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Social comparison and risk taking behavior

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Abstract

This paper studies the effect of social comparison on risk taking behavior. We assume that decision makers evaluate consequences of their choices not only as variations with respect to their economic status but also as variations with respect to the status of their peers. We test experimentally whether different positions in the social ranking determine different risk attitudes. Decision makers interact in a workplace environment, where they receive possibly different wages as compensations for a certain effort and then undertake a risky decision that may give them an extra gain. We find that relative pay comparisons affect decision makers' risk attitudes. In particular, both downward and upward pay comparisons generate more risk loving behavior.

Keywords: Social comparison, risk aversion, interdependent preferences, reference point.
JEL classification: C91, D03, D81.

1 Introduction

Imprudent risk taking by investment bankers is often recognised as one of the main causes of the Financial Crisis in Europe and the United States. In its *Guidance on Remuneration Policies and Practices* (2010), the Committee of European Banking Supervisors argues that the bonus component of bankers pay constitutes a strong incentive to choose risky investments. In line with this

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view, financial regulation authorities in both Europe and the US have established caps on the variable component of bank managers pay.[1] The effectiveness of such polices, however, depends on agents' sensitivity to monetary incentives, rather than to other motives that influence risk attitudes, such as relative pay comparisons with other employees. In this paper we provide new evidence on the relevance of social comparisons in the workplace. We study the effect of relative pay comparisons on risk attitudes in an experimental labor relation setting, and show that pay inequalities foster risk loving behavior.

Research in economics and other disciplines has acknowledged that social comparison is an important determinant of human behavior. For example, in social psychology, according to the *Social Comparison Theory* (Festinger, 1954), people evaluate their own opinions and abilities in comparison with opinions and abilities of others. In the economic literature, Veblen (1899) in his *Theory of the Leisure Class* introduced the idea that individuals care about comparison with other members of the same community and conspicuous consumption is a way to gain and signal social status. Duesenberry (1949) also discussed the relevance of social influence on consumption. Thereafter, many studies in the macroeconomic and asset pricing literature consider social comparison as a determinant of individual decisions, by assuming that agents care not only about their absolute level of consumption, but also about their relative position with respect to the aggregate consumption of the society, the so called *keeping up with the Joneses* phenomenon.[2] Moreover, economists have provided empirical evidence that relative income has an impact on job satisfaction (Card et al., 2012; Clark and Oswald, 1996) and subjective well-being (Ferrer-i-Carbonell, 2005; Vendrik and Woltjer, 2007).

Given the large body of empirical evidence on the relevance of social comparison for the well-being of the individuals, it is natural to consider that, when evaluating the consequences of their decisions, agents do not care solely about their *own* monetary outcome but also about their *relative* outcome with respect to their peers. A strand of the economic literature has focused on the behavioral implications of wage comparison in labor market relations, studying, in particular, how wage inequality affects effort or performance (Charness and Kuhn, 2007; Clark et al., 2010; Cohn et al., 2011; Gächter and Thöni, 2010; Ockenfels et al., 2010).[3] Recent experimental studies have examined the effects that concerns for relative payoffs may have on decision making under risk. Most of them essentially test whether standard social preferences models (Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Fehr and Schmidt, 1999) extend to decision problems with uncertain outcomes (Bolton and Ockenfels, 2010; Gaudel, 2013;

[1] See Committee of European Banking Supervisors (2010) and Office of the Comptroller of the Currency et al. (2010).

[2] See for example Abel(1990) and Galí (1994).

[3] For an analysis of the effects that *perceived* inequalities among agents have on their effort levels see Gill and Stone (2010).

Lahno and Serra-Garcia, 2014; Rohde and Rohde, 2011). There are two very recent studies, i.e., Linde and Sonnemans (2012) and Schwerter (2013), which focus instead on the effect of social comparison *per se* on risk taking behavior. Indeed, the most distinguishing feature of these two experiments is that the peer's payoff is exogenously given; thus, the authors rule out any kind of social concerns that decision makers might have when they are responsible for the others' payoffs or levels of risk.

Our paper contributes to this last strand of the experimental literature on social comparison and risk taking. In our experiment, workers earn a wage from an effort task and, being informed of their co-workers wage, have to take a risky decision in order to increase their earnings. We derive predictions for our experiment from a very general framework that displays interdependent preferences and assumes that the monetary outcome of a social referent enters the utility function of the decision maker.

Since the seminal paper by Kahneman and Tversky (1979), it is well acknowledged that individuals have different risk attitudes depending on whether they face positive or negative variations with respect to a reference point (e.g., status quo, goals etc.).[4] Similarly, in a social environment individuals may have different risk attitudes depending on whether the possible outcomes of a risky choice fall above or below the outcome of a reference group (e.g., colleagues, neighbours, relatives etc.). As in Maccheroni et al. (2012), we assume a utility function that is *additive* in a private and a social component. While the private component represents the intrinsic utility that the decision maker derives from his own outcome, the social component represents the decision maker's concern for relative outcomes. We focus on the implications of a social component that displays the usual Prospect Theory properties, i.e., concavity (*social risk aversion*) in the social gains domain and convexity (*social risk love*) in the social losses domain.

In the experiment, we study whether and how social comparison influences risk taking behavior, by varying the social reference point. We reproduce a social environment, whereby randomly paired subjects interact in a real effort task. If the task is completed, workers earn a fixed wage, which can be either low or high and may coincide or differ from the wage assigned to their co-worker. At the end of the task the subjects are informed about both their own and their co-worker's wage. Then, they face a risky decision through which they can gain an extra bonus on top of their wage. In each pair the bonus is paid only to one worker, who is randomly determined after the risky decisions have been made. Thus, when taking the decision, agents who have a concern for relative payoffs would consider their co-worker's wage as their social reference point. Different wages allocation across pairs determine different social conditions: there are conditions where all possible final earnings (the wage plus the bonus) of a worker are below

[4]Reference-dependent preferences models that differ from Prospect Theory are for example Kozsegi and Rabin (2006, 2007), Masatlioglu and Ok (2005) and Munro and Sugden (2003).

the social reference point (social losses) and conditions where all possible final earnins are above or far above the social reference point (small or large social gains).

We find that the decision maker's social condition when facing the bonus task affects his risk taking behavior. Subjects are on average risk averse in every social condition and they are more risk averse in a situation of small social gains than they are when they face situations of social losses or large social gains.

Our interpretation is the following. First of all, subjects are on average risk averse in every treatment because, whichever their social condition, they face positive variations with respect to their own wage. In addition, variations in risk attitudes across social conditions are determined by two effects. On the one hand, decision makers are willing to take more risks when facing social losses than when facing social gains as in the former case they are driven by the incentive to catch up with their peer (*keeping up with the winners effect*).[5] On the other hand, social risk aversion is decreasing in social gains: the further above a decision maker is with respect to his social referent, the richer he feels and the less risk averse he becomes (*perceived wealth effect*). The combination of these two effects gives rise to non-univoque results on the relation between risk taking behavior in social losses and in social gains: such relation depends on the size of the social gains.

