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**MASTER'S DEGREE IN BUSINESS MANAGEMENT**

# Emotional intelligence and cognitive abilities: their relationship with performance and cooperative behavior.

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**Abstract:**

The objective of this study is to find out whether emotional intelligence and cognitive abilities affect decision makers' performance and cooperative behavior. Using data collected from an experiment-based survey, with 96 participants, we find a positive relationship between emotional intelligence and performance. We also find that people with high levels of emotional intelligence have a tendency to be less cooperative; in particular, participants with high levels of self and social awareness show less interest to cooperate.

**Keywords**: Emotional Intelligence, Cognitive Abilities, Cooperative behavior, Affective State, Performance.

## 1. INTRODUCTION AND LITERATURE REVIEW

In the last two decades, scholars in management studies have tried to explain and interpret the existing relationship between emotional intelligence (EI) and performance (Cote & Miners, 2006)

The first articles on EI appeared in scientific journals, precisely in the field of psychology in the early 1990s (Mayer and Salovey, 1993; 1997; Salovey and Mayer, 1990).

The concept of EI is mostly considered to have emerged as a field of study thanks to the publications of Salovey and Mayer (FALTA AÑO), who defined as "a type of social intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions" (Salovey and Mayer, 1993, P.433). Later in 1997, the same authors expanded their model by focusing on the cognitive elements of EI, and proposed a new definition under the assumption that it is a principal component for enhancing intellectual and emotional aspects. They redefined EI as "the ability of an individual to realize and understand emotions and to generate emotion by supporting and promoting reflective thought or intellectual growth and emotional knowledge" (Mayer, Salovey and Caruso, 2004).

In the mid-1990s, Goleman published a popular science-based book, Emotional Intelligence (Goleman, 1995), from which we can notice that success in life depends less on intelligence quotient (IQ) than on emotional skills, and that this one can be cultivated and improved. Goleman (1998) consider EI as a set of learned skills that could lead directly into success in different personal and social domains. The same author proposed in 2000 his famous EI domains which are:Self Awareness, Self-Management, Social Awareness,and Relationship Management (Boyatzis, Goleman, & Rhee, 2000).[1]

Over time, management researchers have employed tremendous efforts to explain the sources of performance within firms, trying to explain how emotional intelligence and cognitive intelligence are correlated with performance and what are possible relationships between manager's behaviors and performance.

In this perspective Cartwright and Pappas, (2008), claimed that the performance of an individual is directly related to his level of emotional intelligence. The authors also found

[1](e.g., Joseph et al 2015; Carmeli, A. 2003 ; Mandell &Pherwani, 2003)

thatmanagers who recognize their emotions and beliefs always achieve their objectives with high efficiency.

Conversely, Goleman (2007) considers that emotional intelligence is not a strong and suitable indicator to determine an outcome factor, although it is a real demonstration of the ability to acquire the skills necessary to succeed.

Recently, we can observe that a lot of studies have shown more interest in the role of individuals, some previous investigations found evidence to associate performance with individual's cognitive capabilities. According to Levine et al. (2017), cognitive capabilities refer to "the ability to solve abstract problems"; and to strategic intelligence "the ability to anticipate competitors' behavior and preempt it".

Some researchers have adopted the theory that cognitive abilities can create a competitive advantage, while others have insisted on the need of more evidence demonstrating the role of individuals and their modes of interaction; here can be mentionedHelfat and Peteraf (2015) contributions in managerial cognition2 field in order to understand the role of mental processes, as they mentioned, "heterogeneity of cognitive capabilities may produce heterogeneity of dynamic managerial capabilities among top executives, which may contribute to differential performance of organizations under conditions of change".

In a similar vein, researchers have focused on studying the individual mood and how positive affect could enhance decision making, (Isen and Baron, 1991; Schwarz and Clore, 1983). Results in this regard indicate that several aspects of individual's behavior were influenced by this variable.

On the other hand, some evidence has disclosed that emotions pursue a weak relationship with performance. (Rozellet al., 2002).

From another perspective, scholars have tried to understand people's cooperative behavior. Fischbacher, Gächter and Fehr (2001) circumvent the question of conditional cooperation by applying experimental methods in the fields of Public Economics, from which they conclude that approximately 50% of people cooperate and even increase their contribution if others do so.

[2]Cognition: "processes of knowing, including attending, remembering, and reasoning;also, the content of the processes, such as concepts or memories" (American Psychological Association, 2009)

Mavroveli et al. (2007) explored the existing relationship between the trait EI and social competences such as cooperation and leadership. Indeed, they found a positive correlation between trait EI and social competences, among which cooperation could be considered.

Through this paper, we aim to contribute to existing literature shedding some light to understand the impact of the emotional state and cognitive abilities of company's managers, on their ability to generate an adequate competitive performance along with their cooperative behavior. In other words, we will study the relationships that may arise between emotional intelligence, analytic skills, strategic intelligence and performance together with cooperative behavior.

## 2. THEORY AND HYPOTHESES

This section presents the model that will be used to empirically explore the relationships among the variables of interest in this research (see Figure 1).

### 2.1. The relationship between emotional intelligence and performance

Seeking new sources of performances is always one of most important factors of differentiation among organizations. From this perspective, the relationship between EI and increased performance was intuitively appealing to organizations. Researchers like (Rosete&Ciarrochi, 2005; O'Boyle et al., 2011) have tried to explain during the last twenty years the existing links between EI and performance.

Indeed, scientific findings in this field (Abraham, 1999), support the notion that persons with high levels of EI are those who perform better, due to their best understanding of their emotions and their capacities to influence others' feelings.

These investigations, together with Rosete&Ciarrochi (2005) conclusions on the existence of a positive correlation between EI and performance, lead us to formulate our first hypothesis:

**H1**: High levels of emotional intelligence are associated with better performance.

### 2.2. The relationship between analytic skills and performance

Analytical skills consist on the ability to find right solutions; from this perspective, we can understand that everyone may devote an effort in enhancing these skills, whether at school or training in business.In total the main objective of each organization will be to empower its staff and strengthen such skills among them to optimize their performance.

Scholars have explained the link between analytical skills and performance through studies that that have found a strong correlation between CEOs' analytic skills and organization performance (Kaplan, Klebanov, & Sorensen, 2012; Malmendier and Tate, 2009).

