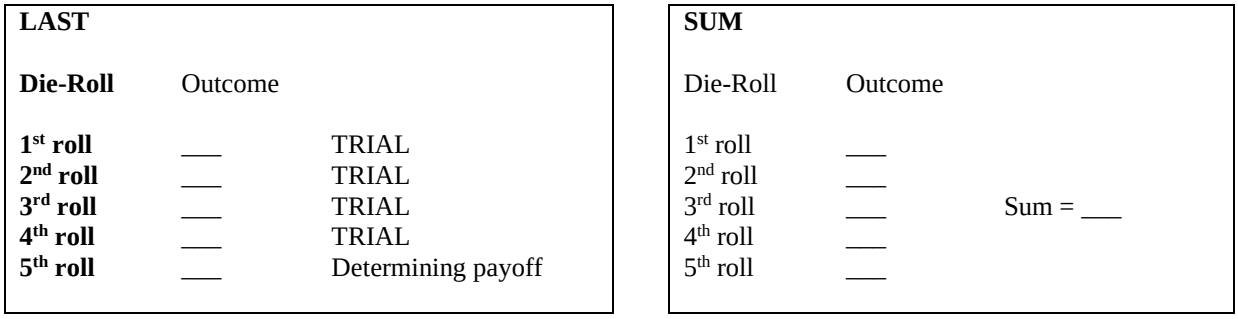
University of Copenhagen campus. After receiving written instructions in English, participants roll a die five times in private and report the outcomes on paper report sheets (see Figure 3.1). Subjects are paid proportionally to what they report: reporting a higher number gives right to a higher payoff (with 0 as lower payoff). Our main treatment manipulation is the payment rule: in Treatment **LAST** (113 subjects), we paid participants according to only the last outcome reported (the fifth[19]), whereas, in Treatment **SUM** (114 subjects), we paid participants according to the sum of the five outcomes separately reported. Figure 3.1 shows our treatment manipulation: on the left the detail of the report sheet in LAST, on the right the one in SUM. Table 3.1 illustrates the relation between payoffs and the possible reports of LAST and SUM.

As consequences of the simple treatment manipulation we have some similarities and some differences between the two treatments. The expected payment is similar between SUM and LAST treatments such that the benefits of cheating are comparable: 9 and 10 DKK when the maximum possible is 20; 22.51 and 25 DKK when the maximum is 50; 45.03 and 50 DKK when it is 100. Note that the discrepancy between the mean payment in the two treatments is lower than 5% of the total and that the highest is of 5 DKK (0.67 Euro). The payment scheme is made such that to gain the same amount of over reporting by 1 point in LAST, in SUM it is necessary to over report by multiple points (at least 3). In LAST the expected distribution of (honest) reports is uniform with mean equal to 3.5; whereas, in SUM the expected distribution is normal with mean equal to 17.5. In SUM subjects can get the same outcome using different cheating strategies (e.g. subjects can get a 25 by reporting 5, 5, 4, 6, 5 or 3, 4, 6, 6, 6). There are 6 possible outcomes (and 6 payoffs) in LAST while in SUM there are 26 outcomes

[19] Since we do not even know if dice were rolled (reporting was secret), we choose to be relevant for pay an outcome position easy to remember and identify.

corresponding to 11 payoffs. Combining all the differences, in SUM subjects face a more complex situation where there are multiple and more nuanced possibilities for cheating. In SUM on one side there is the possibility to engage in smaller lies, which has been shown to be easier to justify (Ayal et al., 2015; Shalvi et al., 2015), but on the other side the underling theoretical distribution of outcomes can exacerbate the aversion to be perceived as cheater (Dufwenberg and Dufwenberg, 2018).

Figure 3.1: Report sheets in the two treatments



Note: Report sheets in treatments LAST (on the left) and SUM (on the right).

Table 3.1: Report-payment scheme for the two treatments

LAST Report	6	-	5	-	4	-	3	-	2	-	1	-
Payoff	**π**	**9/10 π**	**8/10 π**	**7/10 π**	**6/10 π**	**5/10 π**	**4/10 π**	**3/10 π**	**2/10 π**	**1/10 π**	**0**	**0**
SUM Report	28,29, 30	26, 27	24, 25	22, 23	20, 21	18, 19	16, 17	14, 15	12, 13	10, 11	8, 9	5, 6, 7

Note: Reports and corresponding payoffs in LAST and SUM treatment. **π** indicates the maximum payment possible, i.e. 20, 50 or 100 DKK.

We have two additional treatment manipulations: the size of payoffs - subjects in different treatments can win a maximum of 20, 50 and 100 DKK (respectively 72, 71 and 74 observations)- and framing - subjects in different treatments can cheat to gain an amount of money or to avoid losing the same amount (respectively 102 and 115 observations). These additional manipulations allow to test the robustness of a difference between the two main treatments. Appendix D contains copies of the instructions.

3.3 Results

In LAST, subjects report a significantly higher-than-expected number when incentivized (4.12, *p*-value < 0.001, Wilcoxon signed-rank test). None of the first four reports, which are not incentivized, differs from the expected value (3.68, *p*-value 0.28; 3.49 *p*-value 0.93; 3.51 *p*-value 0.93; 3.54 *p*-value 0.8, Wilcoxon matched-pairs signed-ranks tests), in particular none is lower. On aggregate, subjects did not engage in underreporting to compensate the higher values of the incentivized report and they do not over-report without a monetary incentive. In SUM, subjects are reporting a sum of numbers significantly higher than expected (18.85 corresponding to an average of 3.77; *p*-value < 0.001, Wilcoxon signed-rank test). Moreover, the sum they report corresponds perfectly to the sum of the numbers reported. Subjects did not cheat differently from how we expected, i.e. by writing a sum higher than the reported numbers.

Looking at the incentivized reports, subjects are cheating significantly more when they have only one incentivized report versus when all reports are incentivized (fifth report of 4.12 vs. mean of the five reports of 3.77, *p*-value = 0.005, Wilcoxon rank-sum test). This does not necessarily mean that in SUM they are cheating less often, but only that they are stealing less in total. SUM treatment is therefore more efficient in minimizing the amount of extra profit "gained". Figure 3.2 shows the distribution of the values of the fifth outcome reported by the subjects in LAST (left panel) and the distribution of the values of the sum reported by subjects in SUM (right panel).

