To Win or Not to Lose: an Experiment on Communication Efforts

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To win or not to lose: an experiment on communication efforts∗

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Abstract

In contrast to the cheap talk literature, our laboratory experiment studies the impact of monetary incentives on real, costly and truthful communication effort choices. It investigates and confirms some predictions of the Dewatripont and Tirole’s (2005) modes of communication model.

The experiment also gives evidence that, in a situation where a sender tries to convince a receiver to accept a project, the receiver pursues one out of two communication goals.

On the one hand, if without any communication the receiver would refuse the project, his communication objective is to identify and accept a high quality project. His effort depends positively on the earning he wins when accepting a high quality project.

On the other hand, if without any communication the receiver would accept the project, his communication objective is to identify and refuse a low quality project. His effort depends positively on his loss when accepting a low quality project.

Keywords: communication ; experiment ; information acquisition ; effort
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1 Introduction

Acquiring relevant information can help someone to make the best possible choices. Nevertheless, grasping and conveying information requires a costly effort. In contrast to most of the communication literature focused on cheap talk/strategic information transmission, we strive to better understand the drivers of costly and truthful communication efforts. This has been theoretically studied by Dewatripont and Tirole (2005) and by Body (2014). Some of their predictions are tested in this paper through a laboratory experiment on real communication efforts.

The experiment studies the following situation: a sender (S) communicates with a receiver (R) to convince him to accept a project. On the one hand, the project is either of high or low quality, i.e. R either wins or loses money by accepting it. On the other hand, S is only rewarded if R accepts the project, regardless of its quality.

Before communication, both agents do not know the project quality: the project is of high quality with probability 0.5. On the one hand, by accepting the project, R wins $r_H$ if it is of high quality, and loses $|r_L|$ otherwise (with $r_L < 0 < r_H$). On the other hand, S earns $s$ if R accepts the project.

S has information that, if understood by R, tells R whether the project is of high or low quality. Therefore, if S wants R to accept the project, S may need to communicate with R to resolve the uncertainty about the project quality. The communication between S and R may either fail or succeed. The higher their efforts to communicate, the more likely communication will succeed. If communication fails, we assume that R does not learn anything about the project quality; he still believes that by accepting it, he will win $r_H$ with probability 0.5 and lose $|r_L|$ otherwise. If communication succeeds, there are two possible outcomes: R either finds out that the project is of high quality or that it is of low quality.

After communication, R decides whether to accept the project or not.

To test the impact of monetary incentives on real communication effort choices, each project in the experiment is represented by a master thesis: it is a high quality project if its grade is higher than 16.5 out of 20, and it is a low quality project if its grade is lower than 13 out of 20. Master theses were used because participating students are familiar with the way master theses are graded.

Moreover, each experiment round is composed of two stages. In the first stage, S has to read the master thesis and write a report to transmit information about the thesis quality. In the second stage, R has to decide whether to accept the project (and to get a negative revenue if the project is of low quality and a positive one

Note that R cannot evaluate the project quality without communicating with S.
otherwise) by reading S’s report and by comparing it to the thesis.

The participants’ efforts are measured by the time they have spent on their tasks.

Finally, to assess the impact of monetary incentives on R’s effort, the treatments differ in $r_H$ (R’s revenue from accepting a high quality project) and/or in $r_L$ (R’s loss from accepting a low quality project).

In such a situation, we test and show that R’s communication objective and effort depend on whether the project yields R a negative expected revenue before communication (NEG case: $r_H \leq -r_L$) or a positive one (POS case: $r_H \geq -r_L$).

Before developing the differences between the NEG and the POS cases, note that R is only interested in a communication outcome that induces him to change his mind about his project acceptance decision.

In the NEG case, R refuses the project if communication fails (R does not acquire any new information) because his expected revenue of accepting the project is negative. R is so only interested in learning that the project is of high quality; it is the only communication outcome for which R accepts the project and that induces him to change his mind about his project acceptance decision. R thus exerts a communication effort to enhance his chance of identifying and accepting a high quality project. Therefore, since R’s effort is costly, an increase in $r_H$ raises his effort. In the experiment, R spends approximately 10% more time assessing the project quality when $r_H$ equals 9€ than when $r_H$ equals 3€ (with $r_L$ equal to -10€). Moreover, since R should never accept a low quality project, an increase in $|r_L|$ does not affect R’s effort.

In the POS case, R accepts the project if communication fails. R thus exerts an effort to enhance his chance of identifying and refusing a low quality project. Therefore, an increase in $|r_L|$ raises his effort. Moreover, since R should never reject a high quality project, an increase in $r_H$ does not affect his effort.

By testing the validity of the models of Dewatripont and Tirole (2005) and of Body (2014), we have conducted the first economic experiment offering evidence about these two communication objectives. Moreover, as far as we know, among the economic experiments measuring real effort choices (for example Achtziger and Alos-Ferrer, 2013; Blumkin et al., 2010; Bruggen and Strobel, 2007; Hennig-Schmidt et al., 2010; Rosaz and Villeval, 2012 and Van Dijk et al., 2001), this is the first one investigating communication.

This experiment differs from the ones testing predictions of models on soft information (initiated by Crawford and Sobel, 1982; for a review about these experiments, see Crawford, 1998; and for more recent studies, see for example Cai and Wang, 2006; Lundquist et al., 2009; Sánchez-Pagés and Vorsatz, 2009; Serra-Garcia
et al., 2011; or Wang et al., 2010). A major difference with this literature is that we study verifiable information. In these experiments on strategic information transmission/cheap talk, S knows with certainty the state of the world and sends an unverifiable message about it to R. R then chooses an action whose consequences on S and R’s payoffs depend on the state of the world.

It also differs from the experiments (for example Dickhaut et al., 2003; Hobson and Kachelmeier, 2005) testing predictions of models on hard information (pioneered by Grossman, 1981 and Milgrom, 1981). In this Hobson and Kachelmeier’s experiment (2005), S chooses his disclosure of information strategy and R infers information about his disclosure choices.

Contrary to both the literature on hard and soft information, it is considered that communication success is endogenous to S and R’s efforts, and that the disclosure and absorption of information are both costly since communication requires time and devotion.

Moreover, the models of Dewatripont and Tirole (2005) and of Body (2014) are built upon the elaboration likelihood model of persuasion from the psychology literature (Petty et al., 2005) in which two modes of communication are considered: issue-relevant and cue communication. In this experiment, only the former is studied: R carefully thinks about and examines information pertinent to the merits of a project in order to determine whether he should accept or refuse it.

This paper is organized as follows. The experimental design and procedures are detailed in sections 2 and 3. The theoretical model and predictions are explained in section 4. In section 5, the experimental results are presented. Finally, in section 6, we conclude.

2 Experiment design

In this section, we present the important features of the experiment.

- **Group:** the experiment is played in pairs of 2 participants, one playing S’s role and the other R’s role.

- **Rounds, sessions and partner setting:** there are 8 experiment sessions.
  - In the first session, 13 participants play S’s role during 4 rounds.
  - In the next 6 sessions, 59 participants first play R’s role during 4 rounds and then S’s role during 4 rounds.

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2 Compared to Dewatripont and Tirole (2005) and Body (2014), the model focuses on R’s behavior.
3 For the instructions, see appendix B.
– In the last session, 13 participants play R’s role during 4 rounds.

– During all 4 rounds, each receiver was matched with the same sender of the previous experiment session. The composition of each group was anonymous: the participants did not get to know their partner’s identity.

This setup allows the participants not to have time-outs: R does not have to wait for S to finish his task (see infra) to start his round.

• Projects:

– **Master theses**, presented in economics and management between 2009 and 2011 at the Université libre de Bruxelles, are used to represent the projects.

– **The probability** that the project is of high quality is 50%.

– **The quality** of the project is determined by the mark of the thesis; it is of:

  * high quality if the mark it received is higher than or equal to 16.5 out of 20; and is
  * low quality if the mark it received is lower than or equal to 13 out of 20, and higher than or equal to 12 out of 20.

No theses with a grade strictly lower than 12 were used. The reason for this is that 12 represents the passing grade in Belgian universities, and therefore we suspect that it would have been too easy for subjects to find out that theses with a grade strictly lower than 12 are low quality projects.

Moreover, no theses with a grade between 13.5 and 16 were used to create a clear distinction between low and high quality projects.

Note that a thesis with a grade higher or equal to 16.5 typically belongs to the upper quartile and a thesis with a grade lower or equal to 13 typically belongs to the lower quartile.

– **R is informed** about the **quality** of the two previous projects at the end of the second and of the fourth round.

By contrast, S is not informed of the quality of his projects.

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4Among the 464 theses presented in economics and management in 2009 and 2010 at the Université libre de Bruxelles, 39 (8.4%) received a grade strictly lower than 12, 58 (12.5%) received a grade between 12 and 13, and 129 (27.8%) received a grade higher than 16.5.
• Task:
  - S’s task is to convey information about the project to R through a report.
    * The report is presented in a structured form; there are 4 sections:
      - clarity - style - structure;
      - introduction - conclusion;
      - originality - contribution to the existing literature; and
      - analysis - methodology - documentation.
    On each of these 4 sections, S can give his opinion by selecting one out of several choices (no opinion, very good, good, medium, bad or very bad) and he can write free text explanations.
    * The maximum time that S can spend per round is 20 minutes.
  - R’s task is to decide whether to accept or to refuse the project based on his assessment of the master thesis. R may read S’s report and the master thesis before his acceptance decision.
    R faces 2 time limits:
    * Before the beginning of each round, R is informed of the time that S has spent during each of the 4 rounds. The time limit that R can spend reading the master thesis during a round is the time S has spent during that round divided by 2. When this time limit is exceeded, the master thesis disappears from the computer screen, R may however still read S’s report and decide whether to accept the project or not.
    * The maximum time that R can spend before taking a decision is 10 minutes. After 10 minutes, the project is automatically refused.

Moreover, at the end of each round, each participant is asked his quality assessment of the project on a 7 level scale.

• Earnings:
  - S earns 6 € if R accepts his project (in the model, s = 6).
  - R earns an amount $r_H$ if he accepts a high quality project and gets a negative amount $r_L$ if he accepts a low quality project.
  - R and S do not earn anything if R refuses the project.
  - 8 treatments (8 different combinations of $r_H$ and $r_L$) are used to test the impact of financial incentives on the participants’ communication efforts.
Table 1: Payoff treatments

<table>
<thead>
<tr>
<th>Case</th>
<th>Treatment</th>
<th>$r_H$</th>
<th>$r_L$</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NHmin</td>
<td>3 €</td>
<td>-10 €</td>
<td>↗</td>
</tr>
<tr>
<td>E</td>
<td>NHmax</td>
<td>9 €</td>
<td>-10 €</td>
<td>$r_H$</td>
</tr>
<tr>
<td>G</td>
<td>N</td>
<td>L</td>
<td>min</td>
<td>6 €</td>
</tr>
<tr>
<td>G</td>
<td>N</td>
<td>L</td>
<td>max</td>
<td>6 €</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>L</td>
<td>min</td>
<td>12 €</td>
</tr>
<tr>
<td>O</td>
<td>PHmin</td>
<td>9 €</td>
<td>-4 €</td>
<td>↗</td>
</tr>
<tr>
<td>S</td>
<td>PHmax</td>
<td>14 €</td>
<td>-4 €</td>
<td>$r_H$</td>
</tr>
</tbody>
</table>

* For each role (4 rounds), each participant either faces each of the 4 treatments in the NEG case (yielding R a negative expected revenue before communication), or all 4 treatments in the POS case: PHmax, PHmax, P|L|min and P|L|max. These treatments enable us to study the impact of an increase in $r_H$ ($r_L$) on R’s effort with the same value of $r_L$ ($r_H$).