Levine et al. (2017) have showed how CEOs' analytic skills could make differences among competitors and they conclude that competitors with high analytic skill perform better. ALARGAR ESTA FRASE EXPLICÁNDOLA MEJOR

In sum, based on the latest studies we propose our second hypothesis as follows:

**H2**: Higher analytic skills are linked with better performance.

## 2.3. The relationship between strategic intelligence and performance

Strategic intelligence leads decision makers to a better understanding of what is happening in their businesses environments and it also makes them more capable to predict competitors' behavior. Such skills can also help to anticipate market volatility and make right decisions(Levine et al, 2017).On the other hand, a lack of strategic intelligence would lead to a competitor's bad understanding, and then to a "behavioral market failure" (Gavetti, 2012). Levine et al. (2017) also consider that low strategic intelligence will cause bad performance.

Following these lines of research, we expect that a manager with high strategic intelligence may make a positive difference in the organization leaded, which draws us to our third hypothesis:

**H3**: Better performance is expected among individuals with higher levels of strategic intelligence.

## 2.4. The relationship between mood and performance

The relationship between mood and performance has largely been tested in the management literature (Eisenberger et al., 2001; Fredrickson, 2001; Erez&Isen, 2002). Fredrickson (2001) theory suggests that positive emotions enhance behavioral flexibility and increase the reach of attention, which can improve performance.

From the other hand Phillips et al.(2002) conclude in their study that a positive mood generally improves performance.On the other hand, (Monk, 1990) concluded that negative mood, has a negative association with performance.

These ideas lead us to state that emotion regulation processes allow managers to induce and maintain a positive state of mind, which in turns, may increase motivation and performance. This idea leads us to our fourth hypothesis:

**H4**: Positive/negative mood is associated with better/poorer performance.

2.5. The relationship between emotional intelligence and cooperative behavior

In order to highlight the relationship between emotional intelligence and cooperative behavior, we focus on the existing studies that approach this question.

Fernández-Berrocal et al. (2014) find that persons with high emotional intelligence scores are less predisposed to cooperate no matter what others' behaviors are.

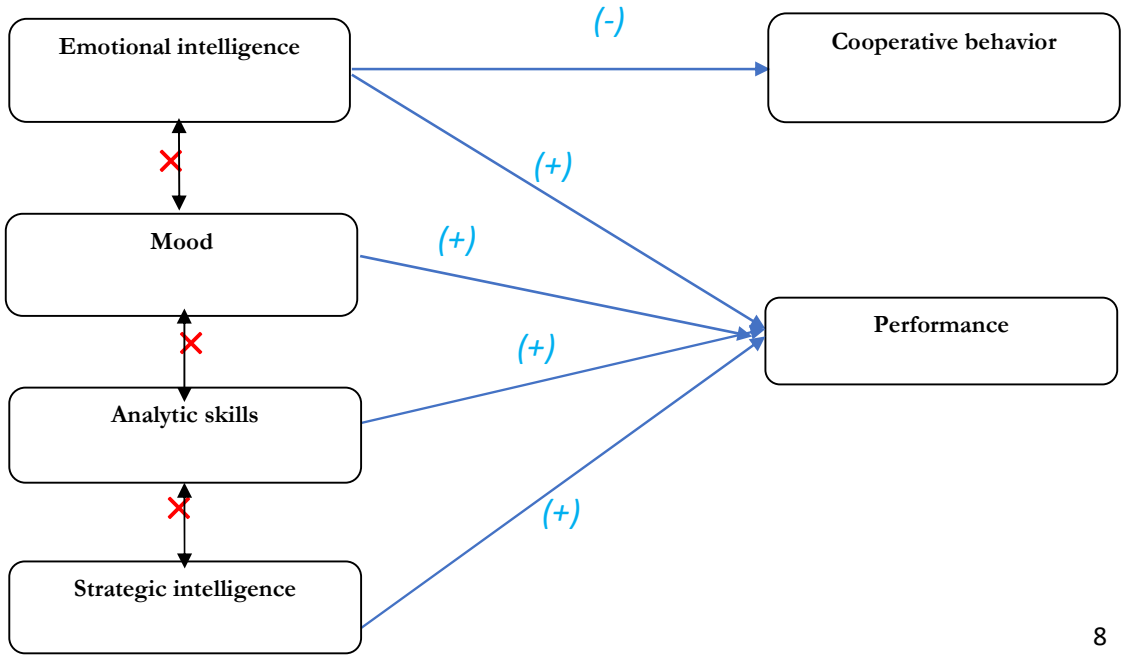
Schutte et al. (2001) reported, in one of the studies they conducted, that participants with higher emotional intelligence scores cooperate even in situations when they adopt defending strategies.

From another perspective, persons with high EI tend to be more competitive rather than cooperative in order to achieve their goals (Tamir& Ford, 2012).

Following the main ideas of previous research, our fifth hypotheses states as follows:

**H5**: People with high EI scores are less cooperative.

Figure 1. - Outline of the model



## 3. METHODS

The idea behind the design of thisempirical study is to highlight the strategic role of individuals vis-à-vis their EI, cognitive capabilities, positive & negative affect as well as their willingness to cooperate, as key factors to enhance performance.

### 3.1. Participants and Procedures

For data collection, we used an experiment-based survey. The 96 study participants were recruited among those volunteering to participate from the groups of students enrolled in the subject "Strategic Management" in the third course of the degree in Business Administration at Public University of Navarre (UPNA).In exchange for their participation, the students received a confidential report on their results for each of the instruments, as well as an academic incentive.

Their mean age is 22, 69.8 per cent of themare female; with academic average record score of 6.48 points on a 1-10 grading scale.

We conducted three identical experimentsat the Experimental Economics Laboratory of UPNA. To do so, we used z-Tree (Zurich toolbox for ready-made economic experiments) (Fischbacher, 2007): software for developing and conducting economic experiments. The software was originally developed in 1998 by Fischbacher at the University of Zurich and it is now used worldwide. In fact, it is characterized by its flexibility and simplicity of programming; it is stable and can be used to program almost any type of experiments quickly.

In order to get participants' behave as they normally do and to encourage them to achieve their best performance, we motivated them with an incentive. We explained that a prize will be dedicated to a winner by the end of the study, and it consists on a 100 Euros check to spend in a sports store. For this matter we clarify that the everyone's objective should be to gain as many points as possible throughout all the experiments.

Running the experiments took about 55 min, and it was divided into 5 parts.

The first part consisted of 20 questions regarding participants' mood at that moment of taking part in the experiment. These questions were the ones used in the PANAS questionnaire(Watson et al., 1988). See *Appendix 1.1.*

Answering this part took only 2 min.

Next, in the second part, it was presented to the participants the first experiment (named P-Experiment, or Public Goods experiment; Fischbacher and Gächter, 2006) intended to

measure participant's cooperative behavior (the whole description of this experiment can be read at *Appendix 1.2*).

To facilitate their work, we provided all participants with detailed instructions and gave them time enough to read them carefully. This experiment was played in groups of six members.At first, participants were told to answer 10 control questions that tested their understanding of this public goods problem.