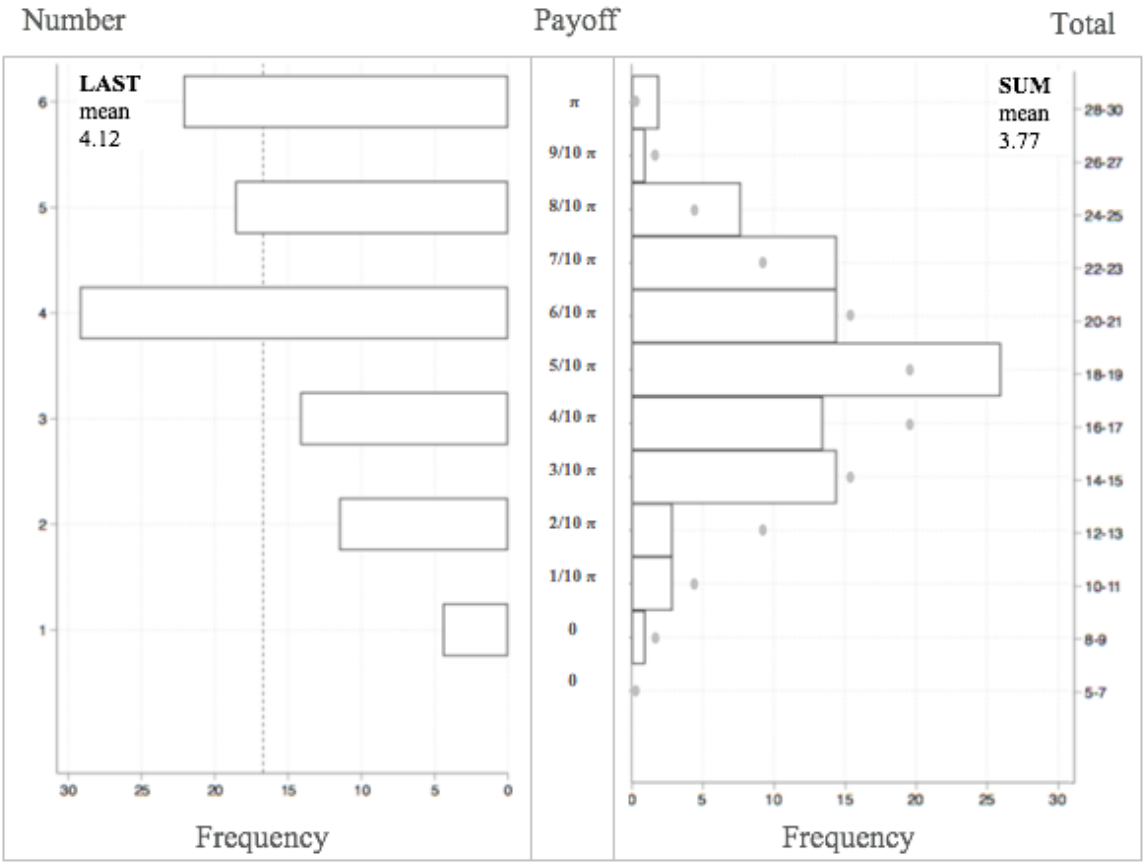
Comparing the sum of the five numbers reported in LAST and in SUM, we find that they do not differ from each other statistically (18.34 vs 18.85, *p*-value = 0.33, Wilcoxon rank-sum test), while when we compare the fifth values we find them slightly higher in LAST (4.12 vs 3.7, *p*-value = 0.08, Wilcoxon rank-sum test). This indicates that, whatever the incentive, the amount of cheating on the total is similar as if the dishonesty in the fifth opportunity in LAST

was cut in pieces and redistributed in all the five opportunities in SUM. Incentivizing and monitoring each report instead of only a defined one just splits dishonesty into parts. Figure 3.3 shows the distribution of the values of the total sum of reports in the two treatments. The two distributions do not differ by treatment (two-sample Kolmogorov-Smirnov test of the equality of distributions, *p*-value = 0.818)

Regarding the other experimental variables, we do not find any significant difference when we compare reports in treatments using a gain frame and loss frame (3.91 vs 4, *p*-value = 0.8, Wilcoxon rank-sum test). Neither we find any significant difference when we compare reports in treatments where the maximum possible amount is 20, 50 or 100 DKK (3.87, 4.04, 3.96, respectively, *p*-values: 20 vs. 50 = 0.36; 20 vs. 100 = 0.5; 50 vs. 100 = 0.72, Wilcoxon rank-sum test).

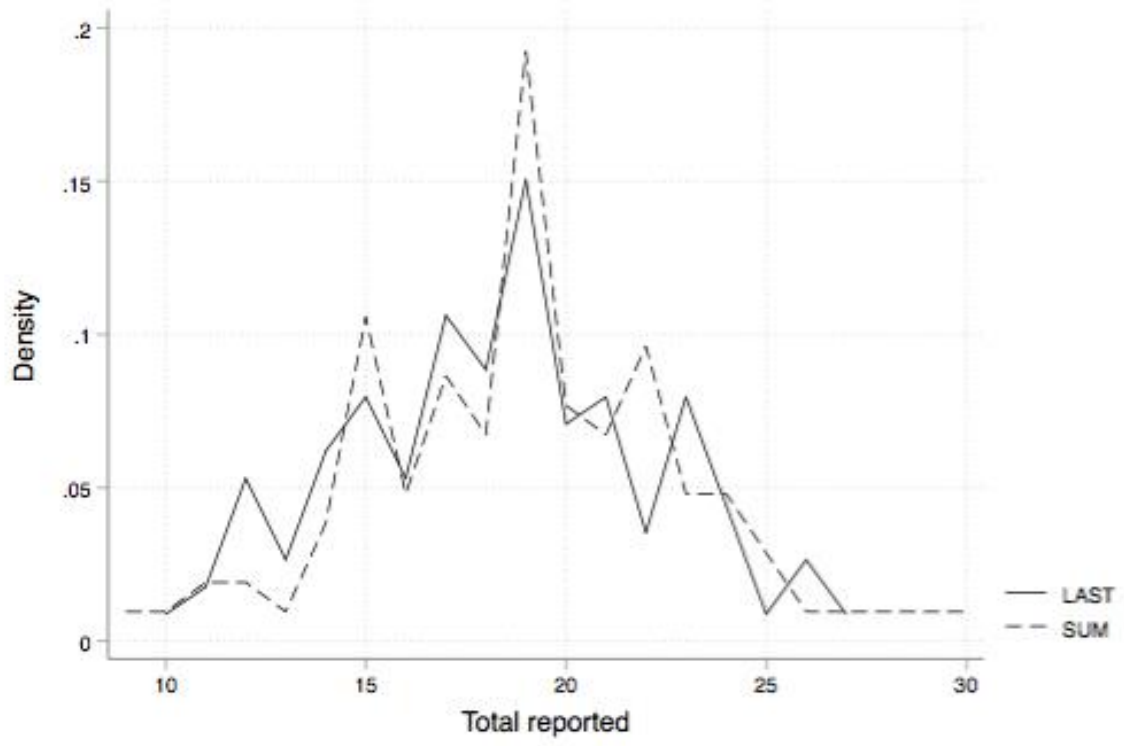
We further check that the background variables - the frame (Gain, 1 for treatments with Gain frame, 0 Loss frame) and the size of payoffs (Small, a dummy defining when maximum payment is 20 DKK, Medium for max 50 DKK, Large for max 100 DKK) - and the individual characteristics - Female (a dummy indicating gender) Age (a continuous variable, in years) and field of study (EcoPsi, 1 if self-reported field of study belongs to the area of economics or psychology, 0 otherwise) - have similar effects in both treatments. We find - using regression analysis, an ordered probit for LAST and an OLS for SUM - that none of these variables significantly affects reporting in any treatment. Estimation outputs are reported in Appendix C. We can therefore affirm that our treatment effect is not driven by a mediated effect of the background variables or of the individual characteristics.