The main contribution of our paper is twofold. First of all, we find new evidence that cannot be explained neither by a straightforward application of Prospect Theory nor by inequity aversion models applied to uncertain environments (Brock et al., 2013; Fudenberg and Levine, 2012; Saito, 2013). In particular, the relation that we find between risk attitudes in social losses and in social gains does not match the predictions of a direct application of Prospect Theory to the social reference point. More importantly, the relation itself is ambiguous as it depends on the extent of the social gains. Moreover, we find that risk attitudes vary in the social gains domain, which cannot be explained by the inequity aversion models that predict constant risk attitudes in such domain. Secondly, we show how our experimental results are compatible with a reference-dependent model where the overall risk attitudes are determined by the interplay of a private and a social component, where the latter displays risk love in social losses and decreasing risk aversion in social gains.

The paper proceeds as follows. In Section 2, we describe the experiment; in Section 3, we discuss the theoretical framework and the hypotheses; in Section 4, we present the results; in Section 5, we discuss features of our experiment

[5] The fact that there might be a *keeping up with the winners* effect at work finds support in Fafchamps et al. (2013). Among other findings, their multi-round experiment on asset integration provides evidence that subjects who are asked to invest an initial endowment which is relatively smaller than the endowment received by the other subjects are more willing to take risks.

that distinguish our paper from the related literature and we conclude.

2 The experiment

We analyze the effect of social comparison on risk taking behavior by reproducing in the lab a workplace environment, where subjects perform an effort task in pairs, get (possibly) different wages and then face a risky decision which can generate a bonus on top of their wage. This experimental setting reflects the economic context we have in mind, that is a financial institution where risk takers perceive a pay which is given by a fixed part, the wage, and a variable part, the bonus, which depends on the success of their investment decisions.

We ran the experimental sessions in March and in July 2013 at the lab of the Max Planck Institute of Economics in Jena. We recruited 436 participants from various disciplines at the local university using the ORSEE software (Greiner, 2004). We ran 14 sessions of about one hour each. The experiment was programmed and conducted with the software Z-tree (Fischbacher, 2007).

Upon arrival at the laboratory, subjects were randomly assigned to one of the computer terminals. Each computer terminal is in a cubicle that does not allow communication or visual interaction among the participants. The experiment consisted of two parts.[6] Paper-based instructions for each part were distributed separately, participants were given time to read them privately and were allowed to ask for clarifications. Moreover, at the beginning of each part, after reading the instructions, participants answered some control questions (displayed on the screen). At the end of the experiment, participants filled in a computer-based questionnaire after which they received their payments. The average earnings in the experiment was approximately 10.20 euros (including a 2.50 euros participation fee). Payoffs were expressed in Experimental Currency Units (ECU), where 1 ECU corresponded to 1 euro. Subjects were paid in cash and privacy was guaranteed during the payment phase.

The first part of the experiment consisted of a *risk elicitation task*, which we use to classify the participants' risk attitudes in absence of a social environment. The task was structured with a Multiple Price List (MPL) format (Holt and Laury, 2002; Laury and Holt, 2005). We modified the MPL format by making the components of the decision problems as visual as possible. Subjects faced a menu of ten choices between two lotteries (A and B), where each lottery had two possible monetary outcomes and lottery A was safer than lottery B.[7] The

[6]Subjects had to complete both parts, but they were paid only for one of them, randomly drawn by the computer at the end of the experiment. The probability that the first part was paid was 10%.

[7]Lottery A paid either 2.00 ECU or 1.60 ECU, while lottery B paid either 3.85 ECU or 0.10 ECU. These are the same stakes as in Holt and Laury (2002). We also kept the same payment structure: if the risk task was paid out the computer randomly drew a row out of ten and played the lottery chosen by the subject in that row.

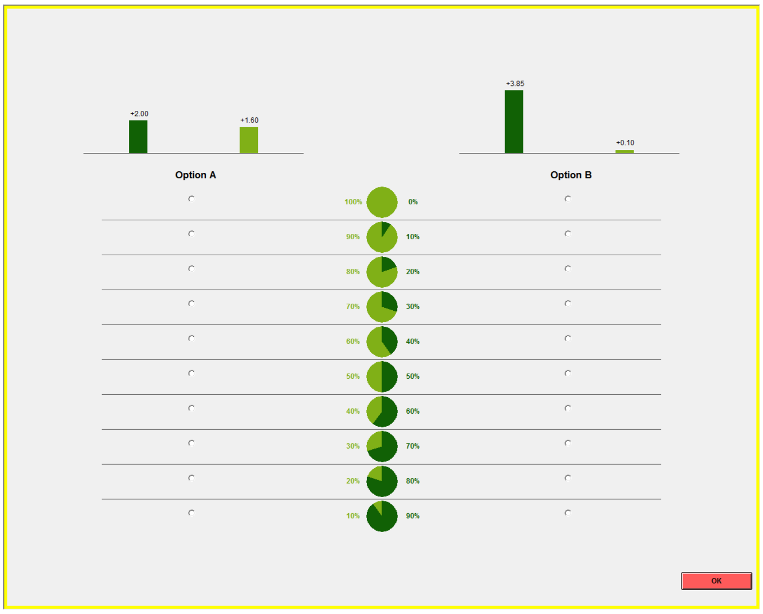

Figure 1: Risk elicitation task

ten choices in the task differed in the probability distribution over monetary outcomes, where the probability of the unfavourable outcome was 1 in the first row and decreased, in each of the subsequent choices, down to 0.1 in the tenth and last choice. Outcomes and probabilities were such that a rational decision maker would choose lottery A in the first-row choice, and a risk neutral decision maker would choose A for the first five rows and B for the remaining five. Figure 1 shows the screenshot of the risk task.

In the second and main part of the experiment we randomly paired every subject with a co-worker. Each pair undertook an effort task (*work task*) that determined the workers' wages. Afterwards, each worker faced a risky decision that could generate a bonus (*bonus task*).

In the work task we assigned each participant one of two contracts (E and F). Each contract paid the worker, upon completion of the task, either 2 ECU or 10 ECU, depending on the realization of a computerized coin toss. In particular, contract E (F) paid the high wage of 10 ECU when head (tail) was tossed. Regardless of their contracts and the realization of the coin toss, workers got 0 ECU in case they could not finish the task within a certain time limit.[8] At this stage, participants were only informed about their own contract, not about

[8]In every session, we allocated contracts in such a way that, in principle, half of the subjects could get a wage of 2 ECU and half a wage of 10 ECU by completing the task (subjects received this information in the instructions). Notice that this contract allocation scheme ensured a procedurally fair wage distribution across all participants in a session and across co-workers in every pair. Obviously, *exactly* half of the subjects actually got 10 ECU and half 2 ECU only when everybody in the session completed the task.

their co-worker's one.