This experimentwasdivided in two tasks, named "unconditional contribution" and "contribution table".

The first one consisted in 10 rounds. At the beginning of each one, participants received 20 points and they were invited to put them into a private account or invest them into a project.

The second task required them to complete a "contribution table", in which participants indicated the number of points they wanted to contribute to the project, taking into account each of the 21 possible average contribution levels of the other group members.We noticed that the first part of the game took 7 minutes while the last took 8 minutes.

The third part consisted on measuring participant's emotional intelligence. We did so through two different questionnaires: the Trait Emotional Intelligence Questioner-short form (TEIQUE-SF) (Petrides et al., 2007) and the Emotional Intelligence questionnaire, designed by (Cavero et al, 2017) to measure Goleman et al (2000) four EI domains. See these questionnaires at *Appendices 1.2*and *1.3*.

It took 10 minutes to participants to answer both questionnaires.

The fourth part was designed to evaluateparticipants' reasoning abilities; to do so they were by presented several problems that seemed to haveintuitive but incorrect answers. We used the cognitive reflection test (CRT, Frederick, 2005), consisting of only 3 questions (see *Appendix 1.5*).Participants were asked to answer them without time restrictions.It took them only 4 min to complete this part.

Finally, in the fifth part, we set up the last test, the so called "guessing game", traditionally used in the literature to measure subject's Strategic Intelligence (Nagel,1995; Costa et al., 2006).

In this game, participants are asked to choose a number between 0 to 100 at the same time. The winner is the person whose number is closest to 2/3 of the average of the other numbers. Here, the Nash equilibrium will be number zero, and to reach that equilibrium, everyone must behave rationally and assume the rest of the group do so. This game took only 2min.

### 3.2. Measurement

In order to test our hypotheses, we develop a set of measures for each variable of interest in this study, based on the tests, questionnaires and games described in the previous subsection and approved for credibility by Science Committees.

#### *3.2.1. Mood measurement*

To measure participants'mood we focused on (Watson et al., 1988) questionnaire, known as PANAS (the positive affect and the negative affect scale), translated to Spanish by Sandín et. al. (1999).

It consists of 20 items describing feelings and emotions (10 positive and 10 negative). Each participant assigns a score using a Likert type ordinal scale with 5 response options (never, rarely, in a while, Sometimes, always). The lowest score that can be obtained is 20 and the highest is 100. The scale is composed of two subscales, each of which refers to the type of emotions (Positive Effects Scale and Negative Effects Scale), where high/low scores in each of the subscales suggest a high presence of positive/negative emotions in the subject.

There is strong evidence that the instrument works well by taking into account the evidence of concurrent validity with scales of assessment of depressive states, character traits personality, anxiety, stress and adaptation.Theoretically, the factor structure of the reagents is better represented by two factors (the PA and NA scales), which are reported by numerous studies in different contexts (Crawford, & Henry, 2004, Zevon and Tellegen, 1982).

Given that that each person may havea positive and a negative affectivity score at the same time, and in order to analyze the results of this test we create three variables:

- *PosMood*consists of the average score of each participant in the 10 items measuring positive affectivity.
- *NegMood*consists of the average score of each participant in the 10 items measuring negative affectivity.

- *Mood*is the difference between *PosMood* and *NegMood*.

*3.2.2. Cooperative behavior*

In order to explore the relationship between participants' willingness to cooperate and their emotional intelligence state, we have adopted the approach of Fischbacher et al. (2001) in the field of Public Economics, through the public goods game, described in section 3.1, and detailed at *Appendix 1.2*.

In accordance with Fischbacher and Gächter (2006) subjects may be classified according to their contribution function from which we can distinguish two subject types: either a "free rider", if participant contributes zero in all 21 cases, or a "conditional cooperator" whether the scale of contributions is a positive function of the others average contribution.

For the purpose of this study, the variable we use to measure participant's cooperative behavioris based on the total contribution made by each individual during the experiment. The assumption behind this proposal is that the larger the total contribution of a subject, the more cooperator behavior s/he exhibits. This variable states as follows:

- *TotContrib* (total contribution), is defined as the sum of the contributions made by the participant along the 10 rounds of the first part of the P-Experiment.

*3.2.3. Emotional intelligence*

Two different questionnaires were used to measure EI.

3.2.3.1. Trait Emotional Intelligence Questionnaire-short form (TEIQUE-SF)

Trait EI is defined as a constellation of emotion perceptions and dispositions located at the lower levels of personality hierarchies (Petrides et al., 2007). The TEIQUE is assessed through questionnaires and rating scales that were developed initially by (Petrides, 2007).The aim objective was to create an instrument to measure how people experience, perceive, identify, process, use and regulate their emotions and those of others. The goal was to know for the emotional functioning of the individual and its repercussions at a social level.The interest of such an instrument was to provide information complementary to that obtained via IQ tests and classic personality tests.

TheTEIQUE-SFcontains 30 items and includes two items from each of the TEIQue's 15 facets (see *Table 1*). Items are selected mainly on the basis of their correlations with the

corresponding total facet scores, which allows for a broad coverage of the sample domain of the construct.

*Table 1: The adult sampling facets, factors of trait emotional intelligence TEIQue facets, factors,Petrides(2009)*

| Facets | High scorers perceive themselves as… |
|---|---|
| Adaptability | …flexible and willing to adapt to new conditions |
| Assertiveness | …forthright, frank and willing to stand up for their rights |
| Emotion expression | …capable of communicating their feelings to others |
| Emotion management | …capable of influencing other people's feelings |
| Emotion perception | …clear about their own and other people's feelings |
| Emotion regulation | …capable of controlling their emotions |
| Impulsiveness (low) | …reflective and less likely to give in to their urges |
| Relationships | …capable of having fulfilling personal relationships |
| Self-esteem | …successful and self-confident |
| Self-motivation | …driven and unlikely to give up in the face of adversity |
| Social awareness | …accomplished networkers with excellent social skills |
| Stress management | …capable of withstanding pressure and regulating stress |
| Trait empathy | …capable of taking someone else's perspective |
| Trait happiness | …cheerful and satisfied with their lives |
| Trait optimism | …confident and likely to 'look on the bright side' of life |
| **Factors** | **Included facets** |
| Well-being | Self-esteem, trait happiness, trait optimism |
| Self-control | Emotion regulation, stress management, impulsiveness |
| Emotionality | Emotion perception, emotion expression, trait empathy, relationships |
| Sociability | Social awareness, emotion management, assertiveness |
| Global trait EI | All 15 facets |

Our participants were invited to respond to each statement (*Appendix 1.3*) by choosing a number on a scale of 1 to 7 that best reflects their degree of agreement or disagreement with that statement.