Figure 3.2: Distribution of claims in LAST (on the left) and in SUM (on the right)



Note: On the left panel the distribution of the reports in LAST, on the right panel the distribution of the total of reports in SUM. The external axes indicate the numbers reported (from the single roll or the total of five rolls). The central one indicates the payment categories. π indicates the maximum payment achievable, a gain of 20, 50 100 DKK or an equivalent not-loss. Note that in SUM there are more feasible payment categories. The dotted line indicates the expected of frequency of 16.7 in LAST, on the left. Similarly, the dots represent the expected frequencies in SUM, on the right.

Figure 3.3: Distribution of the total in LAST (solid) and in SUM (dashed)



Note: Distribution of the total sum of reports in LAST treatment, solid lines, and SUM, dashed lines.

3.4 Conclusion

In this chapter we experimentally test if dishonesty differs in a situation where there is only one opportunity to profitably cheat (LAST) or where there are more (SUM) but the total amount to earn is the same and equal are also the required number of reports. We find that dishonesty is not cut down when there are less opportunities: subjects report, on average, a number higher than expected when they have incentive to cheat once (treatment LAST) compared to when they have incentives to do it multiple times (treatment SUM). Moreover, we find evidence that dishonesty splits: while the mean of the incentivized reports is significantly different, the sum of all the reports made does not differ between the two treatments. Subjects engage in smaller

lies and spread them in all the opportunities if they have to misreport more times for the same benefit, such that there is no difference looking at the total reported.

In our experiment we find that in LAST over-reporting is huge but limited to the only incentivized report; in SUM over-reporting is smaller but it is diffused across reports. This reveals that in choosing the scheme there is an important trade-off between how many lies and their size and that a stable limit to dishonesty seems to exist: no matter the distribution of the incentives the total deviation from the true sum is the same. Further research is needed to determine whatever this limit replicates in other experimental conditions.

In conclusion, a simple change on how a same incentive is distributed across the same reporting opportunities has non-negligible effects and these differ by looking at the level or the distribution of overreporting (and therefore overearnings). These results open the way to find an optimal distribution of incentives to minimize (dis)honesty.

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APPENDIX A

A.1. Descriptive Statistics and Randomization Test

Table A.1.1 reports summary statistics and tests for the randomization for the whole sample.

Table A.1.1: Descriptive Statistics and Randomization Test

	N Takers	N Resp.	Mean Takers	Mean Resp.	Diff.	St. Err.	*P*-value
Female	67	67	.49	.49	0	.09	1
Age	68	68	24.46	23.82	.63	.66	.34
FemaleField	44	50	.3	.3	0	.1	.96
LivesFamily	68	68	.43	.5	-.07	.09	.39
Education	66	67	1.45	1.36	.1	.1	.35
Works	68	68	.71	.65	.06	.08	.47
TimeCare	67	68	16.5	18.8	-2.3	3.59	.52
InRelationship	68	65	.63	.42	.22	.09	.01
Hetero	67	64	.78	.78	-.01	.07	.94
Drinks	68	68	1.66	1.76	-.1	.18	.56
Prosocial	64	64	.9	.93	-.03	.05	.55
Envy	67	68	.73	.73	0	.08	1
Risk	68	68	5.54	5.37	.18	.43	.68
Happiness	67	67	35.67	35.4	.27	1.16	.82
Neuroticism	67	66	8.7	9.55	-.84	.5	.09
Extraversion	67	68	8.69	8.74	-.05	.39	.9
Openness	67	68	11.33	11.79	-.47	.33	.16
Agreeableness	66	68	10.35	10.35	0	.42	.99
Conscientiousness	67	67	10.85	10.88	-.03	.39	.94
Experience	68	68	.71	.68	.03	.08	.71

Notes. Table A.1.1 reports the number of answers and the mean value of the variables collected in the questionnaire, separately for subjects assigned to the role of Takers and Respondents. It also reports the difference between the two (Diff, value for Takers minus value for Respondents), standard errors and *P*-values from two-sample t-test with equal variances.

In all the pairwise tests there is no difference between subjects assigned to the role of Takers or Respondents, except for the fact of being in a sentimental relationship.
The sample is balanced for gender, by construction. Mean age is 24. Participants who reported to be enrolled in typically female dominated fields (FemaleField, 1 if Literature and Languages, 0 otherwise) are equally splitted, but not all subjects reported this piece of information. They also are similar in the level of degree they have (Education). Half of the subjects lives with the family (LivesFamily, 1 if they live with their family, 0 otherwise), around 70% work (Work, 1 if yes, 0 otherwise) and they spend around 17 minutes a week in (unpaid) work of care. About half are in a sentimental relationship, but Takers are more likely to (InRelationship, 1 if yes, 0 otherwise). 80% declares to be heterosexual (Hetero, 1 if yes, 0 otherwise). Takers and Respondents are comparable for social preferences (Prosocial and Envy) and risk preferences (Risk and Drinks). The first were elicited using non-incentivized version of Bartling et al. (2009). The second are Risk, which represents the answer to the general question on risk aversion (Dohmen et al., 2011), and Drinks, that is an indirect measure using self-reported drinking behaviour (number of days in which the subject usually drinks alcoholic beverages in a week). Scores in the 5 domains of personality (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) and in subjective

well-being (happiness) do not differ significantly by role, even if neuroticism levels appear to be higher for Respondents.