The work task consisted of two similar parts, each lasting a maximum of four minutes. Subjects needed to complete both of them in order to receive their wage. In each part, subjects had to write 20 combinations of two letters out of a given set of 10 letters (a, b, c, d, e, f, g, h, i, j, in the first part; k, l, m, n, o, p, q, r, s, t, in the second part). Participants were neither allowed to write the same combination twice, nor to write combinations already validated to their co-worker. When either of these two situations occured, the participant received an error message. This procedure created a link between co-workers: by encountering each other during the work task (when they wrote a combination already validated by the co-worker) - or by knowing that there was such possibility - they experienced the existence of the other.[9]

After the work task a coin was tossed (once for all subjects in a session) and participants who completed both parts of this task were told the result of the coin toss, their own wage and the co-worker's wage.

Then, workers faced the bonus task, that was designed with a MPL format as the one administered in the first part of the experiment, but with different stakes[10] and some additional information (worker's and co-worker's previous wages) displayed on the top of the screen. In the bonus task, the two lotteries were presented as projects that could generate additional earnings for the worker and outcomes were presented as positive variations with respect to the wage previously earned. Figure 2 shows the screenshot of the bonus task.

Even though every worker faced the bonus task, the task was paid out *only to one worker in every pair*. Subjects paid for the bonus task received the realized bonus on top of their previous wages, while their co-workers received only their previous wages. The selected worker of every pair was called the *team leader*. The fact that the identity of the leader was still unknown during the bonus task induced both workers to focus on the investment decision as if they were the leader and their decision had economic consequences.

This procedure allows us to uniquely identify the social reference point as the co-worker's wage. For this reason, we made this mechanism very clear in the instructions and we insisted on it in the control questions.

[9]Notice that a more competitive interaction would have generated emotions with an impact on the bonus task that would have been out of our control.

[10]In the bonus task Lottery A paid now either 4.00 ECU or 3.20 ECU, while lottery B paid either 7.70 ECU or 0.20 ECU. These are the same stakes as in Laury and Holt (2005). As in the first part of the experiment, lottery A was safer than lottery B, the first choice assigns probability 1 to the unfavorable outcome, a rational decision maker would prefer lottery A in the first choice and a risk neutral individual would switch exactly after the 5^{th} row.

Figure 2: Bonus task

3 Theoretical framework and Hypotheses

The existing literature on social comparison and decision making under risk provides no empirical support in favor of a specific functional form for the agents' value function. The theoretical approach that the literature on social comparison has adopted so far is based on a standard reference-dependent utility function that we can represent in its general form as:

$$v(x, s) = u(x) + g(x - s) \tag{1}$$

where the first component $u(x)$ describes the agent's intrinsic utility from the monetary outcome x and the second component $g(x - s)$ describes the utility (or disutility) derived from the comparison of x with the outcome of a social referent s. An axiomatization of this utility function is provided by Maccheroni et al. (2012).[11] We assume that both components are increasing in x.

Within this general framework we want to understand how variations of the social condition (variations of $(x - s)$) impact the decision maker's risk attitude. We focus on the behavior of the social component of the value function, and we want to investigate whether such social component may display Prospect

[11]Notice that the representation in equation (1) encompasses as special cases many functional forms that have been adopted to study for example relative income concerns in the macroeconomic literature (e.g., Abel, 1990) and in the empirical literature (e.g., Ferrer-i-Carbonell, 2005). We find different specifications of equation (1) in Clark and Oswald (1998), Fehr and Schmidt (1999), and in recent experimental studies as Lahno and Serra-Garcia (2014) and Schwerter (2013).

Theory features, i.e., convexity in social losses and concavity in social gains. We also take into account that the private component may play an important role, as the satisfaction (or disappointment) of getting more (or less) than one's peers might not be the only determinant of risk taking behavior in a social context. Decision makers who dislike the risk associated with their absolute outcomes may display risk averse behavior regardless of their concern for relative outcomes. Hence the decision maker's risk attitudes are determined both by his *private risk aversion*, which is the decision maker's aversion to risks associated with his monetary outcomes *per se* and by his *social risk aversion*, which is the decision maker's aversion to risks that relate his standing with respect to his peer's status.[12] Private and social risk aversion are related to the curvature of the two components of the utility function $u(\cdot)$ and $g(\cdot)$ respectively.

A trivial application of Prospect Theory to the social reference point disregards the effect on risk attitudes that might come from the private utility $u(\cdot)$. It essentially predicts that risk taking behavior uniquely depends on social risk aversion, implying risk loving behavior in social losses conditions and risk aversion in social gains conditions.[13] However, the experimental evidence of Linde and Sonnemans (2012) suggests that Prospect Theory predictions do not apply in a simple way to social comparison: subjects in their experiment displayed risk aversion in every social condition and, in particular, more risk aversion in social losses conditions than in social gains conditions.

To consider the effect of private risk aversion on risk taking behavior in a social context, we need to generalize $u(\cdot)$ to be non linear. In this case, the behavioral implications ultimately depend on the relation between private and social risk aversion. For example, a decision maker who is privately risk averse ($u(\cdot)$ concave) and socially risk lover in social losses (i.e., $g(\cdot)$ is convex when $x < s$) may not be risk lover overall.

The intrinsic utility itself may however depend on how subjects perceive outcome x in relation with some intrinsic reference point other than s. That is, private risk aversion, as social risk aversion, may also be reference-dependent. If this is the case, decision makers evaluate outcomes in relation with two reference points, a private and a social one.[14] An explicit analysis of how the two reference points may interact goes beyond the aim of the present study. However, we took into account that subjects, during the experiment, may form an intrinsic

[12] We borrow the term *social risk aversion* from Maccheroni et al. (2012).

[13] Notice that the same behavior is predicted by a utility function as in equation (1) if the private component is *linear* and the social component has Prospect Theory features, i.e., concave for social gains and convex for social losses.

[14] A recent strand of literature on behavioral decision making considers that the decision makers' attitudes may be influenced by the presence of multiple individual reference points (see, for example, Wang and Johnson, 2012 and March and Shapira, 1992). Also the experimental literature such as Sullivan and Kida (1995), Ordonez et al. (2000) and Koop and Johnson (2010) investigates the behavior of agents that simultaneously consider *multiple* reference points, e.g., the status quo and the individual goals.

reference point that affects private risk aversion. In order to control this, we induced an explicit individual reference point r, which is the wage a worker gets as a compensation for his effort in the work task. Moreover, we expressed outcomes of the risky decision of the bonus task as positive variations with respect to the wage. Hence, every possible outcome that the decision maker faces is a gain with respect to the individual reference point. We kept $(x - r)$ constant across social comparison situations, for every possible outcome x of the two lotteries. This procedure allows us to disentangle the effect of social comparison as all changes in risk attitudes that we observe need to come from changes in social risk aversion.