The collected data were used to create four quantitative variables that represent the mean score of each participant in the statements and indicating the four trait EI factor according to Petrides(2009). The variables are:

- *Emotionality*; defined as the average score of the individuals in items 3,18,1,8,23,6,17,16,2 and13of the TEIQue.
- *SelfContr*(Self-control), is the average score of the individuals in items 14,29,4,19,22 and15of the TEIQue.
- *Sociability*, defined as the average score of the individuals in items 7,10,11,26,30 and 28of the TEIQue.

- *WellBeing*, is the average score of the individuals in items 20,5,12,27,9,24,25 and 21 of the TEIQue.
- Finally, we added a fifth variable, *Av_EIp*, which is the average score of the four previous variables.

3.2.3.2 - Emotional Intelligence questionnaire

To strengthen our EI measurement, we used another tool designed by (Cavero et al, 2017) to test the EI level of individuals in the four domains defined by Goleman et al.(2002). See *Appendix 1.4*.

The questionnaire consists of 38 items articulated around 18 competences divided into 4 domains (see *Table 2*) as described in Chermiss and Goleman (2001).

*Table 2*.- Goleman's EI domains

| Category | Personal Competencies (Self) | Social Competencies (Other) |
|---|---|---|
| Recognition | **Self-Awareness**<br>(it includes three sub-competencies)<br>• Emotional self-awareness<br>• Accurate self-assessment<br>• Self-confidence | **Social Awareness**<br>(it includes three sub-competencies)<br>• Empathy<br>• Service orientation<br>• Organizational awareness |
| Regulation | **Self-Management**<br>(it includes six sub-competencies)<br>• Emotional self-control<br>• Trustworthiness<br>• Conscientiousness<br>• Adaptability<br>• Achievement drive<br>• Initiative | **Relationship Management**<br>(it includes eight sub-competencies)<br>• Developing others<br>• Influence<br>• Communication<br>• Conflict management<br>• Visionary leadership<br>• Catalyzing change<br>• Building bonds<br>•Teamwork and collaboration |

Source: Chermiss & Goleman, 2001, p. 28.

For each item, the participant is asked to describe himself according to a Likert type scale in five points: (1: never; 2: rarely; 3: sometimes; 4: often; 5: all the time.)

From the obtained results, we created four quantitative variables representing emotional intelligence four domains according to Goleman's model (1998). These variables are:

- *SelfMgmt*(self-management), consists of the average score of the individuals in items 7,30,24,28,19,20,35,36,4,37,16 and 18 of the questionnaire.
- *SelfAw*, (self-awareness), consists of the average score of the individuals in items 11,29,13,23,1 and 12 of the questionnaire .

- *SocAw* (social conscience), consists of the average score of the individuals in items 3,31,9,22,5,6 and 26 of the questionnaire.
- *RelMgmt* (relationship management), consists of the average score of the individuals in items 14,32,8,17,21,33,25,27,2,34,10 and 15 of the questionnaire.
- Finally, the variable*Av_EICav*, which is the average score of the four previous variables.

*3.2.4. Analytic skills*

In order to measure analytic skills, we used in our study the Cognitive Reflection Test (CRT; Frederick, 2005). See*Appendix 1.5*.

The CRT's goal is to highlight the existence of two times in our reflection. We have an immediate response, very fast, instinctive but not necessarily the right one but the one that seems the simplest known as System 1 (Stanovich and West, 2000). In a second time, we have a system 2 that is a "more controlled processes that serves to decontextualize and depersonalize problems" (Stanovich and West, 2000, P. 659). Thus, always before taking a decision we take a step back, we analyze and find a more logical solution, resulting from a real reflection. This test tends to show the existence of these two systems but especially, to verify if the person is able to go beyond his system 1.

Even though only a few minutes are required from participant to finish the whole test,it offers more predictive power than other tests that are longer. Thus, it has become a common measure of analytical skills. The variable that we created to measure individual's analytical skills is:

- *AnalSkill* . It values 0 if the participant missed all three questions; 1, if s/he was able to resolve one problem; 2, if the person answered correctly to 2 of the 3 problems, and 3, for ones who were able to answer all CRT questions correctly.

*3.2.5. Strategic Intelligence*

By strategic intelligence we refer to "the ability to anticipate competitors" (Levine et al., 2017, P. 2390). In this prospective we would like to understand how it could be possible to anticipate the competitors' behavior in a very competitive market. Nagel (1995), through her investigations in this field, tried to approach the subject by designing a new experiment called "guessing game".

The game consists onasking participants to choose a number between 0 and 100, both included. All other participants do the same and submit their chosen numbers. You win if your chosen number is closest to 2/3 times the average of all submissions(Nagel,1995; P.1313).

In our experiment, we followed the method recommended by Nagel (1995). The winner of the game was the individual submitting the number 28 (even though the Nash Equilibrium of this game is represented by number 0). To measure the strategic intelligenceof participants, we proposethe following variable:

- *Guess_score* which is a dummy variable that values 1 for those individuals whose chosen number is over or under a 20% of the number proposed by the winner of this game; the variable values 0 in other cases.

*3.2.5. Performance*

The last issue address in this work is individuals' performance, which is measured by means of the following variable:

- *Earned_money*, defined as the total amount of points earned by each participant along the different games of the experiment.

The better the result achieved in each game, the larger the number of points accumulated.

3.3. Strategy of analysis

The analysis of the relationships among the variables of interest in this project is studiedperforming differentbivariate correlation analysis and T-tests to see the differences in performance of individuals (money earned and cooperative behavior) according to their strategic intelligence, their analytical skills, the mood they exhibit and their levels of EI. In this sense, it consists only of a first approach to the analysis of the subject, which needs further development in a future.

## 4. RESULTS

4.1. Descriptive statistics

*Table 2* shows the descriptive statistics of all the variables described in the previous section.