* The treatments NHmin (the treatment with the lowest value of $r_H$ in the NEG case) and NHmax are either both played during rounds 1 and 2, or both played during rounds 3 and 4. The same holds for PHmin and PHmax. The reason for that feature is explained in the results section.

− The show-up fee depends on the experiment session type:

* In the first session, the show-up fee is 20 €.
* In the last session, the show-up fee is 12.5 €.
* In the other sessions, the show-up fee is 15 €.

* Additionally, in all the sessions except the first one, participants earn an amount of money that depends on:
  - the number of low quality projects the participant faces when playing R’s role; and on
  - whether the participant is in the NEG or POS case when playing R’s role.
For example, the earnings of a participant who faces four low quality projects in the NEG case when playing R’s role are increased by 40 €. This enables to compensate R for his potential losses from accepting one or several low quality projects.

The participants were informed about the 5 possible show-up fees. It is only after having played the four R rounds that the participant could find out his exact show-up fee. Putting it differently, the participants could not deduce from the instructions the number of low quality projects they would face.

• Cost:

Participants bear a monetary cost that depends on the time spent on their task:

- S loses 1 cent per 20 seconds;
- R loses 1 cent per 10 seconds.

For example, if a participant has spent 20 minutes per round when playing S’s role and 10 minutes per round when playing R’s role (which represents the maximum time a participant can spend on the experiment), he loses 4.8 € which is compensated by the show-up fee. This feature ensures that S and R’s communication is costly.

All the questions asked in the post-experiment questionnaire are presented in appendix E.
3 Procedures

The experiment took place at the Université libre de Bruxelles. There were 72 groups and 85 participants\(^5\) from the economics or management disciplines of different levels (from bachelor year 2 to master year 2). The participants were recruited by e-mail and during courses with the announcement that, depending on their decisions and on those of other participants, they could earn a substantial amount of money during the experiment.

Each participant was asked to read the instructions individually, to fill in two control questionnaires (presented in appendices C and D, one concerning R’s task and the other concerning S’s task), to play four practice rounds (three rounds as R\(^6\), and one round as S), to play four experiment rounds as R and 4 rounds as S, and finally to fill a post-experiment questionnaire.\(^7\) The participants played the experiment in the same computer room but were isolated from one another.

On average, the experiment lasted 80 minutes. Payments per participant were on average 48.71 € (64.37 $), with a minimum of 22.12 € and a maximum of 72.81 €. The average age was 21.75, with a minimum of 19 and a maximum of 31. There were 28 women and 57 men among the 85 participants.

Finally, 20 master theses were used: 4 to run the practice rounds and 16 to run the experiment rounds.\(^8\)

More information on the treatment and project allocations is presented in appendix F.

4 Model and predictions

In this section, I first present the model before looking at R’s strategy, characterizing the equilibria and stating the predictions tested in the experiment.

4.1 Model setup

There are two agents: S, the sender, proposes a project to R, the receiver. R is the decision maker and has two possible choices: refusing or accepting the project.

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\(^5\)13 participants only played the sender’s role; another 13 participants only played the receiver’s role; and 59 participants played both roles.

\(^6\)When the participants practiced R’s role, the three S reports were written by PhD students who had tested the experiment.

\(^7\)Except for the participants of the first experiment session who only play S’s role during 4 rounds and only filled the control questionnaire concerning S’s task, and for the participants of the last experiment session who only play R’s role during 4 rounds and only filled the control questionnaire concerning R’s task.

\(^8\)The references of the master theses are available on request.
If R refuses the project, both agents get zero revenue.

If R accepts the project, S earns a positive revenue \( s \) but this might lead to a loss for R.

More specifically, R’s revenue \( r \) from accepting the project is either \( r_H \) or \( r_L \), with \( r_H > 0 > r_L \). Parameters \( r_H \) and \( r_L \) respectively represent R’s revenue from accepting a high and that from accepting a low quality project. Moreover, the probability of \( r_H \) before communication is 0.5.

The sequential structure is the following:

**Stage 1**: S exerts his effort \( e_S \in [0,1200] \). S chooses the time, measured in seconds, he spends reading the master thesis and writing his report. The maximum time S can spend is 20 minutes.

**Stage 2**: R observes \( e_S \) and then chooses his effort \( e_R \in [0,b(e_S)] \). R observes the time S has spent before each round, and then chooses the time he will spend and the attention he will pay to assess the project quality. R’s effort choice upper bound \( b(e_S) \) depends positively on \( e_S \) since the time limit that R can spend reading the master thesis is half the time spent by S during that round.

Communicating may enable R to learn the project quality; it may help R to figure out whether or not to accept the project.

Moreover, communication involves increasing and convex costs \( C(e_R) \) for R. There are no communication setup costs and R’s marginal cost of effort is equal to zero when R does not communicate. \( C(e_R) \) is assumed to be continuous and differentiable on \([0,b(e_S))\).

**Stage 3**: The agents’ efforts and pure chance then determine the communication outcome \( j \):

1) with probability \( p \), communication succeeds and R finds out the project quality:
   i) with probability 0.5, R learns that the project is of high quality, \( j = H \);
   ii) with probability 0.5, R finds out that the project is of low quality, \( j = L \).

2) with probability \( 1 - p \), communication fails and R does not find out the project quality, \( j = F \). R still believes that the project is of high quality with probability 0.5;

The higher R and/or S’s efforts, the higher the probability of communication success \( p \): \( \frac{\partial p}{\partial e_S} (\frac{\partial p}{\partial e_R}) \) is strictly positive if \( e_R \neq 0 \) (\( e_S \neq 0 \)), and equals 0 otherwise. Communication is more likely to succeed when S spends more time explaining the master thesis and also when R pays more attention reading S’s report and the master thesis. It is also assumed that \( p \) equals zero if S and/or R does not communicate.
(p = 0 if \( \min\{e_S, e_R\} = 0 \)) and that \( p \) is concave in \( e_S \) and in \( e_R \) (\( \partial^2 p / \partial e^2 _R \) and \( \partial^2 p / \partial e^2 _S \) are both negative).

**Stage 4:** R decides whether to accept the project or not. R chooses his project acceptance decision \( a^j \): the variable \( a^j \) is equal to 1 if R accepts the project after communication outcome \( j \), and is equal to 0 otherwise.

Finally, R’s utility \( U \) is equal to \( E(\Pi) - C(e_R) \) where \( E(\Pi) \) represents R’s expected revenue.

### 4.2 R’s strategy

R’s strategy combines two variables: his effort (a function of S’s effort) and his project acceptance decisions for each possible communication outcome.

Let us first look at R’s project acceptance decision in stage 4 after each possible communication outcome:

1.i) If R finds out that the project is of high quality (\( j = H \)), R strictly prefers to accept the project (\( a^H = 1 \)).

1.ii) If R learns that the project is of low quality (\( j = L \)), R strictly prefers to reject the project (\( a^L = 0 \)).

The classes of strategies playing \( a^H = 0 \) and/or \( a^L = 1 \) are therefore strictly dominated or equivalent to a strategy playing action \( a^H = 1 \) and \( a^L = 0 \).

2) If communication fails (\( j = F \)) and if the project yields R a negative (positive) expected payoff, R prefers to reject (accept) the project, \( a^F = 0 \) (\( a^F = 1 \)). As it will turn out, R’s effort choice depends on his project acceptance decision when communication fails.

This variable \( a^F \) influences R’s expected revenue in the following way:

\[
E(\Pi) = \begin{cases} 
0.5 \ p \ r_H & \text{if } a^F = 0; \\
0.5 \ r_H + 0.5 \ r_L (1 - p) & \text{if } a^F = 1.
\end{cases}
\]

When \( a^F = 0 \), R earns revenue \( r_H \) if communication is successful (with probability \( p \)) and if the project is of high quality (with probability 0.5).

When \( a^F = 1 \), R always accepts the project yielding him an expected revenue \( 0.5r_H + 0.5r_L \) unless R learns that the project is of low quality (with probability \( 0.5p \)).
4.3 Predictions

Predictions are derived from Dewatripont and Tirole (2005) and from Body (2014).

We will test whether R’s communication objective depends on whether R is in the NEG or POS case. Before doing so, let us present the possible equilibria.

I) The NEG equilibrium: R communicates and accepts the project if and only if he finds out that it is of high quality ($a^{F*} = 0$).

In this equilibrium, R’s utility is: $U = 0.5pr_H - C(e_R^*)$.

Therefore, R’s optimal effort $e^*_R$ equals $b(e_S)$ if $\lim_{e_R\to b(e_S)} 0.5r_H \frac{\partial p}{\partial e_R}(e_R) - \frac{\partial C}{\partial e_R}(e_R) > 0$ and to $e^{**}_R$, which is implicitly given by $\frac{\partial C}{\partial e_R}(e^{**}_R) = 0.5r_H \frac{\partial p}{\partial e_R}(e^{**}_R)$, otherwise.

Note that R’s optimal effort depends on $r_H$ and not on $r_L$. This means that R communicates to increase his chance of identifying a high quality project. R is only interested in finding out that the project is of high quality. R’s project acceptance decision when he finds out that the project is of low quality is the same as when communication fails: he refuses the project.

II) The POS equilibrium: R communicates and accepts the project unless he learns that it is of low quality ($a^{F*} = 1$).

In this equilibrium, R’s utility is: $U = 0.5r_H + 0.5r_L(1-p) - C(e_R^*)$.

R’s optimal effort $e^*_R$ equals $b(e_S)$ if $\lim_{e_R\to b(e_S)} -0.5r_L \frac{\partial p}{\partial e_R}(e_R) - \frac{\partial C}{\partial e_R}(e_R) > 0$ and to $e^{***}_R$, which is implicitly given by $\frac{\partial C}{\partial e_R}(e^{***}_R) = 0.5(-r_L) \frac{\partial p}{\partial e_R}(e^{***}_R)$, otherwise.

Note that R’s optimal effort depends on $r_L$ and not on $r_H$. This means that R communicates to increase his chance of identifying a low quality project. R is only interested in learning that the project is of low quality. R’s project acceptance decision when he finds out that the project is of high quality is the same as when communication fails: he accepts the project.