We induced also the social reference point in an unambigous way. Indeed, we implemented a payment scheme such that, in every pair, both workers got the fixed part of their final earnings (i.e., the wage), but only one of them (randomly determined) was paid the relative part of his final earnings (i.e., the bonus). Thus, subjects were aware that, if they received the bonus, their colleague would not receive it and his final earnings would coincide with his wage. Hence, from the subject's perspective, while the *wage* represents his individual reference point r, the *co-worker's wage* represents his social reference point s. Notice that the social reference point is fixed: it does not depend on the worker's investment decision nor on the chance move that determines the realization of the investment.

We expose participants to four different *pairwise social comparison situations*, characterized by the profile (r, s). Therefore, a subject can face either a *downward comparison* situation, when his final earnings are larger than his social reference point, or an *upward comparison* situation, when his final earnings are smaller than his social reference point. The payoff structure of the bonus task is such that subjects cannot invert the (pairwise) social ranking with their investment decisions. Indeed, if a worker has the low wage of 2 ECU and the co-worker has the high wage of 10 ECU, what the worker can get with the bonus is not enough to make him earn more than his co-worker.[15]

To summarize, our social conditions are such that subjects in treatment $(2, 10)$ face social losses with respect to their peers' final earnings, while subjects in treatments $(2, 2)$, $(10, 2)$ and $(10, 10)$ face social gains.

We first want to verify *whether* social comparison influences risk attitudes in the bonus task. In order to do so, we compare risk taking behavior across those workers who share the same wage and differ only in the co-worker's wage. Notice that these workers share the same possible final earnings x and differ only

[15]Obviously, if a worker has either the same wage as his co-worker or the highest wage in the pair, his final earnings including the bonus would be certainly larger than his co-worker's final earnings. We agree that to revert the social ranking could be a driving force for risky behavior. For instance, decision makers could attribute high value to being the first and this would constitute a plausible incentive to choose a risky investment in the bonus task. However, our concern in this paper is to study how the relative position in the social ranking *per se* affects the risk attitudes of the decision maker.

in their relative standing with respect to the social referent.[16] We compare risk attitudes displayed in the bonus task by subjects in condition $(2, 2)$ (social gains) and subjects in condition $(2, 10)$ (social losses). We also compare risk attitudes displayed by subjects in condition $(10, 10)$ and subjects in condition $(10, 2)$, as they both feature social gains but with different variations with respect to the co-worker's status. We expect that risk attitudes vary with the social reference point.

Secondly, we investigate *how* social comparison influences risk attitudes. In order to do so, we preliminarily test whether risk attitudes do differ across treatments $(2, 2)$ and $(10, 10)$ (**H1**). We expect to observe the same risk taking behavior by subjects in these two conditions as they face the same variations with respect to s and the same variations with respect to r.

H1 (*Reference dependence.*) Subjects in condition $(2, 2)$ behave as subjects in condition $(10, 10)$.

The purpose of this hypothesis is twofold. On the one side, it sheds light on the form of the utility function and, in particular, on the role of private risk aversion. On the other side, it is propedeutic to make comparisons across different social conditions.

Rejecting this hypothesis would imply that risk attitudes are sensitive to own outcomes.[17] If this were the case we would not be able to compare in a meaningful way risk taking behavior of subjects who face different social conditions (i.e., different $(x - s)$) and, at the same time, different individual reference points r. For example we would not be allowed to conclude that differences in risk attitudes across treatments $(2, 10)$ and $(10, 10)$ (or $(2, 10)$ and $(10, 2)$) come from relative outcomes concerns as they may come from the private utility being non-linear in own outcomes.

Given our general framework, we can formulate some predictions on how risk attitudes vary across social conditions. There are predictions that depend only on social risk aversion and predictions that depend on the interplay of private and social risk aversion.

The first prediction regards risk attitudes in social gains conditions. We assume that social risk aversion decreases in social gains. This assumption is rather plausible as it is the counterpart in a social context of the assumption that risk aversion is decreasing in *absolute* wealth, which is actually well supported by the experimental evidence (see, for example, Holt and Laury, 2002). Indeed, if it holds true that individuals are less averse to risks that regard their absolute

[16] The private component of the utility function is not a determinant of the variation in risk attitudes here, as both x and $(x - r)$ are fixed.

[17] This hypothesis implies that either we can represent the argument of the private utility as $(x - r)$ or that private utility is $u(x)$ but it displays constant risk aversion. In both cases, private risk aversion does not vary across our social conditions hence we can focus on social risk aversion.

wealth as they become richer, it is also plausible that individuals are less averse to risks that regard their relative wealth as they *perceive* to become richer, i.e., when they are further away from their social reference point. Under this assumption, Theorem 5 of Pratt (1964) implies that overall risk aversion is decreasing in social gains.[18] Hence, we expect to observe that decision makers with higher relative standing are less risk averse. We can state this hypothesis as:

H2 (*Risk aversion is decreasing in social gains.*) Subjects in condition $(10, 10)$ are more risk averse than subjects in condition $(10, 2)$.

Next we compare risk attitudes in social losses and in social gains. Predicting differences in risk taking behavior across these conditions is not trivial. In particular, it is not obvious that overall risk aversion is higher in social gains than in social losses as Prospect Theory would predict. Even if we assume that the social component has Prospect Theory features, i.e., convexity in social losses and concavity in social gains, the relation that occurs between social risk aversion in social gains and losses does not always result into the same relation between overall risk aversion in the two domains. Indeed, such relation depends also on private risk aversion. In a more formal analysis contained in the appendix we show under which assumptions on the shape of $u(\cdot)$ and of $g(\cdot)$ we should expect to observe less risk aversion in social losses than in social gains. We can state the following hypothesis:

H3 (*Prospect Theory.*) Subjects in the social losses condition (i.e., $(2, 10)$) are less risk averse than subjects in the social gains conditions (i.e., $(2, 2)$, $(10, 10)$ and $(10, 2)$).

Notice that, if it holds true that risk aversion decreases in social gains (as stated in **H2**), it might be the case that the relation predicted by **H3** holds true when we compare social losses and small social gains, but not when we compare social losses and large social gains.

4 Experimental Results

Before going into the discussion of our experimental results, we present a preliminary analysis of the risk preferences of the participants as elicited in the first

[18]Notice that Theorem 5 of Pratt (1964) applies to our framework as our utility function is additive in its two components and both components are increasing in own outcomes. Essentially, the theorem states that the sum of two functions that are constantly or decreasingly risk averse is decreasingly risk averse. We assumed that the social component is decreasingly risk averse; the private component is constant across every social conditions, as, by design, its argument $(x - r)$ is constant.

part of the experiment.