*Table 2:Descriptive Statistics*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PosMood | 96 | 1.6 | 5 | 3.51 | .60 |
| NegMood | 96 | 1 | 3 | 1.64 | .54 |
| Mood | 96 | -.3 | 3.5 | 1.86 | .71 |
| TotContrib | 96 | .00 | 176 | 77 | 36 |
| Emotionality | 96 | 2.3 | 4.6 | 3.35 | .41 |
| SelfContr | 96 | 2.4 | 5.6 | 4.12 | .65 |
| Sociability | 96 | 2 | 6.3 | 4.04 | .84 |
| WellBeing | 96 | 2.62 | 6.25 | 4.54 | .59 |
| Av_ElP | 96 | 3 | 5 | 4.01 | .39 |
| SelfMgmt | 96 | 2 | 4.9 | 3.52 | .52 |
| SelfAw | 96 | 2.6 | 5 | 3.83 | .49 |
| SocAw | 96 | 2.8 | 4.8 | 4.01 | .44 |
| RelMgmt | 96 | 2.8 | 4.9 | 3.90 | .41 |
| Av_EICav | 96 | 2.8 | 4.7 | 3.8 | .38 |
| AnalSkill | 96 | 0 | 3 | .80 | .878 |
| guess_score | 96 | 0 | 1 | .22 | .416 |
| Valid N (listwise) | 96 | | | | |

| VARIABLE | CATEGORY | N | % |
|---|---|---|---|
| GENDER | Men | 29 | 30,2 |
| | Women | 67 | 69.8 |
| AGE | Under 22 | 73 | 76 |
| | Over 22 | 23 | 24 |
| ACADIMIC RECORD | Over 6 | 51 | 53.1 |
| | Between 5-6 | 45 | 46.9 |

4.2. Tests of the hypotheses

This section presents the results of the statistical tests performed and suggests some answers to the central questions presented in the introduction. It also consists on a first step to verify the hypotheses presented in the model section.

*Table 3* presents the bivariate correlation analysis among all the variables of interest in this study.

*Table 3:Bivariate correlation analysis among variables.*

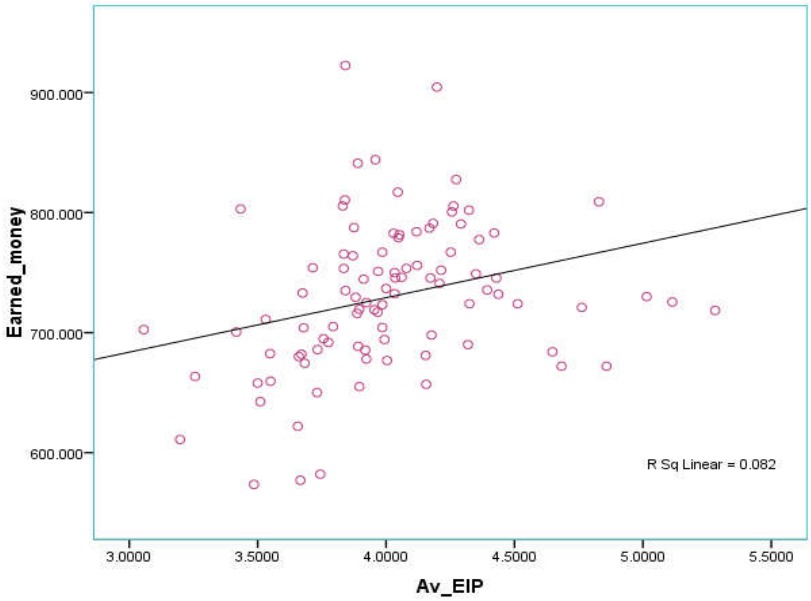
| | | Earned_money | TotContrib |
|---|---|---|---|
| Emotionality | Pearson Correlation | .093 | -.069 |
| | Sig. (2-tailed) | .368 | .502 |
| SelfContr | Pearson Correlation | .214* | -.102 |
| | Sig. (2-tailed) | .036 | .325 |
| Sociability | Pearson Correlation | .137 | .063 |
| | Sig. (2-tailed) | .182 | .539 |
| WellBeing | Pearson Correlation | .260* | -.103 |
| | Sig. (2-tailed) | .011 | .318 |
| Av_ElP | Pearson Correlation | .286** | -.065 |
| | Sig. (2-tailed) | .005 | .528 |
| SelfMgmt | Pearson Correlation | .084 | -.130 |
| | Sig. (2-tailed) | .415 | .207 |
| SelfAw | Pearson Correlation | .093 | -.097 |
| | Sig. (2-tailed) | .368 | .349 |
| SocAw | Pearson Correlation | .078 | -.060 |
| | Sig. (2-tailed) | .452 | .558 |
| RelMgmt | Pearson Correlation | .116 | -.055 |
| | Sig. (2-tailed) | .261 | .595 |
| Av_EICav | Pearson Correlation | .111 | -.107 |
| | Sig. (2-tailed) | .280 | .299 |
| PosMood | Pearson Correlation | -.024 | -.010 |
| | Sig. (2-tailed) | .815 | .919 |
| NegMood | Pearson Correlation | .083 | -.033 |
| | Sig. (2-tailed) | .424 | .748 |
| Mood | Pearson Correlation | -.083 | .016 |
| | Sig. (2-tailed) | .420 | .875 |
| AnalSkill | Pearson Correlation | .073 | -.261* |
| | Sig. (2-tailed) | .477 | .010 |
| guess_score | Pearson Correlation | -.115 | .096 |
| | Sig. (2-tailed) | .264 | .350 |
| ** Correlation is significant at the 0.01 level (2-tailed). | | | |
| *Correlation is significant at the 0.05 level (2-tailed). | | | |

*4.2.1. Emotional intelligence and performance*

Pearson correlation coefficients shown in Table 3 show a positive and statistically significant relationshipbetween EI, measured as thetrait emotional intelligence mean score (*Av_EIP*), and individuals' performance (*Earned_money*),r(94)=.286, p=.005.

The same positive relationship among both variables can be observed from the scatter plot chart (see *Figure 2*). These results may be indicating that individuals' trait emotional intelligence is positively associated with a better performance, as stated in hypothesis 1.

*Figure 2: Linear regression line between EI and performance*



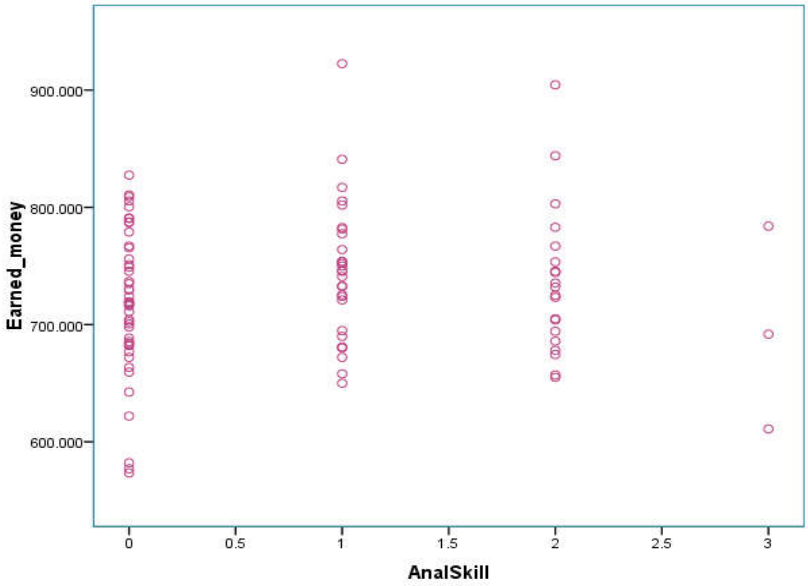

*4.2.2. Analytical skills and performance*

Pearson correlation coefficients showed in*Table 3*among the variables we use to measure analytical skills (*AnalSkill*) and Performance (*Earned_Money*) show no relationship among them.r(94)=.073, p=.477.