Table A.1.2 reports summary statistics and tests the randomization in the two roles for the females in the sample, while Table A.1.3 does it for males. The relevant differences are for the values of Neuroticism where female Takers have slightly higher values than female Respondents and for being in a sentimental relationship, fact that is more common for male Takers than for male Respondents.

Table A.1.2: Descriptive Statistics and Randomization Test - Females

	N Takers	N Resp.	Mean Takers	Mean Resp.	Diff.	St. Err.	*P*-value
Female	33	33	1	1	0	0	.
Age	33	33	24.18	23.79	.39	1.08	.72
FemaleField	23	22	.35	.23	.12	.14	.38
LivesFamily	32	33	1.38	1.27	.1	.14	.47
Education	33	33	.36	.55	-.18	.12	.14
Works	33	33	.67	.7	-.03	.12	.8
TimeCare	32	33	20.5	23.88	-3.38	6.51	.61
InRelationship	33	30	.61	.53	.07	.13	.57
Hetero	32	30	.84	.83	.01	.1	.91
Drinks	33	33	1.61	1.64	-.03	.23	.9
Prosocial	33	33	1.91	1.88	.03	.08	.7
Envy	33	33	1.15	1.18	-.03	.09	.75
Risk	33	33	5.12	5.09	.03	.63	.96
Happiness	33	33	35.48	33.58	1.91	1.77	.29
Neuroticism	33	32	9.06	10.34	-1.28	.68	.06
Extraversion	33	33	9.15	8.33	.82	.52	.12
Openness	33	33	10.97	11.67	-.7	.45	.13
Agreeableness	33	33	10.76	10.27	.48	.61	.43
Conscientiousness	33	32	11.27	11.12	.15	.54	.79
Experience	33	33	.7	.61	.09	.12	.45

Notes. Table A.1.2 focuses on the female subsample and reports the number of answers and the mean value of the variables collected in the questionnaire, separately for subjects assigned to the role of Takers and Respondents. It also reports the difference between the two (Diff, value for Takers minus value for Respondents), standard errors and *P*-values from two-sample t-test with equal variances.

Table A.1.3: Descriptive Statistics and Randomization Test - Males

	N Takers	N Resp.	Mean Takers	Mean Resp.	Diff.	St. Err.	*P*-value
Female	34	34	0	0	0	0	.
Age	34	34	24.5	23.88	.62	.78	.43
FemaleField	21	27	.24	.33	-.1	.13	.48
LivesFamily	34	33	1.53	1.45	.07	.15	.62
Education	34	34	.47	.44	.03	.12	.81
Works	34	34	.76	.62	.15	.11	.2
TimeCare	34	34	12.79	14.12	-1.32	3.24	.68
InRelationship	34	34	.65	.29	.35	.12	0
Hetero	34	33	.74	.76	-.02	.11	.84
Drinks	34	34	1.68	1.88	-.21	.27	.45
Prosocial	34	34	1.88	1.97	-.09	.06	.17
Envy	34	34	1.35	1.35	0	.12	1
Risk	34	34	5.88	5.71	.18	.59	.77
Happiness	33	33	35.61	36.94	-1.33	1.47	.37
Neuroticism	33	33	8.42	8.85	-.42	.73	.56
Extraversion	33	34	8.15	8.97	-.82	.54	.14
Openness	33	34	11.61	11.91	-.31	.48	.53
Agreeableness	32	34	10.03	10.59	-.56	.57	.33
Conscientiousness	33	34	10.33	10.68	-.34	.57	.55
Experience	34	34	.71	.74	-.03	.11	.79

Notes. Table A.1.3 focuses on the male subsample and reports the number of answers and the mean value of the variables collected in the questionnaire, separately for subjects assigned to the role of Takers and Respondents. It also reports the difference between the two (Diff, value for Takers minus value for Respondents), standard errors and *P*-values from two-sample t-test with equal variances.

A.2 Additional Analyses

Table A.2.1: Marginal effects from Probit regressions of the Choice to enter competition - Robustness checks - Different specifications

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents	(4) Takers	(4) Respondents
Female	0.00980	-0.317***	0.00344	-0.313***	-0.0995*	-0.326***	-0.00897	-0.285***
	(0.19)	(-5.61)	(0.17)	(-4.80)	(-2.47)	(-4.95)	(-0.06)	(-3.45)
Payoff 1			0.000329	-0.000102	0.00140***	-0.000139	0.00246	-0.000369
			(0.20)	(-0.09)	(3.34)	(-0.12)	(1.65)	(-0.30)
Difference			0.000970**	0.000498	0.00220***	0.000156	0.00236**	0.000378
			(2.87)	(0.47)	(3.81)	(0.18)	(2.60)	(0-36)
Believed Rank			-0.181***	0.00815				
			(-3.95)	(0.20)				
Submit PR to T					0.452***	0.283		
					(9.58)	(1.63)		
Neuroticism							0.0225	0.0174
							(0.31)	(0.64)
Extraversion							0.0112	0.0502**
							(0.42)	(2.96)
Openness							-0.0278	-0.0344
							(-0.60)	(-1.03)
Agreeableness							-0.0277	0.0112
							(-1.50)	(0.52)
Conscientiousness							0.00465	-0.0128
							(0.15)	(-0.89)
AIC	88.82	85.12	77.91	84.51	74.80	79.46	78.81	79.40
BIC	93.23	89.53	82.31	88.92	79.21	83.87	83.15	83.74
Observations	67	67	67	67	67	67	65	65

Notes. Table A.2.1 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T) and personality traits (Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness).
T statistics in parentheses: *** p<0.001, ** p<0.01, * p<0.05. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Three observations lost in the last specification due to incomplete questionnaires.

Table A.2.1 reports estimated marginal effects of the regressions of the choice to compete. The first specification includes only the gender (Female). The next specifications add the payoff in Stage 1 (Payoff 1) and the difference between the payoff of Stage 2 and Stage 1 (Difference). The second also controls for the belief about own position in Stage 2 tournament (BelievedRank, 1 if first, 2 if second, 3 if third, 4 if fourth). The third instead controls also for the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise). The fourth adds the scores in the personality traits (Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness). Comparing the estimations, effects due to interdependence of the control variables that alter the main result do not emerge.