The first thing to notice is that our visual application of the risk elicitation task by Holt and Laury (2002) and Laury and Holt (2005) is very efficient in producing consistent behavior. In particular, only 12 out of 436 subjects displayed inconsistencies such as choosing the dominated lottery in the first row or switching multiple times in either task.[19] We focus only on the behavior of subjects who displayed none of these inconsistencies. Moreover, there are 4 subjects who did not complete the work task, and for this reason got a zero wage. We drop these subjects and also their co-workers from the sample, as we believe that different incentives and mechanisms of social comparison may operate in case wage inequalities arise from a failure of one of the two co-workers.[20]

Hence, we analyze the behavior of the 417 subjects who got a positive wage, started from lottery A in the first row and switched to B only once. In order to evaluate the risk attitudes of these subjects in both risk tasks, we use the number of consecutive safe choices as a measure of their degree of risk aversion. As discussed in Section 2, a risk neutral subject would switch exactly at the fifth row in each task, a risk averse subject would switch after the fifth row, and a risk lover would switch before it.

Table 1 provides the distribution of risk types, classified according to the number of consecutive safe choices (SCI) in the individual risk elicitation task.

Table 1: Classification of subjects according to their behavior in the individual task.

Risk Type	**Freq.**	**Percent**
Risk averse	262	62.83
Risk neutral	85	20.38
Risk lover	70	16.79
Total	417	100.00

Notes. Classification of the subjects into risk types according to the number of consecutive choices in the individual risk task (SCI): Risk averse (SCI$<$ 5), Risk neutral (SCI$=$ 5) and Risk lover (SCI$>$ 5).

The individual risk elicitation task allows us to control for intrinsic disposition toward risk when we analyze the effect of social comparison on risk taking

[19] The largest number of mistakes was made in the first task, where 11 subjects made multiple switches between the lotteries, and one of them also started from the dominated lottery in the first row. In the bonus task only 6 subjects switched multiple times (5 of which had also inconsistencies in the first task), while nobody started from the dominated lottery; so that overall only 12 subjects displayed one or more of these inconsistencies. We drop these 12 subjects from the sample. This result is particularly interesting if one considers for example that Laury and Holt (2005) have 44 subjects out of 157 who present multiple switches.

[20] We drop only 19 subjects overall because one of the subjects with zero wage also belongs to the group of subjects with inconsistencies in the behavior of the first risk task.

behavior. This is particularly helpful because we perform a between subjects analysis; by introducing a measure of individual risk aversion we can isolate the social component in a more precise way.

Table 2 shows for each social condition the aggregate behavior of subjects in the bonus task in terms of the number of consecutive safe choices performed in the bonus task (SCB). Notice that the conditions where both subjects in the pair have received the same wage have a higher average number of consecutive safe choices. Variations in the means across regions may not seem relevant; however, it should be understood that the MPL format has a tendency to induce a large concentration of switches around 5 or 6.[21]

Table 2: Aggregate behavior in the bonus task by social condition.

Condition	**Mean**	**Std. Err.**	**Obs.**
(2, 2)	6.14	0.15	101
(2, 10)	5.90	0.15	107
(10, 2)	5.96	0.15	106
(10, 10)	6.26	0.14	103

Notes. Summary statistics across social conditions of the variable SCB defined as the number of consecutive safe choices in the bonus task.

We perform a between subjects analysis to study whether and how the presence of social comparison affects risk attitudes. We conduct such analysis using OLS. We start with two regressions (with and without individual controls) which have the following structure:

$$SCB_i = \alpha + \beta SCI_i + \gamma_1 D(2,2) + \gamma_2 D(2,10) + \gamma_3 D(10,2) + \delta Z_i + \varepsilon_i, \quad (2)$$

where the independent variables are SCI, a set of dummy variables $D(r,s)$ that identify subjects in social condition (r,s) (we use condition $(10,10)$ as our base category), and some individual controls (Z_i) that come from the final questionnaire (age, gender and height).[22] The sample characteristics of these variables are summarized in Table 6, contained in the Appendix; in the same table we also report subsample characteristics across the four treatments (r,s), from which it is possible to notice that the sample is quite homogeneous. The results of the regressions are presented in Table 3.

[21] See Harrison et al. (2005) for a discussion on the MPL format.

[22] In the questionnaire, we also asked subjects to report their weekly budget. However, since we inferred from their unplausible answers that they did not understand the question, we do not consider this variable as a meaningful individual control. If included, the variable budget is significant with coefficient 0.0002, but none of the other results change.

Table 3: Effects of social conditions on risk taking behavior in the bonus task.

SCB	(1)	(2)
SCI	0.534***	0.536***
	(14.47)	(14.44)
D(2,2)	-0.155	-0.143
	(0.89)	(0.81)
D(2,10)	-0.420**	-0.411**
	(2.45)	(2.37)
D(10,2)	-0.491***	-0.484***
	(2.85)	(2.78)
Age		-0.001
		(0.06)
Gender		-0.042
		(0.24)
Height		0.005
		(0.55)
Constant	3.063***	2.283
	(12.12)	(1.34)
R^2	0.34	0.34
N	417	417

Notes. SCB is the number of consecutive safe choices in the bonus task; SCI is the number of consecutive safe choices in the individual risk task; dummy variables D(r,s) identify subjects with wage r and a co-worker with wage s; Age is measured in years; Gender=0 is female; Height is measured in cm. The base category is condition $(10, 10)$. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Reference dependence (H1). As stated in Hypothesis 1, we expect that behavior does not differ across conditions $(2, 2)$ and $(10, 10)$, that is $\gamma_2 = 0$. In Table 3 we see that γ_2 is not significantly different from zero, hence we cannot reject the hypothesis that risk taking behavior of subjects under condition $(2, 2)$ does not differ from the behavior of subjects under condition $(10, 10)$. Subjects belonging to these two treatments face, in terms of final earnings, the same possible variations $(x - s)$ with respect to the social reference point. Social risk aversion should therefore have the same impact on their risk attitudes. We argued in Section 3 that differences across these two conditions, if any, should come from the private component of the utility function, as these subjects differ exclusively in their own wages. The evidence that there are no significant differences across the two treatments implies that private risk aversion does not change with own absolute outcomes x when we keep $(x - r)$ fixed. Therefore we can meaningfully compare subjects in conditions characterized by different own wages.