These results indicatethat,in our case, students' analytical skills do not affect their performance in the games played. In other words, participants' ability to solve abstract problems was not a determinant factor to have better scores. Therefore, we did not find empirical support for hypothesis 2.

The relation among both variables can be observed from the scatter plot chart(figure 3).

*Figure 3: relationship between analytical skills and performance.*




*4.2.3. Strategic intelligence and performance*

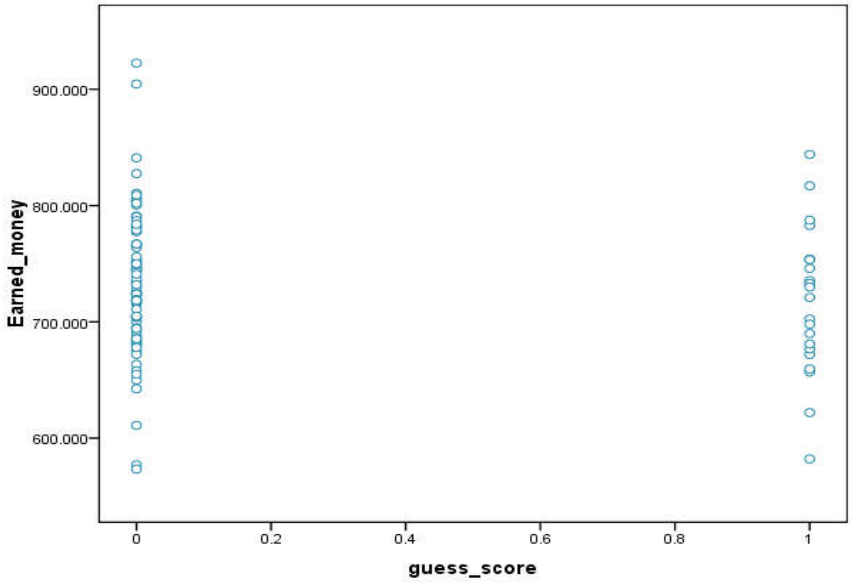
To measure if there exist any differences in performance according to individuals' level of strategic intelligence we perform a T-test with the variables of interest in this case: *Guess_score* and *Earned_money*.

The mean earnedmoney was 737.9 for participants that their guessing number was close to the winning numberand 727.6, for the rest. Even though individuals with larger strategic intelligence perform better than the others, these differences in performance are not statistically significant: t(94)=.714, p=.477.

Therefore, in our data set, we do not find empirical support for hypothesis 3.

Next figure illustrates non existing relationship between the two variables.

*Figure 4: relationship between strategic intelligence and performance.*




*4.2.4. Mood and performance*

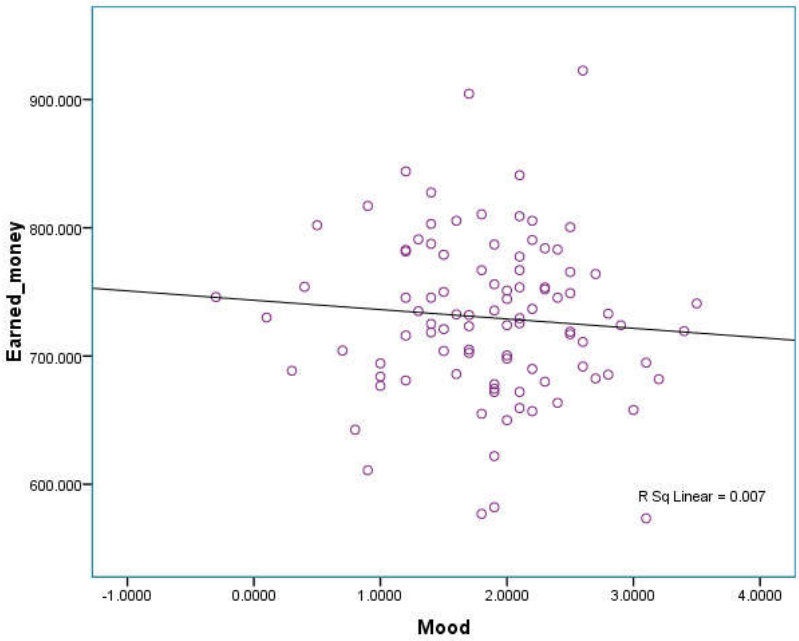
This relationship was again analyzed through bivariate correlation, between mood (positive, negative mood and average mood) and total earned money.(See *Table 3*) .

Results doesn't show,in general, any link between mood state and total earned money ($p>.05$) in all cases which is not statistically significant.

These results led us to conclude, that there is no relationship between state affect and performance.

*Figure 5* below shows the existing relation among both variables.