Table A.2.2: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Control for unbalanced variable.

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents
Female	-0.0388	-0.346***	-0.0802*	-0.346***	-0.00797	-0.364***
	(-1.78)	(-3.38)	(-2.13)	(-4.43)	(-0.09)	(-3.58)
Payoff 1	0.00136	0.000412	0.000507	0.000371	0.00203*	0.000704
	(1.16)	(0.47)	(0.50)	(0.30)	(2.16)	(0.43)
Difference	0.00160***	0.000202	0.00164**	0.0000261	0.00265*	0.000378
	(4.04)	(0.20)	(2.97)	(0.02)	(2.43)	(0.29)
Believed Rank			-0.164**	0.0270	-0.180**	0.0823
			(-2.75)	(0.45)	(-3.15)	(1.29)
Submit PR to T			0.426***	0.257	0.528***	0.194
			(10.07)	(1.42)	(4.55)	(1.44)
Neuroticism					-0.0415***	0.0262
					(-4.42)	(0.55)
Extraversion					0.0370	0.0102
					(0.68)	(0.37)
Openness					-0.0147	0.00204
					(-0.48)	(0.08)
Agreeableness					0.0184	0.0600***
					(0.50)	(5.32)
Conscientiousness					-0.0792	-0.00112
					(-1.52)	(-0.03)
InRelationship	-0.0554	-0.0761	-0.0171	-0.117	-0.0977	-0.185*
	(-0.53)	(-0.59)	(-0.14)	(-1.20)	(-1.37)	(-2.19)
AIC	85.43	77.62	68.81	73.64	57.97	68.90
BIC	89.84	81.94	73.22	77.96	62.31	73.15
Observations	67	64	67	64	65	62

Notes. Table A.2.2 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), personality traits (Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness) and the fact of being in a sentimental relationship (InRelationship)
T statistics in parentheses: *** p<0.001, ** p<0.01, * p<0.05. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table A.2.2 reports estimated marginal effects from the regressions of the choice to compete in three specifications of paragraph 4.4.2 but controlling for a dummy variable indicating if the subject declared to be in a sentimental relationship (InRelationship). Only in the third specification being in a sentimental relationship has a statistically significant effect on the probability of choosing the coopetition: it has the effect of reducing it for the Respondents. The results on gender and other factors influencing willingness to compete in the two different roles are not affected by including as a control the fact of being in a sentimental relationship. It is to note that this variable represents a novel control that other studies about willingness to compete did not have and/or used.

Table A.2.3: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Other controls

	(1) Taker	(1) Respondent	(2) Taker	(2) Respondent	(3) Taker	(3) Respondent
Female	0.0147	-0.308***	-0.0536	-0.363***	-0.0710	-0.333***
	(0.39)	(-4.62)	(-0.79)	(-7.05)	(-1.63)	(-5.02)
Payoff 1	0.000534	-0.000133	0.000452	-0.000203	0.000596	-0.000186
	(0.45)	(-0.12)	(0.39)	(-0.15)	(0.73)	(-0.12)
Difference	0.00114	0.000540	0.00148***	0.000287	0.00168**	0.000223
	(1.96)	(0.50)	(3.59)	(0.28)	(2.89)	(0.21)
Believed Rank	-0.171***	0.0160	-0.172*	0.0246	-0.161**	0.0272
	(-5.16)	(0.33)	(-2.43)	(0.57)	(-2.85)	(0.85)
Submit PR to T			0.413***	0.259	0.431***	0.272
			(15.57)	(1.57)	(6.92)	(1.56)
Risk	0.0229	0.0175				
	(0.64)	(0.72)				
TimeCare			-0.00115	0.00317		
			(-0.28)	(1.21)		
Hetero					-0.0711	-0.0944
					(-0.33)	(-0.72)
AIC	77.03	84.04	68.44	77.82	68.61	78.95
BIC	81.44	88.45	72.82	82.23	73.02	83.36
Observations	67	67	66	67	67	67

Notes. Table A.2.3 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), risk preference (Risk), weekly hours of unpaid care work (TimeCare), sexual orientation (Hetero).
T statistics in parentheses: *** p<0.001, ** p<0.01, * p<0.05. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table A.2.3 reports estimated marginal effects from the regression of the choice to compete on gender (Female), payoff in Stage 1 (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), belief about own position in Stage 2 tournament (BelievedRank, 1 if first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise).
The first specification controls for the level of risk aversion (Risk, continuous variable from 0 to 10) instead of SubmitPRtoT since it also reflects risk aversion. The second controls also for the time spent in unpaid care work (TimeCare, continuous variable). The third controls for sexual orientation (Hetero).
Using as control Risk or SubmitPRtoT gives qualitatively the same results but for the fact that Risk does not have a significant effect, while SubmitPRtoT had a positive effect on willingness to compete for Takers. Correlation of Risk with the other measure of riskiness elicited, Drinks, is low. Anyway, using the latter in the regressions gives similar result. Time spent in work of care (TimeCare) and sexual orientation (Hetero) do not influence results, nor have an effect on choosing the competition.

Table A.2.4: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Social preferences and happiness

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents
Female	-0.0977***	-0.321***	-0.0481*	-0.355***
	(-7.83)	(-4.61)	(-2.38)	(-5.10)
Payoff 1	0.000476	-0.000226	0.00134	-0.000201
	(0.48)	(-0.20)	(0.82)	(-0.12)
Difference	0.00174***	0.000129	0.00194***	0.000220
	(3.40)	(0.15)	(4.38)	(0.20)
Believed Rank	-0.166*	0.0208	-0.147*	0.00455
	(-2.52)	(0.48)	(-2.28)	(0.11)
Submit PR to T	0.432***	0.278	0.449***	0.273
	(8.07)	(1.52)	(15.55)	(1.65)
Envy	0.0611	-0.0679		
	(0.48)	(-0.69)		
Happiness			0.00125	-0.0119**
			(0.26)	(-2.90)
AIC	68.66	79.13	65.12	76.91
BIC	73.07	83.54	69.50	81.29
Observations	67	67	66	66

Notes. Table A.2.4 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), being envy (Envy) and level of happiness (Happiness).
T statistics in parentheses: *** p<0.001, ** p<0.01, * p<0.05. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table A.2.4 reports estimated marginal effects from the regression of the choice to compete on gender (Female), payoff in Stage 1 (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), belief about own position in Stage 2 tournament (BelievedRank, 1 if first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise).
The two specifications add two different controls: Envy, a dummy variable indicating if the subject is categorizable as envy, and Happiness, a continuous variable indicating the points in the happiness questionnaire, from 6 to 48 (higher scores, higher happiness).
Accounting for being envy, i.e. choosing unequal distributions over balanced ones without personal benefit from doing it, has no significant effect by itself, but including this as control increases the magnitude and the significance of the coefficients on female.
Levels of happiness, instead, influence the choice to compete, reducing its probability, for the Respondents. This result is in line with that on personality traits - happiness levels and the agreeableness trait are positively related.

