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INTUITIVE AND ANALYTICAL THINKING IN DECISION MAKING: THE ROLE OF MINDREADING AND COGNITIVE STYLE IN A STRATEGIC INTERACTIVE CONTEXT

Tesi di Dottorato di: Paola Iannello
Matricola: 3480082

Anno Accademico 2007/2008

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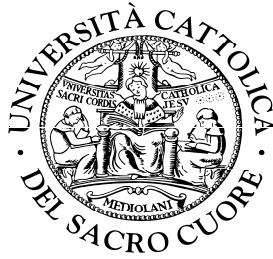MILANO

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ABSTRACT

The present work aimed at researching into the constructs of intuition and analysis in decision-making through the integration of different sources of data in order to provide a comprehensive and multifaceted outline of the issue at hand.

Specifically, the first part of the investigation concerned the study of intuition and analysis by employing self-report inventories. The general purpose of the Study 1 and 2 was to verify the existence of relationships among different instruments which, even though providing varied conceptual and operational definitions of the same constructs, showed some points of overlapping. Basing on these relations the goal was, then, to identify broad cognitive and decision profiles including a set of characteristics, rather than defining individual styles through single and isolated dimensions.

The second part of the investigation intended to study intuition and analysis "in action", that is to assess the role of both intuitive-analytical strategies and individual styles within a specific strategic context. Focussing on the proposer's perspective, Study 3, 4, and 5 all employed the Ultimatum Game as experimental setting. Study 3 aimed at assessing whether people can activate relevant mindreading processes in order to successfully interact in the course of the game. Study 4, then, investigated how the monetary proposals were affected by the introduction of two distinct modes, intuitive and analytical, of processing information about the counterpart. Finally, in Study 5, the role of individual intuitive and analytical style in directly influencing the entity of the offers and, in case, modulating the effect of the intuitive and analytical modes of thinking was examined.

Results from the five studies were discussed and compared with existing literature.

RIASSUNTO

Il presente lavoro di ricerca si è proposto di indagare i costrutti di intuizione e analisi nell'ambito del decision-making attraverso l'integrazione di differenti tipologie di dati al fine di delineare un quadro esauriente e dettagliato dell'oggetto di studio.

Nello specifico, la prima parte della ricerca si è occupata dello studio di intuizione e analisi attraverso l'impiego di scale self-report. L'obiettivo generale degli Studi 1 e 2 è stato quello di verificare l'esistenza di relazioni tra differenti strumenti che, sebbene propongano definizioni e operazionalizzazioni diverse dello stesso costrutto, presentano aree di sovrapposizione. A partire da tali connessioni, ci si è, quindi, posti l'obiettivo di identificare ampi profili individuali, cognitivi e decisionali, descritti attraverso tali differenti dimensioni stilistiche.

La seconda parte della ricerca si è posta l'obiettivo di indagare intuizione e analisi "in azione", ossia di valutare il ruolo di strategie e stili individuali intuitivi e analitici nell'ambito di uno specifico contesto strategico. Focalizzando l'indagine sulla prospettiva del proposer, negli Studi 3, 4 e 5 è stato utilizzato l'Ultimatum Game come setting sperimentale. In particolare, lo Studio 3 si è proposto di verificare se le persone siano in grado di attivare processi di mindreading pertinenti per interagire con successo nel corso del gioco. Attraverso lo Studio 4, ci si è posti l'obiettivo di valutare come l'introduzione di due distinte modalità, intuitiva e analitica, di processamento delle informazioni relative all'altro giocatore influenzi le proposte monetarie. Da ultimo, nello Studio 5 ci si è focalizzati sul ruolo giocato dallo stile individuale intuitivo e analitico nell'influenzare direttamente l'entità delle offerte e nel modulare l'effetto della modalità di pensiero intuitivo e analitico.

I risultati e le implicazioni dei cinque studi sono stati discussi anche attraverso il confronto con la più recente letteratura di settore.

INTRODUCTION

Nowadays intuition has come to a popular appeal. The best-selling book *Blink* by Gladwell (2005) testifies that this issue is not confined to the academic research, but, rather, it is widespread also across the general public. This volume has helped to shed light not only on the scientific basis of the concept, but on the powerful influence that intuition has in both everyday life choices and in various life-or-death situations, such as the decisions of firefighters (Klein, 1998), military commanders (Kaempf et al., 1996), and emergency room surgeons (Abernathy & Hamm, 1995).

The great interest which intuition has recently arisen could be due to a number of reasons. First, nowadays our environment is as complex as it has ever been (Sadler-Smith, 2008); second, everything appears to move ever-quickly and changes rapidly (Andersen, 2000); and, last, the amount of available information is overwhelming and, often, inadequate (Goodman, 1993). Given this scenario, people have little time to devote to decision-making requiring the consideration of a potentially enormous amount of information under an ever-increased time pressure (Kuo, 1998). In these days, it seems that intuition is not only necessary, but it is an absolute requirement for dealing with this reality. As a consequence, intuition could be a tool which is particularly responsive to today's environment, in that it permits an overcoming of the limits of analysis in a such unstable environment (Prietula & Simon, 1989). For all these reasons, a renewed interest in intuition arose, which has led to the claim that intuition needs not to be magical but, rather it can be defined and explained scientifically, made intuition a very intriguing and promising topic in various fields of research, such as entrepreneurship, business management, education, training, and health care (Hodgkinson, Langan-Fox & Sadler-Smith, 2008).

Even though intuition has an indubitable power, its use, however, can not be

considered as a panacea for the speed-accuracy outcomes, since it may facilitate speed at the expense of accuracy (Dane & Pratt, 2007). Traditionally, rational analysis has been considered the best, if not the only, way of thinking which allowed people to make effective decisions. However, the above-mentioned growing body of research has questioned recently the assumption concerning the supremacy of analytical thinking. An in-between position claims that none of the two modes of thinking is absolutely better than the other. Rather both kinds together are better than either alone, since the effectiveness of a decision depends on the ability to select and adapt the right mental process for the task at hand (Sadler-Smith, 2008).

In spite of the acknowledgment of the fundamental role played by intuition and analysis in decision-making, there still exist some barriers to a productive discourse on these topics. Even though intuition and analysis have been the subject of research for a very long time, any agreement has been reached yet on what intuition and analysis are, how intuition and analysis work, and under which circumstances the employment of one mode of thinking is better than the other (Dane & Pratt, 2007).

The present work aimed at researching into the constructs of intuition and analysis in decision-making through the integration of different sources of data in order to provide a comprehensive and multifaceted outline of the issue. Specifically, the first part of the investigation concerned the study of intuition and analysis by employing self-report inventories. Starting from the establishment that varied conceptual and operational definitions of the constructs underlie the existing scales, the main purpose of the first two studies was to examine the relationship between different commonly used measures of cognitive and decision styles. Basing on these relations the goal was, then, to identify, if possible, broader stylistic profiles, which constituting dimensions, even if conceptually and operationally conceived in different ways and pertained to distinct fields, tap the same intuitive-analytical dimension. Whereas in Study 1 decision-making and cognitive styles only were employed, in Study 2 the

relationships between these dimensions and mental abilities were also investigated. After the validation of those instruments whose Italian versions were neither applied nor validated yet and the subsequent comparison between different occupational groups on these scales, the connection between decision-making and cognitive styles was explored (Study 1). Then, employing a larger experimental sample, the possible relationships between decision and cognitive styles and a measure of cognitive abilities were verified so to identify broad and comprehensive cognitive and decision profiles (Study 2). Once these profiles had been established, people showing "extreme" scores within each profile were selected (Study 2) to constitute the experimental sample of Study 5, which, in fact, required the involvement of people with an intuitive or analytical stylistic profile.

The second part of the investigation intended to study intuition and analysis "in action", that is to assess the role of both intuitive-analytical strategies and individual styles within a specific strategic context. Focussing on the proposer's perspective, Study 3, 4, and 5 all employed the Ultimatum Game as experimental setting. Specifically, the three studies were nested, in that each subsequent study aimed at providing further support to what found in the previous study and, in addition, at investigating a specific aspect which distinctive of that study. The assessment of whether people can activate relevant mindreading processes, that is taking into account the other player's perspective, in order to successfully interact in the course of the game (Study 3) was, then, qualified through the introduction of two distinct modes of processing information about the counterpart. How the monetary proposals were affected by these two modes of thinking, intuitive and analytical ones, was then investigated (Study 4). Afterwards, the role of individual intuitive and analytical style in directly influencing the entity of the offers and, in case, modulating the effect of the intuitive and analytical modes of thinking was examined (Study 5). Lastly, both intuitive and analytical thinking and styles were controlled for the corresponding patterns of physiological activation in order to clarify if the

possible behavioural differences depended either on general arousal activation or on the specific quality of each type of elaboration process (Study 5).

The following figure provides a general overview of the research.

INTUITION AND ANALYSIS
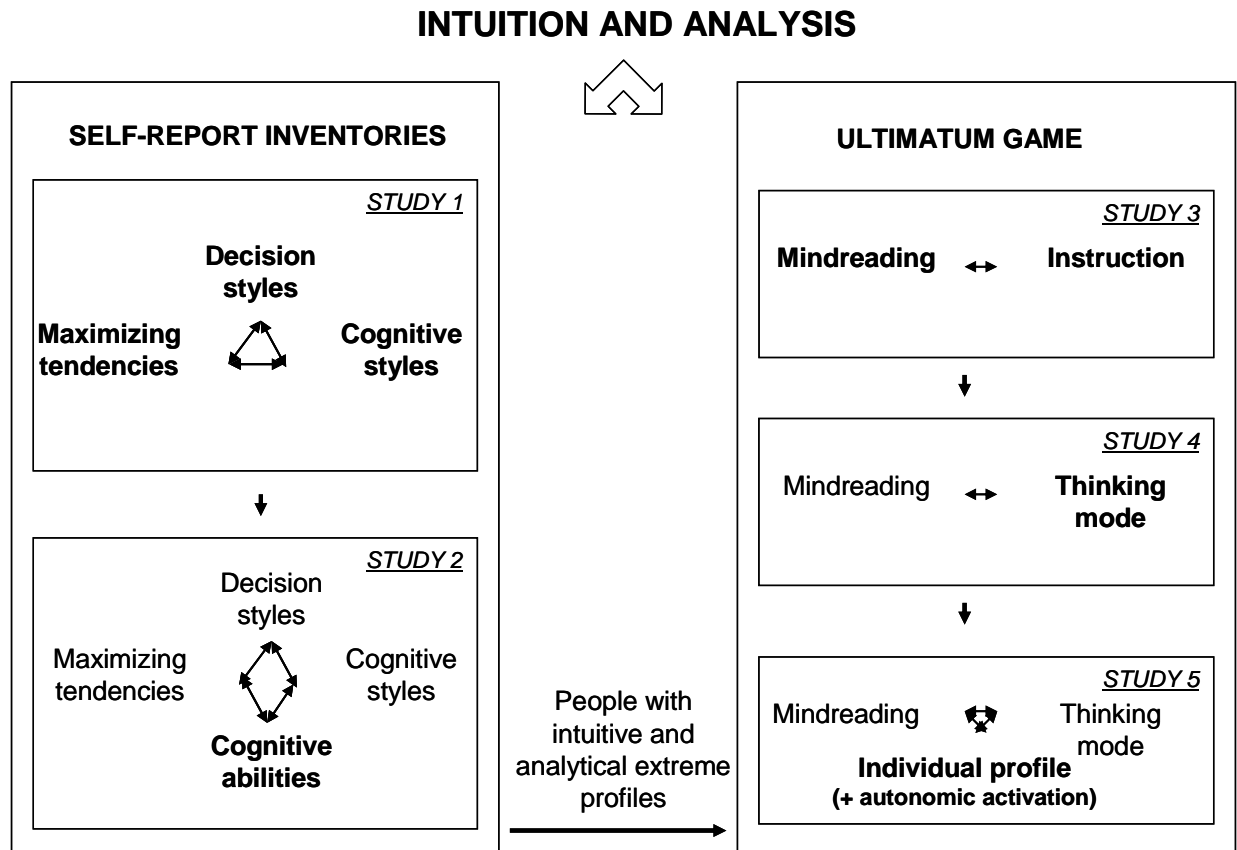
As shown in the figure, every study, through its specific methods and procedures, dealt with precise and definite aims contributing to the achievement of the general purpose of the whole research, that is the investigation of intuition and analysis in decision-making.

CHAPTER 1

INTUITION AND ANALYSIS:
THEORETICAL PERSPECTIVES

1.1 DEFINING INTUITION AND ANALYSIS

Multiple and competing definitions of the constructs of intuition and analysis have been proposed across years. The definitions vary widely depending, on one side, on the different underlying theoretical foundations, and, on the other side, on the specific aspects of intuition and analysis that they stress.

Intuition and analysis, in fact, have been referred to as personality traits (Myers et al., 1998) or cognitive styles (Allinson & Hayes, 1996), different level of awareness (Bastick, 1982), right/left hemisphere brain skills (Lank & Lank, 1995), the result of past experience either implicitly or explicitly learned (Covin, Slevin & Heeley, 2001), cognitive strategies (Hogarth, 2001; Klein, 2003) and abilities (Tversky & Kahneman, 1974).

Moreover, different definitions focus on specific features of the constructs: some focus on the antecedents of the process identified as implicit/explicit knowledge (Epstein, 1994; Hogarth, 2001; T. Betsch, 2007); in other definitions the focus is on the features of the process itself, that is the cognitive (Tversky & Kahneman, 1974; Gigerenzer, 1991), metacognitive (Barnard, 1968), affective (Epstein, 1991; Haidt, 2001) elements; and, finally, some other definitions highlight the consequences of the constructs (T. Betsch, 2007; Sinclair et al., 2002). Specifically, conceiving intuition and analysis as processes, it follows that it is possible to identify the sources and consequences of the two processes and,

moreover, determine a series of features which characterize them. Figure 1.1 provides a general overview of this layout.

INPUT

FEATURES
OF THE

OUTPUT

What does
intuition/analysis

Which are the key features of
intuition/analysis?
-Behavioural
-Cognitive
-Affective

What does
intuition/analysis
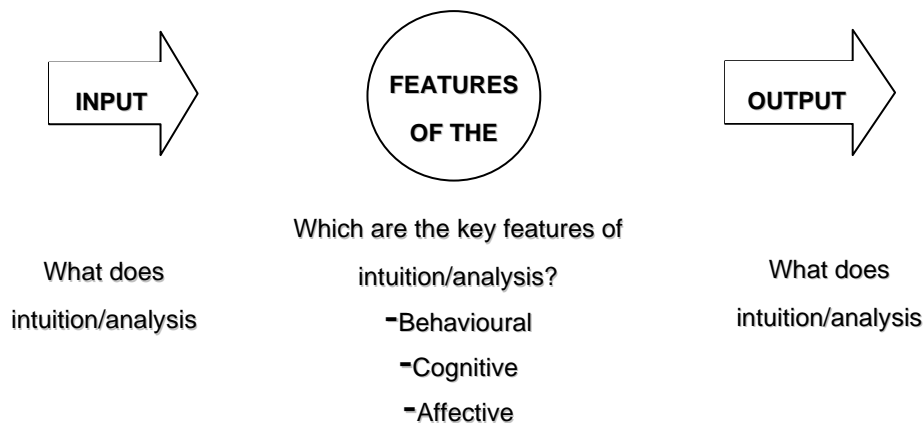
Fig. 1.1 - Intuition and analysis: input, process and output.

Defining intuition is usually a difficult undertaking, as the broadness of the phenomena that are subsumed under the umbrella of intuition impedes a precise definition. From the above review of the definitions of intuition and analysis it should appear clear that an integrated and coherent account of the nature and the role of these concepts has generally lacked. For this purpose dual-process theories provide a conceptual framework in which to place intuition and analysis that, in fact, lie at the heart of a great number of dual-process theories of social cognition and cognitive psychology (Epstein, 1991; Evans, 2008; Gilovich, Griffin & Kahneman, 2002; Stanovich & West, 2000; Wilson, 2002; Wilson, Linsey & Schooler, 2000). Most researchers distinguish between two basic systems of information processing (Bruner, 1986; Chaiken & Trope, 1999; Evans & Over, 1996; 2003; Sloman, 1996; Sun, Slusarz & Terry, 2005) by referring to dual process theories and sometimes combining the theories resulting in two sets of features that distinguish intuition from analysis. The first information processing system, which is believed to be the older of the two systems from an evolutionary perspective (Epstein, 1994; Evans & Over, 1996), involves the automatic and effortless processing of information (Stanovich & West, 2002). This system, which permits individuals to learn from experience and reaches knowing without conscious attention (Hogarth, 2001), has been

referred to as experiential (Epstein, 1994), automatic (Bargh & Chartrand, 1999), tacit and intuitive (Hogarth, 2001), natural (Tversky & Khaneman, 1983), associative (Sloman, 1996). The second system enables individuals to learn information deliberatively, to develop ideas, and to carry out analyses in an attentive manner. This system has been referred to by various names, including rational (Epstein, 1994), intentional (Bargh & Chartrand, 1999), deliberate and analytical (Hogarth, 2001), extensional (Tversky & Kahneman, 1983), rule based (Sloman, 1996).

Following the above-mentioned distinction among the antecedents, the core process, and the consequences of intuition and analysis, it is possible to identify and classify the specific features of both processes as described in literature. This overall outline provides a clear and, at the same time, comprehensive systematization of the varied and diverse characteristics that the different theoretical descriptions of the constructs highlight. All these features, which are schematized in Figure 1.2, will be tackle in detail in the next paragraph.
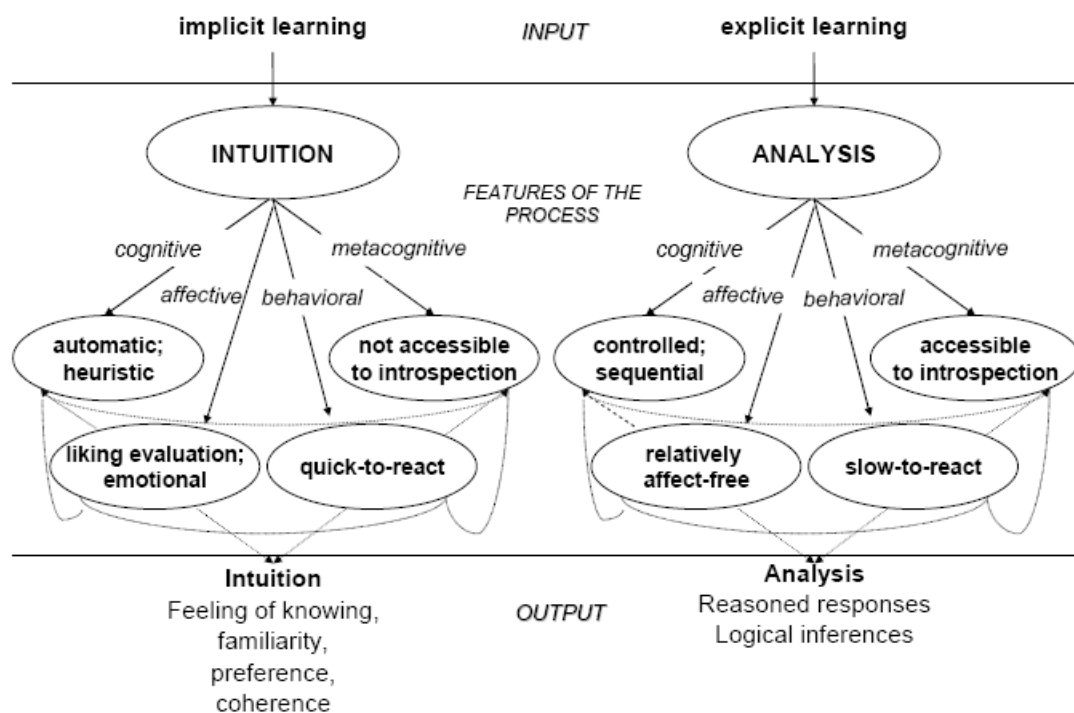
Fig. 1.2 - Intuition and analysis as a function of the intuitive and analytical system yielding different processing features

1.1.1 Where intuition and analysis stem from

Various theories assume that intuition allows judgments based on implicit knowledge (Epstein, 2007; Hogarth, 2007) which is acquired unconsciously, since the individual is unaware of the learning process. Experiments on artificial-grammar learning represent illustrative examples such implicit learning (Reber, 1967; for an overview see Frensch & Rünger, 2003). Participants were asked to memorize letter strings that were created by some rules. The spontaneous behaviour – classifying new strings as grammatical or not – revealed the application of the implicitly learned rules (participants were better than chance); however, if they were asked to explicate the rules, participants were not able to do so. This and subsequent findings (Reber, 1967; Reber & Allen, 1978) have been interpreted in terms of an unconscious abstraction of the underlying rule, thus providing evidence for the existence of implicit knowledge and inducing researchers to study it in different domains, such as unconscious perception (Merikle & Daneman, 1996), perception of structure (Bolte, Goschke & Kuhl, 2003), implicit memory (Perrig, 2000), and problem solving (Bowers et al., 1990; Reber, Ruch-Monachon & Perrig, 2007) Moreover, spontaneous judgments on the valence or the frequency of events and objects reflect the entire stream of prior, incidentally acquired experiences (T. Betsch, Plessner & Schallies, 2004), while explicit judgments failed to correctly represent the implicitly learned content. In sum, the findings suggest that implicitly learned knowledge seems to be better accessible by means of an intuitive judgment or decision.

This assumption is further substantiated by theoretical models. Regarding the differential acquisition of knowledge, the cognitive experiential self theory (CEST, e.g. Epstein, 2007) proposes that the experiential system, which hosts intuition, features associative learning (e.g. through conditioning) that relates stimulus-response connections to outcomes. The rational system, on the other hand, consciously monitors the acquisition of information as learning is assumed as a conscious acquisition of beliefs from explicit sources of information

(Epstein, 2007). Regarding the use of this knowledge in judgments and decisions, the MODE model (Motivation and Opportunity as Determinants of Behaviour; Fazio, 1990) assumes that spontaneous judgments reflect implicit attitudes, while deliberate judgments reflect explicit attitudes. Experimental results underline this proposal: intuitive judgments and decisions were better predicted by implicit rather than by explicit attitudes (Friese, Wänke & Plessner, 2006; Richetin et al., 2007), while deliberate choices seemed to be a function of a positive explicit attitude. Following this line, Koriat (2000; 2007) distinguishes between experience-based and information-based judgments which correspond to intuitive and analytical judgments. The authors claims that "fast, unconscious, automatic inference results in a sheer subjective experience, and that subjective experience can then serve as the basis for noetic judgments" (p.314). Experience-based judgments are immediate impressions which have the same quality of a direct intuition. Conversely, information-based judgments are based on explicit inferential processes which are influenced by conscious thoughts and expectations.

In sum, explicit learning can be understood as the feed for the analytical system, while implicit learning seems to be the major input of intuition.

1.1.2 Features of the intuitive and analytical processes

Intuition and analysis are described as quick and slow processes, respectively. Intuition allows people to know almost instantly what the best course of action is, since, as already mentioned in the previous paragraph, it compresses years of experience and learning into seconds (Isenberg, 1984). In fact, not being constrained to process information serially, one by one, but, rather, having the possibility to call a number of problems and issues at the same time, intuition allows to apprehend the entirety of the situation in a rapid and quick synthesis. Its speed is the consequences of the fact that thinking is considered an evolutionary precursor to more conscious and analytical thinking: intuitive

system responds quickly to environmental stimuli, whereas analytical system operates in a slower way being oriented toward delayed action. In fact, under the analytical mode of thinking, people have the necessary time to go through a sequential process, since analysis can take a considerable long time to come to an end (Epstein et al., 1996). Even though, traditionally, trade-off decision accuracy has been considered as inversely related to decision speed, a growing body of literature has proved that speed does not necessarily affect the decision quality, thus proving that even quick choices can result in high-quality outcome (Hayashi, 2001; Hitt, Keats & DeMarie, 1998; Khatri & Ng, 2000; Perlow, Okhuyensen & Repenning, 2002).

Relying on associative thinking (Sloman, 1996; 2002), intuition is a synthetic psychological function, in that it apprehends the totality of a given situation (Vaughan, 1990). It allows to synthesize isolated pieces of information and experience into an integrated picture, thus permitting a holistic processing of reality that transcends each single parts.

Intuition is also described as automatic processing similar to visual insight and pattern recognition resulting from holistic processing (Epstein, 2007; Klein, 1998; 2003). Glöckner (2007) illustrates how intuition resembles visual perception processes by referring to the fact that individuals immediately form a consistent impression of a decision situation on perceiving it (p.312). In other words, intuition implies a process of linking disparate elements of information so that intuitive thinking can be defined as an holistic recognition of patterns or structures such as prototypes, script, narratives (Epstein, 1994; Kahneman, 2003). The process of intuition thinking can be also defined as automatic, since it can be executed with minimal impact on the capacity of cognition, thus not reducing the capacity for performing other tasks (Kyllonen & Shute, 1989). Analysis, conversely, can be described as rule-based thinking mode which implies making formal, abstract, and logical connections by encoding reality in abstract symbols, words or numbers (Verschueren et al., 2005). To do this, analytical thinking requires conscious control and deliberate effort. The

demands for cognitive resources makes analysis subject to the constraints of human cognitive capacity.

Being automatic and effortless, intuition lies at subconscious level, in that it consists of "assessing the internal reservoir of cumulative experience and expertise developed over a period of years, without being able to understand consciously how we get the answers" (Parikh, 1994, p.38). In fact, the process of intuition is characterized by a lack of awareness of how judgments have been achieved (Shapiro & Spence, 1997; Wally & Baum, 1994). Intuition somehow produces an answer without the use of a conscious process which, as a consequence, can not be reconstructed and made transparent (Khatri & Ng, 2000). People unconsciously make holistic associations between the stimuli they encounter and their underlying cognitive structures integration of wide-ranging stimuli into categories of information. On the contrary, analytical thinking operates under conscious control and forces the decision maker to make explicit the bases for a decision. This is possible due to the fact that analysis is transparent, that is open to scrutiny and to be verbalized (Arkes & Hammond, 1986).