The NEG equilibrium exists provided that the project yields R a negative expected revenue before communication ($r_H \leq -r_L$) and that S exerts a strictly positive effort ($e_S > 0$). The POS equilibrium exists provided that the project yields R a positive expected revenue before communication ($r_H \geq -r_L$) and that S exerts a strictly positive effort. This is proven in appendix A.

The NEG (POS) equilibrium exists only if R refuses (accepts) the project when communication fails. Moreover, R only exerts a strictly positive effort if S does so as well: it is impossible for R to find out the project quality if S does not communicate.
This paper tests 2 main predictions.

1) Prediction of R’s effort

In the NEG (POS) case, if S’s effort is strictly positive and if we control for the value of S’s effort,

- an increase in $r_H (|r_L|)$ raises R’s effort: as illustrated in Table 1, R’s effort in the treatment $N|L|\text{max}$ and $N|L|\text{min}$ (PHmax and PHmin) should be lower than in the treatment $NH\text{max}$ ($P|L|\text{max}$) and higher than in the treatment $NH\text{min}$ ($P|L|\text{min}$); and

- an increase in $|r_L| (r_H)$ does not affect R’s effort: R’s effort in the treatment $N|L|\text{max}$ (PHmax) should not be significantly different from R’s effort in the treatment $N|L|\text{min}$ (PHmin).

2) Prediction of R’s project acceptance decision

Theoretically, in the NEG case, R never accepts a low quality project, since R’s expected revenue from accepting the project is negative when communication fails. Likewise, in the POS case, R never rejects a high quality project.

Nevertheless, this is a proxy of reality since the communication outcome is not necessarily as clear-cut as assumed in the model. Communication can change R’s belief about the probability that the project is of high quality to a value other than 0 or 1. Putting it differently, after communication, R may have learned about the project quality without being certain about it.

Therefore, we are only going to test whether R is less likely to accept low and high quality projects in the NEG case (the treatments $NH\text{min}$, $NH\text{max}$, $N|L|\text{min}$ and $N|L|\text{max}$) than in the POS case (the treatments $PH\text{min}$, $PH\text{max}$, $P|L|\text{min}$ and $P|L|\text{max}$).

5 Results

5.1 Prediction of R’s effort

Let us first present two important variables: S and R’s efforts.

S’s effort is measured by the time spent by S during a round. There are 288 observations of S’s effort ranging from 2 to 1200 seconds. On average, S spent 336 seconds per round.

R’s effort represents the attention he pays to S’s report and the master thesis. It is measured by the time spent by R during a round compared to the maximum time allotted for R to read the thesis. R’s effort is therefore equal to 2 times the time R has spent during a round divided by S’s effort.

Because the first prediction is only true if S communicates ($e_S > 0$), all the
observations for which S has spent less than 60 seconds have not been considered when using R’s effort variable. Thus, we consider 272 observations of R’s effort ranging from 1% to 202%. The mean is equal to 89%; it means that R has spent on average 89% of the maximum time he had to read the thesis before taking his decision.

5.1.1 Mean and median comparisons

Let us first compare, at the individual level, R’s effort, $e_R$, for different values of $r_H$ and $|r_L|$. More precisely, we are going to consider the difference in R’s effort for a same receiver in the following cases: i) $e_R^{NH\text{max}} - e_R^{NH\text{min}}$ (the difference in R’s effort between treatments NHmax and NHmin); ii) $e_R^{|L|\text{max}} - e_R^{|L|\text{min}}$; iii) $e_R^{P|L|\text{max}} - e_R^{P|L|\text{min}}$; iv) $e_R^{PH\text{max}} - e_R^{PH\text{min}}$.

Note that the participant’s game experience is not that different in these 4 comparisons. This is explained by the two following experiment features:

1) The treatments NHmax and NHmin are both played during rounds 1 and 2, or during rounds 3 and 4. The same holds for $N|L|\text{max}$ and $N|L|\text{min}$; $P|L|\text{max}$ and $P|L|\text{min}$; and PHmax and PHmin.

2) R is informed about the quality of the two previous projects at the end of the second and of the fourth rounds.

We performed two one-sided tests:

a) a one-sample t-test to assess whether the mean of the difference in R’s effort concerning the cases i to iv is positive; and

b) a Wilcoxon signed-rank test to assess whether the median of the difference in R’s effort concerning the 4 cases is positive.

<table>
<thead>
<tr>
<th>Case (nb of obs)</th>
<th>Difference</th>
<th>Prediction</th>
<th>t-stat</th>
<th>Pr (T &lt; t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) $e_R^{NH\text{max}} - e_R^{NH\text{min}}$ (34)</td>
<td>10.50%*</td>
<td>+</td>
<td>1.47</td>
<td>7.53%</td>
</tr>
<tr>
<td>ii) $e_R^{</td>
<td>L</td>
<td>\text{max}} - e_R^{</td>
<td>L</td>
<td>\text{min}}$ (35)</td>
</tr>
<tr>
<td>iii) $e_R^{P</td>
<td>L</td>
<td>\text{max}} - e_R^{P</td>
<td>L</td>
<td>\text{min}}$ (33)</td>
</tr>
<tr>
<td>iv) $e_R^{PH\text{max}} - e_R^{PH\text{min}}$ (32)</td>
<td>-1.72%</td>
<td>0</td>
<td>-0.29</td>
<td>61.39%</td>
</tr>
</tbody>
</table>
b) Testing whether the **median** of the difference in R’s effort between specific treatments is positive (Wilcoxon signed-rank test)

<table>
<thead>
<tr>
<th>Case (nb of obs)</th>
<th>Difference</th>
<th>Prediction</th>
<th>z-score</th>
<th>Pr (Z &lt; z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) $e_{R_{NHmax}} - e_{R_{NHmin}}$ (34)</td>
<td>10.36%*</td>
<td>+</td>
<td>1.46</td>
<td>7.19%</td>
</tr>
<tr>
<td>ii) $e_{R_{</td>
<td>L</td>
<td>max}} - e_{R_{</td>
<td>L</td>
<td>min}}$ (35)</td>
</tr>
<tr>
<td>iii) $e_{R_{PLmax}} - e_{R_{PLmin}}$ (33)</td>
<td>3.03%*</td>
<td>+</td>
<td>1.35</td>
<td>8.865%</td>
</tr>
<tr>
<td>iv) $e_{R_{PHmax}} - e_{R_{PHmin}}$ (32)</td>
<td>-4.78%</td>
<td>0</td>
<td>-0.56</td>
<td>71.26%</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

i) R’s effort is on average 10.5 percentage points higher in treatment NHmax ($r_H = 9 \, \text{€}$ and $r_L = -10 \, \text{€}$) than in treatment NHmin ($r_H = 3 \, \text{€}$ and $r_L = -10 \, \text{€}$). This difference is significantly positive at the 10% level; this is also verified for the median. Therefore, as predicted, an increase in $r_H$ (of 6 €) in the NEG case raises R’s effort.

ii) The difference in the mean of R’s effort between N|L|max ($r_H = 6 \, \text{€}$ and $r_L = -13 \, \text{€}$) and N|L|min ($r_H = 6 \, \text{€}$ and $r_L = -7 \, \text{€}$) should not be significantly positive at the 10% level. This result is the only one that contradicts the model.

According to the model, there should be neither low quality projects accepted in the NEG case, nor high quality projects refused in the POS case. The former explains why R should not care about the value of $|r_L|$ in the NEG case; and the latter explains why R should not care about the value of $r_H$ in the POS case. Therefore, we performed the same tests, as the ones presented in Table 3, except that we exclude the observations of the receivers in the NEG case accepting low quality projects 50% or more of the time and of those in the POS case refusing high quality projects 50% or more of the time (see Table 4). By doing so, 18.66% of the observations are excluded.

iii) Similarly, as predicted by the model, an increase in $|r_L|$ in the POS case from $|r_L| = 1 \, \text{€}$ to $|r_L| = 6 \, \text{€}$ (with $r_H = 12 \, \text{€}$) raises R’s effort: the mean of the difference in R’s effort between the treatments P|L|max and P|L|min is significantly positive at the 5% level and its median is significantly positive at the 10% level.

iv) As predicted, the mean and the median of the difference in R’s effort between the treatments PHmax ($r_H = 14 \, \text{€}$ and $r_L = -4 \, \text{€}$) and PHmin ($r_H = 9 \, \text{€}$ and $r_L = -4 \, \text{€}$) are not significantly positive at all.
Table 4:

a) Testing whether the mean of the difference in R’s effort between specific treatments is positive when excluding the observations of the receivers accepting a low quality project in the NEG case 50% or more of the time (t-test)

<table>
<thead>
<tr>
<th>Case (nb of obs.)</th>
<th>Difference</th>
<th>t-stat</th>
<th>Pr (T &lt; t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) $e_R^{NH_{max}} - e_R^{NH_{min}}$ (27)</td>
<td>15.43%**</td>
<td>1.83</td>
<td>3.97%</td>
</tr>
<tr>
<td>ii) $e_R^{NH_{max}} - e_R^{NH_{min}}$ (28)</td>
<td>3.47%</td>
<td>1.32</td>
<td>21.53%</td>
</tr>
</tbody>
</table>

b) Testing whether the mean of the difference in R’s effort between specific treatments is positive when excluding the observations of the receivers refusing a high quality project in the POS case 50% or more of the time (Wilcoxon signed-rank test)

<table>
<thead>
<tr>
<th>Case (nb of obs.)</th>
<th>Difference</th>
<th>t-stat</th>
<th>Pr (T &lt; t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>iii) $e_R^{PH_{max}} - e_R^{PH_{min}}$ (27)</td>
<td>13.37%*</td>
<td>1.63</td>
<td>5.80%</td>
</tr>
<tr>
<td>iv) $e_R^{PH_{max}} - e_R^{PH_{min}}$ (27)</td>
<td>-0.09%</td>
<td>-0.01</td>
<td>50.54%</td>
</tr>
</tbody>
</table>

c) Testing whether the median of the difference in R’s effort between specific treatments is positive when excluding the observations of the receivers accepting a low quality project in the NEG case 50% or more of the time (t-test)

<table>
<thead>
<tr>
<th>Case (nb of obs.)</th>
<th>Difference</th>
<th>z-score</th>
<th>Pr (Z &lt; z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) $e_R^{NH_{max}} - e_R^{NH_{min}}$ (27)</td>
<td>20.36%**</td>
<td>1.85</td>
<td>3.215%</td>
</tr>
<tr>
<td>ii) $e_R^{NH_{max}} - e_R^{NH_{min}}$ (28)</td>
<td>-0.75%</td>
<td>0.16</td>
<td>43.67%</td>
</tr>
</tbody>
</table>

d) Testing whether the median of the difference in R’s effort between specific treatments is positive when excluding the observations of the receivers refusing a high quality project in the POS case 50% or more of the time (Wilcoxon signed-rank test)

<table>
<thead>
<tr>
<th>Case (nb of obs.)</th>
<th>Difference</th>
<th>z-score</th>
<th>Pr (Z &lt; z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>iii) $e_R^{PH_{max}} - e_R^{PH_{min}}$ (27)</td>
<td>7.19%*</td>
<td>1.345</td>
<td>8.925%</td>
</tr>
<tr>
<td>iv) $e_R^{PH_{max}} - e_R^{PH_{min}}$ (27)</td>
<td>-3.48%</td>
<td>-0.22</td>
<td>58.56%</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

We will now explain which results significantly change when excluding the observations of the receivers whose project acceptance decisions contradict the model 50% or more of the time.