APPENDIX B

Table B.1 Ordered Probit of the intentions about washing hands, using face covers and keeping distance – marginal effects probability of reporting 10.

Hands	Coef.	St.Err.	t-value	p-value	[95% Conf. Inter.]		Sig
0.Treat	0	.	.	.	.	.	
1.Treat	.219	.034	6.50	0	.153	.285	***
2.Treat	.217	.048	4.54	0	.123	.31	***
Male	-.277	.023	-11.96	0	-.322	-.231	***
Age	.022	.003	7.97	0	.017	.027	***
cut1	-2.171	.128	.b	.b	-2.422	-1.919	
cut2	-2.031	.131	.b	.b	-2.289	-1.774	
cut3	-1.852	.135	.b	.b	-2.116	-1.588	
cut4	-1.729	.137	.b	.b	-1.998	-1.46	
cut5	-1.679	.138	.b	.b	-1.95	-1.408	
cut6	-1.078	.11	.b	.b	-1.294	-.861	
cut7	-.72	.111	.b	.b	-.939	-.502	
cut8	-.27	.123	.b	.b	-.512	-.028	
cut9	.286	.1	.b	.b	.09	.482	
cut10	.624	.1	.b	.b	.429	.819	

Mean dependent var	8.777	SD dependent var	1.606
Pseudo r-squared	0.010	Number of obs	718.000
Chi-square	.	Prob > chi2	.
Akaike crit. (AIC)	2108.315	Bayesian crit. (BIC)	2154.079

**** p<.01, ** p<.05, * p<.1*

Face Cover	Coef.	St.Err.	t-value	p-value	[95% Conf. Inter.]		Sig
0.Treat	0	.	.	.	.	.	
1.Treat	.183	.05	3.63	0	.084	.281	***
2.Treat	.281	.046	6.11	0	.191	.371	***
Male	-.467	.035	-13.54	0	-.535	-.4	***
Age	.006	.002	3.93	0	.003	.01	***
cut1	-1.784	.057	.b	.b	-1.896	-1.672	
cut2	-1.718	.06	.b	.b	-1.836	-1.599	
cut3	-1.556	.061	.b	.b	-1.676	-1.437	
cut4	-1.392	.06	.b	.b	-1.51	-1.274	
cut5	-1.313	.066	.b	.b	-1.442	-1.184	
cut6	-1.032	.068	.b	.b	-1.165	-.898	
cut7	-.827	.07	.b	.b	-.965	-.689	
cut8	-.526	.073	.b	.b	-.67	-.383	
cut9	-.118	.079	.b	.b	-.274	.038	
cut10	.145	.073	.b	.b	.003	.288	

Mean dependent var	8.408	SD dependent var	2.369
Pseudo r-squared	0.013	Number of obs	718.000
Chi-square	369.879	Prob > chi2	0.000
Akaike crit. (AIC)	2306.700	Bayesian crit. (BIC)	2370.771

**** p<.01, ** p<.05, * p<.1*

Distance	Coef.	St.Err.	t-value	p-value	[95% Conf. Inter.]		Sig
0.Treat	0	.	.	.	.	.	
1.Treat	-.003	.053	-0.06	.953	-.106	.1	
2.Treat	.071	.046	1.56	.12	-.018	.16	
Male	-.266	.038	-7.08	0	-.339	-.192	***
Age	.015	.003	4.56	0	.008	.021	***
cut1	-2.459	.109	.b	.b	-2.673	-2.245	
cut2	-2.026	.068	.b	.b	-2.159	-1.892	
cut3	-1.889	.076	.b	.b	-2.037	-1.74	
cut4	-1.783	.086	.b	.b	-1.951	-1.615	
cut5	-1.697	.084	.b	.b	-1.861	-1.532	
cut6	-1.385	.091	.b	.b	-1.563	-1.206	
cut7	-1.141	.088	.b	.b	-1.314	-.968	
cut8	-.809	.082	.b	.b	-.97	-.649	
cut9	-.334	.078	.b	.b	-.486	-.182	
cut10	.04	.082	.b	.b	-.121	.2	

Mean dependent var	9.046	SD dependent var	1.646
Pseudo r-squared	0.005	Number of obs	718.000
Chi-square	.	Prob > chi2	.
Akaike crit. (AIC)	1873.330	Bayesian crit. (BIC)	1932.824

*** *p<.01*, ** *p<.05*, * *p<.1*

Notes. Table A.1 reports coefficient and cut points from an Ordered Probit of the willingness to adopt each protective behaviour separately for washing hands, using face covers and keeping distance. Variables include dummies for the treatments (Treat, 1 Positive 2 Negative), Male and Age, in years. Standard errors are clustered at regional level

Table A.1 reports the estimates and cut points of probit regressions from which marginal effects are used in the analyses.

Table B.2 Ordered Probit of the intentions about washing hands, using face covers and keeping distance – marginal effects probability of reporting 10 by gender.

FEMALE (N=542)

Hands

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.120	0.023	5.280	0.000	0.076	0.165
2	0.088	0.028	3.150	0.002	0.033	0.143
Age	0.009	0.001	9.420	0.000	0.007	0.011

Face cover

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.094	0.024	3.940	0.000	0.047	0.140
2	0.130	0.021	6.050	0.000	0.088	0.172
Age	0.006	0.001	4.960	0.000	0.004	0.009

Distance

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	-0.016	0.019	-0.820	0.411	-0.053	0.022
2	0.027	0.021	1.290	0.198	-0.014	0.068
Age	0.003	0.001	2.260	0.024	0.000	0.006

MALE (N=176)

Hands

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	-0.019	0.001	-27.680	0.000	-0.020	-0.018
2	0.061	0.001	44.930	0.000	0.058	0.063
Age		0		(omitted)		

Face cover

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.020	0.001	33.550	0.000	0.019	0.021
2	0.058	0.001	39.760	0.000	0.055	0.061
Age		0		(omitted)		

	Distance					
	dy/dx	Std. Err.	z	P>z	[95% Conf. Inter.]	
Treat						
1	0.044	0.065	0.670	0.501	-0.084	0.171
2	0.031	0.044	0.710	0.477	-0.055	0.118
Age	0.009	0.004	2.380	0.017	0.002	0.016

Notes. Table A.3 reports marginal effects relative to the prediction of the maximum outcome (10) from an Ordered Probit of the willingness to practice each protective behaviour: washing hands, using face covers and keeping distance. Variables include dummies for the treatments (Treat, 1 Positive 2 Negative), Male and Age, in years. Estimates are separated for prosocial and not. Standard errors clustered at regional level

Table B.2 reports marginal effects separately for the subsample of females and males. Looking at the male subsample a possible effect of the framing emerges, where a negative message is more useful to increase compliance.