Due to the fact that intuition involves little time and little effort, it has been maintained that intuition promotes the use of heuristic rules. In the tradition of Kahneman and Tversky's heuristics and biases program (e.g. Gilovich, Griffin, & Kahneman, 2002) the term intuition represents the application of useful and timesaving, however sometimes faulty heuristics. Heuristic is considered as a low-effort way of reasoning that can produce less than optimal judgments and decisions (Tversky & Kahneman, 1974). In particular, according to this perspective, relying on these mental shortcuts may be disadvantageous when processing abstract and probabilistic information since statistical and probabilistic judgments require a slower and more detailed way of reasoning. Even though the traditional view of heuristics generally highlights their faultiness and the fact that they result in erroneous and biased judgments (Kahneman & Tversky, 1982), the more recent fast-and-frugal perspective

proposes an alternative and positive idea of heuristics which are considered as fast and cognitively economical but, at the same time, accurate and effective means of making judgments and decisions (Gigerenzer & Todd, 1999). People are particularly susceptible to relying on heuristics when they are under time pressure (Finucane et al., 2000), under cognitive load (Gilbert, 2002), in a good mood (Eisenberg, 2000), or lacking in motivation (Pelham & Neter, 1995).

From the affective point of view, a basic feature of intuition is that it involves quickly accessible affect (Epstein, 1994). The sudden feeling can be seen as representative of the implicitly learned information and is thus only as valid as the informational basis it refers to (Hogarth, 2001). It can be compared with an aesthetic judgment of liking and disliking (Haidt, 2001) and serve as a basis for judgments and decisions (T. Betsch, 2007). The affective valence of a stimulus, e.g. the assessment of whether objects are good or bad, is a "natural assessment" which is automatically registered by the intuitive system (Kahneman, 2003; see also "the affect heuristic": Slovic et al., 2002). However, it has been argued that intuition involves not only an immediate affective reaction, but, it is explicitly connected with emotions (Epstein, 1994; Sinclair, 2003). According to some researchers, this link is further thorough, leading them to claim that intuition is affectively charged (Hassin et al., 2005). Moreover, recent research point out that emotion can activate an intuitive process since they represent inputs to intuitive thought (Hogarth, 2001); emotion may also play a role during the intuitive process and, thus, results in affective judgments (Epstein, 1994). This findings are further supported by neuroscience research which highlight the existence of an intuitive system of thought and show that both intuitions and emotional appraisals appear to arise through similar neurological pathways (Lieberman, 2000; Ochsner & Lieberman, 2001; Lieberman, 2007). The idea that emotions play a key role in making decisions is also being developed in some recent work that contrasts a rapid emotional basis for decision making with a slower, affect-free, and more deliberative cognitive basis (Haidt, 2001; Hanoch & Vitouch, 2004; Wang, 2006).

To sum up, the view that emerges from the work underpinning the two systems distinction is that each system represents qualitatively different modes of processing. Specifically, intuition turns out to be a process which capitalizes on implicit knowledge, is associative, heuristic, automatic/subconscious, and affective in nature; therefore, it is relatively rapid and undemanding in terms of its use of scarce cognitive resources. In contrast, analytical processing is rule-based, conscious, and relatively affect-free in nature; hence, it is relatively slow and makes great demands on cognitive resources (Schroyens et al., 2003; Stanovich & West, 2000).

1.1.3 What intuition and analysis result in

The output of intuition is a feeling which can be defined as an involuntary and immediate breaking into consciousness (Wundt, 1907; Zajonc, 1980) that informs conscious thought about what happens at the unconscious level (Weber & Lindemann, 2007). Intuition can result in numerous types of feeling, but, despite their differences, all share some properties, that is they are immediate, nonverbal, require few cognitive resources, and evolve from experience (Perrig, 2000). In addition, they have in common a metacognitive informational content, since they convey information about people's own past, present or future mental processes that allow people to both monitor and regulate those processes (Koriat, 1998; Nelson, 2001). Even though the concept of feeling suddenly reminds of the emotional component, it should be kept in mind that not all feelings map on the affective dimension. In fact, the outcomes of intuition do not necessarily coincide with emotional type of feeling (T. Betsch, 2007). The feeling of knowing (Hart, 1965), which, for instance, represents a nonemotional feeling produced by intuition, indicates that people are able to recognize the correct answer to a question that they cannot currently recall (Koriat, 1993; Matcalfe, 2000). The feeling of familiarity refers to that cases when people have encountered a certain situation before, even if there is no longer any explicit

memory of the encounter (Dunn, 2004). The feeling of preference identifies those situations in which people express a preference for a decision path without having reasons for that preference. The feeling of coherence refers to the situation in which people perceived consistency even if they do not have reasoned grounds for it (Bowers et al., 1990).

As a consequence, intuition is often thought as a "hunch" or "gut feeling", a sense of calling certainty that is on the threshold of consciousness (Bechara & Damasio, 2005) as opposed to a rational and analytical conclusion based on explicit evidence. While intuition results in immediate apprehension of objects, analysis produces reasoned responses obtained through logical inferences.

1.1.4 How intuition and analysis work

Even though the dual-models of processing conveyed the idea of two distinct and separate modes of processing information, most authors (Epstein, 1994; Hammond, 1996; Hogarth, 2001; Slovic et al., 2002; Kahneman, 2003) did not refer to them as independent systems. According to Epstein (1994), people do not reason in only experiential or rational mode. The two systems are continually active and interacting in much of our cognitive activity (Slovic et al., 2002). Far from working in a dichotomous way, intuition and analysis are considered as parallel yet interconnected (Epstein, 1998; Sinclair, 2003). A slightly different theoretical perspective, in turn, describes people's cognitive activity across a range of styles, since there is a sort of continuum identified by intuitive cognition at one pole and analytical cognition at the other pole. The position along this continuum determines the relative dominance of either two systems (Hammond, 1996).

Hogarth (2001) studied in depth the functional meaning of the two systems. The author highlighted that the two systems work in tandem maintaining that the intuitive system is the default information-processing mode whereas, just in case, the analytical system intervenes; on the other way round, the migration

from the analytical system to intuition represents the hallmark of the acquisition of the expertise. The dominance of either approach seems to be determined by personal disposition and decision-making context (Sinclair & Ashkanasy, 2005). As for the latter is concerned, some authors (Burke & Miller, 1999; Hogarth, 2001; Mintzberg, Ahlstrand & Lampel, 1998) emphasized the fundamental role of the nature of the stimuli and the types of information involved in the two modes of thinking as important factors that affect the functionality of intuitive and analytical systems. In particular, Hogarth (2001) stated that tasks promoting visual processing induce more intuitive reasoning, which is mostly activated when information provided is partial and do not involve comprehensive consideration of all aspects of a decision but, instead, is sensitive to specific features of the stimulus. In this case the response is based on only part of the information that could be relevant to the issue at hand and it is holistic, based on an impression of the whole. On the contrary, in analytical thinking information is additional since it involves manipulation of information that is not just represented by the stimulus and it is independent of the other cues. According to Kahneman (2003), the operating characteristics of System 1 are similar to the features of perceptual processes. In fact, the perceptual system and the intuitive operations of System 1 generate impressions which are neither voluntary nor verbally explicit. On the contrary, System 2 is involved in all types of judgments, whether they originate in impressions or in deliberate reasoning, and they are always intentional and explicit. Intuitive are those judgments that reflect impressions and are not modified by System 2. It is possible to assume that System 2 continuously monitors the judgments and intentions that System 1 produces, so that an intuitive judgment will be modified or overridden just in case System 2 identifies it as biased. However, corrective thoughts are accessible just in specific circumstances, that is when persons experience no time pressure (Finucane et al., 2000), are not involved in a concurrent cognitive task (Gilbert, 2002) and are not in a good mood (Isen, Nygre & Ashby, 1988). Kahneman (2003) pointed out that a key-point of the intuitive and analytical

judgments' functionality is the idea of accessibility, or the ease with which mental contents come to mind. Under specific circumstances intuitive thoughts come to mind spontaneously and without effort depending on the actual properties of the object of judgment such as physical salience, on the states of priming and associative activation (e.g. "hot" states of high emotional and motivational arousal increase accessibility of thoughts) and on the effect of context on the accessibility of interpretations as context induces a certain type of interpretation.

1.1.5 Which is better?

One might wonder what is the best way to make a decision when facing with a choice, either engaging in a detailed analysis or relying on immediate intuition. Research on decision making has traditionally supported the idea that careful analysis leads to better decisions (Janis & Mann, 1977; Koriat, Lichtenstein & Fischoff, 1980; Raiffa, 1968), thus conveying a predominant negative view of intuition in the field of psychology (Bettman, Luce & Payne, 1998; Kahneman, 2003). Historically, science itself has called for explainable assumptions, hence rationality has tended to be the default mode of cognition against which intuition has been compared. However, the pervasive assumption that analytical processing is always the best way to make decisions has been challenged by a number of studies, thus inducing the development of both positive and negative views of intuition among psychology researchers. Whereas those with a negative view of intuition maintain that intuitive decisions are biased and poorer than the analytical ones, those with a positive view of intuition highlight the great opportunities that this mode of thinking affords (Hoch, 1987; Lewicki, 1986). Among the latter, the prevailing opinion highlights the great potential for intuitive processing, but, at the same time, suggests that, in terms of functionality and utility, the two processing systems each have their own strengths and weaknesses (Epstein et al., 1996; Epstein & Pacini, 1999;

Hodgkinson, Langan-Fox & Sadler-Smith, 2008). According to this perspective, successful decision-making does not hinge on analysis or intuition alone, but involves a mix of both processes. This perspective also claims that analytical or intuitive mode of thinking are not efficient in an absolute way, but their effectiveness and accuracy depend on the kind of tasks that they face: decisions are more valid when there is a match between properties of the task and the mode of thought employed (Hammond et al., 1987). McMackin and Slovic (2000) have emphasized the importance of understanding the joint effects of types of task and cognition. They claimed that task characteristics could critically affect the quality of decisions under the two modes of thinking, thus showing that intuition is more valid in an intuitive task and analysis in an analytical task. For the intuitive task, providing reasons has a negative effect on performance, whereas generating reasons has a positive effect on performance in the analytical task. When people engage in problem solving are asked to verbalize their thoughts, there is evidence that this as a negative effect on problems that require insightful solutions but not on analytical problems. Verbalization forces people to act in deliberative mode and cut off access to intuitive processes (Wilson et al., 1993). Ambady and Rosenthal (1993) provide support to the idea that the characteristics of the task at hand may affect the effectiveness either modes of thinking. Specifically, they conclude that intuitive processing leads to efficient performance when the tasks implies limited and visual information. A series of studies recently carried out (Dijksterhuis, 2004; Dijksterhuis et al., 2006) provide further evidence concerning the existence of a relation between mode of thinking and the complexity and quality of decisions. Specifically, it has been suggested that when decision problems are fairly complex and multiattributed, unconscious intuitive processing leads to superior decision making. According to the authors, the inferiority of analysis in complex decisions is probably due to both the low capacity of analytical system (Miller, 1956; Nørretranders, 1998) which induces decision makers to take into account only a subset of information (Dijksterhuis, 2004; Dijksterhuis & van Olden,

2006; Wilson & Schooler, 1991) and to the fact that analysis can lead to suboptimal weighting of the attributes (Levine, Halberstadt & Goldstone, 1996). Besides the type of task people have to face, Hogarth (2001; 2005) identifies other informational variables which represent conditions under which analytical and intuitive judgments are likely to be accurate: feedback quality and the consequences of inferential errors. Depending on the interaction between these factors, it is possible to predict in which cases intuitive or analytical thought will be more valid. As suggested also by other research (Sadler-Smith & Shefy, 2004), the type of feedback that people receive may be crucial in determining if an environment enhances or suppresses the effectiveness of intuitive thinking. In fact, only when people receive timely and veridical feedback on their judgments and actions and when inferential errors are easy to detect the quality of intuitive judgments and decisions increases (Hogarth, 2001).

1.1.6 Intuition and analysis in the present work

Although dual-process models provide a productive foundation for the development of a more integrated account on intuition and analysis (Hodgkinson, Langan-Fox & Sadler-Smith, 2008), we believe that some issues raised by this theoretical model have to be qualified.

An important question which has often come in for criticism is that this feature-based approach leaves open how many attributes must be present, necessary, and sufficient to recognize intuitive and analytical processes (Plessner et al., 2007). Our claim, in this respect, is that the series of equivalences established by dual-process models among intuition and analysis and their respective qualifying features should be taken very cautiously. A fine distinction which is worth clarifying, in our opinion, is that intuition does not coincide with emotion, in that intuition does not spring from emotion as opposed to reason (Vaughan, 1990, Ray & Myers, 1990). We believe that the equivalence between intuition and emotion, on one side, and analysis and pure cognition, on the other side,

should be softened. Intuition does not mean emotion, they are not synonyms, but, rather, they probably show some points of overlapping even if it is possible to keep them separate. Conversely, analysis does not coincide with "cold" cognition, completely detached from any emotional involvement. We share the assumption that both intuition and analysis can involve an emotional component, but, so that intuition and analysis can be specified, the presence/absence of emotion is neither sufficient, nor necessary.

Moreover, we do not agree with the widespread opinion suggesting that intuition necessarily suffers from biases and errors. We share the growing body of research (Ilgen & Feldman, 1983; Harung, 1993; Seebo, 1993) which maintains that intuition, far from being a biased process, it can be very accurate. Moreover, the analytical thinking can suffer from biases too, and, it can even produce extreme errors (Hammond et al., 1987).

In our acceptation, intuition is rapid, holistic and mainly, but not exclusively, based on visual cues. It capitalizes on implicit learning and experience, and is not accessible to introspection. Conversely, analysis is slow, analytical and primarily based on verbal cues. It stems from explicit learning and experience, and is transparent, that is accessible to introspection.

1.2 MEASURING INTUITION AND ANALYSIS

The measurement of intuition and analysis represents a very interesting and, at the same time, debated topic within different fields of research. Being constructs whose definitions and bounds are not always univocal, the operationalization of intuition and analysis could constitute a really difficult effort (Mitchell, Friga & Mitchell, 2005). The multifaceted nature of these concepts is difficulty hosted in their entirety within a single measure. Typically, each measure focuses on one, or at least some, attribute of intuition and analysis. For this reason, when

measuring these constructs, researchers should clear up which aspects of intuition and analysis they are willing to investigate, in order to employ an instrument which is really suitable for that goal. Given the complexity and heterogeneity of these concepts, there is a continuing need for the development of multiple approaches to their assessment. A number of differentiated measures of intuition and analysis have been developed across time, including traditional self-reported inventories, and techniques to measure behaviours, and even neurobiological correlates, in laboratory.

1.2.1 Self-report measures: cognitive and decision styles

The differences we have already described among systems and processes can be partly reflected in systematic individual differences in relying upon a specific type of processing. In fact, starting from the evidence that individuals differ in their tendency to mainly rely on either processes, intuition and analysis have also been conceived as preferred or habitual ways of thinking. The identification of distinct habitual pattern of behaviour leads to the notion of "cognitive style".

1.2.1.1 Defining cognitive and decision styles

The term cognitive styles has been referred to consistent attitudes, preferences, or habitual strategies that affect person's modes of perceiving, learning, judging, decision-making, problem-solving (Messick, 1984). Individual differences about people's cognitive functioning can be defined as cognitive style when they are pervasive and stable, that is they appear consistently in different situations and they are fairly fixed characteristics at different times (Ausburn & Ausburn, 1978; Riding, Glass & Douglas, 1993). In fact, cognitive styles can be described as transversal dimensions which lead people to similar attitudes, behaviours and strategies in a variety of domains. They reflects "how", rather than "how well", people process information. Rather than being abilities, cognitive styles are ways of using abilities. Whereas the latter are measured in terms of level of performance, the former are measured in terms of manner of performance.

Moreover, they are different as for the fact that abilities are unipolar dimensions while styles are bipolar or multipolar dimensions (Antonietti, 2003).

The existence of stable individual differences has been also identified in the specific field of decision making (Stanovich & West, 1998, 2000; Glaser, Nöth & Weber, 2004; Glaser & Weber, 2005). Hence, it seems that people can be differentiated according to their style in making decisions. Over the years, several definitions of the decision style construct has been provided. It has been described as a habitual pattern individuals use in decision-making (Driver, 1979; Scott & Bruce, 1995) or individuals' specific mode of perceiving and responding to decision-making tasks (Harren, 1979) or preference for a certain decision-making strategy (Epstein et al., 1996). Driver, Brousseau and Hunsaker (1990) claimed that decision-making style is identified by the amount of information gathered and the number of options considered when making a decision, whereas other authors suggested that decision-making style regards the way individuals make sense of the data they gather (Hunt et al., 1989). More recently, Galotti et al. (2006) maintained that decision-making styles are far from being connected to information gathering, they affect the way individuals conceptualize decisions instead. According to the authors, stylistic differences would influence the decision-making phase which concerns setting goals and representing the consequences of one's own decisions. Decision making style has been referred to alternatively as "tendency or preference" (Epstein et al., 1996) or "personality trait" (Myers et al., 1998). Even though all of these concepts deal with the way people process information concerning decision making, the idea of personality trait highlights the stability of one's decision-making behaviour across various situations whereas the concept of preference pinpoints the possibility that individuals, though within a repertoire of preferred or dominant decision styles, modulate their own behaviour according to the situation at hand. In fact, although individuals tend to use certain styles more frequently than others (Drivers et al., 1990) or have a dominant style (Rowe & Mason, 1987), they can adapt their styles to the different situations they

encounter, thus showing flexibility in their use and application of decision styles especially over long time (Hayes & Allinson, 1998; Zhang & Sternberg, 2007).

1.2.1.1 Theoretical dimensions for cognitive and decision styles

Many proposals have been offered for dimensions of cognitive and decision making style which ranged from the relatively simple to articulated and complex. However, the most popular and unifying dimension concerns the distinction between intuition, on one side, and analysis, on the other. In fact, a number of different style dimensions have been described basing on the idea of bipolarity which identified two value-equal opposing poles corresponding to distinctive modes of cognitive functioning, such as field dependent-independent (Witkin, 1962), impulsive-reflective (Kagan et al., 1964), holist-serialist (Pask, 1972), verbalizer-visualizer (Paivio, 1971), adaptive-innovative (Kirton, 1976;1989). Confronting with this myriad of style dimensions and starting from the lack of a global perspective and of a common conceptual framework and language (Zhang & Sternberg, 2007), some researchers attempted to integrate different styles categorization (Cassidy, 2004; Coffield et al., 2004; Vance et al., 2007). As already said, however, in the specific field of decision making, the most common and global dimension is represented by the contrast between intuitive and analytical styles (Agor, 1989; Chaiken & Trope, 1999; Klaczynski, 2001; Nygren, 2000; Stanovich & West, 2000). Specifically, people with an intuitive style rely more on feelings to make decisions and solve problems holistically; people characterised by an analytical style prefer to solve problems and make decisions by using analytical techniques. In line with this classification, other authors (Epstein et al., 1996; Betsch, 2004) maintained that people differ in their inclinations and preference for certain strategies. In particular, they distinguished between people with a preference for the intuitive decision mode and people who prefer the analytical decision mode. Intuitive people are those who habitually make decisions in a fast, effortless and automatic way, whereas analytical people tend to make slower, elaborated, planned and analytic decisions. Intuition and anlaysis can be treated as opposite

poles along the same bipolar dimension and therefore as mutually exclusive (Hayes & Allinson, 1994; Myers & McCaulley, 1985; Simon, 1987). However, recent findings (Hodgkinsons & Sadler-Smith, 2003) suggest that people's behaviour is better modelled as two separate unipolar scales. In line with dual-process theories, this view argues that intuition and deliberation are complementary and, as a consequence, can be concurrent. Instruments based on this premise measure intuition and deliberation separately, since the two constructs are conceived as orthogonal and independent dimensions (Isenberg, 1984; Pacini & Epstein, 1999; Sauter, 1999). This implies that people process information by two parallel, interactive systems that interface and are interconnected, although they operate in a different way (Epstein, 1994). The two ways of thinking permit people to switch back and forth from one mode of processing to the other, as required, albeit moderated to some degree by individual styles and preferences (Dane & Pratt, 2007).

Starting from the distinction between intuitive and analytical styles, other authors proposed more complex models of decision-making styles which are not based on the idea of bipolarity, but they rather included more stylistic dimensions. Rowe and Mason (1987) defined four different styles: directive style refers to people who are practical and power-oriented; analytic style defines logical and systematic people; conceptual style concerns the intuitive and creative individuals; behavioural people can be defined as being supportive and receptive. Scott and Bruce (1995) identified the following styles: a rational style characterized by comprehensive search for information and logical evaluation of alternatives; an intuitive style characterized by attention to details and a reliance on hunches and feelings; a dependent style characterized by the search for guidance from others before making decisions; an avoidant style characterized by attempts to avoid decision-making whenever possible; a spontaneous style characterized by the desire to come through the decision-making process as quick as possible.

1.2.1.2 Measuring intuitive and analytical styles

The majority of measures of intuitive and analytical styles have been designed as self-report inventories (see Hayes & Allison, 1994; Myers & McCaulley, 1985) that require the subject to express one's own agreement or disagreement with several statements. However, even though the scales which have been devised across time claim to measure intuition and analysis, they refer to theoretical constructs which are partially different in nature (Pretz & Totz, 2007; Betsch & Iannello, submitted). Some questionnaires reflect the conception of intuition and deliberation as personality traits (MBTI, Myers et al. 1998, Pretz & Trotz, 2007); others are meant to measure intuition and deliberation as abilities (REI, Pacini & Epstein, 1999); in most other inventories the two constructs are conceived as styles and chronic preference or tendencies (PID, C. Betsch, 2004; GDMS, Scott & Bruce, 1995; SOLAT, Torrance et al., 1977; 1978; Torrance, 1987).

In the Myers-Brigg Type Indicator (MBTI: Myers et al., 1998), which is based on Jungian theory (Jung, 1926), intuition and analysis have been conceived as personality constructs. The Intuitive/Sensate subscale distinguishes between the intuitive types who prefer imagination and abstraction in contrast to sensing individuals who prefer reality and concrete facts, whereas the Thinking/Feeling subscale identifies thinking people who are analytical and logical as opposed to feeling types who value emotions and feelings over analysis.

Other instruments, on the contrary, tap on the individual's preference and ability in using specific strategies. The Rational-Experiential Inventory (REI: Epstein et al., 1996; Pacini & Epstein, 1999), which is the first of its kind, measures the degree to which people tend to rely on intuition and hunches over logical and analysis when making decisions. Specifically, the REI aims at measuring both the individual engagement in (preference for) for rational or experiential mode of thinking and the individual beliefs in one's own ability to successfully use that mode. Even if the Preference for Intuition and Deliberation Scale (C. Betsch, 2004) has its root in the REI scale, it focuses only on the assessment of

strategy preferences in decision situations. The main goal of the intuitive scale is the measurement of reliance on intuition and affect, while the deliberate scale aims at assessing the reliance on analysis and cognition. Other instruments aim at measuring preferences in the use of specific strategies, but in a broader sense than just intuitive and analytical tendencies. The General Decision Making Style (Scott & Bruce, 1995) identifies five different styles corresponding to specific patterns of behaviour that individuals use in decision-making: rational, intuitive, dependent, avoidant, and spontaneous style.

Whereas the instruments which have been just described refer to the specific field of decision-making, others are meant to measure preferences for intuition and deliberation in general cognitive processes. The Cognitive Style Index (CSI: Allinson & Hayes, 1996) and the more recent Cognitive Style Indicator (CoSI: Cools & van den Broeck, 2007) have been developed to assess the individual tendency to rely either on intuition or analysis when engaging in cognitive processes. Within these instruments, the Style of Learning and Thinking (Torrance et al., 1977; 1978; Torrance, 1987) mirrors the connection between the intuition-analysis dimensions with the areas of neurological activity associated with the two halves of the human brain. This inventory distinguishes between "right" and "left" thinkers. Right brain thinking has been considered characteristic of the right hemisphere, whose activity, in fact, emphasizes synthesis and simultaneous integration of many inputs at once, whereas left brain thinking

An issue which is still open and is worth deepening concerns the possible relation between analytical thinking and cognitive abilities. In this respect, some authors claim that no connection does exist (Epstein et al., 1996; Handley, Newstead & Wright, 2000), others, conversely, suggest that intelligence, and mental abilities in general, may influence the actual use of intuition and analysis (Frederick, 2005; Kahneman & Frederick, 2002; 2006; Stanovich & West, 2000). Whereas the former maintain the independence of analysis and mental abilities, the latter claim the possibility that they are causally related (Frederick,

2005). Specifically, in the "heuristics and biases" literature, which supports the idea of intuition as a possible source thinking bias, it has been studied the correlation between thinking biases and cognitive ability, thus showing the existence of a relationship between cognitive ability and individual differences in the operation of thinking biases ((Bruine de Bruin, Parker & Fischhoff, 2007; Newstead et al., 2004; Parker & Fishhoff, 2005).

A simple measure of cognitive ability employed in the study of individual differences within the dual-process framework is the Cognitive Reflection Test (CRT: Frederick, 2005). It is made up of three brief problems, for which the default intuitive response is incorrect. Only engaging in a deliberate reconsideration, people can correct the intuitive response and give the right answer. For this reason, it has been considered as a measure of the ability to monitor initial default impressions and reason accurately.

1.2.2 Behavioural measures: intuitive and analytical strategies

Intuition and analysis have been measured also through a number of behavioural tasks (Bruine de Bruin, Parker & Fishhoff, 2007; Shiloh, Salton & Sharabi 2002) supporting the characterization of these two systems. Whereas research on individual styles focus on the dispositional features, behavioural studies pinpoint the situational and contextual aspects affecting and modulating intuition and analysis.