First, the difference in the mean and in the median between the treatments NHmax and NHmin is significantly positive at the 5% level (and not only at the 10% level).

Second, as predicted by the model, the difference in the mean and in the median between the treatments N|L|max and N|L|min is no longer significantly positive at the 10% level.

To conclude, the participants whose project acceptance decisions do not contradict the model tend also to be the ones whose effort varies in the same way as
5.1.2 Validity of the results

To assess whether the results about R’s effort are valid, we have tested:

1) whether S’s effort varies with the treatment;
2) whether for higher S and R’s efforts, communication is more likely to succeed;
3) whether S and R’s efforts vary with the project quality; and
4) whether there is a first session (the participants only play S’s role) and a treatment order effects on S’s effort.

1) We have first tested whether S’s effort varies with the treatment (see appendix G). If the project monetary incentives \((r_H\) and \(r_L\)) influence S’s effort, the differences in R’s effort in Table 3 might be explained by the variations in S’s effort.

By performing a one-sample t-test and a Wilcoxon signed-rank test, we have assessed that an increase in \(r_H\) of 5€ in the POS case significantly raises S’s effort at the 5% level. All the other differences in S’s effort are not significant. Therefore, these tests do neither invalidate the result that an increase in \(r_H\) in the NEG case significantly raises R’s effort, nor do they invalidate the result that an increase in \(r_L\) in the POS case significantly decreases R’s effort.

2) The communication success assumption postulates that the higher S and R’s efforts, the higher is the probability of communication success. We have therefore assessed whether for higher S and R’s efforts, R is more likely to accept a high quality project in the NEG case and to refuse a low quality project in the POS case.

In the NEG case, by performing a two-sided Wilcoxon rank-sum test, we have thus tested whether S and R’s efforts depend on whether R accepts or refuses a high quality project. Similarly, in the POS case, we have tested whether S and R’s efforts depend on whether R accepts or refuses a low quality project (see appendix H).

In the NEG case, an increase in S’s effort significantly raises R’s likelihood of accepting a high quality project at the 1% level. Moreover, R’s effort when accepting a high quality project is not significantly different from R’s effort when refusing a high quality project. This might be explained by the significant variation in S’s effort.

In the POS case, an increase in R’s effort raises significantly his likelihood of refusing a low quality project at the 5% level. Moreover, S’s effort when accepting a low quality project is not significantly different from S’s effort when refusing a low quality project.

Therefore, the results only give weak evidence that an increase in an agent’s effort raises the likelihood of communication success.
3) By performing a two-sided Wilcoxon rank-sum test, we have assessed whether S and R’s efforts vary with the project quality (see appendix I).

The median of S’s effort spent on high quality projects is not significantly different from the median of S’s effort spent on low quality projects (the p-value equals 21.67%). Therefore, we cannot reject the hypothesis that S does not develop private information when communicating.

Similarly, the median of R’s effort spent on high quality projects is not significantly different from the median of R’s effort spent on low quality projects (the p-value equals 77.78%). Therefore, we cannot reject the hypothesis that it is neither easier nor more difficult to communicate about a project of low quality than about a project of high quality.\(^9\)

4) Finally, by performing a two-sided Wilcoxon rank-sum test, we have assessed that the median of S’s effort is significantly higher when he plays in the first session than when he plays in another session at the 5% level (see appendix K).

Similarly by performing two-sided Wilcoxon rank-sum tests in appendix L, we have assessed that the medians of S and R’s efforts in the round(s) 1 (1 and 2) \([3]\) are not significantly different from their effort(s) in the round(s) 2 (3 and 4) \([4]\). Therefore, it does not invalidate our results on the prediction of R’s effort.\(^10\)

\(^9\)Moreover, we have tested, by performing a two-sided Wilcoxon rank-sum test, whether S’s effort affect the distributions of S and R’s the project quality assessments (remember that at the end of each round, each participant is asked their assessment of the project quality; see appendix I).

S and R’s quality evaluations is significantly lower, at the 5% level, when S’s effort is lower than its median than when S’s effort is higher than its median. This may either mean that (R believes that) S develops private information when communicating, or that the more S communicates, the more S and R’s quality evaluations are both positively biased.

Note also that there are roughly the same number of low and high quality projects in each treatment.

\(^10\)To get additional evidence on the prediction of R’s effort, we have also tested, by performing a two-sided Wilcoxon signed-rank test, whether the treatment affects R’s likelihood of changing his mind about the project quality (see appendix J). It is considered that R does not change his mind about the project quality if he answers 4 (“between medium and high quality”) to the project quality assessment question “on a scale from 1 to 7, do you think that the project is of high or medium quality?”, and that he does change his mind otherwise.

As predicted by the model, we have assessed that R’s probability of changing his mind is significantly higher in the treatment NHmax than in the treatment NHmin. All the other differences are not significant (the difference between \(P|L|\)max and \(P|L|\)min goes however in the same direction as predicted by the model). Therefore, these tests gives some support to the result that an increase in \(r_H\) in the NEG case significantly raises R’s effort, and do not invalidate the result that an increase in \(r_L\) in the POS case decreases R’s effort.
5.2 Prediction of R’s project acceptance decision

Table 5 shows the number of low and high quality projects accepted and refused by R.

<table>
<thead>
<tr>
<th>Number (percentage) of low quality projects</th>
<th>Accepted</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) NEG case</td>
<td>22 (30.6%)</td>
<td>50 (69.4%)</td>
</tr>
<tr>
<td>(2) POS case</td>
<td>41 (56.9%)</td>
<td>31 (43.1%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number (percentage) of high quality projects</th>
<th>Accepted</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) NEG case</td>
<td>43 (59.7%)</td>
<td>29 (40.3%)</td>
</tr>
<tr>
<td>(4) POS case</td>
<td>50 (69.4%)</td>
<td>22 (30.6%)</td>
</tr>
</tbody>
</table>

To test the prediction of R’s project acceptance decision, the receivers’ project acceptance decisions, in bold in Table 5, are compared between the NEG and POS cases.

More precisely, we compare, by performing a one-sample t-test and a Wilcoxon rank-sum test,

i) the percentage of receivers accepting a low quality project between the NEG and the POS cases;

ii) the percentage of receivers accepting a high quality project between the NEG and the POS cases.

We run these tests first with all observations and then only with the observations of the last two R rounds (we exclude the observations for which R does not have much experience in assessing the master thesis quality).

Table 6:

<table>
<thead>
<tr>
<th>Samples Compared</th>
<th>Mean Difference</th>
<th>t-stat</th>
<th>Pr (T &lt; t)</th>
<th>z-stat</th>
<th>Pr (Z &lt; z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) - (1)</td>
<td>26.4% ***</td>
<td>3.29</td>
<td>0.06%</td>
<td>3.18</td>
<td>0.075%</td>
</tr>
<tr>
<td>(4) - (3)</td>
<td>9.7%</td>
<td>1.22</td>
<td>0.1127%</td>
<td>1.215</td>
<td>0.1121%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Samples Compared</th>
<th>Mean Difference</th>
<th>t-stat</th>
<th>Pr (T &lt; t)</th>
<th>z-stat</th>
<th>Pr (Z &lt; z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) - (1) (72 obs)</td>
<td>27.78% ***</td>
<td>2.46</td>
<td>0.83%</td>
<td>2.37</td>
<td>0.85%</td>
</tr>
<tr>
<td>(4) - (3) (72 obs)</td>
<td>25.0% **</td>
<td>2.24</td>
<td>1.43%</td>
<td>2.18</td>
<td>1.48%</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.
These tests show that:

i) A low quality project is significantly less likely to be accepted by R in the NEG case than in the POS case, at the 1% level when considering all observations as well as when excluding the observations of the first two rounds.

ii) A high quality project is significantly less likely to be accepted by R in the NEG case than in the POS case, only at the 15% level when considering all observations and at the 5% level when excluding the observations of the first two rounds.

Combined with the results of R’s effort prediction (section 5.1), these results offer some evidence concerning the validity of the model, namely the two communication objectives.\textsuperscript{11}

6 Conclusion

The experiment shows evidence that, in a situation where S tries to convince R to accept a project through communication, there are two communication goals.

On the one hand, if the project yields R a negative expected revenue before communication, R tends to communicate to increase his chance of identifying and accepting a high quality project. R’s communication goal is to find out whether he would make money by accepting the project. Therefore, his communication effort is positively influenced by his gain from accepting a high quality project.

On the other hand, if the project yields R a positive expected revenue before communication, R tends to communicate to increase his chance of identifying and rejecting a low quality project. R’s communication goal is to find out whether he would lose money by accepting the project. Therefore, the higher his loss from accepting a low quality project, the higher his communication effort will be.

Finally, a direction for future research is to carry out a field experiment to test whether these results hold outside the laboratory. There are also other predictions that need to be tested to offer additional evidence about these two communication objectives, for example the impact of the probability of facing a high quality project before communication on R’s effort.

\textsuperscript{11}To get more insights on the interaction between the agents’ efforts and R’s project acceptance decision, we describe in appendix M the percentage of projects accepted for different quantiles of S and R’s efforts.
Appendixes

A Equilibria

I) The NEG equilibrium exists provided that the following conditions hold:

1) Whatever the communication efforts chosen in stages 1 and 2, R does not deviate in stage 4 to $a^F = 1$ provided that:

$$U(a^F = 0) \geq U(a^F = 1)$$

$$\Leftrightarrow p0.5r_H - C(e_R) \geq 0.5r_H + 0.5r_L(1 - p) - C(e_R) \Leftrightarrow -r_L \geq r_H$$

2) R does not deviate to $e_R = 0$ provided that R’s marginal revenue of effort is strictly positive:

$$\frac{\partial p}{\partial e_R}0.5r_H > 0 \Leftrightarrow e_S > 0$$

Recall that there are no communication setup costs, and that R’s marginal cost of effort is null if $e_R = 0$.