Table B.3 Ordered Probit of the intentions about washing hands, using face covers and keeping distance – marginal effects probability of reporting 10 by prosocial.

PROSOCIAL (N=638)

Hands

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.107	0.015	7.140	0.000	0.077	0.136
2	0.114	0.022	5.140	0.000	0.070	0.157
Male	-0.065	0.011	-6.020	0.000	-0.086	-0.044
Age	0.010	0.001	7.420	0.000	0.007	0.013

Face cover

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.077	0.017	4.420	0.000	0.043	0.111
2	0.124	0.021	5.780	0.000	0.082	0.166
Male	-0.167	0.009	-19.070	0.000	-0.184	-0.150
Age	0.002	0.001	1.790	0.073	-0.000	0.004

Distance

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.015	0.018	0.810	0.419	-0.021	0.050
2	0.034	0.019	1.860	0.063	-0.002	0.071
Male	-0.066	0.012	-5.680	0.000	-0.089	-0.043
Age	0.006	0.002	3.650	0.000	0.003	0.010

NON PROSOCIAL (N=75)

Hands

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	-0.091	0.060	-1.500	0.134	-0.209	0.028
2	-0.133	0.059	-2.240	0.025	-0.249	-0.017
Male	-0.339	0.046	-7.410	0.000	-0.429	-0.249
Age	0.003	0.001	2.450	0.014	0.001	0.006

Face cover

	dy/dx	Std. Err.	z	P>z	[95% Conf.	Inter.]
Treat						
1	0.038	0.103	0.370	0.711	-0.163	0.239
2	0.030	0.096	0.320	0.753	-0.157	0.218
Male	-0.244	0.058	-4.170	0.000	-0.358	-0.129
Age	0.004	0.002	2.430	0.015	0.001	0.007

	Distance					
	dy/dx	Std. Err.	z	P>z	[95% Conf. Inter.]	
Treat						
1	-0.120	0.061	-1.980	0.048	-0.239	-0.001
2	-0.053	0.068	-0.770	0.440	-0.187	0.081
Male	-0.305	0.043	-7.130	0.000	-0.389	-0.221
Age	0.005	0.001	3.460	0.001	0.002	0.008

Notes. Table A.3 reports marginal effects relative to the prediction of the maximum outcome (10) from an Ordered Probit of the willingness to practice each protective behaviour: washing hands, using face covers and keeping distance. Variables include dummies for the treatments (Treat, 1 Positive 2 Negative), Male and Age, in years. Estimates are separated for prosocial and not. Standard errors clustered at regional level.

Table B.3 reports estimation of marginal effects separately for the subsample of the prosocial and the non-prosocial. The effects are overall stronger in the prosocial sample which is also more numerous.

Table B.4 Comparison of subjects' characteristics between the ones who answered the second survey and the ones who did not.

	NO	YES	*P*-value
Worriedness	6.562	6.536	0.900
	(0.114)	(0.184)	
Scared for self	4.336	4.464	0.636
	(0.145)	(0.234)	
Scared for others	7.515	7.557	0.860
	(0.130)	(0.198)	
State response ok	6.692	6.734	0.839
	(0.114)	(0.169)	
Health workers as heroes	7.217	6.579	0.017
	(0.138)	(0.247)	
Delivery workers as heroes	6.500	5.850	0.018
	(0.143)	(0.249)	
Health workers unprepared	5.101	5.750	0.009
	(0.137)	(0.195)	
Delivery workers unprepared	5.926	6.471	0.044
	(0.149)	(0.218)	
Had COVID19	0.092	0.086	0.821
	(0.016)	(0.024)	
Acquittances had COVID19	0.724	0.993	0.116
	(0.070)	(0.204)	
Essential worker	0.094	0.069	0.431
	(0.018)	(0.024)	
Acquittances essential worker	2.725	2.353	0.326
	(0.232)	(0.190)	
Acquittances health worker	1.838	1.464	0.462
	(0.324)	(0.139)	
Rooms Nr	4.327	4.179	0.447
	(0.106)	(0.163)	
Housemates Nr	2.952	2.350	0.483
	(0.548)	(0.109)	
Open spaces available	2.097	2.102	0.968
	(0.059)	(0.108)	
City size	1.208	1.186	0.799
	(0.049)	(0.072)	
Region	11.500	11.614	0.609
	(0.129)	(0.155)	
Lives with family	0.804	0.771	0.430
	(0.022)	(0.036)	
Usual house	0.848	0.850	0.969
	(0.022)	(0.033)	
Risk	5.691	6.219	0.019
	(0.120)	(0.195)	
Prosocial	0.893	0.900	0.817
	(0.017)	(0.025)	
Envy	0.709	0.705	0.936
	(0.025)	(0.039)	
Will use tracing app	1.676	1.763	0.060
	(0.026)	(0.036)	
Mask mandatory	0.390	0.372	0.741

	(0.030)	(0.046)	
Used mask	1.545	1.521	0.750
	(0.039)	(0.061)	
Washes hands first	0.932	0.943	0.649
	(0.014)	(0.020)	
Washes hands well	0.765	0.716	0.390
	(0.030)	(0.050)	
Kept distance	0.920	0.957	0.143
	(0.015)	(0.017)	
Times out in a week	1.149	1.093	0.598
	(0.059)	(0.083)	
Time out in mean	1.912	1.732	0.458
	(0.135)	(0.191)	
Male	0.232	0.286	0.218
	(0.023)	(0.038)	
Age	25.443	25.850	0.525
	(0.325)	(0.613)	

Notes. Table A.4 reports mean and standard deviation of the variables collected in the first survey (see section 4.1 for a description) for subjects who answered the follow up survey (YES) and those who did not (NO). It also reports *p*-values from t-test.