1.2.2.1 Intuition and analysis in conflict: the Ultimatum Game

Decision behaviours, in fact, may be conceived as the operation of multiple underlying systems that interact, sometimes in cooperation and sometimes in competition, to form judgment and decisions (Sanfey & Chang, 2008). While most judgments and decisions result from the synergistic interaction between intuitive and analytical thinking, at times the two systems may compete, thus making a conflict arise. Particularly interesting are those tasks where such a conflict clearly emerges. Among the others, the Ultimatum Game, which is

one of the most common games studied by experimental economists (Güth et al., 1982; Roth et al., 1991), turned out to be particularly suitable for the emergence of different and opposed tendencies (Sanfey & Chang, 2008). In the Ultimatum Game two players are given the possibility to split a sum of money. One player (the proposer) offers a part of the money to the second player (the responder). The responder can either accept the offer (in which case both players split the money as proposed) or reject the offer (in which case both players get nothing). According to traditional, computational models of decision making, both proposer and responder are supposed to behave rationally, and, as a consequence, the former should select his/her offer basing on expected utility and weight it by the probabilities that it would be accepted by the responder. Similarly, the latter, adopting a rational behaviour, should accept any positive offers, even the smallest possible offer, since any should be more attractive than receiving nothing. In sum, under the assumption of the predominance of a rational, computational, and "cognitive" conduct, proposers are expected to offer the smallest possible offer, and, in turn, responders are supposed to accept any positive offer. However, several decades of research employing the Ultimatum Game produced a wealth body of evidence showing that computational models do not provide an actual description of human behaviour. Results obtained across many studies demonstrate that the majority of proposers typically offer 40 to 50% of the total sum, and about half of all responders reject offers below 30% (Güth et al., 1982; Camerer & Thaler, 1995; Fehr & Gachter, 1999; Nowak, Page & Sigmund, 2000; Henrich et al., 2004). To explain these anomalies, it has been claimed the involvement of noncomputational affective processes (Pham, 2004) beside, or as an alternative to, computation cognitive processes. Specifically, the intervention of emotional aspects has been supposed to affect the actual behaviour of both proposer and responder. Some authors refer to a more general theory of reciprocity (Falk & Fishbacher, 2006; Fehr & Gachter, 2000) according to which people's behaviour is other-oriented, altruistic, it rewards fair and punishes unfair actions. This could explain why, on

one side, proposers usually offer about half of the entire sum of money, and responders, on the other side, reject low offers. In fact, the negative emotions caused by an unfair treatment in the Ultimatum Game can lead responders to sacrifice considerable amount of money in order to punish their partner and maintain their social reputation (Nowak, Page & Sigmund, 2000). Both players, proposer and responder experience a conflict between "analytical, cognitive", and "intuitive, emotional" tendencies. Specifically, the proposer has to decide whether offering low amount of money ("cognitive suggestion") or fair amount of money ("emotional suggestion"), whereas the responder has to opt for either accepting low offers ("cognitive suggestion") or rejecting them ("emotional suggestion!"). Decisions to solve this conflict in Ultimatum Game have been conceived as a consequence of the predominance of a mode of thinking against the other one.

The Ultimatum Game has been studied focussing either on the responder or on the proposer perspective. Most of the studies concentrates on the responders; it was particularly studied the specific reactions to what are considered as unfair offers. As already said, responders would reject unfair offers in order to punish those who treat them unfairly or those who refuse to cooperate (Haselhuhn & Mellers, 2005). It is as if subjects have an implicit notion of fairness (Camerer, 1997); in some case this notion can be an hyper-fairness since responders tended to reject both low and high offers (Bahry & Wilson, 2006).The notion of fairness regards both the intention and the consequences of an action. The same consequences of an action are perceived and reciprocated in a different way depending on the intention that guides the action. The major role played by intentions during interactive social games is testified by several studies (Sally & Hill, 2006; Rilling et al., 2004). Rilling et al. (2004), in particular, employed an Ultimatum Game version in which the proposers were either human person or computer. It turned out that responders distinguished between human and computer partners, rejecting unfair offers from human partners more frequently than unfair offers from computer. In accordance with the idea of reciprocity,

when participants could attribute and infer the intentions of real social partners they reciprocate punishing unkind offers. On the contrary, when partners were non-intentional agents, such as computers, participants were willing to accept even unfair offers.

As far as proposers is concerned, research focused on the factors that could introduce variations in numerous aspects of both the players and the setting. In particular, researchers introduced variations in specific characteristics of players such as demographic variables like gender (Solnick, 2001), race and culture (Eckel & Grossman, 2001; Oosterbeek, Sloof & Van de Kuilen, 2004; Roth et al., 1991), and age (Murnighan & Saxon, 1998; Harbaugh, Krause & Liday, 2003); and in the characteristics of the setting such as the total number of player involved in the game (Bornstein & Yaniv, 1998), the number of games played (Knez & Camerer, 2000), and the size of the stakes (Hoffman et al., 1996).

Other types of manipulation directly intervene on either the elicitation of cognition and emotion, that is the priming of the cognitive and emotional systems (Harle & Sanfey, 2007; Tesch & Sanfey, 2008). Primes are based on the idea that an induced mood can influence decision making, and in particular social decision making (Forgas, 2003; Zajonc, 2000). In Ultimatum Game research, it was found that, when responders were induced to engage in a spatial cognition task, that is when the cognitive system was primed, they accepted unfair offers more frequently than when no primes occurred (Tesch & Sanfey, 2008). On the contrary, when the emotional system was primed through movies or pictures inducing negative emotions (sadness or disgust), responders were more prone to reject unfair offers (Harle & Sanfey, 2007; Moretti & Di Pellegrino, 2008). The exposure to attractive sex-related pictures, conversely, which is supposed to induce positive emotional activations led to a higher rate of unfair offers' acceptance (Van den Bergh & Dewitte, 2007).

CHAPTER 2

HOW INTUITIVE AND ANALYTICAL STYLES ARE RELATED: COGNITIVE AND DECISION PROFILES

Introduction

A number of different self-report inventories have been devised to measure how people differ in relying on intuition and analysis in making decisions. As discussed in the Introduction, some of them refer to the specific field of decision-making, whereas others regard the more general ambit of cognitive styles. Moreover, some instruments conceive intuition and analysis as two complementary or independent ways of thinking, while others embrace a complex and multidimensional, as opposed to unitary, perspective in this regard (Scott & Bruce, 1995; Sternberg, 1997). Both the different points of view from which they have been studied and the various conceptual and operational definitions of the constructs have resulted in inconsistencies (Shipman & Shipman, 1985; Pretz & Totz, 2007). In fact, the dimensions of styles are still not clearly established, thus leaving unresolved whether the variety of inventories measures the same or different factors (Curry, 1990) and to which degree the different dimensions of styles overlap (Bostic & Tallent-Runnels, 1991). Within this framework, some authors have suggested that studies designed to investigate the connections among different styles dimensions in order to, in case, identify a small number of significant factors are needed (Goldstein & Blackman, 1978; Bostic & Tallent-Runnels, 1991).

The purpose of the present study is to examine the relationship between different commonly used measures of cognitive and decision styles, in order to identify, if possible, broader stylistic profiles, whose constituting dimensions, even if conceptually and operationally conceived in different ways and pertained to distinct fields, tap on the same intuitive-analytical dimension. In order to do so, five different measures have been selected and employed in the present study. Since our main focus was on decision making, most inventories concern decision-making styles. In particular, three decision-making style instruments were selected because of the specific constructs they claim to measure. In fact, in order to identify broad stylistic profile, we selected a number of instruments whose dimensions ranged from the intuitive-analytical dimension to both a more differentiated taxonomy of styles and a diverse dimension which, despite the difference, shows some overlapping with the intuitive-analytical dimension. Moreover, from the perspective of identifying multifaceted stylistic profile, it was decided to include an inventory concerning the more general field of cognitive styles. Finally, since in literature findings were inconclusive about the possibility of connecting the intuitive-analytical dimension to mental abilities, an instrument suitable for this scope was employed.

The *Preference for Intuition and Deliberation Scale* (PID: C. Betsch, 2004) can be valued as a measure which assesses the inclination to intuitive vs. deliberate decision making, with a particular emphasis on the affect-cognition and on the implicit-explicit attitude distinction. The PID assumes individual inclinations towards intuitive decision making (based on affective reactions towards the decision option) and deliberate decision making (based on beliefs, evaluations, reasons). A number of empirical findings supported these assumptions. It has been shown that intuitive people included affective reactions in their choices, while deliberate people refrained from doing so (Schunk & C. Betsch, 2006; C. Betsch & Kunz, 2008). Moreover, intuitive subjects are faster in decisions (Schunk & C. Betsch, 2006; C. Betsch, 2004) and their decisions were better predicted by implicit attitudes Richetin et al., 2007).

The *General Decision Making Style* (GDMS) developed by Scott and Bruce (1995) identifies rational and intuitive dimensions as two of five separate decision-making styles. This inventory suggests the existence of five distinct decision-making styles, which are defined by the authors as a learned habitual response pattern, corresponding to specific patterns of behaviour that individuals use in decision-making. In particular, the authors distinguished the following stylistic dimensions: a rational style characterized by comprehensive search for information and logical evaluation of alternatives; an intuitive style characterized by attention to details and a reliance on hunches and feelings; a dependent style characterized by the search for guidance from others before making decisions; an avoidant style characterized by attempts to avoid decision-making whenever possible; a spontaneous style characterized by the desire to come through the decision-making process as quick as possible. Several studies, which have been conducted to validate the instrument (Loo, 2000; Spicer & Sadler-Smith, 2005; Thunholm, 2004), demonstrated that it is a psychometrically sound inventory.

The intuitive-analytical dimension measured by PID and the more articulated taxonomy proposed by GDMS and the more differentiated two above illustrated measures of decision-making styles seem to present, from a theoretical point of view, some points of overlapping also with other stylistic measures, either with specific decision tendencies or more general cognitive styles. Specifically, they show some point of intersection with the distinction between maximizers and satisficers proposed by Schwartz et al. (2002). The authors distinguished between people who tend to be satisfied with what is considered a "good enough option", the so-called "satisficers" and, on the other side, people who tend to achieve what is considered the "best option", the so-called "maximizers". The satisficers look for the alternative that is over the threshold of acceptability and as soon as they find it, they opt for it. On the contrary, the maximizers aim to obtain the best outcomes and to achieve it they carefully examine all the available alternatives and they tend to rely on other people's opinion in making

their own decisions. Thus, the rational and dependent decision styles could be related with maximizing tendencies, whereas the intuitive and spontaneous decision styles could be connected with satisfying tendencies. The *Maximization Scale* (Schwartz et al., 2002) has been proposed as an instrument designed to measure the maximizing and satisfying tendencies.

Furthermore, all these decision-making measures, they show some points of overlapping with the broader cognitive styles dimensions, as the thinking and learning styles identified by Torrance et al. (1977; Torrance 1987). Hypotheses derived from research into brain lateralization induced Torrance (1987) to propose the distinction between a left and a right style of thinking. The *Style of Learning and Thinking* (Torrance et al., 1977; Torrance, 1987) inventory was originally intended to assess the notion of left-right brain dominance before further research disconfirmed the hypothesized independence of the two hemispheres (Zalewski, Sink & Yachimowicz, 1992). At present the inventory is considered a useful tool for assessing analytic versus intuitive modes of thinking (Zhang, 2002). Left style is concerned with verbal, logical, analytical, and abstract tasks; the left style implies preference for sequential processing of information and systematicity in solving problems. The right style refers to nonverbal, holistic, spatial, and concrete thinking and style implies preference for parallel processing, perceptual representation in the form of synthesized patterns, intuitive and creative problem-solving. People who tend to be conformist and to operate in a logic way are left thinkers, whereas people who tend to be non-conformist, intuitive and creative have a right thinking profile. The right thinking style shares some features with both the intuitive and spontaneous decision styles and the tendencies to be satisfied, whereas the left thinking style presents connections with both the rational and dependent decision styles and the tendencies to maximize.

All these instruments measure the tendency, the habit, or the preference for a specific pattern of behaviour, which is considered as different and separate from cognitive ability (Epstein et al., 1996; Handley, Newstead & Wright, 2000). As

already discussed in the Introduction, whereas the former refers to what people are able to do, the latter to what they are inclined to do. However, some authors suggest that, even if they do not coincide, styles and mental abilities may partially overlap. Specifically, some authors claim that intelligence, and mental abilities in general, may influence the actual use of intuition and analysis (Bruine de Bruin, Parker & Fischhoff, 2007; Frederick, 2005; Kahneman & Frederick, 2002; 2006; Parker & Fishhoff, 2005). The *Cognitive Reflection Test* (CRT: Frederick, 2005) has been employed as a measure of cognitive ability in the study of individual differences within the dual-process framework. It is made up of three brief problems, for which the default intuitive response is incorrect. People can correct the intuitive response only engaging in a deliberate reconsideration of the problem. For this reason, it has been considered as a measure of the ability to monitor initial default impressions and reason accurately. The CRT measure has been found to highly correlate with a variety of measures associated with analytical thinking, including intelligence (Stanovich & West, 2000), however, these results do not provide a conclusive finding concerning the relationship between intuitive/analysis and mental abilities. In fact, it has to be clearly stated what this instrument actually measure, that is what aspects of intuition and analysis are really addressed through it.

The general purpose of the Study 1 and 2 was to verify the existence of relationships among these instruments in order to identify broad cognitive and decision profiles including a set of characteristics, rather than defining individual styles through single and isolated dimensions in which reciprocal boundaries and overlaps are still unclear. Within this general aim, four specific goals are set across the two studies:

- to validate those inventories whose Italian versions were neither applied nor validated yet;

- to verify the existence of relationships among all the instruments employed;

- to compare the scores obtained by different experimental subsamples on these instruments;

- to identify two samples of participants showing an "extreme" intuitive or analytical stylistic profile on the instruments employed.

These specific aims are differently declined and further specified within each study.

2.1 STUDY 1

2.1.1 Aims

The specific aims of the first study were as follows.

Study 1 had an exploratory purpose, that is, it was aimed at verifying the internal structure of the inventories whose Italian versions were neither applied nor validated yet.

The second aim was to verify the existence of relationships between different stylistic measures, such as the styles identified by *General Decision Making Style Inventory* (Scott & Bruce, 1995) and the maximizing tendencies assessed by the *Maximization Scale* (Schwartz et al., 2002), and a more general thinking and learning stylistic dimension such as the left-right style as measured by the *Style of Learning and Thinking questionnaire* (Torrance et al., 1977; 1978; Torrance, 1987). In particular, it was hypothesized to find positive correlations among:

- the rational and dependent decision style, the tendency to maximize, and the left thinking style;

- the intuitive and spontaneous style, the tendency to satisfy, and the right thinking style.

The third aim was to further substantiate the evidence that cognitive and decision styles vary depending on the occupational status of the participants.

Some studies have researched into the role of other personal characteristics such as gender (Allinson & Hayes, 1996; Meric & Capen, 2008; Pacini & Epstein, 1999; Parikh, 1994; Taggart et al., 1997), and age (Phillips, 2008), but very few attempts have been made to connect individual styles and occupational status (Iannello, 2007; Iannello & Antonietti, 2007; Meric & Capen, 2008). In particular, in the present study, a comparison between subsamples of students and workers was made.

2.1.2 Method

2.1.2.1 Materials

The following inventories were administered to participants:

GDMS (General Decision Making Style)

GDMS (Scott & Bruce, 1995) is a questionnaire used to determine the individual decision-making style. The instrument consists of five subscales corresponding to the different styles identified by Scott and Bruce (1995): rational, intuitive, dependent, avoidant, and spontaneous.

The questionnaire is composed of 25 item which are behaviourally phrased. For each item subjects are requested to express their degree of agreement on a 5-point Likert scale (1=strongly disagree; 5=strongly agree).

Maximization Scale

Maximization Scale (Schwartz et al., 2002) is a questionnaire aimed at identifying people who tend to achieve what is considered the "best option" (the so-called "maximizers") and people who tend to be satisfied with what is considered a "good enough option" (the so-called "satisficers").

The measurement consists of 13 items behaviourally phrased. Respondents answer questions regarding their decision-making habits on a 7-point Likert scale (1=completely disagree; 7=completely agree).

SOLAT (Style of Learning and Thinking)

SOLAT (Torrance et al., 1977; 1978; Torrance, 1987) aims at measuring individual thinking and learning style. In particular, the instrument distinguishes between people who tend to be conformist, to operate in a logic and systematic way ("left" thinking profile) and people who can be described as non-conformist, intuitive and creative ("right" thinking profile). The standardized Italian version of *SOLAT* (Antonietti et al., 2005) consists, as the original one, of 28 items. Each of them is composed of two different statements: one of the statement refers to left thinking style, the other refers to the right thinking style. Subjects are requested to choose the statement which best suits him/her. The individual thinking style is the style in which the subject obtains the highest score. Choosing both statements results in scoring on the integrative subscale.

The Italian version of *SOLAT* shows a quite adequate internal-consistency reliability ($\alpha = .69$) and a good fit of global model (Pearson Separation index $= .71$).

2.1.2.2 Participants

One hundred and seventy-three people (78 men and 95 women), aged from 18 to 60 (mean = 29.8 yrs.), were involved in the study. According to occupation, the total sample consisted of two different subsamples. The first subsample was composed of 71 high school students (57 men and 14 women); the mean age for this group was 18.8 yrs (SD = 1.5). The second subsample consisted of 102 workers (21 men and 81 women); the mean age for this group was 36.8 yrs (SD = 9.9).

All participants were volunteers. As for the recruitment of the students, some high schools in Milan were contacted. One of them confirmed the availability of some of the classes to participate in the present study. As for the workers, they were contacted during training courses they attended.

The selection of two different subsamples was decided upon to ensure that the individual differences in terms of styles could be studied in people with different characteristics concerning age and occupation so allowing us to make

comparisons between them. Some of the research studies that are referred to in this paper used a mix of samples to research into stylistic measures (Allinson & Hayes, 1996).

2.1.2.3 Procedure

Data were collected in November 2006. As for the sample of students, the administration of the questionnaires took place in their school during lesson time; as for the workers, it took pace during the training courses they attended. Participants were asked to fill in the three questionnaires (*GDMS, Maximization Scale, SOLAT*) presented in a counterbalanced order in a single session. No time limits were established. Participants took 20 minutes to fill in the three questionnaires. Participants were told that the questionnaires were anonymous and that there were no right or wrong answers.

2.1.3 Results

Analyses of the data proceeded as follows. We first assessed the factorial structure and the internal consistency reliability of both the *GDMS* questionnaire and the *Maximization Scale* (for *SOLAT* this step was skipped since the properties of the Italian translation of the instrument, showing that it matches the original one, had already been assessed: Antonietti et al., 2005). Next, we investigated the relationships among the *Maximization Scale, GDMS,* and *SOLAT*. Finally, we verified the existence of differences between the two subsamples on the *GDMS, Maximization Scale* and *SOLAT*.

2.1.3.1 Exploratory factor analysis and internal consistency

On the data derived from each instrument, an exploratory factor analysis was carried out to identify the factorial structure of each scale. Moreover, the internal consistency reliabilities were calculated for each subscale of the instruments.

Before running the analysis the assumption of univariant normality was assessed on each item of the three inventories by getting skewness and kurtosis and dividing these by the standard errors. Both skewness and kurtosis were within

the +1 to -1 range, so allowing to conclude that data were normally distributed (Marcoulides & Hershberger, 1997). In particular, as for the *GDMS* the skewness values ranged from -.75 to .64, whereas the kurtosis values ranged from -.96 to .28; for the *Maximization Scale* the skewness varied from -.1.02 to .01 and the kurtosis from -.50 to .69; for the *SOLAT* the skewness values ranged from .15 to .97 and the kurtosis values from -.99 to .88.

General Decision Making Style

Prior to the application of the factor analysis, the Kaiser-Meyer-Olkin (KMO, Kaiser, 1970; 1974) was used to measure sampling adequacy and Bartlett's test of sphericity (Bartlett, 1954) was used to test whether the correlation was appropriate for factor analysis and statistically significant. The KMO value for this analysis was 0.75. KMO measure above 0.60 is considered acceptable; above 0.70 is good; above 0.80 is commendable; above 0.90 is exceptional (Henry et al., 2003). The Bartlett's test of sphericity was statistically significant (χ^2=1376.193, p<.001), indicating that the data were appropriate for the analysis. Factor Analysis, using principal components extraction and Varimax rotation, was performed on the data derived from *GDMS.* Items with a component pattern of at least 0.30 were used in interpreting the component. Five factors were extracted.

The rotated components coefficient matrix, which accounted for 52.9% of the postrotational variance, is shown in Table 2.1.

Factors	Items of GDMS																							
	16R	6R	11R	21R	1R	4A	2 I	22I	7 I	12I	18D	3D	23D	13D	8D	9A	14A	24A	19A	10S	5S	15S	20S	25S
2. Rational	.71	.66	.65	.63	.59	.35																		
5. Intuitive							.77	.74	.70	.58														
1.Dependent											.85	.79	.73	.72	.67									
3. Avoidant																.85	.79	.71	.37					
4.Spontaneous																				.73	.68	.67	.63	.49

Tab. 2.1 – GDMS: Rotated components matrix

The five factors extracted corresponded to the structure identified by Scott and Bruce (1995) even though some exceptions came out. Factor 1 (eigenvalue = 4.60, corresponding to the 18.1 % of the variance) was labelled "dependent"

because all five dependent items loaded on this factor. All five items from the rational style loaded on factor 2 (eigenvalue = 3.20, corresponding to the 13.1% of the variance); however also item 4 loaded on this factor instead of loading on its expected component, that is, factor 3. In fact, only four items loaded on factor 3 (eigenvalue = 2.40, corresponding to the 9.5% of the variance), which corresponded to the avoidant style. Factor 4 (eigenvalue = 1.70, corresponding to the 6.9 % of the variance) represented the spontaneous style. Four out of five intuitive items loaded on factor 5 (eigenvalue = 1.30, corresponding to the 5.3% of the variance) since item 17, which was expected to load on this factor, failed to load any of the five components.

Cronbach's alpha was calculated for each factor. Cronbach's alpha coefficient for the first subscale ("dependent style") was .82. Cronbach's alpha for the second and the fourth subscales was above .70 (.74 for the "rational style" and .73 for the "spontaneous style"), whereas it was found to be .61 for the third subscale ("avoidant style") and .56 for the last one ("intuitive style").

Maximization Scale

Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity showed that the samples met the criteria for factor analysis. KMO measure was 0.75 and Bartlett's test of sphericity was significant (χ^2=373.851, p<.001).

Four components were extracted from the items of the *Maximization Scale* by applying the principal components extraction and Oblimin rotation. Items with a component pattern of at least .30 were used in interpreting the component. The rotated components coefficient matrix, which accounted for 54% of the postrotational variance, is shown in Table 2.2.

Components	Items of Maximization Scale												
	9	7	8	10	6	1	3	2	5	11	13	4	12
2. Difficulty in choice	.71	.70	.68	.63									
1. Search for options					.75	.70	.50	.49	.48				
3. High standard										.74	.72	.58	
4. Second best													.86

Tab. 2.2 – Maximization Scale: Rotated components matrix

The first three components corresponded to the three original ones extracted by Schwartz et al. (2002). The first and second components represented behavioural examples of maximizing. The first one referred to the difficulties encountered in choosing among different alternatives, in particular while shopping (eigenvalue = 3.30, corresponding to the 25.3% of the variance). The second component concerned the attitude of being open to different options and actively searching for them (eigenvalue = 1.50, corresponding to the 11.4% of the variance). The third component represented the tendency to have high standards, for oneself and in general (eigenvalue = 1.20, corresponding to the 8.9% of the variance). Item 12 could not be included in any of these components, forming a new fourth component, which referred to the claim "Never settling for the second best" (eigenvalue = 1.10, corresponding to the 8.4% of the variance).

Cronbach's alpha was calculated for each component emerging from factor analysis (with the obvious omission of the fourth factor). Cronbach's alpha coefficient was .66 for the first component ("difficulty in choice"), whereas it was .50 for the second component ("search for options") and .52 for the third one ("high standard").

2.1.3.2 Relationships among decision and cognitive styles

Correlations were first calculated between *GDMS* and *Maximization Scale,* then between *GDMS* and *SOLAT*, and, finally, between *Maximizations Scale* and *SOLAT*.

Bivariate correlations between *Maximization Scale* and *GDMS* resulted to be as shown in Table 2.3.

		GDMS				
		Rational	Intuitive	Dependent	Avoidant	Spontaneous
	Summed scale	.120**	.097	.145*	.227**	.059
	Search for options	-.065	.234**	.021	.139	.174*
MAXIMIZATION SCALE	Difficulty in choice	-.090	.096	.156*	.352**	-.018
	High standard	.311**	.166*	.018	.041	-.046
	Second best	-.002	.222**	-.043	-.128	-.050

Tab. 2.3 – Maximization Scale and GDMS: Bivariate correlations   ** $p < .01$ * $p < .05$

As suggested by previous research (Nenkov et al., 2008) people's scores on the maximization components were assessed in addition to their summed maximization score. Evidence, in fact, suggest that the components are related to different psychological variables (Iyengar et al., 2006; Schwartz et al., 2002).

Correlational analyses revealed that *Maximization Scale* and *GDMS* showed some statistically significant relationships. In particular, results highlighted that the summed scale was positively related to almost every *GDMS* scale, with the exception of the intuitive and spontaneous ones. As for the specific components of the *Maximization Scale*, it turned out that the subscale concerning the difficulty in choosing among different alternatives was positively associated with the dependent and avoidant style subscales. Scores on the Maximization component referring to the active search for different options were positively correlated with both the spontaneous and intuitive *GDMS* subscales. Scores on the maximization subscale referring to the tendency of having high standard of life were associated with both rational and intuitive *GDMS* style. Finally, scores on the intuitive style subscale were associated with the tendency of never settling for the second best.

Then, bivariate correlations between *GDMS* and the subscales of *SOLAT* were calculated. Results are shown in Table 2.4. Before calculating correlations, *SOLAT* data were recoded as follows. To identify which style the participants preferred, the number of items in which they chose the left-style, the right-style statements and either both or none of them was calculated. As a consequence, for each participants three total sums (corresponding to the three styles: left, right, and integrated) were obtained.

		GDMS				
		Rational	Intuitive	Dependent	Avoidant	Spontaneous
SOLAT	Right style	-.152*	.132*	-.042	.010	.128*
	Left style	.300**	-.125*	.095	.102	-.046
	Integrated style	-.084	-.021	-.025	-.093	-.077

Tab. 2.4 – GDMS and SOLAT: Bivariate correlations   ** p < .01   * p < .05

SOLAT and *GDMS* pointed out the existence of some statistically significant relationships. In particular, the analysis revealed that scores on the rational style subscale were associated positively with the left style subscale and negatively with right style subscale. Conversely, the intuitive style was positively associated with the right style and negatively with the left style. Finally, the spontaneous style was positively correlated with the right style.