*Figure 5: Linear regression line between strategic mood and performance*

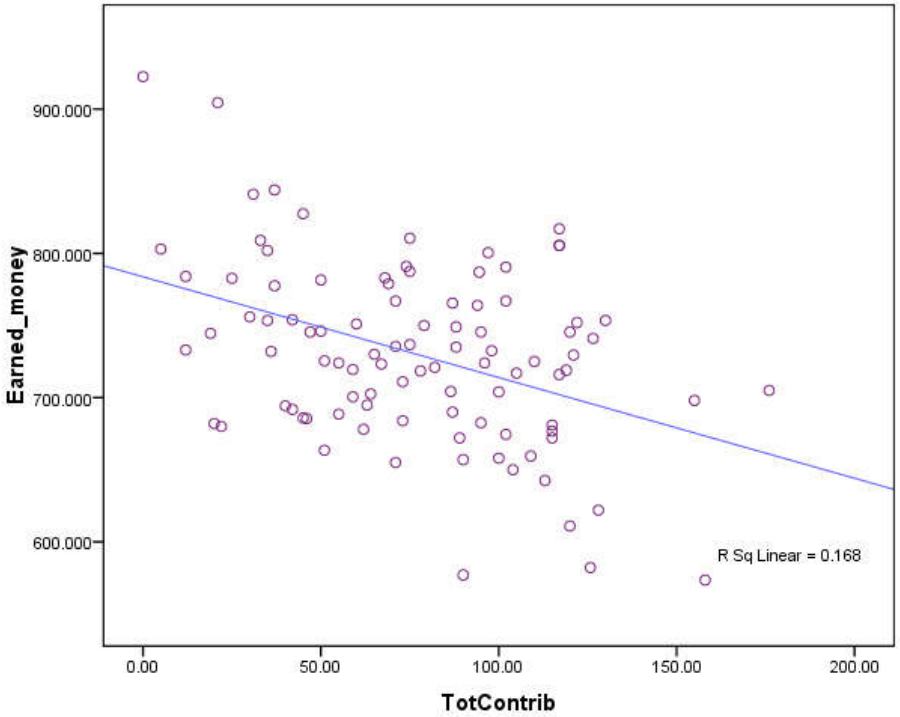



*4.2.5. EI and cooperative behavior*

We used Pearson correlation coefficients to examine any relationships that may exist between EI and total contributions. *Table 3* showed that a significant negative relationship exists between the variable (*Av_EICav*) measuring the general EI coefficient of individuals, according to the definition by Goleman (2000), and their attitude to cooperate (*TotContrib*). Also, the variables measuring some specific fields of EI, such as social-awareness (*SocAv*) and self-awareness (*SelfAv*)showed both significant negative relationships with total contribution.

These results might be indicating that our hypothesis 5 is supported by our results: people with high EI scores show a less cooperative behavior. (see *Figure 6*)

Figure 6: Linear regression line between cooperative behavior and performance



## 5. CONCLUSIONS

This study aimed to find whether emotional intelligence and cognitive abilities affect decision makers' performance and cooperative behavior.

Our results showed a positive correlation between EI and performance. We also found that people with high EI score are less cooperative. Furthermore, participants with high self and social awareness showed less interest to cooperate; in other words, participants who have a deep understanding of their own emotions, people who recognize their own strengths and weaknesses with a strong self-confidence and sincere people are less cooperative.

Finally, concerning cognitive abilities (analytical skills and strategic intelligence) and their relationship with performance, we found a different conclusion than Levine et al. (2017) who concluded that competitors with high analytic skill and strategic intelligence perform better.

In this study, we didn't detect any relationship between cognitive abilities, affective state and performance.

All these results could be implemented for a better recruitment among organizations, in the sense that EI could be used to hire good elements, and because a good profile is not only qualification but it is fusion of qualification and personality, a candidate with high EI level would understand and manage his own and others' emotions better, he will be able to deal with stress, manage conflict and inspire others to achieve organization's goals.

These results have to be seen as very preliminary, in the sense that different measures form the ones used in this study could be used to describe de concepts of interest. For example, to measure individuals' tendency to cooperate, we used the total contribution they made along the 10 rounds of the game played. A different way to do so would be the amount of money with which an individual contributes over the average contribution of the other members of his/her group. The same applies to the way of measuring performance or individuals' mood. In sum, such results are just the basis to focus future research.

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## APPENDIX 1

### 1.1 Positive and negative affect Schedule (PANAS)

| Indicate the extent you have felt this way over the past week. | | Very slightly or not at all | A little | Moderately | Quite a bit | Extremely |
|---|---|---|---|---|---|---|
| PANAS 1 | Interested | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 2 | Distressed | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 3 | Excited | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 4 | Upset | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 5 | Strong | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 6 | Guilty | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 7 | Scared | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 8 | Hostile | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 9 | Enthusiastic | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 10 | Proud | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 11 | Irritable | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 12 | Alert | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 13 | Ashamed | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 14 | Inspired | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 15 | Nervous | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 16 | Determined | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 17 | Attentive | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 18 | Jittery | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 19 | Active | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| PANAS 20 | Afraid | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |

### 1.2 Instructions for the P-Experiment

**Decision making**

This experience is divided into 10 periods in each of which you must make an investment. You will be a member of a group of 6 people. Each group member must decide on the allocation of 20 points. You can invest these 20 points on a private project A or invest them totally or partially in a project B. Each point that you do not invest in the project b will automatically remain in the project A.

**Your income in project A:**

You will earn one point for each point you put in the Project A.

For instance, if you put 20 points in Project A (and thus don't invest in Project B), your income will be exactly 20 points on your Project A.

If you put 6 points in project A, your income on this project will be 6 points.

Nobody except you earns something from Project A. Your income in this project will be determined as follows:

Income from the project A = Sum of all group points invested in project A × 0.5.

**Your income from project B**

Everyone of your group will also benefit from the amount you invest in this project. Adding that you will also get a return on investment from other group members. your income in this project will be determined as follows:

Income from the project B = your points inverted in project B × 1

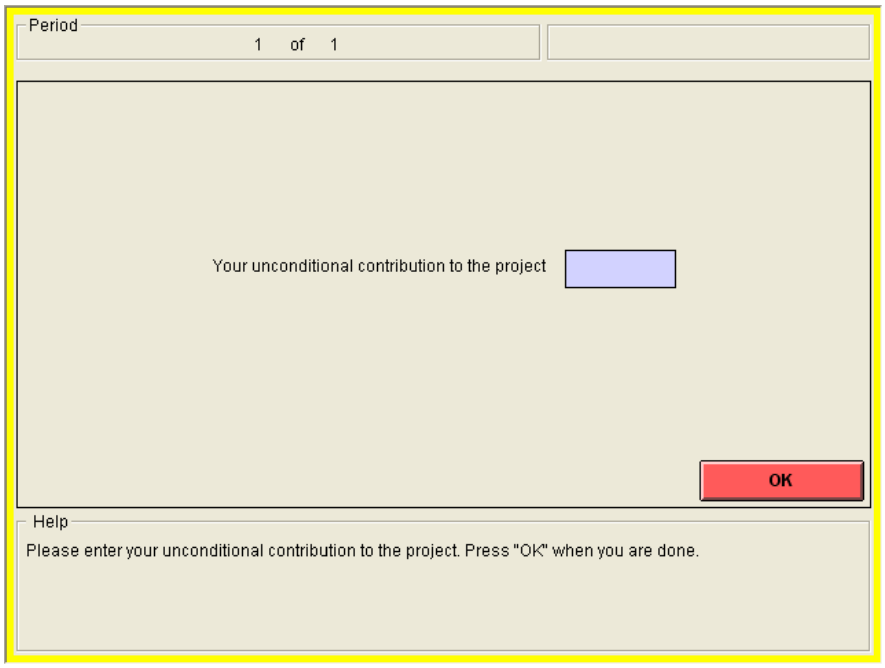
**Total income of the period**

Your total income is the sum of your income from project A and that from the project B:

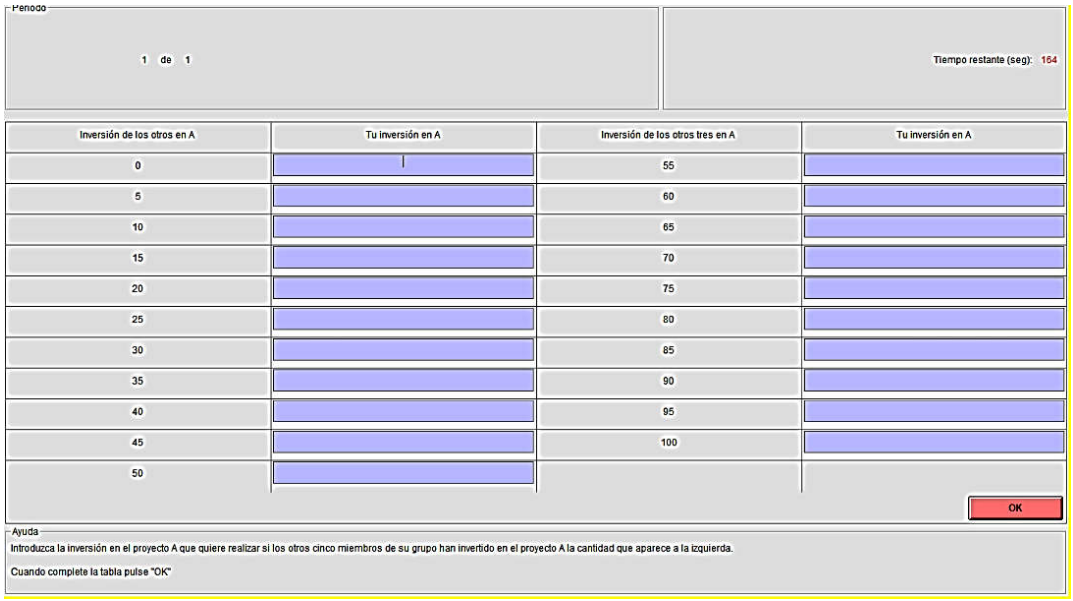
Your income= Sum of all group points invested in project A × 0.5+ your points inverted in project B × 1.

The income of each member will be calculated by the same method.

You'll be invited to indicate your investment in the following screen:




On the other hand, you need to complete a "contribution table" in which you indicate your investment that you wish to make to project B , taking into account the investment of the other members of the group. You can condition your contribution to that of other members of the group. The following table will be presented to you in the experiment:



**1.3 The Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF) by K. V. Petrides**

1. Expressing my emotions with words is not a problem for me.
2. I often find it difficult to see things from another person's viewpoint.
3. On the whole, I'm a highly motivated person.
4. I usually find it difficult to regulate my emotions.
5. I generally don't find life enjoyable.
6. I can deal effectively with people.
7. I tend to change my mind frequently.
8. Many times, I can't figure out what emotion I'm feeling.
9. I feel that I have a number of good qualities.
10. I often find it difficult to stand up for my rights.
11. I'm usually able to influence the way other people feel.
12. On the whole, I have a gloomy perspective on most things.
13. Those close to me often complain that I don't treat them right.
14. I often find it difficult to adjust my life according to the circumstances.
15. On the whole, I'm able to deal with stress.
16. I often find it difficult to show my affection to those close to me.
17. I'm normally able to "get into someone's shoes" and experience their emotions.
18. I normally find it difficult to keep myself motivated.
19. I'm usually able to find ways to control my emotions when I want to.
20. On the whole, I'm pleased with my life.
21. I would describe myself as a good negotiator.
22. I tend to get involved in things I later wish I could get out of.
23. I often pause and think about my feelings.
24. I believe I'm full of personal strengths.
25. I tend to "back down" even if I know I'm right.
26. I don't seem to have any power at all over other people's feelings.
27. I generally believe that things will work out fine in my life.
28. I find it difficult to bond well even with those close to me.
29. Generally, I'm able to adapt to new environments.
30. Others admire me for being relaxed.

**1.4 Questionnaire to measureGoleman et al. (2000) EI Domains(Cavero et al, 2017).**

1. I accept criticism willingly
2. I easily encourage others to participate in the projects or activities I propose
3. I quickly understand the underlying forces or "unwritten rules" that operate within any organization.
4. When I meet someone I usually see the positive aspects of the person rather than the negative
5. I easily establish good relationships with new people
6. The people I interact with quickly understand that they can count on me
7. I adapt quickly and easily to changes
8. I am generally interested in people, their goals, their ambitions, ...
9. I get well with people with cultures or opinions very different from mine
10. I propose to openly share my work and ideas when I'm part of a team
11. I feel in touch with my inner signals and recognize how my feelings affect me
12. I usually laugh at myself without problems
13. I don't mind taking on complex tasks
14. I don't mind questioning the established reality and proposing changes openly
15. I don't mind spending time getting to know the people I'm going to work with beyond what labor obligations mark
16. I don't overlook unethical behavior, but I face it directly
17. I am not afraid to make constructive criticisms to others
18. I have no problem admitting my mistakes openly
19. I don't hesitate to set aside bureaucracy or established rules when I consider it necessary to improve my future possibilities.
20. Normally, I don't wait for opportunities, I take advantage of them or I create them
21. I know how to find confluence between contributions, ideas or diverse opinions.
22. I can listen carefully when interacting with other people
23. I know perfectly what I stand out
24. I know how to remain imperturbable in the face of really critical situations
25. I know how to persuade people to do what I ask
26. I can adequately reward the people with whom I interact
27. I know how to surround myself with the right people to carry out my initiatives
28. I always have the serenity and lucidity necessary to face a stressful situation
29. I always keep in mind the values that guide me through life

30. I am able to face very diverse situations without losing concentration
31. I am able to relate properly with who suits me in different contexts
32. I usually find arguments to convince others when I think a certain situation should change
33. I generally understand others' point of view
34. I usually inspire others with my words or my example
35. I usually set difficult and measurable objectives
36. I have high personal ambitions that lead me to try to continuously improve
37. I tend to see the bottle "half full" part rather than the "half empty" one

**1.5 The Cognitive Reflection Test (CRT; Frederick, 2005)**

(1) A bat and a ball cost $1.10 in total. The bat costs a dollar more than the ball. How much does the ball cost? ____ cents [Correct answer ¼ 5 cents; intuitive answer ¼ 10 cents]

(2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? ____ minutes [Correct answer ¼ 5 minutes; intuitive answer ¼ 100 minutes]

(3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, howlong would it take for the patch to cover half of the lake? ____ days
[Correct answer ¼ 47 days; intuitive answer ¼ 24 days]