The two parts of the sample differ only in their perception/opinion about the most famous agents during the lockdown, health and delivery workers, and their risk aversion.

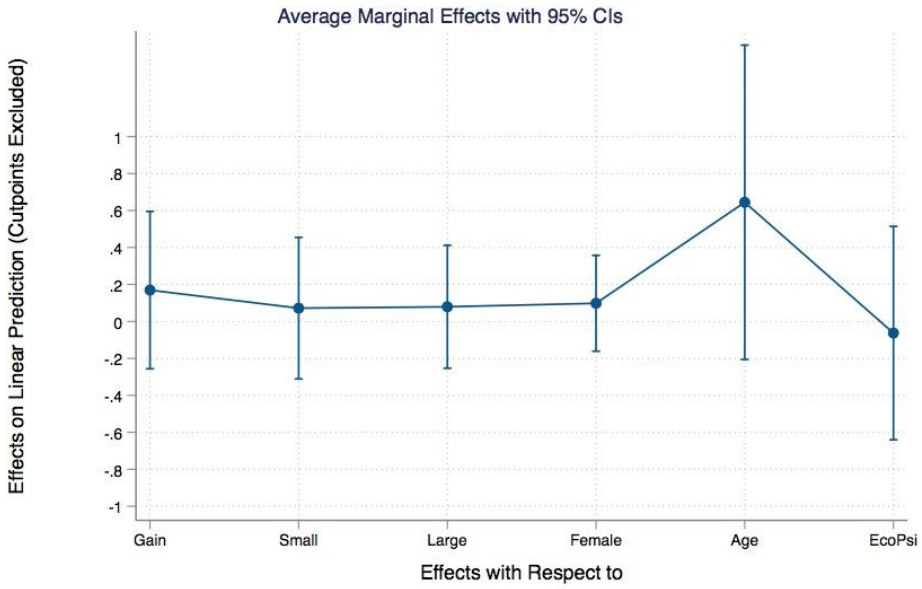
APPENDIX C

C.1. Additional Analysis.

We report the estimated effects – as elasticities – of the background (frame of the game and size of the incentives) and individual characteristics variables (age, gender and field of study) on the reporting behavior, separately for the two treatments.

For treatment LAST we estimate an Ordered Probit of the fifth report on all the background and individual variables. This under the hypothesis that subjects choose the report basing on the related payoff and in this way outcomes are ordered. Using a Multinomial Logit gives qualitatively the same results.

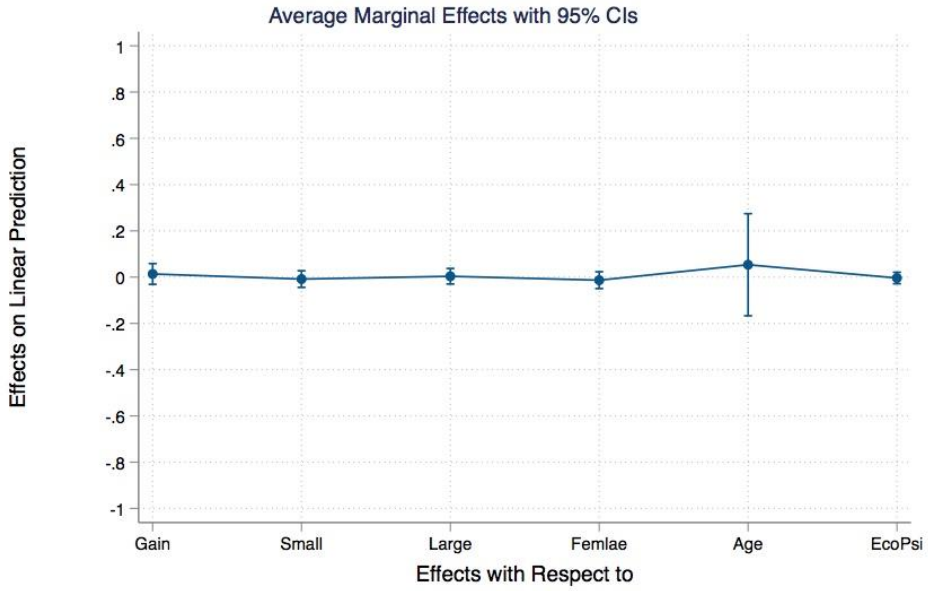
Figure C.1.1 *The effect of background and individual variables on the report in LAST.*



Notes. Estimation output of Ordered Probit regression of the LAST report. Background variables: the frame (Gain, 1 for treatments with Gain frame, 0 Loss frame) and the size of payoffs (Small, a dummy defining when maximum payment is 20 DKK, Medium for max 50 DKK, Large for max 100 DKK). Medium is used as baseline category. Individual characteristics variables: Female (a dummy indicating gender) Age (a continuous variable, in years) and EcoPsi (the field of study, 1 if self-reported field of study belongs to the area of economics or psychology, 0 otherwise). Results from linear prediction are reported as elasticities. The 95% Confidence Intervals are reported.

For treatment SUM we estimate an OLS regression of the sum reported on all the background and individual variables. This since the numerosity of the possible number reported is too high (Ferrer-i-Carbonell and Frijters, 2004) and the expected probability of the outcomes is normal.

Figure C.1.2 *The effect of background and individual variables on the report in SUM.*



Notes. Estimation output of OLS regression of the SUM of reports. Background variables: the frame (Gain, 1 for treatments with Gain frame, 0 Loss frame) and the size of payoffs (Small, a dummy defining when maximum payment is 20 DKK, Medium for max 50 DKK, Large for max 100 DKK). Medium is used as baseline category. Individual characteristics variables: Female (a dummy indicating gender) Age (a continuous variable, in years) and EcoPsi (the field of study, 1 if self-reported field of study belongs to the area of economics or psychology, 0 otherwise). Results are reported as elasticities. The 95% Confidence Intervals are reported.

C.2 General Information.

The lab-in-the-field experiment was run at University of Copenhagen. In our analysis, we excluded 14 subjects (5 in LAST and 9 in SUM) that declared *they did not understand*. However, if we include them our result will not change. We implemented the loss frame by giving an envelope contenting the maximum money they could earn together with the instructions at the beginning of the experiment.

Figure C.2.1: Set up and locations of the lab-in-the field

Auditorium

Canteen

APPENDIX D

Experimental instruction files are available here https://www.dropbox.com/sh/mhn7ge8f1byaisu/AACxtLmdqDdzAJC5zQAbrQN5a?dl=0.