Finally, bivariate correlations between *Maximization Scale* and the three subscales of *SOLAT* were calculated. Results are reported in Table 2.5.

		MAXIMIZATION SCALE				
		Summed scale	Search for optino	Difficulty in choice	High standard	Second best
SOLAT	Right style	.066	.182*	.058	-.076	-.086
	Left style	.130*	.042	.120*	-.063	.104
	Integrated style	-.148*	-.224**	-.112	.129	-.014

Tab. 2.5 – SOLAT and Maximization Scale: Bivariate correlations   ** $p < .01$ * $p < .05$

Correlation coefficients revealed that *SOLAT* and *Maximization Scale* showed some statistically significant relationships. Specifically, results pointed out that scores on the Maximization summed scale were positively correlated with the left style and negatively with the integrated style; the Maximization component concerning the active search for different options were positively associated with scores on the right style subscale and negatively associated with scores on the integrated style subscale; lastly, the maximization component concerning the difficulties in choosing showed a positive correlation with the left style.

2.1.3.3 Differences between subsamples

In order to investigate the existence of differences in terms of decision-making styles, maximization tendencies and thinking styles depending on the participants' occupational status (students and workers), mean scores obtained on each instrument by the two different subsamples were compared. Furthermore, since the mean age of the two occupation subsamples are substantially different (18.8 years for the student group and 36.8 for the worker

one) the effect of age was controlled in order to exclude that any effect due to occupation could have been due to the age instead.

General Decision Making Style

The assumption of homogeneous variances was tested by using Levene's test. P-values were not statistically significant (values ranged from $p = .094$ to $p = .896$), thus indicating that the analysis of variance was possible.

In order to compare scores obtained on *GDMS* by students and workers, a one-way ANOVA was computed. Results are reported in Table 2.6.

Subscales	Occupation	Mean	SD	$F_{(1,171)}$	P	η^2
1. Rational	Students	3.70	0.58	2.643	.074	.030
	Workers	3.86	0.65			
2. Intuitive	Students	3.53	0.59	0.992	.373	.011
	Workers	3.39	0.73			
3. Dependent	Students	3.34	0.72	2.571	.087	.023
	Workers	3.45	0.61			
4. Avoidant	Students	2.79	0.82	6.615	<.005	.070
	Workers	2.32	0.81			
5. Spontaneous	Students	3.08	0.71	1.164	.315	.013
	Workers	2.92	0.70			

Tab. 2.6 – GDMS: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences were found only on the avoidant style subscale in which students obtained significantly higher scores than workers. Nevertheless, even though differences on the other style subscales did not reach the statistical significance, students reported higher scores than workers also on the spontaneous and intuitive style subscales and lower scores on the rational and dependent ones.

Furthermore, a one-way ANOVA was computed in order to compare scores obtained on each subscale by the different age groups. Subdividing the experimental sample into regular intervals (decades) with respect to age, five different age groups were identified (18-19; 20-29; 30-39; 40-49; 50-60). Results are reported in Table 2.7. Statistical mean differences were found on the rational, intuitive and avoidant styles. Specifically, post-hoc tests (LSD and Newman-Keuls tests) showed that 18-19 and 20-29 years people obtained

significantly lower scores as compared to the older groups on the rational style scale and, conversely, they obtained higher scores on the avoidant style scale. As for the intuitive style scale, 40-49 years people scored lower as compared to all other age groups.

Subscales	Age	Mean	SD	$F_{(4,168)}$,	P	η^2
1. Rational	18-19	3.51	0.53			
	20-29	3.60	0.51			
	30-39	3.85	0.66	3.286	<.05	.084
	40-49	3.87	0.61			
	50-59	3.90	0.61			
2. Intuitive	18-19	3.57	0.58			
	20-29	3.52	0.60			
	30-39	3.42	0.77	3.007	<.05	.065
	40-49	3.05	0.71			
	50-59	3.51	0.72			
3. Dependent	18-19	3.23	0.76			
	20-29	3.66	0.84			
	30-39	3.20	0.77	2.325	.059	.060
	40-49	3.44	0.79			
	50-59	3.27	0.66			
4. Avoidant	18-19	2.80	0.79			
	20-29	2.53	0.76			
	30-39	2.35	0.88	4.223	<.005	.094
	40-49	2.08	0.80			
	50-59	2.33	0.88			
5. Spontaneous	18-19	3.16	0.68			
	20-29	2.98	0.67			
	30-39	2.89	0.78	2.228	.068	.047
	40-49	2.71	0.56			
	50-59	3.10	0.73			

Tab. 2.7 – GDMS: One-way ANOVA comparing scores obtained by age subsamples

Maximization Scale

Prior to the application of the analysis of variance, Levene's test (Levene, 1960) was used to verify the assumption that variances were equal across samples. For each component the resulting p-value of Levene's test was not statistically significant (p-values ranged from p = .084 to p = .990, thus allowing to conclude that no differences between variances in samples exist. A one-way ANOVA was performed to compare the factorial scores of the *Maximization Scale*

obtained by the two different subsamples (students and workers). Results are reported in Table 2.8.

Components	Occupation	Mean	SD	$F_{(1,171)}$	P	η^2
1. Summed scale	Students	4.27	0.85	41.648	<.001	.200
	Workers	3.42	0.85			
2. Search for options	Students	3.92	1.35	38.127	<.001	.186
	Workers	2.94	1.19			
3. Difficulty in choice	Students	4.46	1.02	21.569	<.001	.177
	Workers	3.25	1.20			
4. High standard	Students	4.36	1.00	0.131	.718	.001
	Workers	4.36	1.08			
5. Second best	Students	3.32	1.73	0.127	.722	.001
	Workers	3.54	1.73			

Tab. 2.8 - Maximization Scale: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences emerged on the summed maximization scale and on the two subscales representing behavioural examples of maximizing tendencies: the one which includes being open to different options and actively searching for them and the one which refers to the difficulties encountered in choosing among different alternatives. In particular, students obtained significantly higher scores than workers in these three subscales. On the contrary, statistical differences between scores obtained by students and workers did not emerged on the third component, which concerns having high standards and on the last component which refers to the claim "Never settling for the second best".

To verify the effect of age on the maximization scores, a one-way ANOVA was computed on the scores obtained by the different age groups on the maximization subscales. Results are reported in Table 2.9. Statistical mean differences were found on the same subscales. In particular, LSD and Newman-Kreuls post-hoc tests highlighted that 18-19 and 20-29 years groups obtained significant higher scores than the other groups on both the summed scale and the subscale concerning the difficulties in choosing among alternatives. On the search-for-option subscale 18-19 years group scored higher than all other age groups.

Components	Age	Mean	SD	$F_{(4,168)}$	p	η^2
1. Summed scale	18-19	4.26	0.87			
	20-29	3.97	1.05			
	30-39	3.49	0.76	9.841	<.001	.185
	40-49	3.15	0.87			
	50-59	3.29	1.02			
2. Search for options	18-19	3.95	1.32			
	20-29	3.25	1.26			
	30-39	2.87	1.49	6.607	<.001	.135
	40-49	2.82	1.11			
	50-59	2.70	0.63			
3.Difficulty in choice	18-19	4.48	1.07			
	20-29	4.20	1.84			
	30-39	3.32	1.11	13.629	<.001	.247
	40-49	2.80	1.14			
	50-59	2.52	0.87			
4. High standard	18-19	4.25	0.95			
	20-29	4.48	0.93			
	30-39	4.66	1.11	1.299	.272	.030
	40-49	4.29	1.15			
	50-59	4.06	1.31			
5. Second best	18-19	3.16	1.69			
	20-29	3.31	1.52			
	30-39	3.76	2.01	0.981	.420	.023
	40-49	3.60	1.57			
	50-59	3.86	2.09			

Tab. 2.9 – Maximization Scale: One-way ANOVA comparing scores obtained by age subsamples

Style of Learning and Thinking

To assess the equality of variance in different samples Levene's test was used. The results confirmed that the samples met the criteria for the analysis (p-values ranged from p=.339 to p=.923)

Three one-way ANOVA were carried out to compare scores in the subscales of *SOLAT* obtained by the students and workers. Results are shown in Table 2.10.

Subscales	Subsamples	Mean	SD	$F_{(1,171)}$	p	η^2
1. Left	Students	9.32	4.98	1.924	.167	.011
	Workers	8.28	4.83			
2. Right	Students	13.14	5.18	0.560	.455	.003
	Workers	12.53	5.29			
3. Integrated	Students	5.52	5.28	4.117	<.05	.023
	Workers	7.17	5.28			

Tab. 2.10 - SOLAT: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical differences came out only on the integrated style subscale on which workers obtained higher scores than students. As for the left and right style subscales students obtained higher scores than workers, even though in both subscales the difference did not reach the statistical significance.

A one-way ANOVA was computed to verify the effect of age variable on *SOLAT* scores. Results are reported in Table 2.11. Results showed that statistical mean differences emerged on the left and integrated style subscales. LSD and Newman-Keuls post-hoc tests highlighted that 20-29 and 30-39 years groups scored lower than 40-49 and 50-59 years groups on the left style subscale whereas 30-39 years group obtained higher scores than younger people on the integrated style subscale.

Subscales	Age	Mean	SD	$F_{(4,168)}$	p	η^2
1. Left	18-19	8.30	4.73	2.878	<.05	.063
	20-29	7.30	4.75			
	30-39	7.30	4.60			
	40-49	9.46	5.19			
	50-59	10.94	4.90			
2. Right	18-19	13.40	4.79	1.672	.159	.038
	20-29	13.90	5.65			
	30-39	12.20	4.88			
	40-49	11.07	5.96			
	50-59	11.83	4.69			
3. Integrated	18-19	5.30	4.73	2.411	<.05	.053
	20-29	6.80	4.63			
	30-39	8.50	5.21			
	40-49	7.46	5.99			
	50-59	7.10	4.88			

Tab. 2.11 – SOLAT: One-way ANOVA comparing scores obtained by age subsamples

2.1.4 Discussion

A first finding is that the data collected partially supported the structures of the instruments described in literature, so allowing to conclude that the Italian translation of the questionnaires employed in the research mirrors to some extent the corresponding original versions. In fact, factor analysis showed that, in general, the same components as the ones which were found in the original versions emerged, even though some slight differences occurred, such as the two items which do not load on their expected components in *GDMS* and the item which constitutes an additional component in the *Maximization Scale*. The internal reliability for the scales employed (computed with coefficient alpha) can be considered acceptable for the *GDMS* whose subscales' internal reliability was, in almost all cases, consistent with the values previously reported in literature (Loo, 2000; Galotti et al., 2006), whereas for the *Maximization Scale* it was below the level of acceptability, even though these results are in line with other previous research (Nenkov et al., 2008) .

Findings from this study add support to the instruments developed by Scott and Bruce (1995), even if some adjustments to the Italian version are needed in order to overcome some minor problems that emerged in the study. As for the *Maximization Scale*, the study revealed that the psychometric qualities of the instruments are less than ideal. However, since our results are in line with findings from other research, this does not seem to be ascribable to our Italian version of the instrument, but, on the contrary, it turns out to be a finding common to different and numerous investigations (Diab, Gillespie & Highhouse, 2008; Highhouse & Diab, 2006; Parker, Bruine de Bruin & Fishhoff, 2007), so that recently it has been suggested that the existing *Maximization Scale* is a "candidate for refinement" (Nenkov et al., 2008). Nevertheless, given the fundamental importance that the maximizing construct has in decision-making research and being the *Maximization Scale* the only instrument (at least at the moment of the present research) aimed at measuring this construct, it has been opted for using the instrument, so long as bearing

these problems in mind. All in all it appeared that the Italian translations of the two instruments that were devised for this study were adequate, so to be applicable also in future research, thus confirming that *Maximization Scale* and *GDMS* represent useful tools in assessing specific aspects of individual differences in decision-making process.

As regards the pattern of relationships among the instruments employed in the study, it turned out that questionnaires are related one another in consistent ways. Specifically, correlations between *Maximization Scale* and the *GDMS* questionnaires showed that people with either a dependent or avoidant decision style encounter difficulties in choosing among different alternatives that are present at the moment of the choice, whereas people with a spontaneous or intuitive decision style tend to search for different options that are imagined and created by them. A possible explanation is that people who experience decision-making as heavy and demanding, such as individuals with an avoidant decision style, feel uncomfortable when making a choice, all the more having a greater number of options at their own disposal to choose among which probably would make the decision-making process even more difficult. As for people with a dependent decision style, it could be the case that, not being proactive and resourceful and being in need of other people's advice, they encounter difficulties when making choices, all the more when they are provided with a wide range of options. On the contrary, probably due to their tendency to be creative and enterprising, people with both a spontaneous and intuitive decision style prefer searching for and imagining different alternatives. Moreover, both people with a rational and an intuitive decision style are used to settle high standards of life. These relationships could be explained by the fact that, once the standards have been settled, they can be reached through different strategies. In any case, high standard are associated to the possession of a clear strategy to match them. The summed maximization scale turns out to be related to rational, dependent, and avoidant decision makers. These correlations could be predicted from Schwartz's conceptualization of maximizing construct. In fact, according

to him, maximizers engage in more rational decision making which reflect their perception of systematic deliberation about their choices; they tend to rely more on others' advice which indicates the interpersonal comparisons they usually activate; finally, they show a more avoidant decision making which reveals the their tendency to postpone decisions to search for more information and ponder the alternatives (see also Parker, Bruine de Bruin & Fischhoff, 2007).

The patterns of relationships between the *Maximization Scale* and the *SOLAT* pointed out that people with a right thinking style tend to search for different alternatives during decision-making process. Being nonconformist and preferring to hunt for original solutions, right thinkers are used to search for alternatives that are not present at the moment of the decision. On the contrary, people with an integrated thinking style do not search for alternatives and usually experience difficulty when choosing among different alternatives. Integrated thinkers do not present a definite thinking style and, probably, they are not used to invent or imagine alternatives that are not available during decision-making process. The positive association between the summed scale and the left thinking style is in line with what emerged from the relationship between maximization scores and *GDMS*, thus confirming that maximizers tend to engage in an analytical and systematic decision making.

Relationships between the *GMDS* and the *SOLAT* questionnaires showed that the rational decision style is associated with the left thinking style and, in the opposite direction, with the right thinking style. Conversely, the intuitive decision style is positively associated with the right thinking style and negatively with the left thinking style. People who think in a logical and systematic way do not rely on intuitions, but rather tend to make decisions in a rational way. On the contrary, people who think in a associative and holistic way tend to decide in an intuitive way. It appears that the tendency to apply a specific set of strategies (systematic analysis versus intuition) in decision-making reflects a more general tendency to rely on one of the two kinds of thinking processes in cognitive tasks.

Furthermore, the present study found that the comparison between the scores obtained on the three questionnaires by the two subsamples pointed out that students and workers showed differences in various subscales of the instruments. In particular, as far as *Maximization Scale* was concerned, students showed higher scores than workers in the summed scale and in the two components representing behavioural examples of maximizing tendencies, that is, the one which concerns the difficulty to choose among different alternatives and the one which refers to being open to different options and actively searching for them. As for the *GDMS*, students obtained significantly higher scores than workers on the avoidant style subscale and, to a lesser degree, on the spontaneous and intuitive style subscales and lower scores on the rational and dependent style subscales. As far as the *SOLAT* was concerned, students obtained lower scores in the integrated thinking and learning styles.

The students' portrait that came out from these results highlighted that students tend to be curious, enquiring, and open to different alternatives. Probably, these characteristics lead them to wish to have many different alternatives at their own disposal to choose among. However, being even insecure and, at times, taking up extreme attitudes, on one hand they try to avoid decision-making whenever possible and, on the other hand, they show spontaneous and intuitive decision-making styles and thinking style features that are typical of both left and right thinkers. Findings also highlight the existence of significant relationships between individual styles and age, supporting the idea of a general change in styles with maturation (Gurley, 1984). In accordance with other previous research (Furnham et al., 1999; Iannello & Antonietti, 2007), results of the present study suggest that as one ages, that is, gains in life experiences, one tends to rely less on intuitive and avoidant styles than younger people do. Furthermore, adults usually engage in more detailed analysis of the situation, ask other people for advice before making decisions, and present the thinking features that are typical of an integrated style. These results are consistent with the common-sense notion that older people are more reflective and take more

factors into account, whereas young people tend to be impulsive when making decisions.

In conclusion, the present study pointed out that different decision styles' classifications, such as tendencies to maximize as described by the *Maximization Scale* and the five decision styles as identified by the *GDMS,* show several points of overlapping, even though the value of the statistically significant correlation coefficients found were not so high. Presumably, being characteristics that are not independent one another, the distinct style labels emphasise different aspects of a single cognitive profile.

Moreover, decision styles classifications present some features that are typical of certain thinking and learning style proving that, as highlighted by Thunholm (2004), decision-making style could not be regarded as a separate tendency to respond in a specific way in a certain decision-making context. On the contrary, decision-making styles involve other general cognitive mechanisms such as information processing, intentions maintaining, self-evaluation, and self-regulation which lead to a wider and holistic definition of decision-making style that takes the whole person into account. Individual differences among decision makers also involve differences in basic cognitive abilities. The pattern of relationships that emerged in the study can help to identify decision-makers' profiles rather than single and isolated features. In particular it is worth noting that, whereas stylistic aspects of decision-making that make reference mostly to attitudes (such as avoidance, dependence, standard setting) are independent on cognitive styles, aspects that concern more precisely the strategies applied in making decisions (for instance, considering the existing options versus searching new opportunities, considering thoroughly the possible choices versus choosing rapidly on the basis of impressions and feelings) are linked to more general thinking tendencies. Conclusively, decision styles can be considered as having both a common ground in general cognitive styles and autonomous features related to the specific field of decision-making.

2.2 STUDY 2

A second study was carried out employing an higher size experimental sample and, in addition to the instrument used in Study 1, other inventories aimed at better defining the cognitive and decision profiles which emerged in Study 1. Moreover, it has to be specified that during the interval between the Study 1 and 2, the validation of the Italian version of *GDMS* has been devised (Gambetti et al., 2008). Given the minor problems emerged in Study 1 with *GDMS,* a comparison between our and the other versions was possible. As a consequence, some adjustments has been made to our original version.

2.2.1 Aims

The specific aims of the second study were as follows.

This second study had a confirmatory purpose since it was aimed at replicating the results obtained in the first study. It was intended as a confirmation of the internal structure of each instrument. Specifically, after making some changes in the Italian versions of one of the inventories (*GDMS*) and employing a broader experimental sample, the study was aimed at producing further evidence in support of the findings emerging in the first study and improving these results so that they could represent a confirmation of the findings reported in literature. We expected to find the same internal structure for each instrument as the original one reported in literature.

The second aim of this study was to verify the existence of more comprehensive cognitive and decision profiles by adding to the inventories used in Study 1 a specific measure of intuitive and analytical individual style (*Preference for Intuition and Deliberation Scale:* Betsch, 2004) and a measure of cognitive ability (*Cognitive Reflection Test,* Frederick, 2005) and testing whether these measures correlate with the previous ones. We hypothesized that the *PID-Intuitive Scale (PID-I)* was positively associated with the intuitive and

spontaneous style (*GDMS*), the right style (*SOLAT*), and negatively with the summed maximization scale; as for the *PID -Deliberative Scale (PID-D)* we hypothesized that it was positively associated with the rational and dependent style *(GDMS)*, the left style *(SOLAT)*, and the summed maximization scale. As far as concerns the *Cognitive Reflection Test* we didn't expect any correlation with the measures of individual styles. In fact, our conception of cognitive style did not include any ability dimension, since it was conceived as a preference, a habit, a tendency, and not as a measure of cognitive ability.

The third aim was to further substantiate the evidence that cognitive and decision profiles vary depending on the occupational status of the participants as emerged in Study 1. In order to replicate the results obtained in Study 1, a comparison between subsamples of students and workers was made.

The last aim was to identify subjects obtaining extreme scores on the questionnaires employed in the study (in particular, on the inventories specifically intended to measure the individual intuitive and analytical styles, such as *GDMS, SOLAT* and *PID*). "Extreme" subjects were those whose scores were included in the first or fourth quartile or over specific thresholds. These subjects with "extreme cognitive profiles" constituted the sample of the Study 5 (cfr. 3.3).

2.2.2 Method

2.2.2.1 Materials

Maximization Scale

The description of the instrument is reported in § 2.2.1

Maximization Scale was employed without any adjustment had been made.

GDMS (General Decision Making Style)

The description of the instrument is reported in § 2.2.1

As already explained, after the Italian version of *GDMS* has been first published in November 2007 (Gambetti et al., 2008), some changes were

made in our previous version. In particular, some items which were either problematic in our previous version or differently phrased in the published version (items 14, 17, and 24) were slightly modified accordingly. Starting from the results obtained in Study 1, those items which turned out to give different results if compared to the original English version (Scott & Bruce, 1995) were changed. Then, these changes were compared to the Italian version published in the meanwhile (Gambetti et al., 2008), which provided support to our modifications. The revised version employed in Study 2 is reported in Appendix I.

SOLAT (Style of Learning and Thinking)

The description of the instrument is reported in § 2.2.1

PID (Preference for Intuition and Deliberation Scale)

PID (Betsch, 2004) is a scale developed to assess preferences in making decisions intuitively or deliberatively. The measurement consists of 18 questions: nine items assessing the habitual preference for deliberation *(PID-D)* and nine items assessing preference for intuition *(PID-I)*. Subjects answer the questions on a 5-point Likert scale.

CRT (Cognitive Reflection Task)

CRT (Frederick, 2005) consists of three problems for which the intuitive default response is incorrect but that respondents can correctly answer through deliberate reconsideration. For each item subjects are requested to give an answer, if the answer is correct it suggests that the respondent engaged systematic processing to correct the intuitive response.

Figure 2.1 provides an overview of the instruments employed in the present study.

	GENERAL DECISION MAKING STYLE INVENTORY (Scott & Bruce, 1995)	

Subscales (number of items, reliability)	Rational scale: 5 items, α =.70 (Italian version, Gambetti et al., 2008); ranging from .77 to .85 across different subsamples (original version, Scott & Bruce, 1995)
	Intuitive scale:5 items, α =.76 (Gambetti et al.,2008);from.78 to.83 (Scott & Bruce, 1995)
	Dependent scale: 5 items, α =.84 (Gambetti et al., 2008); from .68 to .86 (Scott & Bruce, 1995)
	Avoidant scale: α =.80 (Gambetti et al., 2008); from .93 to .94 (Scott & Bruce, 1995)
	Spontaneous scale: α =.78 (Gambetti et al., 2008); .87 (Scott & Bruce, 1995)
Subscales – correlations with other scales	GDMS-Intuitive: *Bruine de Bruin, Parker & Fishhoff (2007)* More positive decision outcomes in life, higher normative decision making competence, positively valuing physical activity, aesthetics, risk. GDMS-Spontaneous: *Bruine de Bruin, Parker & Fishhoff (2007)* More negative decision outcomes in life, lower normative decision making competence, positively valuing independence, physical activity, creativity, life style, physical prowess, risk. GDMS-Rational: *Bruine de Bruin, Parker & Fishhoff (2007)* More positive decision outcomes in life, higher normative decision making competence, negatively valuing physical activity, risk, variety.
Definition of stylistic dimensions	Intuition is characterized by attention to details in the flow of information rather than systematic search for information and a tendency to rely on premonitions and feelings Rationality is characterized by a comprehensive search for information, inventory of alternatives and logical evaluation of alternatives

	MAXIMIZATION SCALE (Schwartz et al. 2002)	

Subscales (number of items, reliability)	Maximization Scale: 13 items, α =.70 (original version, Schwartz et al., 2002)
Subscales – correlations with other scales	Maximizing tendencies: *Schwartz et al. (2002)* Less happiness, less optimism, less self-esteem, less life satisfaction, more depression, more perfectionism, more regret, less constructive decision-making, more upward social comparisons *Iyengar, Wells & Schwartz et al. (2006)* More reliance on external information sources Satisficing tendencies: *Schwartz et al. (2002)* More happiness, more optimism, more self-esteem, more life satisfaction, less depression, less perfectionism, less regret, more constructive decision-making, less upward social comparisons *Iyengar, Wells & Schwartz et al. (2006)* Less reliance on external information sources
Definition of stylistic dimensions	Maximizers seek only the best option and do not settle for good enough options. Satisficers tend to satisfice.

	STYLE OF LEARNING AND THINKING (Torrance et al., 1978;1987)	

Subscales (number of items, reliability)	Right scale Left scale Integrated scale 28 items, α = .69, Pearson Separation index = .71 (Italian version: Antonietti et al. 2005).
Subscales – correlations with other scales	Right-style: *Zenhausern & Gebhardt (1979):* Preference for the visual channel

	Torrance (1982): More creative than left-thinkers *Fabbri et al. (2007):* Circadian typology: evening-type <u>Left-style:</u> *Zenhausern & Gebhardt (1979):* Preference for the auditory channel *Torrance (1982):* Less creative than right-thinkers *Fabbri et al. (2007):* Circadian typology: morning-type
Definition of stylistic dimensions	Right style corresponds to the right hemispheric functioning whose tactics are characterized as open-ended, spatial, ideas, relationship, summary, intuitive. Left style corresponds to the left hemispheric functioning whose strategies are characterized as structured, verbal, facts, sequences, outline and logical. Integrated style implies the relative dominance of none. (Torrance, 1982)

PREFERENCE FOR INTUITION AND DELIBERATION SCALE (Betsch, 2004)	
Subscales (number of items, reliability)	Preference for Intuition, PID-Intuition (9 items, α = .77) Preference for Deliberation, PID-Deliberation (9 items, α = .79)
Subscales – correlations with other scales	<u>PID-Intuition:</u> *Betsch (2004):* Faith in intuition, Fast decision making, Need for closure (-), Personal need for structure (-), PID-Deliberation (-), Extraversion, Agreeableness, Openness for new experiences, Perfectionism (-) *Schunk & Betsch (2006):* Less linear utility function in lottery choice for intuitive participants *Witteman et al. (2007):* Openness (Big Five) REI Experientiality *Richetin et al. (2007):* Intuitive people's choice was better predicted by implicit measures than explicit measure <u>PID-Deliberation:</u> *Betsch (2004):* Need for cognition, Personal Need for structure, Maximizing, Regret, Faith in intuition (-), Fast decision making (-), Emotional stability, Conscientiousness, Perfectionism *Schunk & Betsch (2006):* Linear utility function in lottery choices for deliberative people *Witteman et al. (2007):* Consciousness (Big Five) REI Rationality *Richetin et al. (2007):* Deliberative people's choice was better predicted by explicit measures than implicit measure
Definition of stylistic dimensions as given by the authors	Intuition is defined as a basic decision mode that uses direct affective reactions towards the decision option as the decision criterion (affect-based decision making). Deliberation follows cognitions (beliefs, evaluations, reasons; cognition-based decision making).