II) The POS equilibrium exists if the following conditions hold:

1) Whatever the communication efforts chosen in stages 1 and 2, R does not deviate in stage 4 to $a^F = 0$ provided that:

$$U(a^F = 0) \leq U(a^F = 1) \Leftrightarrow -r_L \leq r_H$$

2) R does not deviate to $e_R = 0$ provided that R’s marginal revenue of effort is strictly positive:

$$\frac{\partial p}{\partial e_R}0.5(-r_L) > 0 \Leftrightarrow e_S > 0$$

B Instructions

Let us present the instructions handed to the participants playing in a session different from the first and the last ones. Each difference with the instructions of the first and last session will be systemically detailed in a footnote. Note that the participants were given an electronic and a paper version of the instructions.
B.1 Experiment instructions

You are part of an economic experiment; note already that the amount of money you earn depends on:

- the decisions you and other participants make, and
- to some extent on luck.

It is important that you do not communicate with your neighbors throughout the experiment. If you have a question, please raise your hand, an experimenter will come to you and will answer your question privately.

Take your time to read the instructions at your own pace.

Please click on the button “next” to read the next instructions.

B.2 The basic elements of the experiment

• The experiment is played in pairs of 2 participants: a player A and a player B.

  - Player A proposes a project to player B.
  - Player B decides whether to accept or to refuse the player A’s project.

• The project compensation is the following:

  - Player A earns an amount z if player B accepts his project.
  - Player B earns an amount x if he accepts a high quality project and loses an amount y if he accepts a medium quality project.

If player B refuses the project, players A and B do not earn anything.

The experiment is played 8 times: you will first play 4 rounds the PLAYER B’s role, and then 4 rounds the PLAYER A’s role.\textsuperscript{12}

The values of the amounts x, y and z are indicated, for each experiment round, in the table in the bottom of the screen. We will remind you of these amounts before the beginning of each experiment round.\textsuperscript{13}

\textsuperscript{12}The participants of the first (last) experiment session were given the following sentence: “The experiment is played 4 times: you will play 4 rounds the PLAYER A’s (PLAYER B’s) role.”

\textsuperscript{13}The first (second) table was not presented to the participants of the first (last) experiment session.
The projects used in this experiment are master theses presented in economics and management between 2009 and 2011 at ULB. The mark of the thesis, decided by the thesis jury, determines the project effective quality. The project is of:

- **High quality** if the mark of the thesis is higher or equal to $16.5/20$;
- **Medium quality** if the mark of the thesis is lower or equal to $13/20$.

At the beginning of each experiment round, your probability of facing a high quality project is $50\%$. Putting it differently, you have 1 chance out of 2 of facing a master thesis with a grade higher or equal to $16.5/20$; and 1 chance out of 2 of facing a master thesis with a grade lower or equal to $13/20$.

You will never face a master thesis with a grade between $13.5/20$ and $16/20$, or strictly lower than $12/20$.

Your show-up fee is 10 euros. Moreover, independently of your decisions of accepting or refusing a project, your experiment compensation depends on the number of medium quality projects you face during the first 4 rounds (cf. the table in the bottom of the screen):

<table>
<thead>
<tr>
<th>Number of projects of medium quality faced during the first 4 rounds</th>
<th>Additional amount of money you earn</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$\ldots;\varepsilon$</td>
</tr>
<tr>
<td>1</td>
<td>$\ldots;\varepsilon$</td>
</tr>
<tr>
<td>2</td>
<td>$\ldots;\varepsilon$</td>
</tr>
<tr>
<td>3</td>
<td>$\ldots;\varepsilon$</td>
</tr>
<tr>
<td>4</td>
<td>$\ldots;\varepsilon$</td>
</tr>
</tbody>
</table>

The cover sheet and the acknowledgements page of each thesis have been removed to anonymize them. Moreover, some graphics and pictures in appendices have been deleted from the thesis to reduce its file size.

This additional earnings enable to compensate for the possible losses you may incur when accepting one (or several) project(s) of medium quality (when you are player B). The participants of the last experiment session were not given the last parenthesis. The participants of the first experiment session were given the following bullet point: “Whatever your actions during the experiment, your compensation is increased by $17.5\varepsilon$ for you presence.”
B.3 Your task

• Here are the experiment tasks:

  – The player A’s task is to transmit information about the thesis to player B.

  – The player B’s task is to decide whether to accept or to refuse the project based on his assessment of the master thesis (project). The experimenter tells the effective quality of the thesis only to player B and only after this player has decided whether to accept or not the project.

• The transmission of information happens as follows:

  – Player A may read any parts of the master thesis. For example, he can choose only to read the table of contents, the introduction and/or the conclusion; or to skim through the whole master thesis. At the same time, player A can write a report on the thesis for player B.

  – Player B can read the player A’s report and can also compare this report with the thesis. Player B then decides whether to accept or not the player A’s project.

• Players A and B face a time limit to complete their task.

  – The maximum time that player A can spend on a round is 20 minutes. By contrast, there is no minimum time.

  – Player B faces 2 time constraints:

    * Player B will be informed about the time player A has spent on his task. This time divided by 2 will be the time limit that player B can spend on reading the master thesis (the thesis disappears from the computer screen as soon as the time is up).

    * The maximum time that player B can spend on a project is 10 minutes.

• In addition to the other amounts of money, your earnings are increased by 5 euros\(^\text{16}\) to compensate the fact that:

  – Player A loses 1 cent per 20 seconds spent on a round/his task (reading the thesis and writing the report for player B).

\(^{16}\)Concerning the participants of the first and last experiment session, this amount is 2.5 euros instead of 5 euros.
- Player B loses 1 cent per 10 seconds spent on a project/his task (reading the report and the master thesis, and deciding whether to accept or refuse the project).

B.4 Experiment timing and last details

- Before the experiment,
  - You have to answer some short questions to ensure that you understand the experiment instructions. Your answers to this questionnaire do not affect your compensation.
  - You will then simulate 4 rounds: 3 rounds as player B (the 3 player A’s reports have been written by PhD students having tested the experiment) and one round as player A.

Your actions during this simulation will not affect your earnings, but it will ensure that you understand how the experiment works.

The maximum time you can spend on each round of the simulation is 10 minutes.

Contrary to the experiment, the theses you face during the simulation are not randomly drawn, every participant will face the same projects: two theses of high quality followed by 2 theses of medium quality.

We will remind it to you by telling you the effective quality of the 2 previous projects at the end of the second and fourth rounds of this simulation.

This simulation will help you to understand what differentiate a high quality project from a medium quality project.

- The experiment is then played 8 times.\(^{17}\)

  - During the first part of the experiment, you will play 4 rounds the player B’s role. In each round, you will evaluate a thesis by reading the report written by a player A of the previous experiment session. It is therefore not a student sitting currently in this room.

The composition of your pair does not change during these 4 rounds: you will play with the same participant.

You will be informed about the effective quality of the two previous projects at the end of the second and of the fourth round.\(^{18}\)

\(^{17}\)The participants of the first and of the last experiment session were given the following sentence: “The experiment is then played 4 times.”

\(^{18}\)The participants of the first experiment session were not given this bullet point. The part of
Between the first and the second part of the experiment, you will answer some short questions to ensure that you remember the player A’s instructions.¹⁹

During the second part of the experiment, you will play 4 rounds the player A’s role. In each of these 4 rounds, you can write a report concerning the project that a player B of the next experiment session will appraise.²⁰

The composition of your group does not change during these 4 rounds: you will play with the same participant.

- After the experiment, you will complete a short questionnaire.

- The composition of your two pairs (the one you form with player A during the first 4 rounds and the one you form with player B during the last 4 rounds) is anonymous. You will not get to know the identities of your two partners neither during nor after the experiment. Your two other partners will also not get to know your identity.²¹

- The 8 rounds are independent.²² There is no link between one round and another: for example, if you face a medium quality project during the first round, your probability of facing a high quality project during the next round is still 50%.

- You will get your experiment compensation by cash whenever you want from Tuesday April 24 to Friday April 27, between 10h and 18h30. We will remind you the details (place and dates) at the end of the experiment.

- Finally, we will ask you at the end of each round the question “On a scale from 1 to 7, do you think that the project is of high or medium quality?”²³

Your answer to this question does not affect your compensation and will not

---

¹⁹ The participants of the first and last experiment session were not given this paragraph.

²⁰ The participants of the last experiment session were not given this paragraph. The part of the sentence “During the second part of the experiment,” has been removed from the instructions of the participants of the first experiment session.

²¹ The participants of the first [last] experiment session were given the following paragraph: “The composition of your pair (the one you form with player B [A]) is anonymous. You will not get to know the identity of your partner neither during nor after the experiment. Your partner will also not get to know your identity.”

²² The participants of the first and last experiment session were given the following sentence: “The 4 rounds are independent.”

²³ The possible answers are: no opinion (0) - of medium quality with certainty (1) - very probably of medium quality with certainty (2) - probably of medium quality with certainty (3) - between medium and high quality (4) - probably of high quality with certainty (4) - very probably of high quality with certainty (6) - of high quality with certainty (7).
be transmitted to any participants; besides you are not obliged to answer. Nevertheless, your answer will enable the experimenter to better interpret the experiment results.

If you are done reading the instructions and that you do not have any questions, please click on the button “Next”.

C Player A’s control questionnaire

The objective of this questionnaire is to ensure that every participant of the experiment remember the instructions of the next 4 rounds.

Your answers to this questionnaire do not affect your earnings of the experiment.

Please select the correct answers. If one or several of your answers are wrong, the experimenter will explain why and will ensure by another exercise that you understand the experiment.

During the next 4; 6 or 8 rounds, you will be the player A or B.

In each round, you will propose a project to the player B of your pair. This player will have to decide whether to accept or refuse your project. To help him with that task, you dispose of the thesis and may write a report to the player B concerning this thesis.

As a reminder, here is your payoff table of the next 4 rounds:

<table>
<thead>
<tr>
<th>Round</th>
<th>Amount you win if player B accepts your project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 €</td>
</tr>
<tr>
<td>2</td>
<td>6 €</td>
</tr>
<tr>
<td>3</td>
<td>6 €</td>
</tr>
<tr>
<td>4</td>
<td>6 €</td>
</tr>
</tbody>
</table>

As a reminder, here is the player B’s payoff table of the next 4 rounds:

<table>
<thead>
<tr>
<th>Round</th>
<th>Amount earned by the player B if he accepts a project of high quality</th>
<th>Amount lost by the player B if he accepts a project of medium quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>2</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>3</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>4</td>
<td>...€</td>
<td>...€</td>
</tr>
</tbody>
</table>
As a reminder, you lose 1 cent per 20 seconds spent on a project.

Imagine that you spend 10 minutes (600 seconds) in the next round. This time spent on the project of the next round raises or decreases your experiment compensation by 0; 0.15; 0.3; 0.6; 1.5; 6; other € and enables the player B to dispose of the thesis during 300; 600; 1200 seconds.