Risk aversion is decreasing in social gains (H2). The second hypothesis discusses how risk attitudes change in the social gains domain. In order to verify whether risk aversion decreases in social gains, we want to compare the behavior of subjects under condition $(10, 10)$ with the behavior of subjects under condition $(10, 2)$, with the latter being less risk averse. Given our specification we can test this hypothesis by testing that the coefficient of $\gamma_3 < 0$. It can be seen by the results in Table 3 that this is indeed the case. Notice moreover that γ_3 is also lower than γ_1, i.e., the coefficient of $D(2, 2)$. By testing γ_1 against γ_3, we see that they are statistically different, with a p-value of 0.053 (0.05) in the regression without (with) individual controls. This provides further support for the hypothesis that risk aversion is decreasing in social gains.

Prospect theory (H3). Let us now consider the last hypothesis and compare the risk attitudes in social losses with the risk attitudes in social gains. Our theoretical predictions on this comparison are ambiguous; we want to check whether risk aversion is lower in social losses than in social gains. Given that we did not reject the hypothesis that risk aversion is decreasing in social gains, we expect the behavior of subjects in social losses to differ more from the behavior of subjects facing small social gains than large ones. By looking at Table 3, we first observe that the coefficient of $D(2, 10)$ is negative and significant, hence there is less risk averse behavior in social losses than in condition $(10, 10)$, which is in line with **H3**. If we test the coefficients of $D(2, 2)$ and $D(2, 10)$ against each other we find that the difference between them is almost significant (the p-value is 0.125 (0.123) without (with) individual controls). Testing the coefficients of $D(2, 10)$ and $D(10, 2)$ against each other we see instead that we cannot reject the hypothesis that they are equal (the p-value 0.675 (0.671) without (with) individual controls). Therefore our main specifications suggests that it is indeed the case that risk aversion is lower in social losses than in small social gains, while risk attitudes do not change if we compare social losses with large social gains.

To investigate this matter further we run two additional sets of regressions. First of all, we aggregate subjects in treatments $(2, 2)$ and $(10, 10)$ in a single category, and we run the same regressions using this larger category of small social gains as base category (Table 4). We feel that this is an useful exercise as our theoretical model predicts that subjects in these two treatments should behave equally and we cannot reject such assumption in the data (**H1**). We find that the coefficient of $D(2, 10)$ remains negative and significant; hence, risk aversion is lower in social losses than in small social gains. Moreover we still find no difference between social losses and large social gains.[23]

Table 4: Effects of social conditions on risk taking behavior in the bonus task (II).

SCB	(1)	(2)
SCI	0.534***	0.537***
	(14.46)	(14.45)
D(2,10)	-0.343**	-0.340**
	(2.32)	(2.28)
D(10,2)	-0.415***	-0.413***
	(2.78)	(2.76)
Age		0.001
		(0.08)
Gender		-0.037
		(0.21)
Height		0.005
		(0.61)
Constant	2.988***	2.055
	(12.53)	(1.22)
R^2	0.34	0.34
N	417	417

Notes. SCB is the number of consecutive safe choices in the bonus task; SCI is the number of consecutive safe choices in the individual risk task; dummy variables D(r,s) identify subjects with wage r and a co-worker with wage s; Age is measured in years; Gender=0 is female; Height is measured in cm. The base category is the aggregate category that includes all subjects with a wage equal to the co-worker's wage, i.e. subjects in conditions $(2, 2)$ and $(10, 10)$. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

The second step we take to delve further into the relation between social losses and social gains is to perform once again the whole analysis of Tables 3 and 4 restricting our attention to the subsample of subjects that displayed a risk averse or neutral behavior in the individual risk elicitation task. We do this because our theoretical results on the comparison of risk attitudes between social losses and social gains are derived either under the assumption that there is private risk aversion or neutrality (Proposition 1 (ii)), or under parametric conditions that depend on the concavity of the individual component (Proposition 1 (i)). The results of the regressions on the subsample of risk averse and

[23] Testing the coefficients of $D(2, 10)$ and $D(10, 2)$ against each other in the regressions of Table 4 delivers p-value 0.676 (0.671) in the regression without (with) individual controls.

risk neutral individuals are contained in Table 7 which can be found in the Appendix. We observe that the comparison across regions remains the same even if we focus only on subjects who are risk averse or neutral in the individual task. Thus, we conclude that the evidence we have supports the hypothesis that risk aversion is lower in social losses than in small social gains, but we cannot reject the hypothesis that the risk attitudes do not vary when we compare social losses with large social gains.

Effects of individual risk attitudes. We want to stress the fact that in every regression there is a strong correlation between risk attitudes displayed in the social and the individual risk tasks: the effect of SCI on the number of safe choices in the bonus task is positive and strongly significant everywhere. We cannot directly compare risk attitudes displayed in the individual and in the social risk tasks within each treatment;[24] however, it is interesting to look at how risk attitudes vary from the individual to the social environment across treatments. In order to do so, we define the variable ΔSC=SCB-SCI. Table 5 shows the confidence intervals of the mean of ΔSC across the four treatments. We can observe a clear pattern: risk aversion seems to increase in small gains and to decrease in social losses and in large social gains.

Table 5: ΔSC by social condition.

Condition	**Mean**	**Std. Err.**	95% **Conf. Int.**	**Obs.**
(2, 2)	0.09	0.13	[-0.17, 0.35]	101
(2, 10)	-0.20	0.13	[-0.46, 0.07]	107
(10, 2)	-0.39	0.17	[-0.72, -0.05]	106
(10, 10)	0.27	0.13	[0.01, 0.53]	103

Notes. Summary statistics by social condition of the variable ΔSC=SCB-SCI defined as the difference between the number of consecutive safe choices in the bonus task and the number of consecutive choices in the individual tasks.

5 Discussion and conclusions

We conducted an experimental analysis to investigate how risk attitudes change in a social environment across social comparison situations. The empirical analysis showed that the experimental results are compatible with a general framework that combines private and social risk attitudes where the social riks attitudes display Prospect Theory features. It is worth noting that we did not apply Prospect Theory to social comparison in a trivial manner. This implies, for

[24]The direct comparison may not be meaningful as the two risk task differ in terms of stakes and framing; moreover the order in which subjects face the two tasks is fixed.

example, that it is not guaranteed that an individual is risk lover when facing a social losses situation, as a direct application of Prospect Theory to social comparison would imply.

We find that risk aversion is decreasing in social gains, which is consistent with a social component that displays either constant or decreasing risk aversion. Moreover we find that it is not always possible to rank risk attitudes in social losses and in social gains, as the theoretical predictions depend on the relation between private and social risk attitudes. Finally, we see in the data that there is less risk averse behavior in social losses than in small social gains; the behavior in social losses, however, cannot be distinguished from the behavior in large social gains.

Can the results be driven by inequity aversion? To interpret the influence of social comparison on risk taking behavior, we could alternatively adopt the perspective of a model with inequity aversion. The traditional functional form of inequity averse preferences introduced by Fehr and Schmidt (1999), adapted to our context with two reference points, would become:

$$v(x, r, s) = u(x - r) - \alpha \max\{s - x, 0\} - \beta \max\{x - s, 0\}$$

where $\beta \leq \alpha$ and $\beta \in [0, 1)$. This specific model of inequity aversion, that has been extensively used to interpret experimental data, cannot explain our results, as the component that incorporates social comparison is linear, and therefore it does not influence the risk attitudes of individuals.