COGNITIVE REFLECTION TEST (Frederick, 2005)	
Subscales (number of items, reliability)	Three short problems to test the ability to resist intuitively compelling responses
Subscales – correlations with other scales	<u>Low CRT scoring</u> *Frederick (2005):* Lower score on the Need for Cognition Scale, large susceptibility to framing effect, great preference for small and immediate rewards over large

delayed rewards, women

<u>High CRT scoring</u>
Frederick (2005):
    Higher score on the Need for Cognition Scale, scarce susceptibility to framing effect, low preference for small and immediate rewards over large delayed rewards, men

Definition of stylistic dimensions   Measure of a cognitive ability, that is cognitive reflection (Frederick, 2005)

Fig. 2.1– Overview of the scales employed in the study

2.2.2.2 Participants

Two hundred and eighty-nine people (52 men and 237 women), aged from 18 to 61 (mean = 22.7 yrs), were involved in the study. According to occupation, the total sample consisted of two different subsamples. The first subsample was composed of 238 undergraduates (40 men and 198 women); the mean age for this group was 21 yrs (SD = 5.37). The second subsample consisted of 51 workers (12 men and 39 women); the mean age for this group was 30.5 yrs (SD = 9.9).

All participants were volunteers. As for the undergraduates, they were recruited during university classes at the Catholic University of Milan and Brescia. One hundred and thirty-six undergraduates attended psychological courses, 61 attended literature and foreign language courses, and 41 attended pedagogical education courses. As for the workers, they were contacted during training courses they attended.

As in Study 1, the selection of two different subsamples was decided upon to ensure that the individual differences in terms of styles could be studied in people with different characteristics concerning age and occupation so allowing us to make comparisons between them. As for gender, the sample was not well-balanced because differences in individual cognitive and decision style were not hypothesized. In fact, empirical findings regarding gender differences in cognitive styles are inconclusive only in appearance. Even though some results support the common belief that women are more intuitive than men (Parikh, 1994), and others studies found the opposite results that women are more deliberative than men (Allison & Hayes, 1996), others concluded that any

differences between women and men did exist (Taggart et al., 1997). These inconsistencies have been explained by referring to different constructs which are measured in the studies, thus concluding that the use of intuition and deliberation is not affected by gender per se, but these incoherent findings should be considered as the consequence of the way of defining and measuring intuition and deliberation instead (Graham & Ickes, 1997).

2.2.2.3 Procedure

Data were collected in November 2007. As for the sample of students, the administration of the questionnaires took place in their school during lesson time; as for the workers, it took pace during the training courses they attended.

Participants were asked to fill in the five questionnaires presented in a counterbalanced order in a single session. They were told that there were no right or wrong answers. No time limits were established. Participants took 40 minutes to fill in the questionnaires. In order to make it possible the subsequent identification of those people who showed an "extreme" intuitive or analytical cognitive and decision style, participants were asked to write down their email address and/or their mobile number.

2.2.3 Results

Analyses of the data proceeded as follows. For each instrument we first assessed the internal consistency reliability and the intra-correlations among subscales. Then, we verified the internal structure of the instruments so to corroborate the original structures as reported in literature (as already explained, for *SOLAT* this step was skipped since the properties of the Italian translation of the instrument, showing that it matches the original one, had already been assessed: Antonietti et al., 2005; this step was skipped also for *CRT* given that it is not intended as a questionnaire with a factorial structure, but it is a series of problems instead;). In order to overcome the weaknesses of exploratory factor analysis to distinguish between competing factor structures (Fosterlee & Ho, 1999), confirmatory

factor analyses were computed to compare alternatives models. Next, we investigated the relationships among the questionnaires. Then, we verified the existence of differences between the two subsamples on the instruments. Finally, a cluster analysis was computed in order to identify participants with an analytical or an intuitive cognitive and decision profile.

2.2.3.1 Descriptive, reliability and correlational statistics

General Decision Making Style Inventory

The univariant normal distribution of the data was assessed. The skewness values ranged from -.72 to .72 and the kurtosis values ranged from -.98 to .16. The descriptive statistics for *GDMS* are reported in Table 2.12, together with the internal-consistency reliabilities, which ranged from .72 to .84 across the five scales. The correlations among subscales revealed that the rational scale was negatively correlated with intuitive, avoidant, and spontaneous scales and it was positively correlated with the dependent scale. The intuitive scale was positively associated with avoidant and spontaneous scales. The dependent scale was positively related to the avoidant scale and negatively with the spontaneous scale. Finally, the avoidant scale was positive associated with the spontaneous scale.

	Mean	SD	Cronbach's alpha	Mean inter-item correlation	Mean item-total correlation	Correlations among subscales			
						1	2	3	4
1. Rational	3.75	.78	.72	.29	.45	-	-	-	-
2. Intuitive	3.24	.90	.77	.40	.54	-.27**	-	-	-
3. Dependent	3.43	1.02	.84	.52	.65	.16**	.02	-	-
4. Avoidant	2.51	1.3	.83	.56	.63	-.17**	.23**	.26**	-
5. Spontaneous	2.40	1.02	.79	.47	.59	-.44**	.51**	-.17**	.12*

Tab. 2.12 – GDMS: descriptive, reliability statistics and inter-correlations among subscales

Maximization Scale

The descriptive statistics and the internal-consistency reliabilities for *Maximization Scale* are reported in Table 2.13. The correlations among subscales showed that the summed scale was positively correlated with the

"search for options" and "difficulty in choice" components. The "search for options" component was positively associated with the "difficulty in choice" one. The "high standards" component didn't correlate with any of the other components.

The univariant normal distribution of the data was assessed. The skewness values ranged from -.58 to .61 and the kurtosis values ranged from -1.03 to -.27.

	Mean	SD	Cronbach's alpha	Mean inter-item correlation	Mean inter-total correlation	Correlations among components		
						1	2	3
1. Summed scale	3.85	1.72	.70	.15	.32	-	-	-
2. Search for options	3.42	1.79	.64	.31	.43	.81**	-	-
3. Difficulty in choice	3.91	1.79	.63	.22	.36	.20**	.23**	-
4. High standards	4.29	1.47	.50	.15	.20	.09	.03	-.09

Tab. 2.13 – Maximization Scale: descriptive, reliability statistics and inter-correlations among components

Preference for Intuition and Deliberation Scale

The assumption of univariant normal distribution of the data was tested. The skewness values ranged from -.97 to .44 and the kurtosis values ranged from -.95 to .58.

The descriptive statistics for *PID* are reported in Table 2.14, together with the internal-consistency reliabilities, which were .73 and .78 for the *PID-I* and *PID-D*, respectively. The correlation between the intuitive and deliberative scales did not reach the significance level, even though the trend was that of a negative correlation.

	Mean	SD	Cronbach's alpha	Mean inter-item correlation	Mean inter-total correlation	Correlations among subscales
						1
1. Deliberative	3.77	.93	.78	.29	.46	-
2. Intuitive	3.53	.92	.73	.23	.40	-.10

Tab. 2.14 – PID: descriptive, reliability statistics and inter-correlations among subscales

Style of Learning and Thinking Questionnaire

The descriptive statistics for *SOLAT* are reported in Table 2.15. The correlations among subscales revealed that the left scale was negatively associated with both the right and the integrated scales. The right scale was negatively related to the integrated scale.

The univariant normal distribution of the data was assessed. The skewness values ranged from -.08 to 1.03 and the kurtosis values ranged from -.79 to 1.01.

	Mean	SD	Correlations among subscales	
			1	2
1. Left style	9.01	4.26	-	-
2. Right style	12.55	5.08	-.42**	-
3. Integrated style	6.33	4.95	-.39**	-.62**

Tab. 2.15 – SOLAT: descriptive statistics and inter-correlations among subscales

Cognitive Reflection Test

Prior to the statistical analysis, *CRT* responses were recoded as follows. It were counted: the correct answers to the three problems, the incorrect – intuitive answers (that is, the intuitive default response), and the incorrect – nonintuitive (that is, any incorrect response which is not the intuitive default one). Then, these three response categories were combined depending on the mode of thinking – reflective or intuitive – which was required. As a consequence, two synthetic indexes were computed: the reflective responses (the mean score obtained by summing correct and incorrect answers) and the intuitive responses (the mean score of intuitive default answers). The descriptive statistics for *CRT* are reported in Table 2.16, together with the correlational statistics. The latter revealed that the two indexes were negatively correlated.

	Mean	SD	Correlations among subscales
			1
1. Intuitive responses	1.43	1.13	-
2. Reflective responses	.60	.55	-.71**

Tab. 2.16 – CRT: descriptive statistics and inter-correlations among subscales

2.2.3.2 Confirmatory factor analysis

General Decision Making Style Inventory

KMO measure of sampling adequacy was 0.815, indicating that the data were appropriate for the analysis. Bartlett's test of sphericity was significant (χ^2 = 2864.622, p < .001), indicating that correlations existed among some items.

Employing maximum likelihood estimation method (AMOS: Arbuckle, 1997), confirmatory factor analyses were computed on the 5-factor model originally hypothesized by Scott and Bruce (1995). Two alternative models were tested, the correlated and the uncorrelated 5-factors models. Even though from a theoretical point of view decision-making scales are correlated (Scott & Bruce, 1995), and previous CFA showed a better fit to the data with a correlated than an uncorrelated model (Loo, 2000), other alternative perspectives highlighted the importance of considering the decision style, and specifically, the intuitive and the rational style, as independent (Isenberg, 1984; Pacini & Epstein, 1999; Sauter, 1999). In fact, the pattern of correlation among subscales seems to vary quite a lot across different studies, thus inducing to conclude that findings are not univocal. Moreover, the uncorrelated model of *GDMS* has not been tested for the Italian version of the inventory yet.

The goodness of the fit of the models was assessed using different indexes: *X²/df*, RMSEA, GFI, and CFI. The ratio of *X²/df* should be less than 3 (Bollen, 1989), or less than 2.0 in a more restrictive sense (Premkumar & King, 1994); the RMSEA (root mean square error of approximation) was first proposed by Steiger (1990), who argued that values below .1 were good, while others have been more stringent in suggesting that a value of about .08 or less for the RMSEA would indicate a reasonable error of approximation (Browne & Cudeck, 1993); the values of GFI (goodness of fit: Joreskog & Sorbom, 1996) and CFI (comparative fit index: Bentler, 1990) can range between 0 and 1 with higher values indicating a better fit. Moreover, the degree of parsimony of the models was calculated using the AIC index, with comparatively low values

indicating a better fit and parsimony of the model (Raykov & Marcoulides, 2000).The fit indexes of both model are reported in Table 2.17.

Models	x^2	df	X^2/df	RMSEA	GFI	CFI	AIC
5-factors unrelated	910.538	275	3.311	.083	.754	.760	1060.538
5-factors correlated	633.046	263	2.410	.070	.853	.861	757.904

Tab. 2.17 – GDMS: Confirmatory factor analyses, ML method, good fit indexes

Results supported the original structure of the inventory (Scott & Bruce, 1995), confirming the correlated 5-factors model as found (even though only through an exploratory factor analysis) by the authors. In fact, the correlated model had the best fit to the data. Moreover, it had the lowest AIC index. Finally, in order to test whether the difference between the two models was statistically significant, the difference between the models' X² was calculated ($\Delta\chi^2_{12}$ = 277.492, p < .001) proving that the correlated model was significantly better than the uncorrelated one. The correlated model is reported in Figure 2.2.

Fig. 2.2 – GDMS: the correlated model

Maximization Scale

Factorability of items was confirmed by using the Bartlett test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Bartlett's test was statistically significant (χ^2=510.955, p<.001) whereas KMO measure was 0.72.

Employing maximum likelihood estimation method (AMOS, Arbuckle, 1997), confirmatory factor analyses were computed on the 3-components model originally hypothesized by Schwartz et al. (2002). However, both in the original work (Schwartz et al., 2002) and in subsequent research employing the *Maximization Scale* (Diab et al., 2008; Highhouse & Diab, 2006; Nenkov et al., 2008) this factor structure did not obtain a clear confirmation. Specifically, the original Schwartz et al. (2002) results were less than ideal with the respect to factor structure (e.g. there were items loading onto more than one factor) and other recent research suggested different and inconsistent factor structures (it were hypothesized both a unidimensional structure and a 5-factor solution, but findings are inconclusive). Since a univocal and definite factor structure was not identified in literature, we tested different alternative models. As suggested by Highhouse and Diab (2006), from a theoretical point of view the maximizer construct, defined as a general behavioural tendency (Simon, 1955; Schwartz et al., 2002), should be unidimensional. For this reason we first tested the monofactorial model. Then, we evaluated the 3-factors model as suggested by the original Schwartz et al.'s (2002) results. Finally, the 4-factors model was tested as emerged from the results we obtained in the exploratory analysis in Study 1. The fit indexes of both model are reported in Table 2.18.

Models	X^2	df	x^2/df	RMSEA	GFI	CFI	ACI
Monofactorial	181.264	64	2.832	.080	.722	.739	235.264
3-factors	185.593	66	2.812	.080	.720	.733	261.593
4 –factors	117.982	63	1.873	.055	.940	.877	173.982

Tab. 2.18 – Maximization Scale: Confirmatory factor analyses, ML method, good fit indexes

Results supported the 4-factors structure of the scale, confirming the results we obtained trough the exploratory factor analysis in Study 1. In fact, the 4-factors

model had the best fit to the data as compared to the other two models. Moreover, it had the lowest AIC index. Finally, in order to test whether the difference among the models was statistically significant, the difference between the 3-factors model and the monofactorial model's X² was calculated ($\Delta\chi^2_2 = 4.329$, n.s.), thus proving that none of them is better than the other. Then, the difference between the monofactorial model and the 4-factors model's X² was computed ($\Delta\chi^2_1 = 63.282$, p<.001), suggesting that the 4-factors model was significantly better than the other two.

The 4-factors model is reported in Figure 2.3.
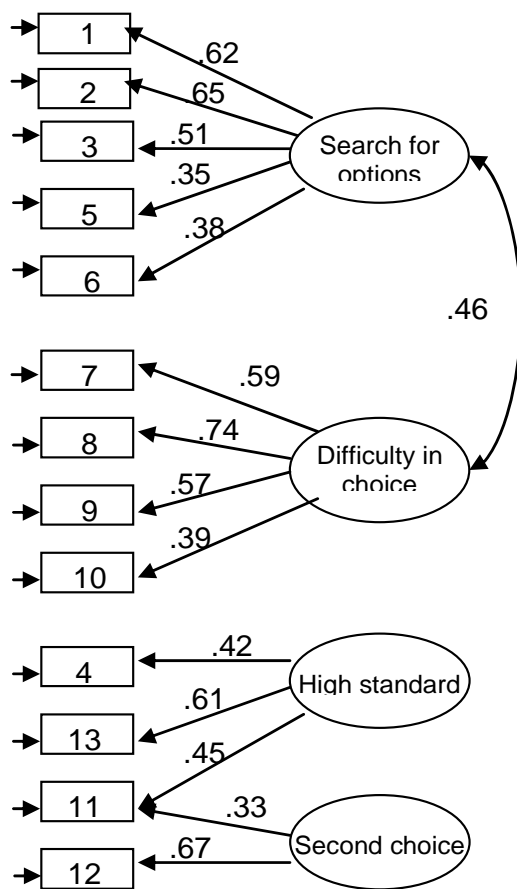
Fig. 2.3 – Maximization Scale: the 4-factors model

Preference for Intuition and Deliberation Scale

The Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were performed to determine whether he data could be factor analysed. Bartlett's test was statistically significant ($\chi^2=1205.942$, p<.001). KMO measure was 0.79.

Confirmatory factor analyses using maximum likelihood estimation method (AMOS: Arbuckle, 1997) were performed on the 2-factors correlated model found in the original version of the instrument (Betsch, 2004) and, since no correlation between the factors was found in previous research (Richetin et al., 2007), on the 2-factors uncorrelated model. The fit indexes of both model are reported in Table 2.19.

Models	X^2	Df	x^2/df	RMSEA	GFI	CFI	ACI
2-factors uncorrelated	274.729	134	2.113	.063	.907	.857	356.729
2-factors correlated	266.706	133	2.067	.061	.908	.864	350.706

Tab. 2.19 – PID: Confirmatory factor analyses, ML method, good fit indexes

Results supported the original (Betsch, 2004) correlated model. The correlated model had the best fit to the data as compared to the other one. Moreover, it had a slightly lower AIC index than the uncorrelated model. Finally, in order to test whether the difference between the models was statistically significant, the difference between model's X^2 was calculated ($\Delta\chi^2_1 = 8.023$, p<.001), thus proving that the correlated model was significantly better than the other one. The correlated model is reported in Figure 2.4.
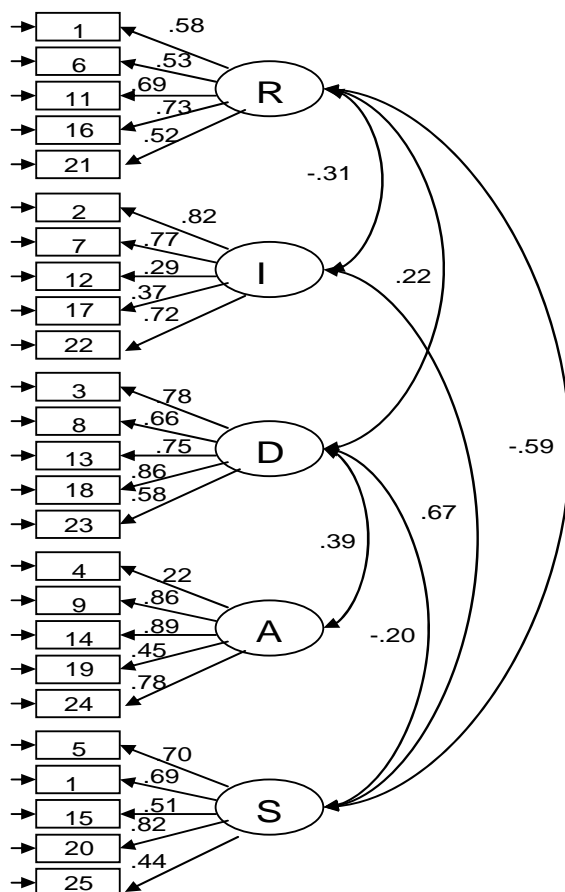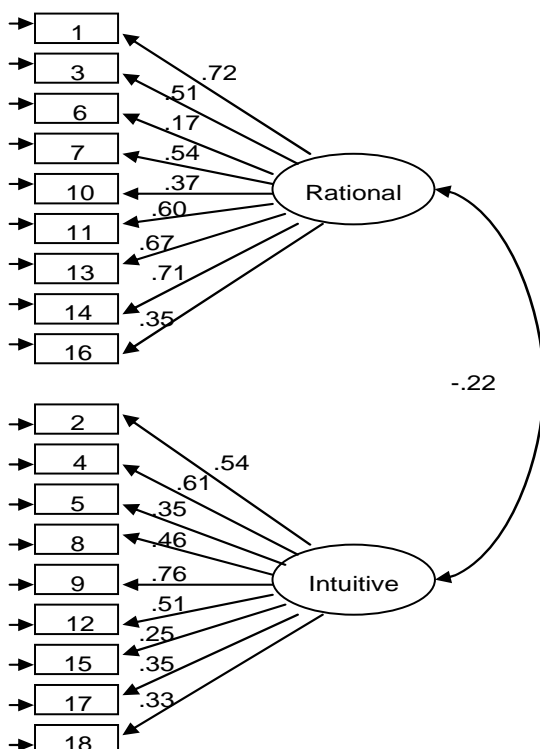

Fig. 2.4 – PID: the correlated model

2.2.3.3 Cognitive and decision profiles: How inventories are related

In order to verify how all instruments were related, bivariate correlations among the scales employed in Study 2 were calculated. Results are reported in Table 2.20.

Scales	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. GDMS – Rational	-	-	-	-	-	.12*	-.29**	-.03	.46**	.28**	.71**	-.15**	.27**	-.35**	.12*	.11	-.11
2. GDMS – Intuitive	-	-	-	-	-	.02	.47**	.15**	-.05	.12*	-.23**	.70**	-.28**	.36**	-.12*	-.09	.15*
3. GDMS – Dependent	-	-	-	-	-	.17**	.42**	.11	.49**	.13*	.23**	.01	-.02	-.02	.01	-.02	.05
4. GDMS – Avoidant	-	-	-	-	-	.32**	.63**	.29**	.25**	-.07	-23**	.08	-.06	.11	-.07	.04	.05
5. GDMS – Spontaneous	-	-	-	-	-	.07	.44**	.17**	-.25**	-.11	-.41**	.44**	-.26**	.42**	-.18**	-.12*	.13*
6. MAX – Summed scale						-	-	-	-	-	.15**	.05	.13*	.04	-.16**	-.04	.05
7. MAX – Difficulty in choice						-	-	-	-	-	-.29**	.32**	-.24**	.29**	-.09	-.11	.14*
8. MAX – Search for option						-	-	-	-	-	-.01	.11	.06	.14*	-.20**	-.09	.06
9. MAX – High standard						-	-	-	-	-	.42**	-.09	.06	-.18**	.11	.11	.01
10. MAX – Second choice						-	-	-	-	-	.26**	.15**	.03	-.07	.05	-.01	-.02
11. PID – Deliberative											-	-	.29**	-.36**	.10	.10	-.04
12. PID – Intuitive											-	-	-.29**	.37**	-.11	-.11	.12*
13. SOLAT – Left style													-	-	-	.01	-.02
14. SOLAT – Right style													-	-	-	-.04	.07
15. SOLAT – Integrated style													-	-	-	.06	-.03
16. CRT – Reflective responses																-	-
17. CRT – Intuitive responses																-	-

Tab. 2.20 – Correlations among instruments   ** p < .01   * p < .05

Correlational analyses revealed that the instruments showed several significant relationships.

As for the relations between *GDMS* and *Maximization Scale*, results was as follows. The rational scale was positively associated with the summed maximization scale, the high standard, and the second choice components, and negatively with the difficulty in choice component. The intuitive scale was positively related to the difficulty in choice, the search for option, and the second choice components. The dependent scale was positively associated with almost all the maximization components, with the exception of the search for option one. Also the avoidant scale was positively related to all maximization components, except for the second choice one. Finally, the spontaneous scale showed a positive correlation with both the difficulty in choice and the search for option components, and a negative correlation with the high standard component.

As for the relationships between *GDMS* and *PID*, it turned out that the rational scale was positively correlated with the deliberative scale and negatively with the intuitive scale. Conversely, both the intuitive *(GDMS)* and the spontaneous scales was positively associated with the intuitive scale *(PID)* and negatively with the deliberative scale. Lastly, the avoidant scale showed a negative correlation with the deliberative scale.

Only some of the *GDMS* scales showed a relationship with *SOLAT*. Specifically, the rational scale was positively associated with the left and the integrated scales, and negatively with the right scale. Conversely, both the intuitive and the intuitive scales were positively related to the right scale, and negatively to the left and the integrated scales.

As for the relationship between *GDMS* and *CRT*, it turned out that the intuitive and spontaneous scale showed a low positive correlation with the intuitive-default responses on *CRT*, and the spontaneous scale showed also a negative correlation with the reflective responses.

Results pointed out that the *Maximization Scale* showed significant relationships with *PID*. In particular, the summed scale was positively associated with the deliberative scale. The difficulty in choice component showed a positive correlation with the deliberative scale, and a negative correlation with the intuitive scale. The opposite emerged for the second choice component, which was negatively associated with the intuitive scale, and positively with the deliberative scale. The high standard component was positively associated with the deliberative scale.

As for the relationships between the *Maximization Scale* and *SOLAT*, it emerged that the summed scale was positively associated with the left scale, and negatively with the integrated scale. The difficulty in choice component showed a positive correlation with the right scale, and a negative correlation with the left scale. The search for option component was positively related to the right scale, and negatively with the integrated scale. The high standard component was negatively correlated with the right scale.

Only the difficulty in choice component showed a negative correlation with the intuitive-default responses on *CRT*.

As for the relationships between *PID* and *SOLAT*, it turned out that the deliberative scale was positively associated with the left scale, and negatively with the right scale. Conversely, the intuitive scale was positively related to the right scale, and negatively to the left scale.

With the exception of intuitive scale and intuitive-default responses, significant correlations were found neither between *PID* and *CRT* , nor between *SOLAT* and *CRT*.

The pattern of correlations which emerged from the analysis can be schematize as reported in Figure 5.