- If the project in the next round is of high quality and if the player B of your pair accepts it, this decision raises or decreases your experiment compensation by 0; 1; 3; 4; 5; 6; 7; 8; 10; 12; 13; 14; other €.
- If the project in the next round is of medium quality and if the player B of your pair accepts it, this decision raises or decreases your experiment compensation by 0; 1; 3; 4; 5; 6; 7; 8; 10; 12; 13; 14; other €.
- If the project in the next round is of high quality and if the player B of your pair refuses it, this decision raises or decreases your experiment compensation by 0; 1; 3; 4; 5; 6; 7; 8; 10; 12; 13; 14; other €.
- If the project in the next round is of medium quality and if the player B of your pair refuses it, this decision raises or decreases your experiment compensation by 0; 1; 3; 4; 5; 6; 7; 8; 10; 12; 13; 14; other €.

D Player B’s control questionnaire

This questionnaire objective is to ensure that every participant of the experiment understand the instructions of the next 4 rounds.

Your answers to this questionnaire do not affect your experiment compensation.

Please select the correct answers. If one of your answers is wrong, the experimenter will explain why and will ensure by another exercise that you understand the experiment.

During the next 4; 6 or 8 rounds, you will be player A or B.

A project is of:

- High or medium quality if the grade of the master thesis is higher or equal to 16.5/20.
- High or medium quality if the grade of the master thesis is lower or equal to 13/20.

To help you decide whether to accept or refuse the project, you will get the report or master thesis written by player A.
You will also be informed during each round of the time spent by player A on the project. This time divided by 2 will be the time limit during which you can read the report or the thesis during the round.

For example, if you have been informed in the first round that player A has spent 1000 seconds (16 minutes and 4 seconds) on the project (reading the thesis and writing the report), you will dispose of the thesis in this first round during 500; 1000 or 2500 seconds to compare it with the report.

If you are at the end of the second or first; third; fourth or fifth round, you will be informed at that time about the quality of the 2 previous projects; about the title of the 2 previous theses; about the player A’s first and last names; or about the content of the player A’s report.

As a reminder, here is your table of revenues for the first 4 experiment rounds:

<table>
<thead>
<tr>
<th>Round</th>
<th>Amount won if you accept a high quality project</th>
<th>Amount lost if you accept a medium quality project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>2</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>3</td>
<td>...€</td>
<td>...€</td>
</tr>
<tr>
<td>4</td>
<td>...€</td>
<td>...€</td>
</tr>
</tbody>
</table>

As a reminder, you lose 1 cent per 10 seconds spent on a project. The time limit is 10 minutes per round.

As a reminder, your experiment earnings depends also on the number of medium quality projects that you face during the first 4 rounds:

<table>
<thead>
<tr>
<th>Number of projects of medium quality during the first 4 rounds</th>
<th>Additional amount of money won</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>... €</td>
</tr>
<tr>
<td>1</td>
<td>... €</td>
</tr>
<tr>
<td>2</td>
<td>... €</td>
</tr>
<tr>
<td>3</td>
<td>... €</td>
</tr>
<tr>
<td>4</td>
<td>... €</td>
</tr>
</tbody>
</table>

The player A’s compensation of your pair (a participant of the previous experiment session) is increased by 6€ for each project you accept or refuse.
Imagine that you have spent 200 seconds during the third round. This time spent on the third project raise or decrease your experiment compensation by 0; 0,1; 0,2; 0,4; 1; 2; 4 €.

- If the project of the third round is of high quality and if you accept it, this decision raise or decrease your experiment compensation by 0; 1; 3; 4; 6; 7; 9; 10; 12; 13; 14 €.
- If the project of the third round is of medium quality and if you accept it, this decision raise or decrease your experiment compensation by 0; 1; 3; 4; 6; 7; 9; 10; 12; 13; 14 €.
- If the project of the third round is of high quality and if you refuse it, this decision raise or decrease your experiment compensation by 0; 1; 3; 4; 6; 7; 9; 10; 12; 13; 14 €.
- If the project of the third round is of medium quality and if you refuse it, this decision raise or decrease your experiment compensation by 0; 1; 3; 4; 6; 7; 9; 10; 12; 13; 14 €.

Independently of your decisions of accepting or refusing a project, your experiment compensation depends also on the number of medium or high quality projects you face during the first 4 rounds.

For example, if you face 3 projects of medium quality during the first 4 experiment rounds, your experiment compensation are increased or decreased by 0; 6; 10; 13; 14; 15; 23; 33; 40 €.

E Post-experiment questionnaire

Please be assured that your decisions will be treated anonymously; we only need your last and first names, your home address and your national registration number to be able to pay you.

- Your last and first names:
- Your home address (number, street, zip code, town):
- Your national registration number:

Please answer (even briefly) the following questions that should enable us to better understand the experiment results.
We are asking you to make a last decision that affects your compensation and that of another participant (this is neither the player A nor the player B with whom you have already interacted, nor a participant of this experiment session).

You receive 3 € from the experimenter. You have to decide how much of these 3 € you give to another participant knowing that the experimenter will double the amount given to this other participant.

Example 1: if you keep 2.5 € and give 0.5 € to the other participant, your experiment compensation is increased by 2.5 € and that of the other participant is increased by 1 €.

Example 2: if you keep 1 € and give 2 € to the other participant, your experiment compensation is increased by 1 € and that of the other participant is increased by 4 €.

Those rules are the same for every participant of the experiment.

You will therefore also receive an amount of money that depends on another participant’s decision: your experiment compensation is increased by the amount he gives you multiplied by 2. This other participant is different from the one to whom you can give a share of the 3 €.

⇒ From these 3 €, you decide to give choice between 0 and 3 € with maximum one decimal € to the other participant.

- Sex: F; M
- Age:
- Studies and year of studies:
- Score on 20 of your academic grades during the year 2010-2011:
  - What is the average amount of pocket money you receive each month (without taking into account July/August)? No opinion; between 0 and 20 €; between 21 and 50 €; between 51 and 100 €; between 101 and 200 €; between 201 and 500 €; more than 500 €
  - What is the average amount of money you earn through work (without taking into account July/August/September)? No opinion; between 0 and 50 €; between 51 and 200 €; between 201 and 500 €; between 501 and 1500 €; more than 1500 €
- Did you feel weariness during this experiment? Yes; no; no opinion
  - If so, when?
• When you were player B, during which round(s) have you had the feeling that the content of the player A’s report was false?24
  
  – Round 1: Yes; no; no opinion
  – Round 2: Yes; no; no opinion
  – Round 3: Yes; no; no opinion
  – Round 4: Yes; no; no opinion
  – Comment:

• When you were player B, have you had negative/positive feelings towards your partner concerning the way he wrote his 4 reports? Positive; negative; no opinion
  
  Comment:

• When you were player B, on what did you base your assessment of the thesis? Entirely on the report; more on the report than on the thesis; as much on the report as on the thesis; more on the thesis than on the report; entirely on the thesis; neither the thesis nor the report; no opinion

• What did you read in general in the thesis (the table of contents, the executive summary, the introduction, the conclusion, the case study, the econometric/statistical analysis - all the thesis diagonally)?

• Did you have the feeling that some theses were more difficult to assess than others? Yes; no; no opinion
  
  If so, which ones?

F Project and treatment allocations

In the experiment, 8 projects of high quality (noted H1, H2, H3, H4, H5, H6, H7 and H8) and 8 projects of low quality (noted L1, L2, L3, L4, L5, L6, L7 and L8) were used.

To better explain the procedures of this experiment, let me present the project and treatment allocations of the 8 first participants (noted subjects 1 to 8, see Table 7) and of the participants who were matched with them when playing R’s role (noted subjects a to h, see Table 8).

24Note that the participants of the first experiment session were not asked this question as well as the next 2 ones.
Table 7:
Project allocation of the 12 first participants (playing only S’s role)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Rounds</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>H1</td>
<td>H2</td>
<td>L3</td>
<td>H4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>H1</td>
<td>L2</td>
<td>H3</td>
<td>L4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>L1</td>
<td>H2</td>
<td>L3</td>
<td>L4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>L1</td>
<td>L2</td>
<td>H3</td>
<td>H4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>H5</td>
<td>H6</td>
<td>H7</td>
<td>L8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>H5</td>
<td>L6</td>
<td>L7</td>
<td>H8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>L5</td>
<td>H6</td>
<td>L7</td>
<td>L8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>L5</td>
<td>L6</td>
<td>H7</td>
<td>H8</td>
<td></td>
</tr>
</tbody>
</table>

Treatment allocation of the 12 first participants (playing only S’s role)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Rounds</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1 to 4</td>
<td>NHmin</td>
<td>NHmax</td>
<td>N</td>
<td>L</td>
</tr>
<tr>
<td>5 to 8</td>
<td>P</td>
<td>L</td>
<td>max</td>
<td>P</td>
</tr>
</tbody>
</table>

For example, the subject 8 faces 2 projects of low quality in the first two rounds (with treatment P|L|min in the first round and treatment P|L|max in the second round) and 2 projects of high quality in the last two rounds (with treatment PHmin in the third round and treatment PHmax in the last round).

Table 8:
Project allocation of the participants matched with the 12 first participants

<table>
<thead>
<tr>
<th>Subject</th>
<th>R’s role</th>
<th>S’s role</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rounds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1  2  3  4</td>
<td>1  2  3  4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>H1  H2  L3  H4</td>
<td>L5  L6  L7  L8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>H1  L2  L3  L4</td>
<td>H5  L6  H7  H8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>L1  H2  L3  L4</td>
<td>H5  H6  H7  L8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>L1  L2  H3  L4</td>
<td>L5  H6  L7  H8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>H5  H6  H7  L8</td>
<td>H1  L2  L3  L4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>H5  L6  L7  H8</td>
<td>L1  L2  H3  H4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>L5  H6  L7  L8</td>
<td>H1  H2  H3  L4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>L5  L6  H7  H8</td>
<td>L1  H2  L3  H4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Treatment allocation of the participants matched with the 12 first participants when playing S’s role

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Rounds</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>a to d</td>
<td>N</td>
<td>L</td>
<td>max</td>
<td>N</td>
</tr>
<tr>
<td>e to h</td>
<td>P</td>
<td>L</td>
<td>max</td>
<td>P</td>
</tr>
</tbody>
</table>

In the first 4 rounds, subjects a to h were matched with subjects 1 to 8.

In a session, every 4 participants face the same treatments in the same order. During the first 2 rounds, each of these 4 participants faces one of the 4 possible combinations of quality in the project allocation: one participant faces 2 low quality
projects, one faces two high quality projects, one faces a project of high quality before one of low quality, and one participant faces a project of low quality before one of high quality.

The same holds for the last 2 rounds: each of these 4 participants faces one of the 4 possible combinations of quality in the project allocation; but not necessarily the same as in the first two rounds: this has been chosen randomly.

Moreover, a project was associated with a specific round; for example, the project H3 was always played in round 3.

Except for treatments NHmin and NHmax, there were as many observations with high quality projects as observations with low quality projects. In the treatment NHmin (36 observations), there were 17 projects of high quality and 19 projects of low quality. In the treatment NHmax, there were 19 projects of high quality and 17 projects of low quality.