Applications and extensions of Fehr and Schmidt (1999) model to risky environments have been introduced in Brock et al. (2013), Fudenberg and Levine (2012) and Saito (2013). However, none of these models can explain our experimental results. In particular, they all predict that risk aversion should be constant across social gains conditions.[25]

How does our results relate to other experimental work? The relation between social comparison and risk attitudes has been already investigated in the literature. Two features that differentiate our study from most of the other experimental work are that decision makers cannot change their social status nor they can influence the social reference point, as both their social condition and their co-worker's wage are *exogenously determined.*

[25] For example, Saito (2013) axiomatizes the *expected inequality-averse* model, which, applied to our social reference point s, can be rewritten as follows:

$$V(x, s) = \delta U(\mathbb{E}(x), \mathbb{E}(s)) + (1 - \delta)\mathbb{E}(U(x, s)),$$

where $U(x, s) = x - \alpha \max\{s - x, 0\} - \beta \max\{x - s, 0\}$. If we limit our attention to social gains we can rewrite the above equation as $U(x, s) = x - \beta(x - s)$ which is linear. Hence $U(\mathbb{E}(x), \mathbb{E}(s)) = \mathbb{E}(U(x, s))$; moreover $V(x, s)$ becomes linear and cannot explain the finding that risk attitudes vary across the social gains domain.

In particular, a recent paper by Schwerter (2013) studies experimentally risk taking under social comparison within a reference-dependent utility framework. The author analyzes how risk taking behavior changes when outcomes of risky decisions can revert the social ranking and finds evidence of social loss aversion. Differently, in our experiment the social ranking is pre-determined by the wages assignment and decision makers can only influence their distance from the social reference point, so that any social loss aversion consideration is ruled out. Our studies are complementary: within the same theoretical framework, Schwerter (2013) focuses on the slope of the social component, while we focus on its curvature.

The fact that the social reference point is certain and exogenously given allows us to rule out social concerns that the decision maker might have in case he was responsible also for the payoff of the other or for the risk that the other faces. This aspect distinguishes our study from other experiments where the decision maker's choice determines the peer's payoff and (or) the distribution of the peer's payoffs (Bolton and Ockenfels, 2010; Rohde and Rohde, 2011; Lahno and Serra-Garcia, 2014; Gaudel, 2013). For example, in Bolton and Ockenfels (2010) subjects face dictator choice problems with uncertain payoffs allocation. The authors study how the advantageous or disadvantageous inequality in the payoff allocations of either the safe or the risky option affect the decision maker's risk attitude. Rohde and Rohde (2011) study decision making under uncertainty in a social context and show that risk taking is affected by the risks faced by other persons.

The experimental work that is closest to our analysis is by Linde and Sonnemans (2012). Importantly, their experiment demonstrates that a straightforward application of Prospect Theory to social comparison fails to explain risk taking behavior in a social environment. We discussed in Section 3 how this calls for an analysis that takes into account both private and social risk attitudes. We designed our experiment so to isolate the effect of social conditions keeping the private risk attitudes fixed and framing the choice problems as positive variations from a previous wage (individual gain) in every social condition. This is a major departure from the specification of Linde and Sonnemans, as they do not induce any salient individual reference point.

There are many other differences in the two experiments. We feel that an important distinction is related to the structure of the analysis. Linde and Sonnemans want to conduct a within subject analysis. As a consequence, they ask each subject to perform 42 separate choices between lotteries. These choices vary across social conditions. Moreover 22 out of 42 choices (10 in the neutral social conditions and 12 other ones) are designed so that the subject affects not only his outcome but also his peer's outcome.

Our results differ from the results of their experiment. Linde and Sonnemans find, only aggregating the data across subjects, that risk aversion decreases moving from social losses to social gains.[26] We find instead that risk aversion in social losses is significantly smaller than in small social gains and not distinguishable from the risk attitudes displayed in social losses.

The first observation to be made is that our theoretical analysis (and our experimental results) show that there are no clearcut predictions in the comparison between social losses and social gains, due to the simultaneous presence of private and social risk attitudes. As we induce a salient individual reference point, and we compare choices in which the social conditions vary but the distance from the individual reference point is constant, we intentionally control for variations of the private component; this may explain why our results are closer to Prospect Theory predictions.

Moreover, the larger number of choices that subjects face in the experiment of Linde and Sonnemans, and the fact that in their experiment subjects alternate conditions of social gains with conditions of social losses, and conditions in which they affect the peer's outcome with conditions in which the peer's outcome is fixed may introduce in their experiment behavioral confoundings that are absent in our work.

However, the two studies may be considered part of the same research program. Linde and Sonnemans suggest that Prospect Theory does not apply trivially to a social context; we propose a model which modifies Prospect Theory and proves to be compatible with risk taking in a workplace environment. In particular, our model suggests that an analysis of social comparison and risk taking should not leave the individual reference point out of consideration.

Further elaborating on the mechanisms through which social comparison affects risk attitudes may prove a fruitful avenue of future research, as risk taking behavior can have a relevant economic impact. Our experimental work emphasizes that, besides being an important aspect in the well-being of economic agents and having important behavioral implications in labor relations settings (e.g., effort and performance), social comparison is also a determinant of risk taking behavior in a workplace environment. We concluded that large differences in workers' earnings can produce more risk loving behavior. Indeed, for different reasons, workers below and far above their social referent will take more risks than those close to it: while the former risk more in order to catch up with the social referent, the latter do so as they feel far more rich. An immediate implication of our findings is that to act only on monetary incentives (e.g., the ratio between the fixed and the variable component of bankers' pay) may not be enough to contrast imprudent risk taking, especially when there exist structural differences in the bankers' fixed pay components. More importantly, we suggest that social comparison is an additional channel to moderate bankers' risk taking

[26] Their paper also provides results on the neutral condition. However, such condition differs from gains and losses as the decision maker chooses which lottery will be played not only for himself but also for the other person.

behavior. According to our results, an appropriate compensation scheme of an investment institution should try not only to limit the variable component of bankers' pay but also the (overall) pay inequality between them.