The two pattern of correlation roughly correspond to the analytical and intuitive styles, even though these dimensions are richer than the single features identified by the usual intuitive-analytical inventories, thus providing broader and more detailed profiles. Analytical people show a rational, deliberative, and

dependent decision making style. They usually strive for the best option and settle high standard for themselves. From the cognitive functioning point of view they show a logic and systematic style, but also an integrated thinking style. On the contrary, intuitive people show a global, holistic, immediate and spontaneous approach to decision making, and also to cognitive processing, in general. Furthermore, they tend to adopt a maximizing strategy in choosing among alternatives.
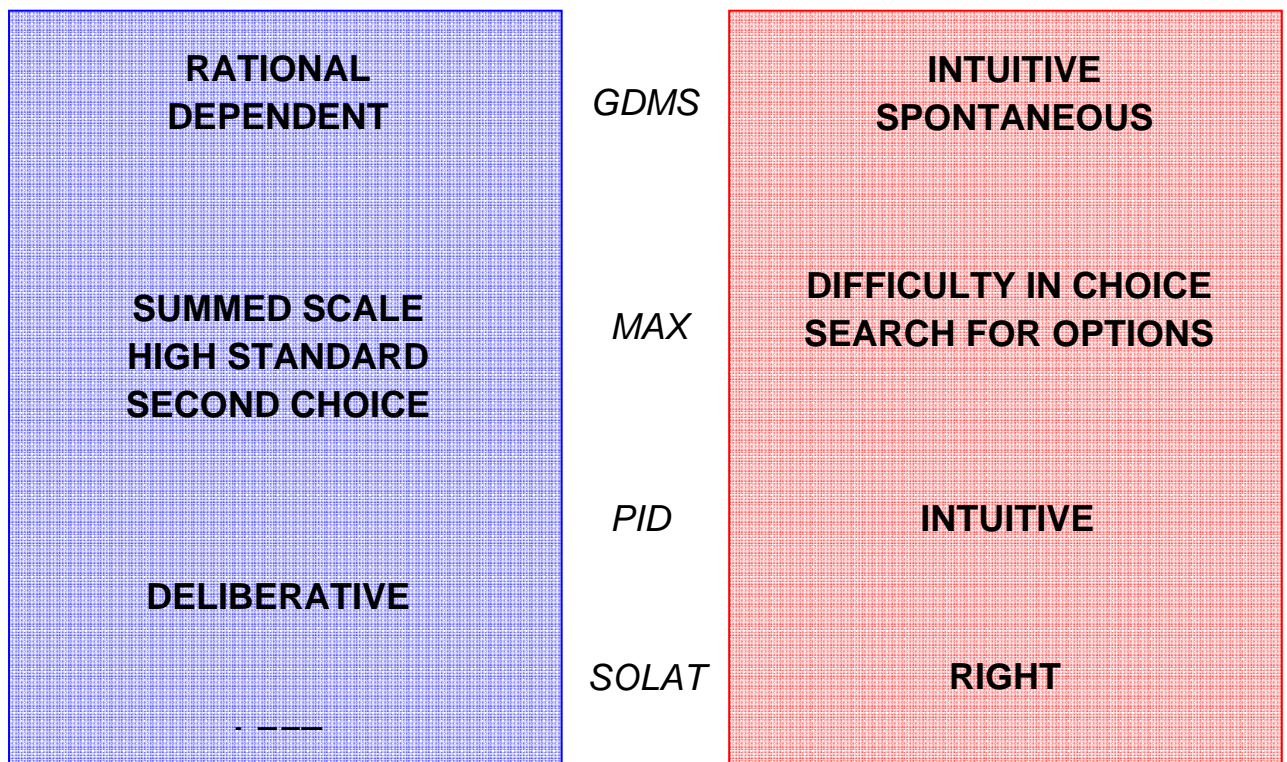
Fig. 2.5 – Pattern of correlations among instruments

2.2.3.4 Differences between subsamples

In order to investigate the existence of differences in terms of decision-making styles, maximization tendencies, thinking styles and cognitive abilities depending on the participants' occupational status (students and workers), mean scores obtained on each instrument by the two different subsamples were compared. Furthermore, as in Study 1, since the mean age of the two occupation subsamples are substantially different (21 years for the student group and 30.5 for the worker one) the effect of age was controlled in order to exclude that any effect due to occupation could have been due to the age instead.

General Decision Making Style

The assumption of homogeneous variances was tested by using Levene's test (Levene, 1960). For each subscale p-values were not statistically significant (values ranged from p=.132 to p=.825), thus indicating that the analysis of variance was possible.

In order to compare scores obtained on GDMS by students and workers, a one-way ANOVA was computed. Results are reported in Table 2.21.

Subscales	Occupation	Mean	SD	$F_{(1,288)}$	P	η^2
1. Rational	Students	3.69	0.61	0.344	.558	.015
	Workers	3.74	0.63			
2. Intuitive	Students	3.28	0.67	4.193	<.05	.011
	Workers	3.07	0.68			
3. Dependent	Students	3.43	0.83	0.003	.954	.003
	Workers	3.44	0.68			
4. Avoidant	Students	2.66	0.82	12.110	<.001	.041
	Workers	2.21	0.83			
5. Spontaneous	Students	2.43	0.64	3.079	.080	.001
	Workers	2.21	0.56			

Tab. 2.21 – GDMS: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences were found on the avoidant and the intuitive subscales in which students obtained significantly higher scores than workers. Nevertheless, even though differences on the other style subscales did not reach the statistical significance, students reported higher scores than workers also on the spontaneous subscale.

Furthermore, a one-way ANOVA was computed in order to compare scores obtained on each subscale by the different age groups. The same procedure as in Study 1 was employed. Five different age groups were identified (18-19; 20-29; 30-39; 40-49; 50-60).

Results are reported in Table 2.22.

Subscales	Age	Mean	SD	$F_{(4,284)}$	P	η^2
1. Rational	18-19	3.67	0.61			
	20-29	3.65	0.63			
	30-39	3.85	0.59	1.082	.366	.015
	40-49	3.88	0.75			
	50-59	3.65	0.47			
2. Intuitive	18-19	3.25	0.66			
	20-29	3.27	0.68			
	30-39	3.12	0.67	0.326	.861	.005
	40-49	3.28	0.88			
	50-59	3.21	0.67			
3. Dependent	18-19	3.46	0.83			
	20-29	3.43	0.82			
	30-39	3.43	0.74	0.287	.887	.004
	40-49	3.36	0.84			
	50-59	3.17	0.71			
4. Avoidant	18-19	2.68	0.80			
	20-29	2.65	0.80			
	30-39	2.23	0.94	3.168	<.05	.043
	40-49	2.20	0.93			
	50-59	2.42	0.71			
5. Spontaneous	18-19	2.43	0.81			
	20-29	2.44	0.79			
	30-39	2.10	0.73	1.434	.223	.020
	40-49	2.43	0.94			
	50-59	2.31	0.59			

Tab. 2.22 – GDMS: One-way ANOVA comparing scores obtained by age subsamples

Statistical mean differences were found on the avoidant subscale. Specifically, post-hoc tests (LSD and Newman-Kreuls tests) showed that 18-19 and 20-29 years people obtained significantly higher scores as compared to the older groups.

Maximization Scale

Prior to the application of the analysis of variance, Levene's test was used to verify the assumption that variances were equal across samples. For each component the resulting p-value of Levene's test was not statistically significant (p-values ranged from p=.103 to p=.975)

As in Study 1 people's scores on the maximization components were assessed in addition to their summed maximization score.

A one-way ANOVA was performed to compare the factorial scores of the *Maximization Scale* obtained by the two different subsamples. Results are reported in Table 2.23 .

Components	Occupation	Mean	SD	$F_{(1,288)}$	p	η^2
1. Summed scale	Students	3.94	.79	26.221	<.001	.095
	Workers	3.32	.67			
2. Search for options	Students	3.90	1.10	23.860	<.001	.034
	Workers	3.04	1.13			
3. Difficulty in choice	Students	3.89	.75	9.982	<.005	.078
	Workers	3.52	.73			
4. High standard	Students	4.86	.95	0.063	.802	.001
	Workers	4.90	.80			
5. Second best	Students	3.99	.81	0.503	.479	.002
	Workers	4.08	.75			

Tab. 2.23 - Maximization Scale: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences emerged on both the summed scale and the two subscales representing behavioural examples of maximizing tendencies: the one which refers to the difficulty in choosing among different alternatives and the one which includes being open to different options and actively searching for them. In particular, students obtained significantly higher scores than workers in all these scales.

On the contrary, statistical differences between scores obtained by students and workers did not emerged on the third and fourth components, which concern having high standards and never settling for the second best, respectively.

In order to verify the effect of age on the maximization scores, a one-way ANOVA was computed on the scores obtained by the different age groups on the maximization subscales. Results are reported in Table 2.24. Statistical mean differences were found on the summed scale and the difficulty in choosing among alternatives subscale. In particular, LSD and Newman-Kreuls post-hoc tests highlighted that 30-39 and 40-49 years groups obtained significant lower scores than the 18-19 and 20-29 years groups.

Components	Age	Mean	SD	$F_{(4,284)}$	p	η^2
1. Summed scale	18-19	4.03	0.84			
	20-29	3.89	0.70			
	30-39	3.33	0.79	7.737	<.001	.092
	40-49	3.45	0.62			
	50-59	3.26	0.78			
2. Search for options	18-19	3.96	1.18			
	20-29	3.87	0.97			
	30-39	3.13	1.08	6.852	<.001	.081
	40-49	3.06	1.37			
	50-59	2.94	0.97			
3. Difficulty in choice	18-19	3.89	0.75			
	20-29	3.87	0.74			
	30-39	3.56	0.82	1.653	.161	.023
	40-49	3.64	0.74			
	50-59	3.87	0.88			
4. High standard	18-19	4.93	0.97			
	20-29	4.80	0.88			
	30-39	4.88	0.90	0.642	.633	.009
	40-49	4.93	1.01			
	50-59	4.50	0.65			
5. Second best	18-19	3.95	0.75			
	20-29	3.97	0.85			
	30-39	4.05	0.79	1.204	.309	.017
	40-49	4.31	0.70			
	50-59	4.37	0.91			

Tab. 2.24 – Maximization Scale: One-way ANOVA comparing scores obtained by age subsamples

Style of Learning and Thinking

Levene's test confirmed that the data met the criteria for the analysis of variances (p-values ranged from p=.060 to p=.900).

Three one-way ANOVA were carried out to compare scores in the subscales of SOLAT obtained by the students and workers. Results are shown in Table 2.25.

Subscales	Subsamples	Mean	SD	$F_{(1,288)}$	P	η^2
1. Left	Students	9.14	4.14	1.264	.262	.004
	Workers	8.38	4.81			
2. Right	Students	12.57	5.09	0.010	.920	.001
	Workers	12.48	5.06			
3. Integrated	Students	6.17	4.80	1.499	.100	.005
	Workers	7.12	5.61			

Tab. 2.25 - SOLAT: One-way ANOVA comparing scores obtained by occupation subsamples

Even though the differences between groups did not reach the significance level, the same trend as in Study 1 emerged. In fact, on the integrated scale workers obtained higher scores than students.

Furthermore, a one-way ANOVA was computed in order to compare scores obtained on each subscale by the different age groups. Results are reported in Table 2.26.

Subscales	Age	Mean	SD	$F_{4,284)}$	P	η^2
1. Left	18-19	9.09	3.98			
	20-29	9.17	4.33			
	30-39	8.68	4.75	0.232	.920	.003
	40-49	8.31	5.00			
	50-59	8.50	4.53			
2. Right	18-19	12.14	4.54			
	20-29	13.38	5.66			
	30-39	11.77	4.86	1.276	.279	.018
	40-49	11.62	4.74			
	50-59	13.25	5.75			
3. Integrated	18-19	6.54	4.48			
	20-29	5.43	4.93			
	30-39	7.54	5.75	1.944	.103	.027
	40-49	8.06	5.02			
	50-59	6.25	5.90			

Tab. 2.26 – SOLAT: One-way ANOVA comparing scores obtained by age subsamples

Even if it was not significant, the trend on the integrated scale among age groups was the same as in Study 1. The groups of 18-19 and 20-29 years scored lower than the older groups, with the exception of the 50-59 group which obtained scores that were similar to the ones obtained by the younger groups.

Preference for Intuition and Deliberation Scale

To assess the equality of variance in different samples Levene's test was used. The results confirmed that the samples met the criteria for the analysis (p-values ranged from p=.206 to p=.360).

A one-way ANOVA was performed to compare the scores obtained by the two different subsamples on the two scales.

Results are reported in Table 2.27.

Subscales	Subsamples	Mean	SD	$F_{(1,288)}$	p	η^2
1. Deliberative	Students	3.76	0.58	0.663	.416	.003
	Workers	3.83	0.49			
2. Intuitive	Students	3.55	0.52	3.107	.079	.011
	Workers	3.41	0.50			

Tab. 2.27 – PID: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences were not found. However, even though the difference did not reach the significance level, on the intuitive scale students scored higher than workers.

Furthermore, a one-way ANOVA was computed in order to compare scores obtained on each subscale by the different age groups. Results are reported in Table 2.28.

Subscales	Age	Mean	SD	$F_{4,284)}$	P	η^2
1. Deliberative	18-19	3.72	0.57	1.338	.256	.019
	20-29	3.77	0.59			
	30-39	3.93	0.45			
	40-49	3.88	0.61			
	50-59	3.56	0.41			
2. Intuitive	18-19	3.55	0.50	0.642	.633	.009
	20-29	3.54	0.52			
	30-39	3.47	0.52			
	40-49	3.51	0.67			
	50-59	3.27	0.39			

Tab. 2.28 – PID: One-way ANOVA comparing scores obtained by age subsamples

In none of the scales differences among scores obtained by the different age groups turned out to be significant.

Cognitive Reflection Test

The equality of variances was assessed by using Levene's test. For each subscale p-values were not statistically significant (p-values ranged from p=.090 to p=.301).

A one-way ANOVA was computed to compare the scores obtained by the two different subsamples on the two indexes. Results are reported in Table 2.29.

Subscales	Subsamples	Mean	SD	$F_{(1,288)}$	p	η^2
1. Reflective	Students	0.54	0.53	15.784	<.001	.053
	Workers	0.88	0.58			
2. Intuitive	Students	1.52	1.11	8.460	<.005	.029
	Workers	1.02	1.11			

Tab. 2.29 – CRT: One-way ANOVA comparing scores obtained by occupation subsamples

Statistical mean differences emerged on both the reflective and intuitive indexes. In particular, students scored lower than workers on the reflective index, and, on the contrary, obtained higher scores than workers on the intuitive index.

Furthermore, a one-way ANOVA was computed in order to compare scores obtained on each index by the different age groups. Results are reported in Table 2.30.

Subscales	Age	Mean	SD	$F_{4,284)}$	p	η^2
1. Reflective	18-19	0.52	.50			
	20-29	0.55	.57			
	30-39	0.84	.58	3.453	<.01	.047
	40-49	0.78	.63			
	50-59	0.87	.23			
2. Intuitive	18-19	1.55	1.10			
	20-29	1.47	1.16			
	30-39	1.02	1.02	1.651	.162	.023
	40-49	1.31	1.30			
	50-59	1.25	.46			

Tab. 2.30 – CRT: One-way ANOVA comparing scores obtained by age subsamples

Only on the reflective index statistical differences emerged. Specifically, 18-19 and 20-29 years groups scored lower than the older groups.

2.2.3.5 Cluster analysis: identification of intuitive and analytical participants

In order to identify the participants who showed an "extreme" intuitive or analytical profile, a K-means cluster analysis was performed. The K-means clustering method allows to groups cases based on their proximity to a multidimensional centroid. The output is simply an assignment of items to a cluster. It requires the number of clusters to be specified in advance. Starting from the results obtained through the correlational analyses (cfr. 3.3.2) that

identified two different pattern of correlations, the number of clusters was fixed at two. The variables included in the cluster analysis were the ones which turned out to be openly part of one of the two pattern as emerged in the previous correlational analyses (cfr. 3.3.2). All the components of the *Maximization Scale* were excluded because of the unclear dimensionality of the instrument. From a theoretical point of view, the maximizing construct should be unidimensional, but, as emerged in both Study 1 and 2, its different components, which are supposed to be just simple examples or facets of the unidimensional construct, showed a trend that is anything but univocal. Moreover, it emerged that not all the components have the same influence in determining the global maximizer score. As a consequence, the whole maximizing construct does not seem to clearly be in an univocal way on the side of either the intuitive or the analytical style and for that reason it was excluded by the cluster analysis which was aimed at identifying only people with an extreme intuitive and analytical profile. Even if for a different reason, also *CRT* was not included in this analysis. In that case it was excluded because the instrument was not consistently related with the other scales. Table 2.31 reports the final cluster centres which shows the mean abundance of each variable in each of the clusters. Basing on the variables in each cluster it was possible to give to each cluster a descriptive name, which, specifically, corresponded to "analytical style" as for cluster 1, and "intuitive style" as for cluster 2.

	Clusters	
	1	2
1. GDMS Rational	20.18	16.67
2.GDMS Intuitive	14.61	18.04
3. GDMS Dependent	17.49	16.91
4. GDMS Avoidant	11.84	14.19
5. GDMS Spontaneous	8.03	11.26
6. PID Deliberative	36.93	30.84
7. PID Intuitive	29.86	33.93
8. SOLAT Left	11.05	6.76
9. SOLAT Right	9.55	15.82

Tab. 2.31 – Final clusters centers

Table 2.32 reported the number of samples in each cluster. Almost about half participants turned out to belong to the analytical style cluster, and the other half to the intuitive one.

Clusters	1 – analytical style	143
	2 – intuitive style	146
		289

Tab. 2.32 – Number of cases in each cluster

In order to test whether the variables included in cluster analysis are suitable to maximize the differences among cases in the different clusters F tests for each variable are computed. Results, which are reported in Table 2.33, supported this hypothesis.

	Cluster		Error		F	p
	Mean Square	Df	Mean Square	Df		
1. GDMS Rational	868,994	1	6,689	281	129,905	<.001
2.GDMS Intuitive	830,092	1	8,812	281	94,203	<.001
3. GDMS Dependent	256,925	1	16,526	281	15,448	<.001
4. GDMS Avoidant	386,776	1	16,369	281	23,628	<.001
5. GDMS Spontaneous	737,589	1	7,437	281	99,177	<.001
6. PID Deliberative	2623,088	1	16,134	281	162,578	<.001
7. PID Intuitive	1172,498	1	17,781	281	65,942	<.001
8. SOLAT Left	1300,398	1	13,664	281	95,169	<.001
9. SOLAT Right	2773,897	1	16,094	281	172,360	<.001

Tab. 2.33 –F-tests for each variable

Through cluster analysis each participant of the whole experimental sample was assigned to one of the two clusters, the analytical or intuitive style cluster. However, we were interested in identifying, within the total sample, the subsample of participants showing either an extreme intuitive or analytical profile.

We considered the results obtained through cluster analysis the first step of this identification procedure. In fact, after the splitting up of the total sample into two groups, the analytical and the intuitive ones, two distinct procedures were activated.

Firstly, the difference between the intuitive and rational *GDMS* scales, the intuitive and deliberative *PID* scales, and the right and left *SOLAT* scales were calculated. By sticking to the reference literature (Betsch, 2004; Schunk & Betsch, 2006), only those participants who obtained an absolute difference value higher than 8 on every instruments were identified as analytical or intuitive (e.g. *PID*-difference = -10, *GDMS*-difference = -9, *SOLAT*-difference = -12 : the participant was classified as analytical; but *PID*-difference = -3, *GDMS*-difference = -9, *SOLAT*-difference = -12: the participant was classified neither as analytical, nor as intuitive).

Secondly, the median values for each instrument were calculated (*PID-D* = 34; *PID-I* = 32; *GDMS*-Rational = 19; *GDMS*-Intuitive = 16; *SOLAT*-Left = 9; *SOLAT*-Right = 12). Only those participants who scored simultaneously above the analytical median value and under the intuitive median value on every instrument were classified as analytical. Conversely, those participants who scored simultaneously above the intuitive median value and under the analytical median value on every instrument were classified as intuitive.

Lastly, only those participants whose scores met simultaneously both the above-mentioned criteria were selected. Namely, the "extreme" analytical participants were those who, within the analytical group as identified through cluster analysis, were classified as analytical according both the difference and the median computation methods. Conversely, the "extreme" intuitive participants were those who, within the intuitive group as identified through cluster analysis, were classified as intuitive according both the difference and the median computation methods. Following this procedure 13 participants were classified as intuitive people (2 males and 11 females; ranged from 19 to 32 years, mean age = 22.9 yrs), whereas 16 participants as analytical people (2 males and 14 females; ranged from 18 to 48 years, mean age = 27.1 yrs). These people constituted the experimental sample of the Study 5.

2.2.4 Discussion

The data collected support, almost completely, the structures of the instruments originally described in literature. Specifically, as for the scales employed in Study 1, we found a confirmation, and, at some extent, an improvement of what emerged in Study 1. As for the scale which was not used in the previous study, the *PID* scale, it turned out that our data supported the original structure of the instrument, so allowing us to conclude that our Italian translation mirrors the corresponding original version. In the following paragraphs each instrument is examined in details.

The inter-item correlation and the Cronbach's alpha coefficients for each subscale of *GDMS* show acceptable reliabilities of the *GDMS*. In fact, Cronbach's alpha coefficients are higher, in almost all subscales, than the ones emerged in Study 1, and they are in line with both the original version of the instrument (Scott & Bruce, 1995) and the subsequent psychometric assessments of the inventory proposed in the original English version (Loo, 2000; Thunholm, 2004), and also in the Italian language (rational subscale: .70; intuitive subscale: .77; dependent subscale: .84; avoidant subscale: .80; spontaneous subscale: .78; Gambetti et al., 2008). Except for the finding of a positive correlation between dependent and spontaneous styles, the pattern of inter-correlations among the subscales are in line with the pattern reported by Scott and Bruce (1995) supporting their conclusion that the styles are not mutually exclusive. The negative correlation between the rational and the intuitive styles indicates that people who express a stronger preference for one style show a lower perspective for the other one, meaning that, even though individuals tend to use more than one decision-making style, they probably, have a dominant style. Both the negative correlations between rational and spontaneous style and the strong positive correlation between intuitive and spontaneous style indicate that rational decision makers probably engage in accurate and detailed assessment of the alternatives and take much more time to make a decision as compared to the intuitive and spontaneous decision makers, who are more inclined to decide

under time pressure (Spicer & Sadler-Smith, 2005) and can be seen as a kind of high speed intuitive style (Thunholm, 2004). The negative correlation between rational and avoidant styles shows that the rational decision makers tend to approach rather than avoid problems (Scott & Bruce, 1995; Loo, 2000), whereas the positive correlation between dependent and avoidant styles suggests that dependent decision makers are more likely to avoid decisions, thus contrasting the findings by Loo (200), but supporting Harren's (1979) conclusion that dependent decision makers are relatively passive and try to avoid making decisions and judgments. Moreover, from our data, it turned out that the avoidant style is positively correlated also with the intuitive and spontaneous styles (Thunholm, 2004; Gambetti et al., 2008). It seems that individuals who tend to avoid decisions, in addition to their dependency on others' opinions, also tend to decide as quick as possible. It has been speculated that avoidant people feel insecure and, as a consequence, whenever they can, they look for guidance from other, and when it is not possible to consult others, they try to go through the decision rapidly so to end the uncertainty (Bensi & Giusberti, 2007; Gambetti et al., 2008). The positive correlation between rational and dependent styles and, conversely, the negative correlation between spontaneous and dependent styles, suggest that people who depend on other's advice when making decisions tend to behave carefully analysing in details the situation and comparing all the alternatives rather than relying on their own hunches and feelings. It can be speculated that dependent decision makers feel uncertain as the avoidant decision makers, but, on the contrary, they tend to rely on a different strategy: instead of deciding as quick as possible, they meticulously labour the point in order to be sure about the quality of their decisions and, as a consequence, try to get over their sense of uncertainty.

The confirmatory factor analysis support the correlated 5-factors model of the *GDMS* as originally proposed (Scott & Bruce, 1995) and as emerged with the Italian version of the instrument (Gambetti et al., 2008). As compared to the results obtained through the exploratory factor analysis in Study 1, the factorial

structure which emerged in Study 2 turned out to be improved and much more in line with the original structure (Scott & Bruce, 1995). Probably due to both the adjustments which have been made to the Italian translation of the instrument after Study 1 was completed and the ampler sample employed in Study 2, the factorial structure of the GDMS turned out to be the same as the original version. As predictable from the higher inter-correlations among the subscales, the correlated model resulted to have better fit indexes (even though not always optimal) than the unrelated model, thus confirming what found in the Italian validation of the instrument (Gambetti et al., 2008).

The internal reliabilities of each of both the summed scale and the components of the *Maximization Scale* reached, only partially, the acceptability level. As in Study 1, the summed scale's Cronbach alpha coefficient was acceptable, but not high, even though this result is in line with the original version validation (Schwartz et al., 2002) and with subsequent research (Diab, Gillespie & Highhouse, 2008; Nenkov et al., 2008; Parker, Bruine de Bruin & Fishhoff, 2007). The Cronbach's alpha coefficients of the scales' components, as emerged in other studies (Nenkov et al., 2008), can not be considered as acceptable. The pattern of inter-correlations among components highlight that only two of them, namely the search for option and difficulty in choice, correlate with the summed scale, whereas the high standard component seems to be unrelated to both the summed scale and the other components. This raises an important point, in fact, concerning the dimensionality of the *Maximization Scale*. Previous research (Nenkov et al., 2008) and the data collected in both these studies raise an important conceptual issue about the real meaning of "maximizing". Specifically, data seem to suggest that maximizing could not be defined as the result of all components included in the scale, but only a subset of them instead. In fact, it remains unclear whether maximizing refers to the goals or to the strategy and process, or to both of them. In Simon's (1995) conceptualization maximizing refers to both goals and search strategy and all these aspects are represented in *Maximization Scale*. However, previous research found out that

the one component of the *Maximization Scale* ("high standard") is related to perfectionism, regret and need for cognition, but not to happiness, optimism, satisfaction with life even though they are supposed to be related. Moreover, our data highlight no relationships between the dimensions concerning the process and strategy ("search for options" and "difficulty in choice") and the ones concerning the goals ("high standard" and "second best"). As already noted, only the formers show a high correlation with the summed scale, thus suggesting that maximizing, as measured by the *Maximization Scale*, is more about the process and search strategies which are required to seek the "best". These findings, in addition to the results of the confirmatory factor analysis which, contrary to the original version, identifies a 4-components model as the best one to fit our data, on one side suggest that, probably, the Italian version of the *Maximization Scale* present a different internal structure, and, on a more general level, it confirms that the original 13-items version of the *Maximization Scale* could not be considered as a sound psychometric instrument (Diab, Gillespie & Highhouse, 2008; Nenkov et al., 2008; Parker, Bruine de Bruin & Fishhoff, 2007), thus inducing some authors to work on a shorter form of the *Maximization Scale* (Nenkov et al., 2008), that is a 6-item version which possesses better pshychometric properties than the original 13-item version. In particular, it has been demostrated that this short version has superior reliability and validity and a more stable dimensional structure which encompasses the same dimensions as the original scale but has the advantage that the dimensions are equally weighed in the summed scale whereas in the original scale the number of items arbitrarily varies across domains.