Among the 72 receivers, there were:
- 2 receivers who faced 4 projects of high quality (and no project of low quality);
- 18 receivers who faced 3 projects of high quality (and 1 project of low quality);
- 33 receivers who faced 2 projects of high quality (and 2 projects of low quality);
- 16 receivers who faced 1 project of high quality (and 3 projects of low quality);
and
- 3 receivers who faced no project of high quality (and 4 projects of low quality).

Finally, let us describe the number of observations for each treatment depending on the round.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Round</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHmin</td>
<td></td>
<td>13</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>NHmax</td>
<td></td>
<td>7</td>
<td>13</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>N</td>
<td>L</td>
<td>min</td>
<td></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>N</td>
<td>L</td>
<td>max</td>
<td></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>P</td>
<td>L</td>
<td>min</td>
<td></td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>P</td>
<td>L</td>
<td>max</td>
<td></td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>PHmin</td>
<td></td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>PHmax</td>
<td></td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

For example, there are 12 projects played with the treatment PHmin in round 3,
i.e. 12 receivers played the treatment P|L|min in the first round and the treatment P|L|max in the second round. Except for the treatments NHmin and NHmax, note that these numbers of observations are all multiples of 4 (the exceptions are due to an encoding error). This is explained by the following treatment and project allocation procedure: every 4 participants face the same treatments in the same order.

G Difference in S’s effort between different treatments

We are going to consider the difference in S’s effort for a same sender in the following cases: i) $e_S^{NH_{max}} - e_S^{NH_{min}}$ (the difference in S’s effort between the treatments NHmax and NHmin); ii) $e_S^{NL_{max}} - e_S^{NL_{min}}$; iii) $e_S^{PL_{max}} - e_S^{PL_{min}}$; iv) $e_S^{PH_{max}} - e_S^{PH_{min}}$.

We performed two one-sided tests:

a) a one-sample t-test to assess whether the mean of the difference in S’s effort concerning the cases i to iv is positive; and

b) a Wilcoxon signed-rank test to assess whether the median of the difference in S’s effort concerning the 4 cases is positive.

| Table 10: a) Testing whether the mean of the difference in S’s effort between specific treatments is positive (t-test) |
|-----------------|----------------|-----------------|
| Case (nb of obs) | Difference | t-stat | Pr (T < t) |
| i) $e_S^{NH_{max}} - e_S^{NH_{min}}$ (36) | 9 | 0.49 | 31.37% |
| ii) $e_S^{NL_{max}} - e_S^{NL_{min}}$ (36) | 4 | 0.20 | 42.32% |
| iii) $e_S^{PL_{max}} - e_S^{PL_{min}}$ (36) | 11 | 0.46 | 32.24% |
| iv) $e_S^{PH_{max}} - e_S^{PH_{min}}$ (36) | 32** | 1.87 | 3.46% |

| Table 10: b) Testing whether the median of the difference in S’s effort between specific treatments is positive (Wilcoxon signed-rank test) |
|-----------------|----------------|-----------------|
| Case (nb of obs) | Difference | z-score | Pr (Z < z) |
| i) $e_S^{NH_{max}} - e_S^{NH_{min}}$ (36) | 10.5 | 0.78 | 21.83% |
| ii) $e_S^{NL_{max}} - e_S^{NL_{min}}$ (36) | 4.5 | 0.629 | 26.48% |
| iii) $e_S^{PL_{max}} - e_S^{PL_{min}}$ (36) | -1 | -0.02 | 99.37% |
| iv) $e_S^{PH_{max}} - e_S^{PH_{min}}$ (36) | 24.5** | 1.74 | 4.13% |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

S spends on average 32 seconds more in treatment PH_{max} than in treatment PH_{min}. This difference is significant at the 5% level, this is also verified for the median. All other differences are not significant.
Let us test the communication success assumption.

By performing a two-sided Wilcoxon rank-sum test, we have tested whether:

a) in the NEG case, the median of S’s (R’s) effort when R accepts a high quality project is higher than the one when R refuses a high quality project; and whether

b) in the POS case, the median of S’s (R’s) effort when R accepts a low quality project is lower than the one when he refuses a low quality project.

| Role | Median of the effort when the high quality project is a) refused (nb. of obs.) | b) accepted (nb. of obs.) | Difference b - a | Prediction | z-score | Pr (Z < |z|) |
|------|-------------------------------------------------|--------------------------|-------------------|------------|---------|---------|
| S    | 289 (29)                                        | 484 (43)                 | 195***            | +          | 2.69    | 0.71%   |
| R    | 106% (29)                                       | 88% (43)                 | -18%              | +          | -1.47   | 14.01%  |

**Table 11:**

| Role | Median of the effort when the high quality project is a) refused (nb. of obs.) | b) accepted (nb. of obs.) | Difference b - a | Prediction | z-score | Pr (Z < |z|) |
|------|-------------------------------------------------|--------------------------|-------------------|------------|---------|---------|
| S    | 258 (31)                                        | 274 (41)                 | 16                | -          | 1.28    | 20.07%  |
| R    | 104% (28)                                       | 83% (36)                 | -20%**            | -          | -1.96   | 4.97%   |

*** Significant at the 1% level.

** Significant at the 5% level.

* Significant at the 10% level.

In the NEG case, the median of S’s effort is almost 2 times higher when R accepts a high quality project than when R refuses a high quality project. This difference is significant at the 1% level and confirms the model assumption. Nevertheless, the difference in R’s effort is insignificant and positive; this might be explained by the significant variation in S’s effort.

In the POS case, the difference in the median of S’s effort between the low quality projects accepted by R and those refused by R is insignificant and positive.25 On the contrary, as predicted by the model, the difference in the median of R’s effort is negative and significant at the 5% level.

If we exclude the observations in which S has spent less than 60 seconds, the difference is positive and significant at the 10% level.
I  Variation of S and R’s efforts with the project quality

By performing a two-sided Wilcoxon rank-sum test, we have tested whether the medians of S and R’s efforts concerning high quality projects are different from the ones concerning low quality projects (with all the observations, and separately in the NEG and POS cases).

| Case | Median of S’s effort when the project is of a) low quality (nb. of obs.) | Median of S’s effort when the project is of b) high quality (nb. of obs.) | Difference b - a | z-score | Pr (Z < |z|) |
|------|--------------------------------------------------|-----------------------------------------------------------------|-----------------|--------|-----------|
| NEG  | 312 (72)                                         | 325 (72)                                                       | 13              | 0.66   | 51.10%    |
| POS  | 268 (72)                                         | 287 (72)                                                       | 19              | 1.08   | 27.80%    |
| All  | 284 (144)                                        | 306 (144)                                                     | 22              | 1.23   | 21.67%    |

| Case | Median of R’s effort when the project is of a) low quality (nb. of obs.) | Median of R’s effort when the project is of b) high quality (nb. of obs.) | Difference b - a | z-score | Pr (Z < |z|) |
|------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------------|--------|-----------|
| NEG  | 96% (69)                                                       | 90% (72)                                                       | -6%             | -0.02  | 98.35%    |
| POS  | 102% (64)                                                      | 100% (67)                                                      | -3%             | -0.36  | 71.95%    |
| All  | 99% (133)                                                      | 96% (139)                                                      | -3%             | -0.28  | 77.78%    |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

None of these differences in S and R’s efforts between high quality and low quality projects are significant. Therefore, nor can we reject the hypothesis that S does not develop private information when communicating, nor can we reject the hypothesis that it is neither easier nor more difficult to communicate about a low quality project than about a high quality project.

To get additional evidence on whether (R believes that) S develops private information when communicating, let me define a new variable about R’s subjective project quality assessment. At the end of each round, the participant is asked the following project quality evaluation question: “on a scale from 1 to 7, do you think that the project is of high or medium quality?”. R’s quality evaluation variable
equals:
- 1 if R has answered “of medium quality with certainty” to this question;
- 2 if R has answered “very probably of medium quality”;
- 3 if R has answered “probably of medium quality”;
- 4 if R has answered “between medium and high quality”;
- 5 if R has answered “probably of high quality”;
- 6 if R has answered “very probably of high quality”; and
- 7 if R has answered “of high quality with certainty”. All the observations for which R has answered “no opinion” have been excluded when using this variable.

By performing a two-sided Wilcoxon rank-sum test, we are going to compare S and R’s project quality evaluations when S’s effort is lower than its median ($\tilde{e}_S$) and otherwise.

Table 13:

| Case (\(\hat{e}_S\)) | Mean of R’s quality evaluation when \(e_S\) | Difference | z-score | Pr (\(Z < |z|\)) |
|----------------------|-----------------------------------------|------------|---------|----------------|
|                      | a) \(\leq \hat{e}_S\) (nb. of obs.) | b) \(> \hat{e}_S\) (nb. of obs.) | b - a score (Z) | \(|z|\) | \(\%\) |
| NEG (322)            | 4.1 (67)                                | 4.5 (67)   | 0.4*    | 1.68 | 9.30% |
| POS (284.5)          | 4.2 (62)                                | 4.5 (63)   | 0.3     | 1.20 | 23.19%|
| All (297)            | 4.1 (129)                               | 4.5 (130)  | 0.4**   | 2.55 | 1.09% |

| Case (\(\hat{e}_S\)) | Mean of S’s quality evaluation when \(e_S\) | Difference | z-score | Pr (\(Z < |z|\)) |
|----------------------|-----------------------------------------|------------|---------|----------------|
|                      | a) \(\leq \hat{e}_S\) (nb. of obs.) | b) \(> \hat{e}_S\) (nb. of obs.) | b - a score (Z) | \(|z|\) | \(\%\) |
| NEG (330)            | 4.6 (66)                                | 4.9 (66)   | 0.3     | 1.21 | 22.7% |
| POS (286)            | 4.3 (67)                                | 4.8 (65)   | 0.4*    | 1.95 | 5.16% |
| All (297)            | 4.5 (133)                               | 4.9 (131)  | 0.4**   | 2.49 | 1.26% |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

S and R’s project quality evaluations are both significantly lower, at the 5% level, when S’s effort is lower than its median than when S’s effort is higher than its median. This may either mean that (R believes that) S develops private information when communicating, or that the more S communicates, the more S and R’s project quality evaluations are both positively biased.
J Variation of the project quality assessment with the treatment

To get additional evidence on the prediction of R’s effort, let me assess whether R’s likelihood of changing his mind about the project quality depends on the treatment.

To do so, let me define the new R’s opinion change variable $oc_R$: I consider that R changes his mind about the project quality and that this variable equals 1 if R’s subjective project quality assessment (defined in the precedent appendix) is different from 4 (R has answered “between medium and high quality” to the *project quality evaluation* question), and that it equals 0 otherwise. All the observations for which R has answered “no opinion” and/or for which S’s effort is lower than 60 seconds have been excluded. The mean of this variable equals 0.79, which means that R changes on average 79% of the time his mind about the project quality.