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A Theoretical analysis

Assume $v(x;r,s) = u(x-r) + g(x-s)$ where both $u(\cdot)$ and $g(\cdot)$ are increasing in x and $g(\cdot)$ is concave in social gains $(x > s)$ and convex in social losses $(x < s)$. Let

$$RA^u(x-r) = -\tfrac{u''(x-r)}{u'(x-r)}, \quad RA^g(x-s) = -\tfrac{g''(x-s)}{g'(x-s)}. \tag{3}$$

be the coefficients of private and social risk aversion respectively. It is easy to show that the overall coefficient of risk aversion $RA(x;r,s)$ can therefore be rewritten as

$$\begin{aligned} RA(x;r,s) = & \frac{u'(x-r)}{u'(x-r)+g'(x-s)} RA^u(x-r) \\ & + \frac{g'(x-s)}{u'(x-r)+g'(x-s)} RA^g(x-s), \end{aligned} \tag{4}$$

hence the overall risk aversion is a convex combination of the private and social risk aversion.

The proposition below shows however that these structure does allow us to rank the risk attitudes in social gains and in social losses only under certain conditions.

Proposition 1 *Consider x, r, $\bar{s}$ and $\hat{s} \in \mathbb{R}$ such that $\bar{s} < x < \hat{s}$. Then $RA(x;r,\bar{s}) > RA(x;r,\hat{s})$ if either of the following conditions apply:*

(i) $RA^g(x-\hat{s}) < RA^u(x-r) < RA^g(x-\bar{s})$;

(ii) $RA^u(x-r) \geq 0$ *and* $g^{'}(x-\bar{s}) \leq g^{'}(x-\hat{s})$.

Proof. For simplicity let $u' = u^{'}(x-r)$, $\bar{g}' = g^{'}(x-\bar{s})$, $\hat{g}' = g^{'}(x-\hat{s})$. Let also $\widehat{RA}^g = RA^g(x-\hat{s})$ and $\overline{RA}^g = RA^g(x-\bar{s})$, and define similarly RA^u, $\widehat{RA}$ and $\overline{RA}$. First notice that, given the assumptions on $g(\cdot)$, $\widehat{RA}^g < 0 < \overline{RA}^g$. We can equivalently rewrite $\overline{RA} - \widehat{RA}$ as follows:

(i)

$$\overline{RA} - \widehat{RA} = \frac{1}{(u'+\hat{g}')(u'+\bar{g}')}\left[u'\left((RA^u - \widehat{RA}^g)\hat{g}' + (\overline{RA}^g - RA^u)\bar{g}'\right) + (\overline{RA}^g - \widehat{RA}^g)\hat{g}'\bar{g}'\right]. \tag{5}$$

From the above equation it is easy to see that $RA^g(x-\hat{s}) < RA^u(x-r) < RA^g(x-\bar{s})$ is a sufficient condition for the difference to be positive.

(ii)

$$\overline{RA} - \widehat{RA} = \frac{1}{(u'+\hat{g}')(u'+\bar{g}')}\left[u'(\hat{g}' - \bar{g}')RA^u + \hat{g}'\bar{g}'(\overline{RA}^g - \widehat{RA}^g) + u'(\overline{RA}^g\bar{g}' - \widehat{RA}^g\hat{g}')\right]. \tag{6}$$

From the above equation it is easy to see that $RA^u(x-r) \geq 0$ and $g^{'}(x-\bar{s}) \leq g^{'}(x-\hat{s})$ are sufficient conditions for the difference to be positive.

■

The above proposition implies that the relation that exists between the social risk attitudes in social losses and in social gains is trasmitted to the overall risk attitudes of the decision maker either when the risk attitudes of the social component are more extreme than the private risk attitudes ($RA^g(x-\hat{s}) < RA^u(x-r) < RA^g(x-\bar{s})$) or when the decision maker has a private component that displays risk aversion ($RA^u(x-r) \geq 0$) and a social component that is steeper in social losses than in social gains.

B Additional tables

B.1 Independent variables

Table 6: Summary statics of the independent variables

	Condition	**Mean**	**Std. Err.**	95% **Conf. Int.**	**Min**	**Max**
SCI	all	6.12	0.08	[5.96,6.28]	1	10
	(2, 2)	6.05	0.15	[5.75,6.35]	2	10
	(2, 10)	6.09	0.15	[5.79,6.40]	1	10
	(10, 2)	6.35	0.17	[6.01,6.69]	2	10
	(10, 10)	5.99	0.16	[5.66,6.32]	1	10
Age	all	24.17	0.17	[23.83,24.51]	18	41
	(2, 2)	23.42	0.32	[22.80,24.05]	18	34
	(2, 10)	23.96	0.35	[23.28,24.65]	18	41
	(10, 2)	24.12	0.37	[23.40,24.85]	19	39
	(10, 10)	25.17	0.34	[24.51,25.84]	18	34
Height	all	173.41	0.47	[172.48,174.35]	142	205
	(2, 2)	172.37	0.81	[170.78,173.96]	156	193
	(2, 10)	173.50	0.95	[171.62,175.37]	142	193
	(10, 2)	173.10	1.08	[170.96,175.24]	150	205
	(10, 10)	174.68	0.92	[172.86,176.50]	156	197
Gender	all	0.61	0.02	[0.56,0.66]	0	1
	(2, 2)	0.63	0.05	[0.54,0.73]	0	1
	(2, 10)	0.67	0.05	[0.57,0.75]	0	1
	(10, 2)	0.59	0.05	[0.50,0.69]	0	1
	(10, 10)	0.54	0.05	[0.46,0.65]	0	1

Notes. Summary statistics of the independent variables for the 417 subjects considered in the main analysis. Age is expressed in years, Height in cm and Gender= 0 when the subject is female.

B.2 Risk averse subjects

Table 7: Effect of social conditions on risk taking behavior in the bonus task for risk averse individuals only.

	base category D(10,10)		base category D(r=s)	
SCB	(1)	(2)	(3)	(4)
SCI	0.583***	0.585***	0.585***	0.587***
	(11.36)	(11.35)	(11.41)	(11.40)
D(2,10)	-0.443**	-0.432**	-0.353**	-0.353**
	(2.38)	(2.30)	(2.21)	(2.20)
D(10,2)	-0.547***	-0.538***	-0.458***	-0.459***
	(2.92)	(2.86)	(2.84)	(2.84)
D(2,2)	-0.175	-0.153		
	(0.94)	(0.81)		
Age		0.013		0.014
		(0.67)		(0.75)
Gender		0.022		0.026
		(0.12)		(0.14)
Height		0.004		0.005
		(0.50)		(0.56)
Constant	2.749***	1.622	2.646***	1.398
	(7.56)	(0.90)	(7.63)	(0.78)
R^2	0.28	0.29	0.28	0.28
N	347	347	347	347

Notes. SCB is the number of consecutive safe choices in the bonus task; SCI is the number of consecutive safe choices in the individual risk task; dummy variables D(r,s) identify subjects with wage r and a co-worker with wage s; dummy variable D(r=s) identifies all subjects with a wage equal to the co-worker's wage; Age is measured in years; Gender=0 is female; Height is measured in cm. The regressions above are run only for risk averse subjects (SCI$\geq$ 5). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

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