Both the two subscales of *PID* show acceptable reliabilities, even though slightly lower than the original version validation (Betsch, 2004) and with other research (Richetin et al., 2007). The pattern of inter-correlation between the two subscales show a tendency to negative correlation even if it does not reach the significance level, as previously found by Richetin et al. (2007). However, when the correlated and the unrelated models were directly compared using

confirmatory factor analyses, the correlated model obtained the best fit indexes, thus allowing to conclude that the deliberative and analytical subscales are negatively correlated, even the correlation is very low, as emerged from the original validation of the instrument (Betsch, 2004). As for the *GDMS,* a negative correlation between the analytical and the intuitive dimensions, could be considered as a confirmation that one of the two styles is the predominant, even though they can not considered as mutually exclusive. Once again, different styles could be thought as alternative ways of thinking and deciding.

As for *SOLAT* the inter-correlations among subscales highlighted that all the styles are negatively related to one another. Also in this case, it seems that styles are alternative way of behaving and, probably, one of them dominates the others.

The pattern of relationships among the instruments employed in the study highlights that questionnaires are related one another in consistent way. Specifically, correlations between *Maximization Scale* and the *GDMS* questionnaires showed that maximizers tend to be rational, dependent and avoidant decision makers. As predictable by Schwartz's accounts (2002), maximizers engage in more rational decision making which reflect their perception of systematic deliberation about their choices, more dependence on others which indicates the interpersonal comparisons and the quest for information they usually activate, and more avoidant decision making which reveals the their tendency to postpone decisions to search for more information and ponder the alternatives (Parker, Bruine de Bruin & Fischhoff, 2007). The correlation between dependent style and maximizing tendencies is consistent with previous findings (Schwartz et al., 2002; Iyengar et al., 2006; Parker, Bruine de Bruin & Fischhoff, 2007) and with the naïve image of maximzers agonizing over the best option and trying to reach this outcome by all means, including the search for advice and guidance from others. The relationship between avoidant style and maximizing tendencies could be also explained by the fact that maximizers always try to reach the best solution and experience a

greater feeling of regret after the decision has been made as compared to the satisficers. As showed by previous research (Beattie et al., 1994), the main sources of "decision aversion" are anticipated regret and fear for blame for less-than-optimal outcomes. It could be the case that maximizers, who are not content with a less-than-optimal choice, tend to be "decision averted" in order to prevent themselves from experiencing regret and from being blamed for their possible poor decisions. As for the intuitive and spontaneous styles, it turned out that only two components of the *Maximization Scale*, that is the "difficulty of choice" and "search for option" ones concerning maximizing strategy and process, are related to these styles. It could be the case that intuitive and spontaneous decision makers adopt a maximizing strategy in choosing among alternatives, even though the aim of this searching is not to seek the best option. It seems that they take into account different alternatives when deciding, but this does not necessarily imply that the objective is to reach the best choice. Probably due to their tendency to be enterprising, people with both a spontaneous and intuitive decision style prefer searching for different alternatives even if they can encounter some difficulties in choosing among them, rather than having a few alternatives among to choose which.

As expected, the pattern of relationship between *GDMS* and *PID* suggests that the rational and the deliberative scales, and the two intuitive scales are positively correlated among them, whereas the two couples are negatively related. The spontaneous style is positively associated with the intuitive style and negatively with the deliberative style, which, in turn, is negatively associated with the avoidant style. The strong correlation between the "analytical" scales on one side, and the "intuitive" scales, on the other side, indicates that *GDMS* and *PID*'s measures of analytical and intuitive styles shows a great overlapping, even though they do not coincide. From a theoretical point of view, it was expected to find an almost total coincidence, but it did not happen. A possible explanation could refers to the fact that, on a closer inspection, the two instruments, even though both the two instruments claim to measure analytical

and intuitive decision making styles, what is measured by the scales is partially the same. On a closer inspection, in fact, it emerges that intuition and analysis are operationalized in different way. Whereas in *GDMS* items are only phrased as expression of habits (e.g. "When I make decisions, I tend to rely on my intuition"), in *PID* items are conceived also as personal beliefs (e. g. "With most decisions it makes sense to completely rely on your feelings"), liking (e.g. "I prefer making detailed plans rather than leaving things to chance"), besides habits (e.g. "When it comes to trusting people, I can usually rely on my gut feelings"), thus allowing to conclude that the two instruments make reference to different level of analysis. It can be speculated that *GDMS* refers to a first level which concerns the individual habits of people, that is the way they usually behave when making decisions. The *PID,* on the contrary, place itself also on other levels of analysis, such as the personal preferences and liking, that is not how they really behave, but, rather, how they would like to behave; and the individual beliefs, that is what people believe should be the best way of making decisions, the values, and the decision behaviour which is ideally the best. These levels of analysis may coincide, but, also may not. In fact, while individuals may have an ideal or preferred decision-making style, it could be the case that their actual decision behaviours are totally different from this ideal one (Leonard, Scholl & Kowalski, 1999).

The only correlations between *GDMS* and *SOLAT* confirm that the rational decision style is positively associated with the left and integrated thinking styles, and negatively with the right thinking style. The intuitive and spontaneous decision style are positively related to the right thinking style, and negatively with the left and integrated thinking styles. Also in this case, the correlations suggest an overlapping between the two "analytical" and the two "intuitive" scales. However, in this case, the correlations are so low that it is not possible to think to a total correspondence between constructs. This further substantiates the idea that cognitive and decision styles share a common ground, but place themselves into different levels of explanations. In fact, decision –making styles,

even if present distinctive specificities, can not be considered as something different from thinking styles. In fact, decision-making implies general cognitive mechanisms, so that the two types of style have necessarily to show some considerable overlapping.

The relationships between *Maximization Scale* and *PID* highlight that the summed maximization scale, the high standard and the second choice components are positively associated with the deliberative scale, thus confirming that the maximizing tendencies are typical of people with an analytical decision style, as found in the pattern of relationships between *Maximization Scale* and *GDMS*. Another confirmation of this finding emerges from the pattern of correlation between *Maximization Scale* and *SOLAT*, which highlights the positive association between the summed maximization scale and the left thinking style, and the negative association between the summed scale and the right thinking style. In both the pattern of correlation between *Maximization Scale-PID* and *Maximization Scale-SOLAT* only the components concerning the maximization strategy are positively connected with the intuitive decision style and the right thinking style, thus allowing to conclude that intuitive-right individuals adopt a maximizing strategy in choosing among alternatives, even though the aim of this searching is not to seek the best option.

The pattern of relationships between *PID* and *SOLAT* reveals that the deliberative decision style is positively associated with the left, and negatively with the right thinking style. Conversely, the intuitive decision style is positively connected with the right, and negatively with the left thinking style. However, the correlation coefficients are not so high to suggest a total overlapping between the constructs. As noted for the pattern between *GDMS* and *SOLAT*, it supports the idea that cognitive and decision styles share a common ground, but place themselves into different levels of explanations.

A different point altogether is the relationship between the *CRT* and all the stylistic measures. In fact, *CRT* shows a few marginal correlations with the other measures. This represents a fundamental finding emerging from the present

study since it can count as evidence for the claim that style is different from ability. Even though in literature some relationships between styles and abilities are reported (MacLeod, Jackson & Palmer, 1986; Myers & McCaulley, 1985), our findings strengthen the prevailing idea that styles can not be conceived as abilities, but rather as preferred ways of using abilities (Antonietti, 2003).

Starting from this considerable number of correlations among the instruments employed, two distinct pattern of relationships has been identified. They roughly correspond to the analytical and intuitive styles, even though these dimensions are enriched and qualified by other aspects which contribute to better define the analytical and intuitive styles providing a multifaceted profile, rather than only single dimensions, of these constructs. It turned out that the analytical people, a part form showing a rational, deliberative, and systematic approach to decision making, tend to rely on others' advice and guidance before making important decisions, probably in order to be sure that they can reach the best outcome. In fact, analytical people prove to be particularly aiming at the best option. They have clear in mind the goal of their decision-making: striving for the best. They settle high standard for themselves and are never satisfied with what they consider a "second choice". At a more general level of cognitive functioning, they also show a logic and systematic thinking and learning style, thus confirming that cognitive and decision styles can not be treated as single and isolated aspects, but as fundamental determinants that contribute to provide a more comprehensive and holistic profile that takes the whole person into account. Analytical people, in addition, show an integrated thinking style. This could be explained by the fact that "integration" can be considered as a kind of mental balance which is very similar to rationality and analysis. Conversely, the intuitive people show a global, holistic, immediate and spontaneous approach to decision making, and also to cognitive processing, in general. They do not strive for the best option, since the attainment of the maximum is not the goal of their decision making, but, however, they tend to adopt a maximizing strategy in choosing among alternatives. It could be speculated that intuitive and

spontaneous, probably because of their enterprising attitude, tend to search for different options in order to have the possibility to choose what they prefer, even if this option does not represent the best one.

These two pool of characteristics turned out to be good predictors for the cluster analysis which, in fact, succeeded in identifying those participants whose cognitive and decision profiles corresponded either to the analytical or intuitive one.

Finally, the present research provided the opportunity to compare different subsamples' scores on this instrument. Specifically, the comparison between students and workers showed differences in a considerable number of subscales of the instruments employed. Results lead to the identification of different profiles for students and workers, even though these profiles do not precisely coincide with the analytical/intuitive distinction, but rather with other something different. In fact, students turned out to have a more avoidant and, at some extent, intuitive decision-making style as compared to the workers. Moreover, they result to have higher maximizing tendencies, in particular as concerns the search for options and difficulty in choice. Then, they have a less integrated thinking and learning style, whereas they show a lower number of reflective responses on the ability instrument as compared to the workers who, on the contrary, seem to adopt a more reflective strategy when asked to answer a query. From these results it emerged a students' portrait that describe students as open to different alternatives, in search for them, and striving for the best options. It seems that they like having different options among which to choose, even though, probably being insecure and novices in decision making, they try to avoid decision-making whenever possible. Compared to the workers, they are less able to balance and integrated in a coherent way different approaches, which probably required more experience to be reached. This kind of impulsivity prevent students from adopting a reflective strategy also when asked to reconsider the default incorrect answer that first comes to mind. A similar trend came out from the comparison among age groups, thus making it difficult

to clearly separate the effect of occupational status from the effect of age on these results. Since the occupational status distinguish between students and workers, and this distinction roughly coincide with the distinction between younger and older groups, it could be speculated that either only one of the two variables affect the individual style, or both of them have an influence on the individual style. Probably further investigations are needed in order to separate the effect of age from occupational status. However, the comparison between different occupational samples were an ancillary aim, being the main purpose to have a heterogeneous experimental sample, instead of the more common homogeneous sample made up of undergraduate students.

CHAPTER 3

INTUITION AND ANALYSIS IN ACTION: MINDREADING STRATEGIES AND INDIVIDUAL STYLES IN THE ULTIMATUM GAME

Introduction

The Ultimatum Game can be considered as an interactive strategic context where players are required to assume the opponent's perspective and think about his/her mental states (Singer & Fehr, 2005). The activation of mindreading processes, that is this ability to attribute feeling and thoughts to others, seems to be indispensable and really influential during the course of the game (Hoffman et al., 2000). In fact, far from behaving like rational maximizing agents who only care about monetary gain, people have been shown to be responsive to the other players' intentions and behaviours (Rilling et al., 2004; Sally & Hill, 2006).

Taking into account the other's perspective can be either an immediate and holistic process or a slower and analytical one. Specifically, mindreading processes can develop alternatively through a rapid and synthetic apprehension or a detailed and systematic analysis of the person and the situation at hand. When reading the other's mind in the Ultimatum Game, in fact, a person can form a global idea of the other player and try to imagine his/her reaction to an unfair offer. On the contrary, a person can take into consideration every piece of information about the other player and engage in a minute deliberation which leads him/her to an analytical and detailed outline. Whereas in the first case the

process resembles the formation of impression, in the second one a logical evaluation is involved. As a consequence, it is possible to figure out that in the Ultimatum Game, players activate either an "immediate, intuitive" or "detailed, analytical" mindreading processes to take into consideration the other's player perspective. In this respect, intuition and analysis can be conceived as different strategies employed in the course of the game.

However, as already discussed in the second chapter, intuition and analysis can also be conceived as individual cognitive and decision styles. Although Ultimatum Game has been widely studied, few attempts have been made to understand to what extent psychological factors can influence subjective behaviour in this game. Some studies introduced experimental factors in Ultimatum Game, such as structural changes to the game (Hoffman, McCabe & Smith, 2000; Huck, 1999), methodological manipulations (Camerer & Hogarth, 1999; Sutter, Kocher & Strauss, 2003), and demographic variables like gender (Solnick, 2001; Solnick & Schweitzer, 1999), race and culture (Eckel & Grossman, 2001; Roth et al., 1991: Hoffman & Tee, 2006), age (Murnighan & Saxon, 1998; Harbaugh, Krause & Liday, 2003; Harbaugh, Krause & Vesterlund, 2007; Hoffman & Tee, 2006), genetic aspects (Wallace et al., 2007), and the presence of non-human beings (Jensen, Call & Tomasello, 2007). However, a part from few studies exploring the role of emotions (Haselhuhn & Mellers, 2005), selfishness (Brandstätter & Königstein, 2001), some personality traits (Scheres & Sanfey, 2006; Schmitt et al., 2008), and specific brain disorder (Agay et al., 2008), there have been no studies researching into the role of cognitive and decision styles in Ultimatum Game. Moreover, another important aspect which has been almost neglected so far, or at least scarcely investigated, is the bridging between the stylistic individual differences and the decision-making outcomes. In fact, few attempts have been made to study how specific styles result in different decision-making performance. A part form some contributes which relate styles to the speed of decision (Wally & Baum, 1994) and action radicalness (Stumpf & Dunbar, 1991), very few studies connect

individual style and decision quality or effectiveness (Hough & Ogilvie, 2005; Pretz, 2008; Schmitt et al., 2008; Shiloh, Salton & Sharabi, 2002).

The general purpose of Study 3, 4, and 5 is to investigate, within a strategic context requiring the reading of the other player's mind, the role of intuition and analysis intended as both strategies and individual styles. Specifically, even though all three studies involved the Ultimatum Game as experimental setting, the aims of the subsequent three studies were different and nested, in that each subsequent study aimed at providing further support to what found in the previous study and, in addition, at investigating a specific aspect which distinctive of that study. The specific aims were as follows.

The proper aim of Study 3 was to assess whether, within a general mindreading attitude, different psychological features of the responder, which the proposer was induced to take into account, affected the amount of money that the latter offers to the former. This should provide good evidence that the focus on the presumed mental states of the other player induced the proposer to differentiate the way in which he/she conceived the reciprocal financial advantage in a social interactive game.

Study 4 aimed at assessing whether reciprocity in social interactive games based on mindreading was influenced by the way in which the psychological portraits of the responders were processed – the intuitive or analytic modes of thinking. Specifically, it was hypothesized that the intuitive or analytic way of processing information about the responders affected the sums of money offered by subjects. Starting from the findings obtained by Dijksterhuis et al. (2006) concerning the superiority of intuitive thinking when dealing whit complex and multiattributed decision, it was expected that in the intuitive task participants would make offers that were consistent with the psychological portraits of the responders. On the contrary, requiring the consideration of multiple aspects, the offer proposal would be less consistent with the responders' psychological portraits.

Finally, in Study 5 it was hypothesized that the individual intuitive vs. analytical style modulated the effect of the two way of processing information (activated by the intuitive or analytical task) on the sums of money offered by participants. Specifically, we expected that a fit between individual style and mode of thinking (e.g. a participant with an intuitive style who is presented with the intuitive task) resulted in an optimization of the offers (see Schunk & Betsch, 2006), that is a better ability to differentiate the offers according to the psychological features of the responders.

Then, in case it would emerge behavioural differences between intuition and analysis, as we expected, it would be interesting to control for the participants' physiological activation corresponding to both intuitive and analytical strategies and styles. Hence, in order to clarify whether these behavioural differences depend either on the tension, effort, and general arousal or on the specific quality of each type of elaboration process, we control for the physiological activation components in relation to intuition and analysis. According to traditional dual-process models, intuition is affectively charged (Epstein, 1994; Hassin et al., 2005; Sinclair, 2003), thus following this assumption we should expect a higher physiological activation for both the intuitive people and for the intuitive thinking as compared to the analytical people and the analytical thinking. However, as already clarified in the Introduction, since our conception and operationalization of intuition does not include an emotional component, we expect that the pattern of autonomic activation do not differ depending on the intuitive and analytical thinking and style.

3.1 STUDY 3

3.1.1 Aims

In a study carried out by Hoffman et al. (2000) it turned out that, when proposers were explicitly hinted at activating mentalizing processes which induced the proposer to assume the responder's perspective and think to his expectations and feelings, the sum of money offered to the responder was higher. This lead the authors to the conclusion that mindreading, that is assuming the responder's mental perspective, is influential in deciding how much to reciprocate in the Ultimatum Game. Starting from this finding, we were interested in assessing whether, not only assuming a general mindreading attitude (as shown by Hoffman et al., 2000), but taking into account the specific different psychological features of the responder affects the amount of money that the proposer offers to the responder. Specifically, it was hypothesized that the activation of mindreading processes led subjects to modulate their offers according to the psychological portrait of the responders. In particular, it was expected that the sums of money participants proposed to the responders varied consistently by considering features of the responders such as honesty, sense of justice and personal dignity.

A second aim of Study 3 was to verify whether distinct instructions stressing in a different way the goal of the Ultimatum Game might affect the proposers' offers. To our knowledge no specific studies have been conducted in order to test the effect of particular instruction given to the participants on the amount of offers made by proposers. Except for a study (Binmore, Shaker & Sutton, 1985) in which, even though experimenters explicitly induced participants to maximize their monetary gain, the study was not specifically intended to control the effect of instruction on the Ultimatum Game results and, as a consequence, it did not

lead to conclusive explanations, no other contributions were found on this issue. Relying on logic, we hypothesized that the more the instructions stressed the maximizing gain goal, the more participants did not differentiate their offers depending on the responders' psychological features, and, as a consequence, offered the same low amount of money to all responders.

To summarize, the goals of the study were:

- to verify that the psychological portraits of the responders led to differences in term of offers made by the proposers;

- to assess whether constraints affected the amount of money offered by the proposer.

3.1.2 Method

3.1.2.1 Materials

Four different descriptions of fictitious responders were devised. Responders were described focusing on specific characteristics such as the sense of justice, personal dignity, and honesty. The four responders differed from each other depending on these characteristics. Two of them (Marco and Grazia) were portrayed so to convey the idea that they would refuse unfair offers and, for this reason, were labelled as "rejecters". The other two (Gianni and Marina) were portrayed so to induce people to believe that they would accept even unfair offers, so they were called "acceptors".

Moreover, in order to test whether different constraints might affect the proposers' offers, three kinds of instructions were devised. Instructions stressed in a different way the aim of the Ultimatum Game. In the *spontaneous* condition no precise instructions were given concerning the aim of the game. In the *maximizing* condition participants were told that the aim was to gain as much as possible. In the *threshold* condition participants were informed that the aim was to gain at least 25 euros at the end of the game.

The study presents a mixed 2X3 experimental design. The type of responder variable is a within-subjects variable with two levels corresponding to *acceptors* and *rejecters* responders; the instruction variable is between-subject and shows three levels corresponding to the *spontaneous, maximizing,* and *threshold* constraints.

3.1.2.2 Pretests

Prior to the experimental stage, it was held it necessary to have an evaluation of the four responders' descriptions in order to be sure that the descriptions were actually rated as different only as for the features we intended to be distinctive of each description. A series of pre-tests were carried out to verify that the four descriptions of the fictitious responders were homogeneous as for some characteristics (such as likableness and attractiveness), but not homogeneous as for the psychological features which contributed to define the distinctive profile of each responder. In fact, the aim of these three pre-tests was to make sure that the descriptions differed only in the features which were distinctive for each psychological portrait. Specifically, the pre-tests were aimed at verifying that the 4 responders' descriptions were:

- *homogeneous* as for "external" features (likeableness, attractiveness, friendliness and humbleness);
- *different* as for "internal" features which contribute to define the distinctive profile of each character (altruism, sense of justice, honesty, personal dignity, unselfishness, generosity)

In each of the following pre-tests the procedure was the same. After reading each character's description participants were requested to evaluate the character with regard to the above-mentioned ten bodily and psychological features on a semantic differential scale.

 In the following paragraphs the series of pre-tests we carried out to test the four descriptions are reported.

3.1.2.2.1 Pretest 1

Participants

The experimental sample was composed of 69 undergraduates aged from 18 to 28 (mean age = 22.5).

Analyses and Results

Before running the analysis the assumption of univariant normality was assessed on each item of the differential scale by getting skewness and kurtosis and dividing these by the standard errors. Both skewness and kurtosis were within the +1 to -1 range, so allowing to conclude that data were normally distributed (Marcoulides & Hershberger, 1997). Specifically, the skewness values ranged from -1.01 to .97, whereas the kurtosis values ranged from -1.02 to .91.

On each of the features considered, a repeated measure ANOVA was computed in order to compare the mean ratings obtained by the different responders. Prior to ANOVAs the assumption of sphericity, which implies the equality of the variances of the differences between levels of the repeated measures factor, was assessed through the Mauchly's sphericity test. Mauchly's test was not significant only for two features, altruism and friendliness (Mauchly's $W(5) = 0.856$, $p = .057$; Mauchly's $W(5) = 0.881$, $p = .122$, respectively). A part from these two features, Mauchly's test turned out to be significant (likeableness: Mauchly's $W(5) = 0.695$, $p < .001$; sense of justice: Mauchly's $W(5) = 0.728$, $p < .001$; honesty: Mauchly's $W(5) = 0.584$, $p < .001$; attractiveness: Mauchly's $W(5) = 0.789$, $p < .05$; humbleness: Mauchly's $W(5) = 0.811$, $p < .05$; personal dignity: Mauchly's $W(5) = 0.820$, $p < .05$; unselfishness: Mauchly's $W(5) = 0.782$, $p < .005$; generosity: Mauchly's $W(5) = 0.710$, $p < .001$;), then sphericity couldn't be assumed and, as a consequence, the Greenhouse-Geisser correction for violation of sphericity was used. ANOVAs' results are reported in Table 3.1. Since for most ANOVAs the sphericity assumption was not confirmed, the degrees of freedom were different for each ANOVA and, thus, are reported in brackets after each F-value.

Features	Responders	Mean	SD	F	P	η^2
Likeableness	Marco	5.80	1.19	4.689 (df 2.401, 168.037)	<.05	.244
	Grazia	4.75	1.05			
	Gianni	4.37	1.08			
	Marina	3.75	1.09			
Altrusim	Marco	5.86	1.20	11.525 (df 3,204)	<.005	.542
	Grazia	4.78	1.13			
	Gianni	3.24	1.12			
	Marina	3.38	1.56			
Sense of justice	Marco	5.04	1.41	16.923 (df 2.513, 175.935)	<.001	.579
	Grazia	6.53	0.91			
	Gianni	3.21	1.23			
	Marina	3.61	1.56			
Attractiveness	Marco	4.46	1.13	2.643 (df 2.612, 182.825)	.074	.073
	Grazia	3.95	0.97			
	Gianni	4.42	0.95			
	Marina	4.24	1.07			
Humbleness	Marco	4.89	1.49	2.748 (df 2.699, 188.897)	.065	.080
	Grazia	4.43	1.42			
	Gianni	3.51	1.04			
	Marina	3.13	1.36			
Honesty	Marco	5.32	1.19	15.309 (df 2.243, 154.786)	<.001	.588
	Grazia	6.06	0.91			
	Gianni	3.21	1.26			
	Marina	3.58	1.14			
Personal dignity	Marco	5.63	1.37	8.438 (df 2.686, 185.326)	<.05	.431
	Grazia	6.22	1.01			
	Gianni	4.01	1.24			
	Marina	4.51	1.28			
Unselfishness	Marco	5.37	1.25	12.643 (df 2.486, 174.021)	<.001	.549
	Grazia	5.07	1.29			
	Gianni	2.83	1.20			
	Marina	3.01	1.31			
Friendliness	Marco	4.62	1.42	1.687 (df 3, 204)	.147	.060
	Grazia	4.44	1.20			
	Gianni	4.90	1.38			
	Marina	3.79	0.99			
Generosity	Marco	5.59	1.22	6.445 (df 2.586, 181.014)	<.05	.444
	Grazia	4.51	1.13			
	Gianni	3.44	1.08			
	Marina	3.83	1.03			

Tab.3.1 Repeated-measure ANOVAs comparing ratings obtained by each responder's description on each feature

Results showed that, as we expected, the four responders' descriptions were rated as different as for those features which were intended to be typical of the portraits (altruism, sense of justice, honesty, personal dignity, unselfishness, generosity). More in details, all these features were rated higher for Marco and Grazia's descriptions than Gianni and Marina's ones, thus allowing to conclude that the verbal descriptions we devised actually convey the ideas that we intended to give. However, three out of four features which were expected to be rated as homogeneous turned out to be so, whereas likeableness was rated as different within the descriptions. Specifically, Marco's description was judged to be more likeable as compared to the other characters whereas Marina's description was rated as less likeable than all other responders (mean difference between Gianni and Grazia was not significant ($p = .054$), whereas Marco's rating was significantly higher than the others ($p < .001$) and Marina's rating was significantly lower than the others ($p < .001$)). In addition, it's worth noticing that, even though no differences emerged as for friendliness, Marina's rating was lower than the other ones.

As a consequence, some adjustments were made to both Marco and Marina's descriptions in order to make all descriptions homogeneous as for the likeableness feature, and, to a lesser extent, also for friendliness. In particular, in Marco's description two adjectives aimed at conveying the idea of a less likeable person were included, and, moreover, some expressions were added to Marina's description so to give the picture of a kinder and less off-putting woman. The modified versions of the descriptions are reported in Appendix II

3.1.2.2.2 Pretest 2

Participants

Forty-nine undergraduates aged from 19 to 29 (mean age = 22.9 yrs) were involved.