We are going to consider the difference in R’s opinion change for a same receiver between the following treatments: i) $oc_{R}^{NH\text{max}} - oc_{R}^{NH\text{min}}$; ii) $oc_{R}^{NL\text{max}} - oc_{R}^{NL\text{min}}$; iii) $oc_{R}^{PL\text{max}} - oc_{R}^{PL\text{min}}$; iv) $oc_{R}^{PH\text{max}} - oc_{R}^{PH\text{min}}$.

We performed a two-sided Wilcoxon signed-rank test to assess whether the distribution of R’s opinion change varies with the treatment.

| Case (nb of obs) | Difference | z-score | Pr (Z < |z|) |
|----------------|------------|---------|-------------|
| i) $oc_{R}^{NH\text{max}} - oc_{R}^{NH\text{min}}$ (29) | 24.14%** | 2.33 | 1.96% |
| ii) $oc_{R}^{NL\text{max}} - oc_{R}^{NL\text{min}}$ (32) | -15.625% | -1.39 | 16.55% |
| iii) $oc_{R}^{PL\text{max}} - oc_{R}^{PL\text{min}}$ (25) | 12.00% | 1.00 | 31.73% |
| iv) $oc_{R}^{PH\text{max}} - oc_{R}^{PH\text{min}}$ (29) | -3.45% | -0.38 | 70.55% |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

As predicted by the model, R is 24 percentage points more likely to change his mind about the project quality in the NHmax treatment than in the NHmin one, this difference is significant at the 5% level.

As predicted, there is no significant difference between the treatments NLmax and NLmin as well as between the treatments PHmax and PHmin.

Even if the difference in R’s likelihood of changing his mind between the treatments PLmax and PLmin goes in the same direction as predicted by the model, that difference is not significant.
K  First session impact on S’s effort

By performing a two-sided Wilcoxon rank-sum test, we have tested whether the median of S’s effort in the first experiment session is significantly different from the one in the other sessions.

| Case | S’s effort when he plays in the first session (nb. of obs.) | Difference a - b | z-score | Pr (Z < |z|) |
|------|----------------------------------------------------------|------------------|---------|------------|
| NEG  | 440 (20)                                                 | 112*             | 1.82    | 6.83%      |
| POS  | 347.5 (28)                                               | 69.5             | 1.48    | 13.83%     |
| All  | 347.5 (48)                                               | 47.5**           | 2.03    | 4.23%      |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

S’s effort when he plays in the first session is significantly higher than when he plays in another session at the 5% level. This is mainly explained by the observations in the NEG case.

If the observations for which S does not communicate (S’s effort is lower than 60 seconds) are not excluded, the difference in S’s effort between the observations for which S plays in the first session and the other observations is not significant anymore.

L  Round impact on S’s effort

By performing two-sided Wilcoxon rank-sum tests, we have tested whether:

a) the medians of S and R’s efforts in the first two rounds are significantly different from the ones in the last two rounds;

b) the medians of S and R’s efforts in the first round are significantly different from the ones in the second round; and

c) the medians of S and R’s efforts in the third round are significantly different from the ones in the fourth round.
Table 16:
a) Test of the difference in S and R’s efforts between the first 2 rounds and the last 2 rounds (two-sided Wilcoxon rank-sum test)

| Role | Effort in the rounds | Difference - a - b | z-score | Pr (Z < |z|) |
|------|----------------------|-------------------|---------|----------|
|      | a) 1 and 2 (nb. of obs.) | b) 3 and 4 (nb. of obs.) |          |          |
| S    | 302.5 (144)          | 289 (144)         | 13.5    | 0.08     | 93.46%   |
| R    | 92.5% (136)          | 99.4% (136)       | -6.9%   | -0.18    | 85.63%   |

b) Test of the difference in S and R’s efforts between rounds 1 and 2 (two-sided Wilcoxon rank-sum test)

| Role | Effort in the round | Difference - a - b | z-score | Pr (Z < |z|) |
|------|---------------------|-------------------|---------|----------|
|      | a) 1 (nb. of obs.)  | b) 2 (nb. of obs.) |          |          |
| S    | 306.5 (72)          | 292 (72)          | 14.5    | 0.835    | 40.37%   |
| R    | 89.0% (68)          | 92.6% (69)        | -3.6%   | -0.29    | 77.30%   |

c) Test of the difference in S and R’s efforts between rounds 3 and 4 (two-sided Wilcoxon rank-sum test)

| Role | Effort in the round | Difference - a - b | z-score | Pr (Z < |z|) |
|------|---------------------|-------------------|---------|----------|
|      | a) 3 (nb. of obs.)  | b) 4 (nb. of obs.) |          |          |
| S    | 285.5 (72)          | 297.5 (72)        | -12     | -0.52    | 60.35%   |
| R    | 102.8% (68)         | 91.2% (67)        | 11.6%   | 1.55     | 12.14%   |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

None of these differences are significant. Nevertheless, if we had performed one-sided Wilcoxon rank-sum tests, the median of R’s effort in round 3 would be significantly higher than in round 4 at the 10% level.

M Percentage of projects accepted for different quantiles of S and R’s efforts

Let us describe the percentage of projects accepted for different quantiles of S’s effort (the different quartiles of S’s effort and the observations for which S does not communicate, i.e. S spends less than 60 seconds during the round) in Table 17, and for the different quartiles of R’s effort in Table 18.
Table 17:
A. Percentage of projects accepted for different quantiles of S’s efforts in the NEG case (number of observations)

<table>
<thead>
<tr>
<th>$e_s$</th>
<th>60</th>
<th>60 &lt; $e_s$ ≤ 220</th>
<th>220 &lt; $e_s$ ≤ 322</th>
<th>322 &lt; $e_s$ ≤ 472</th>
<th>$e_s$ &gt; 472</th>
</tr>
</thead>
<tbody>
<tr>
<td>33% (3)</td>
<td>27% (33)</td>
<td>43% (37)</td>
<td>46% (35)</td>
<td>64% (36)</td>
<td></td>
</tr>
</tbody>
</table>

B. Percentage of receivers accepting the project for different quantiles of S’s efforts in the POS case (number of observations)

<table>
<thead>
<tr>
<th>$e_s$</th>
<th>60</th>
<th>60 &lt; $e_s$ ≤ 190</th>
<th>190 &lt; $e_s$ ≤ 276</th>
<th>276 &lt; $e_s$ ≤ 384.5</th>
<th>$e_s$ &gt; 384.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>69% (13)</td>
<td>43% (23)</td>
<td>61% (36)</td>
<td>69% (36)</td>
<td>69% (36)</td>
<td></td>
</tr>
</tbody>
</table>

In both the NEG and the POS case, the higher the quartile of S’s effort, the higher is the percentage of projects accepted. Nevertheless, in the POS case, even if there is only few observations, the percentage of projects accepted when S does not communicate ($e_s \leq 60$) is the same as when S’s effort is higher than its median ($276 < e_s$).

Table 18:
A. Percentage of projects accepted for the different quartiles of R’s efforts in the NEG case (number of observations)

<table>
<thead>
<tr>
<th>$e_r$</th>
<th>60%</th>
<th>60% &lt; $e_r$ ≤ 93%</th>
<th>93% &lt; $e_r$ ≤ 116%</th>
<th>$e_r$ &gt; 116%</th>
</tr>
</thead>
<tbody>
<tr>
<td>46% (35)</td>
<td>57% (35)</td>
<td>42% (36)</td>
<td>37% (35)</td>
<td></td>
</tr>
</tbody>
</table>

B. Percentage of receivers accepting the project for different quantiles of R’s efforts in the POS case (number of observations)

<table>
<thead>
<tr>
<th>$e_r$</th>
<th>67%</th>
<th>67% &lt; $e_r$ ≤ 102%</th>
<th>102% &lt; $e_r$ ≤ 110%</th>
<th>$e_r$ &gt; 110%</th>
</tr>
</thead>
<tbody>
<tr>
<td>73% (33)</td>
<td>64% (33)</td>
<td>56% (32)</td>
<td>58% (33)</td>
<td></td>
</tr>
</tbody>
</table>

The percentage of projects accepted in the NEG case decreases between the second and the third quartiles of S’s effort. Contrary to the second quartile, R may have exceeded the time limit for reading the master thesis in the third quartile (the impact of R exceeding that time limit on his decision to accept the project is studied in appendix N).

In the POS case, except for the fourth quartile of R’s effort, the higher the quartile of R’s effort, the lower the percentage of projects accepted by R.

N The impact of R exceeding the time limit for reading the master thesis on his decision to accept a project

By performing a two-sided Wilcoxon rank-sum test, let us compare the percentage of projects accepted when R has exceeded the limit of time allowed to read the master thesis (i.e. R’s effort is strictly higher than 1) or when R has not exceeded that limit.
(i.e. R’s effort is lower than 1); we discuss the NEG and POS cases separately.

Table 19:
A) Test of the difference in the percentage of projects accepted when R’s effort is strictly higher than 1 and when it is lower than 1 (two-sided Wilcoxon rank-sum test)

| Case | Percentage of projects accepted when R’s effort is | Difference - | z-score | Pr (Z < |z|) |
|------|--------------------------------------------------|--------------|---------|-------------|
|      | a) > 1 (nb. of obs.) | b) ≤ 1 (nb. of obs.) | b - a |              |
| NEG  | 39% (62) | 51% (79) | 12% | 1.41 | 15.96% |
| POS  | 57% (67) | 69% (64) | 12% | 1.42 | 15.64% |
| All  | 48% (129) | 59% (143) | 11%* | 1.76 | 7.83% |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

The percentage of projects accepted when R’s effort is lower than 1 (i.e. R has not exceeded the limit of time allowed to read the master thesis) is significantly higher of 11 percentage points (at the 10% level) than when R’s effort is strictly higher than 1. In the NEG case, this difference can be explained by a higher percentage of communication failures: S’s effort is significantly higher in the former case than in the latter at the 1% level (see Table 20).

This explanation does not hold in the POS case, otherwise R would be more likely to accept the project when his effort is strictly higher than 1. The difference might be explained by R’s frustration of not being allowed to read the master thesis longer.

Table 20:
B) Test of the difference in the median of S’s effort when R’s effort is strictly higher than 1 and when it is lower than 1 (two-sided Wilcoxon rank-sum test)

| Case | S’s effort when R’s effort is | Difference - | z-score | Pr (Z < |z|) |
|------|-------------------------------|--------------|---------|-------------|
|      | a) > 1 (nb. of obs.) | b) ≤ 1 (nb. of obs.) | b - a |              |
| NEG  | 248.5 (62) | 409 (79) | 160.5*** | 5.93 | < 0.01% |
| POS  | 241 (67) | 372.5 (64) | 131.5*** | 5.53 | < 0.01% |
| All  | 248 (129) | 383 (143) | 135*** | 8.125 | < 0.01% |

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.
References