Analyses and Results

Prior to the analyses, the assumption of univariant normality was checked for each feature of the differential scale. The skewness and kurtosis values turned out to be within the +1 and -1 range, so confirming the normal distribution. In particular, the skewness values varied from -.98 to .54, and the kurtosis values ranged from -1.00 to .88.

Before carrying out the ANOVA, Mauchly's sphericity test was used to test the assumption of sphericity. Mauchly's test resulted to be not significant for all features ((likeableness: Mauchly's $W(5) = 0.455$, $p = .070$; altruism: Mauchly's $W(5) = 0.122$, $p = .322$; sense of justice: Mauchly's $W(5) = 0.237$, $p = .122$; attractiveness: Mauchly's $W(5) = 0.521$, $p = .065$; humbleness: Mauchly's $W(5) = 0.211$, $p = .344$; honesty: Mauchly's $W(5) = 0.347$, $p = .234$; personal dignity: Mauchly's $W(5) = 0.480$, $p = .090$; unselfishness: Mauchly's $W(5) = 0.423$, $p = .076$; friendliness: Mauchly's $W(5) = 0.444$, $p = .074$; generosity: Mauchly's $W(5) = 0.333$, $p = .133$;), thus allowing to conclude that the sphericity could be assumed. A repeated measures ANOVA was carried out for each features to compare the mean ratings of the each description. Results are reported in Table 3.2.

Features	Responders	Mean	SD	$F_{(3,144)}$	P	η^2
Likeableness	Marco	4.31	1.85			
	Grazia	6.12	0.95	4.832	<.005	.235
	Gianni	4.68	1.49			
	Marina	4.93	1.18			
Altrusim	Marco	5.06	1.52			
	Grazia	4.68	1.62	6.051	<.005	.342
	Gianni	3.31	1.49			
	Marina	3.75	1.48			
Sense of justice	Marco	4.81	1.32			
	Grazia	5.81	1.97	7.277	<.001	.354
	Gianni	3.81	1.47			
	Marina	3.87	1.45			
Attractiveness	Marco	4.00	1.26			
	Grazia	3.18	1.27	2.513	.100	070
	Gianni	3.93	1.23			
	Marina	4.50	1.63			
Humbleness	Marco	4.68	1.66			
	Grazia	4.70	1.38	3.154	.080	.080
	Gianni	3.75	1.31			
	Marina	3.52	1.20			
Honesty	Marco	5.27	1.16			
	Grazia	6.06	0.85	17.204	<.001	.598
	Gianni	3.60	1.48			
	Marina	3.66	1.31			
Personal dignity	Marco	4.87	1.70			
	Grazia	5.81	1.55	4.701	<.005	.265
	Gianni	3.93	1.48			
	Marina	4.62	1.74			
Unselfishness	Marco	4.46	1.01			
	Grazia	4.93	1.23	15.903	<.001	.561
	Gianni	2.60	1.20			
	Marina	2.53	1.19			
Friendliness	Marco	3.56	1.66			
	Grazia	5.13	1.44	2.921	<.05	.092
	Gianni	4.75	1.57			
	Marina	4.93	1.43			
Generosity	Marco	4.75	1.39			
	Grazia	5.25	1.06	10.464	<.001	.365
	Gianni	3.37	1.20			
	Marina	3.31	1.19			

Tab. 3.2 – Repeated-measure ANOVAs comparing ratings obtained by each responder's description on each feature

Results confirmed what emerged in Pre-test 1, thus highlighting that characters were not homogeneous as for the features that we intended to highlight in profiling them (as we expected Marco and Grazia's descriptions were rated higher on altruism, sense of justice, honesty, personal dignity, unselfishness and generosity), and homogeneous as for two of the others (attractiveness and humbleness). As emerged in Pre-test1, it turned out that characters were not rated as homogeneous as for likeableness and, in this Pre-test, also for friendliness. However, as compared to Pre-test 1, the mean ratings of the descriptions seemed to show an opposite trend, that is, whereas Marco's likeableness and friendliness ratings were the highest one in Pre-test 1, in Pre-test 2 they were the lowest. This is probably due to the addition of the two "negative" adjectives to Marco's description which were supposed to reduce the excessive positivity of his portrait. In fact, the two adjectives probably reduced too much this positive image, thus leading participants to the opposite tendency to rate Marco's likeableness and friendliness significantly lower as compared to the other characters' ratings. For this reason, only one of the two added adjectives was kept so to avoid an excessive negative ratings and, moreover, an expression, which conveyed the idea of a too peculiar person, was eliminated. The modified version was reported in Appendix II.

3.1.2.2.3 Pretest 3

Participants

Forty undergraduates aged from 20 to 25 (mean age = 23.8 yrs) were involved.

Analyses and Results

Prior to the analyses, the assumption of univariant normality was assessed for each feature of the differential scale. All the skewness and kurtosis values were within the +1 and -1 range. Specifically, the skewness values ranged from -.67 to .87, and the kurtosis values ranged from -.90 to .77.

Before carrying out the ANOVA, the assumption of sphericity was checked employing Mauchly's sphericity test. It turned out to be not significant for all

features ((likeableness: Mauchly's $W(5) = 0.333$, $p = .135$; altruism: Mauchly's $W(5) = 0.189$, $p = .222$; sense of justice: Mauchly's $W(5) = 0.245$, $p = .189$; attractiveness: Mauchly's $W(5) = 0.675$, $p = .077$; humbleness: Mauchly's $W(5) = 0.232$, $p = .433$; honesty: Mauchly's $W(5) = 0.376$, $p = .301$; personal dignity: Mauchly's $W(5) = 0.898$, $p = .066$; unselfishness: Mauchly's $W(5) = 0.768$, $p = .076$; friendliness: Mauchly's $W(5) = 0.498$, $p = .101$; generosity: Mauchly's $W(5) = 0.353$, $p = .175$;), thus allowing to conclude that the sphericity could be assumed.

On the data a repeated-measure analysis of variance was carried out for each feature to verify that the characters were not homogeneous as for the features that we intended to be distinctive of each portrait, but homogeneous as for the others which were not aimed at identifying the distinctive characters. Results are reported in Table 3.3.

Features	Responders	Mean	SD	$F_{(3, 117)}$	P	η^2
Likeableness	Marco	4.48	1.22	0.503	.681	.055
	Grazia	4.82	0.98			
	Gianni	4.47	1.24			
	Marina	4.21	1.15			
Altrusim	Marco	5.70	1.43	21.544	<.001	.676
	Grazia	4.83	1.54			
	Gianni	3.00	1.35			
	Marina	3.79	1.47			
Sense of justice	Marco	4.79	1.28	23.882	<.001	.699
	Grazia	6.58	1.68			
	Gianni	3.16	1.25			
	Marina	3.75	1.34			
Attractiveness	Marco	4.12	1.35	2.899	.060	.085
	Grazia	3.83	1.23			
	Gianni	4.41	1.12			
	Marina	4.91	1.57			
Humbleness	Marco	3.75	1.66	1.494	.224	.040
	Grazia	4.50	1.38			
	Gianni	3.62	1.31			
	Marina	3.63	1.20			
Honesty	Marco	5.41	1.13	17.998	<.001	.544
	Grazia	6.12	1.01			
	Gianni	3.12	1.45			
	Marina	4.41	1.23			
Personal dignity	Marco	6.04	1.26	10.343	<.001	.423
	Grazia	6.37	1.23			
	Gianni	4.33	1.46			
	Marina	4.87	1.68			
Unselfishness	Marco	5.12	1.09	16.012	<.001	.523
	Grazia	4.92	1.21			
	Gianni	2.37	1.24			
	Marina	3.62	1.18			
Friendliness	Marco	4.93	1.36	3.983	.058	.255
	Grazia	4.58	1.35			
	Gianni	3.20	1.02			
	Marina	3.58	1.10			
Generosity	Marco	5.45	1.28	9.125	<.001	.353
	Grazia	4.50	1.05			
	Gianni	3.25	1.01			
	Marina	4.16	1.13			

Tab. 3.3 – Repeated-measure ANOVAs comparing ratings obtained by each responder's description on each feature

Results highlighted that no significant differences emerged as for the features which were expected to be homogeneous (likeableness, attractiveness, friendliness and humbleness), whereas differences came out as for the other features (altruism, sense of justice, honesty, personal dignity, unselfishness and generosity). As in both previous studies, Marco and Grazia's descriptions were rated higher than Gianni and Marina's ones on all features which were supposed to be distinctive of each psychological profile.

In conclusion, the subsequent pre-tests lead to the identification of four responders' descriptions meeting the settled criteria and, as a consequence, employable in Study 3.

3.1.2.3 Participants

Fifty-seven undergraduate students attending different faculties were recruited at the Catholic University of Milan. Their age ranged between 20 and 27 years (mean age = 23.7 yrs). They were volunteers who neither were paid nor received course credits. A short interview allowed the experimenter to assess that they had never attended any cognitive psychology or economics course and that they had no notions about the Ultimatum Game.

3.1.2.4 Procedure

The four descriptions of the pretended responders were reported onto a sheet of paper. The portraits were preceded by one of the three type of instructions (*spontaneous, maximizing, threshold*) concerning the specific goal of the Ultimatum Game.

Participants were divided into three groups under the three different instruction they received. Twenty-one participants received the *spontaneous* instruction, nineteen the *maximizing* instruction, and eighteen the *threshold* instruction.

They were asked to play four rounds of a single-shot Ultimatum Game. Participants played the role of the proposer who had to split 10 euros with a different responder in each round. After reading the description of the responders, they were asked to make their offer to each of them.

3.1.3 Results

Analyses of the data proceeded as follows. We first verified the existence of differences among the offers made by participants to the different responders. Then, we investigated whether different constraints affected the amount of money offered by participants.

3.1.3.1 Activation of mindreading processes

On the data collected a one-way repeated measure ANOVA was carried out in order to verify whether participants made significantly different offers depending on the psychological features of each responder.

Before running the analysis the assumption of univariant normality was assessed on the offers made to each responder by getting skewness and kurtosis and dividing these by the standard errors. Both skewness and kurtosis were within the +1 to -1 range, so allowing to conclude that data were normally distributed (Marcoulides & Hershberger, 1997). Specifically, as for the offers made to Marco the skewness was -.89, whereas the kurtosis was 46; for the offers made to Grazia the skewness was – 1.05 and the kurtosis from -.53; for the offers made to Gianni the skewness value was .09 and the kurtosis .88; for the offers made to Marina the skewness value was .56 and the kurtosis value -.77.

The mean values of the sums of money that the proposers offered to each responder by collapsing the three instruction conditions are reported in Table 3.4.

Responder	Mean	SD
Marco	5.39	2.45
Grazia	4.28	1.62
Gianni	3.69	1.67
Marina	3.68	1.86

Tab. 3.4 – Mean values of money offered to each responder

Prior to the ANOVA, the assumption of sphericity, which implies the equality of the variances of the differences between levels of the repeated measures factor, was assessed by using the Mauchly's sphericity test. Since Mauchly's test was significant (Mauchly's $W(5) = 0.517$, $p < .001$) then sphericity couldn't be

assumed and, as a consequence, the Greenhouse-Geisser correction for violation of sphericity was used.

Then, the analysis of variance assuming the four responders as the levels of the independent variable was computed. It showed that offers were significantly different according to the psychological portrait of the other player ($F(2.052, 114.898) = 9.61$, $p <.001$). More precisely, contrast analyses allowed us to maintain that the amount of money offered to Marco was higher than the amounts offered to the other three responders, and that the amount offered to Grazia was higher than the amount offered to Gianni and Marina, who received mean amounts of money not significantly different each other (see Table 3.5).

Responders	Mean difference	$F_{(1,56)}$	P	η^2
Gianni – Grazia	-0.588	3.888	.054	.059
Gianni – Marco	-1.702	7.929	<.001	.146
Gianni –Marina	0.009	.001	.972	.001
Grazia – Marco	-1.114	13.842	<.005	.194
Grazia – Marina	0.596	3.481	.067	.065
Marco – Marina	1.711	13.476	<.001	.199

Tab. 3.5 – Contrast analyses comparing each couple of responder under the mean offered amount of money

Then, the mean value of money offered to the couple of responders who were described as "acceptors" (Gianni and Marina) and to the "rejecters" (Marco and Grazia) was calculated. The acceptors and rejecters' unified mean values were reported in Table 3.6.

Type of responder	Mean	SD
Acceptors	3.69	1.50
Rejecters	4.84	1.57

Tab. 3.6 – Mean values of money offered to "acceptors" and "rejecters"

By assuming the two types of responders as the levels of the independent variable a one-way repeated measure ANOVA was carried out. Results showed that offers significantly varied depending on the responders' characterization ($F(1,56) = 12.457$, $p <.001$). Participants offered higher sum of money to those responders who were supposed to reject low offers.

Results showed that participants were able to spontaneously activate mindreading processes which permitted them to effectively differentiate their offers in order to increase the likelihood of having their offers accepted.

3.1.3.2 Influence of instruction's type

The influence of the instruction's type was tested both on the total amount of money offered by the proposers (collapsing the four different responders) and, then, on the offers made to each different responder. As a consequence, it was first calculated the total mean value of money offered by the proposer by collapsing the four different responders. Then, before running the analyses, the assumption of univariant normality was assessed on the total offers by getting skewness and kurtosis and dividing these by the standard errors. Skewness and kurtosis values turned out to be within the +1 to -1 range.

The assumption of homogeneous variances was tested by using Levene's test. P-value was not statistically significant ($p = .152$), thus indicating that the analysis of variance was possible.

In order to compare the offers obtained under the three types of constraints, a one-way ANOVA was computed. Results are reported in Table 3.7.

Instruction	Mean	SD	$F_{(2,55)}$	P	η^2
Spontaneous	4.67	1.07			
Maximizing	4.30	0.93	5.957	<.005	.181
Threshold	3.71	0.17			

Tab. 3.7 - One-way ANOVA comparing offers made under the three constraints

Results showed that offers were different under the three constraints. In particular, LSD and Newman-Keuls post-hoc tests highlighted that offers made under spontaneous and maximizing constraints were not significantly different ($p = .177$), whereas the offers made under the threshold constraint were significantly lower than the ones under the other constraints ($p < .001$).

Then, the influence of the different constraints on the offers made to each single responder was tested through four one-way ANOVAs which were carried out on the sums of money offered to each responder by distinguishing among the spontaneous, maximizing and threshold conditions. Results are reported in Table 3.8.

Responder	Instruction	Mean	SD	$F_{(2,55)}$	P	η^2
Marco	Spontaneous	6.71	2.35			
	Maximizing	5.15	2.69	6.983	.002	.205
	Threshold	4.02	1.30			
Grazia	Spontaneous	4.38	2.18			
	Maximizing	4.31	1.33	0.126	.882	.050
	Threshold	4.11	1.11			
Gianni	Spontaneous	3.71	1.85			
	Maximizing	3.78	2.12	0.008	.919	.030
	Threshold	3.55	0.70			
Marina	Spontaneous	3.88	2.49			
	Maximizing	3.94	1.71	1.017	.369	.130
	Threshold	3.14	0.78			

Tab. 3.8 - One-way ANOVAs comparing offers made under the three constraints to each responder

Results showed that only in the case of Marco significant differences occurred. In any case, also with the other players the same trend emerged: the offers were lower in the threshold condition as compared to the other two conditions, which were, except for Marco, approximately the same. It emerged that the type of instructions played a minor role in modulating the offers, with the exceptions that in the spontaneous condition some higher sums of money were offered to the character (Marco) who, working with poor and indigent people, could have driven participants to make him higher offers as compared to the other characters.

In order to verify the existence of an interaction effect between the characterization of the responders (acceptors vs. rejecters) and the type of constraints (spontaneous, maximizing, threshold) a mixed ANOVA assuming

the responders' types as within-subjects variable and the constraints' types as between-subjects variable. Since the assumption of sphericity (Mauchly's W(5)=0.578, p <.001) was not verified, it was used the Greenhouse-Geisser correction for violation of sphericity. Results highlighted that the interaction between responders' type and constraints' type factors was not significant ($F_{(2.000,54.000)}$ = 1.010, p < .371). Given the absence of interaction between responders' and constraints' types, we were induced to conclude that participants, irrespectively of the constraints embedded in the instructions, activate relevant mindreading processes which induce them to reciprocate in a different way according to the presumed psychological features of their counterparts.

However, since it was held it necessary to identify the type of instruction that would have been employed in the next studies, we chose to use the maximizing instruction. In fact, we exclude the spontaneous instruction because it emerged that people, without any monetary gain constraint, showed an exaggerated altruistic attitude, above all toward Marco, whose life could actually induce a hyper-altruistic behaviour. On the contrary, it seemed that the threshold constraint led people to an excessive concern about money, keeping them from taking into the right account the psychological features of their opponents. So, given the importance of some type of monetary constraint, we opted for the maximizing instruction which turned out to allow people to avoid offering to the extremes, both high (spontaneous) and low (threshold) sums of money.

3.1.4 Discussion

The specific aim of Study 3 was to investigate the role of mindreading processes in Ultimatum Game, which can be considered an interactive and strategic context where the ability to assume the other's perspective and think about his expectations, feelings and thoughts are fundamental (Singer & Fehr, 2005).

In particular, we focussed on the figure of the proposer, since we believe that his role in the game, a part from being underestimated by most research in this field, appeared more interesting from a psychological point of view than the figure of the responder. Making his offer to the responder, the proposer has to take into consideration various aspects on which the success of the task depends. Firstly, the proposer always experiences uncertainty about the outcome of his decision since he can never be sure of his offer being accepted. Secondly, the proposer does not make the decision alone, in an isolated context, but, rather, in a strategic interactive environment which induces him to consider the responder's reaction to his own offer and, as a consequence, leads him to activate mindreading processes and to assume the responder's mental perspective. Finally, the offer made by the proposer consists of an open choice since it ranges through a continuous series of values and it is not constrained in given options, as it occurs for the responder who could only accept or reject the offer.

We employed the Ultimatum Game as a setting useful to shed light on how people face the conflict arising by the opposite tendencies of maximizing self-interest and of considering the other persons' perspective. Specifically we were interested in assessing whether individual can apply relevant mindreading processes in order to identify the psychological features of their partners, so to realize when they can risk to offer low sums of money by presuming that the counterpart will accept them.

The effectiveness of mindreading processes activation is now well-known thanks to contributions coming from other field of research, above all the social psychology, which proved that taking into consideration others' perspectives increases the likelihood of helping people in need (Batson, 1994), the success in negotiation (Neale & Bazerman, 1983) and in conflict resolution (Paese & Yonker, 2001), and decreases the likelihood of egocentric biases in making judgments (Savitsky et al., 2005). However, since in experimental economics research on the role of mindreading processes have recently developed and, in particular, in Ultimatum Game research have rarely been investigated, we

believe that establishing the importance of these processes in economic interactions represents a further step in this field of research. In fact, we found that participants can modulate their offers by considering aspects of the responders such has honesty, sense of justice, and personal dignity. The sums of money they proposed to their partners varied in a systematic and consistent way according to the psychological portraits they have been provided with. It is worth noticing that this happened in an experimental procedure where no direct and explicit hints at mindreading were provided, and not when, as in Hoffman et al.'s (2000) study, participants were explicitly instructed to think about the counterparts' mental states. Compared to Hoffman et al.'s (2000), who concluded that by taking the other's perspective people were induced to make higher offers, we found that mindreading processes do not lead to a general increase in the absolute amount of the offers (which may increase the likelihood of having the offers accepted, but at the expense of a greater possible personal gain), but rather to a strategic and functional differentiation of the offers (which increases the likelihood of ending up with a certain amount of money by inducing proposers to renounce considerable sums of money only if it is really necessary). A possible speculation could be that the study by Hoffman et al.'s (2000) and our study induced different type of processes. While in the former the ability to share the feelings of others, the so-called "emphaty" was involved, in the latter the capacity to represent others' intentions, beliefs and expectations, the so-called "theory of mind" was implicated. In fact, in Hoffman's study, people were hinted at thinking about their opponent, who was not presented with specific psychological features, so that we could easily suppose that people tried to imagine an abstract character who may have induced them to feel emphatic with this character. Not being characterized in a psychological way, proposers were free to imagine whatever responder, and, as a consequence, they could imagine a general person to whom they probably feel close. On the contrary, in our study proposers were explicitly induced to take into consideration the specific psychological portraits of their opponents who were negatively or

positively characterized. This have probably led people not to share the others' feeling, but, rather, to represent their intentions and expectations. In fact, even if empathizing and mentalizing have a common ground, they are not exactly the same process. Whereas empathy is likely to render people less selfish and motivates other-regarding behaviours because it allows the sharing of feelings with others (Eisenberg & Miller, 1987), mindreading could also be useful for making self-interested choice because it permits people to anticipate and predict others' behaviour accurately (Singer & Fehr, 2005).

Being understood that proposers were able to differentiate their offers depending on the type of responder they played with, an issue which is worth deepening is trying to clarify why proposers, generally speaking, made equal and fair offers (mean offers were never below 35% of the entire sum of money). The question is: which motives are behind their offers? Two possible explanations have been suggested in literature (Scheres & Sanfey, 2006). One, people may equally split money because they care about equity and fairness (Bolton & Ockenfels, 2000). Two, proposers may anticipate that responders will reject too low offers (Roth et al., 1991). Whereas in the first case people would be fair and other-regarding, in the second case people would be simply strategic by making a decision which would increase the likelihood of having their offers accepted. Far from being altruistic, they would care above all about their own personal gain. If people in our study were purely altruistic, they would offer always the same high amount of money, regardless of the specific portraits of each responder. A mere other-regarding attitude would have led proposers to make equally fair offers to all responders, instead of differentiating the proposals. On the contrary, they seem to adopt a behaviour which is altruistic only in appearance (Croson, 1996; Kagel, Kim & Moser, 1996; Pillutla & Murnighan, 1995), since, as a matter of fact, they show a self-oriented, functional, and strategic behaviour. In fact they are prone to renounce their maximum possible gain in order to be sure, or at least more certain, that their offers would be accepted. It could be defined as a form of "sophisticated" selfishness which derives from the awareness of the

"irrationality" of their opponent. It could be the case that proposers realize when low offers may be rejected, so they maximize their gain by acting "as if" they are fair (Weg & Zwick, 1994). This finding is in line with what Scheres & Sanfey (2006) found. By employing both Ultimatum Game (where offers are a relatively pure measure of altruism) and Dictator Game (where offers are a mixture of fairness and strategy) they could determine the motivations behind the offers in these tasks. It turned out that Dictator Game offers were lower than the Ultimatum Game offers, thus reflecting the strategic component of the offers made.

Moreover, the present showed that people can activate relevant mindreading processes which allows them to make appropriate offers to each type of responders even when they are forced to explicitly care about their personal monetary gain. In fact, regardless of the type of instruction they were presented with, people keep on differentiating their offers even if they were told to focus on a monetary threshold. This further substantiate the conclusion that people, rather than being altruistic, show a strategic and functional behaviour. Not even if, but exactly because of the strict monetary constraint people differentiate their offers, so to be sure that they will be accepted and to reach the established threshold.

3.2 STUDY 4

3.2.1 Aims

In Study 3 participants were not hinted at applying a specific mode of thinking to decide how much money they should offer to the respondent in order to

succeed in the Ultimatum Game by considering the psychological characteristics of the responders.

The goal of Study 4 was to assess whether reciprocity in strategic interactive games based on mindreading is influenced by the way in which the psychological portraits of the responders are processed. We hypothesized that the analytical way of processing information leads participants to make offers that were less consistent with the psychological portraits of the responders as compared to the intuitive mode of thinking, which allows people to process a great amount of information simultaneously and globally, led people to make offers that were coherent with the portraits of the responders.

3.2.2 Method

3.2.2.1 Materials

Two different tasks were devised in order to induce the intuitive or the analytical mode of processing the information about the four fictitious responders. The tasks presented specific aspects that were typical of the two modes of thinking. According to literature, the extent to which intuitive or analytical processes (or both) are activated will be affected by characteristics of the stimulus. The visualization hypothesis (Hogarth, 2001) states that tasks promoting visual reasoning induce more intuitive reasoning. Moreover evidence suggest that individuals are likely to rely on intuitive thought processes when they face time pressure (De Dreu, 2003; Suri & Monroe, 2003). Thus, in order to induce two different modes of thinking we devised two tasks which were different in terms of:

- *characteristics of the stimuli* relevant to perform the task; the intuitive task required focussing on information conveyed by stimuli presented in a visual form, whereas the analytical task required focussing only on verbal information;

- *time constraints*; in the intuitive task participants were given a very short time to process information (3 sec), whereas in the analytical task they had a longer time to process information (30 sec);

- *type of request*; in the intuitive task the instructions which were given to participants invited them to trust their first impression in completing the task, whereas in the analytical task they were induced to engage in a deeper analysis of the characteristics.

The tasks were carried out after the description of the responder and before splitting money (see par. 4.2.4., and Figure 1 and 2 for a detailed description of the tasks). In this way the tasks represented a sort of intrinsic prime as compared to the ones employed in literature which can be described as extrinsic priming (Harle & Sanfey, 2007; Tesch & Sanfey, 2008). In order to introduce an experimental manipulation of the proposer the majority of studies employed priming effects, either emotional (e.g. movies) or rational (e.g. spatial memory task) (Harle & Sanfey, 2007; Tesch & Sanfey, 2008). Primes are based on the idea that an induced mood can influence decision making, and in particular social decision making (Forgas, 2003; Zajonc, 2000). Several research showed that positive mood is associated with higher confidence and greater cooperation (Forgas, Bower & Moylan, 1990), more creative and divergent thinking, and higher task satisfaction (Clapham, 2001; Gasper, 2004; Isen & Shalker, 1982). On the contrary, negative mood is associated with lower confidence and more risk-averse behaviour (Clark & Isen, 1982; Isen & Daubman, 1984). However all this sort of primes can be described as "extrinsic" priming. In fact, they occur before the experimental task is presented and are not part of the task itself, they are something different and separate from the task Conversely, our task are part of the core experiment being carried out during the experimental task and being constituent part of it.

In fact, the task, as already said, induced the activation of either intuitive or analytical processing of the information concerning the portraits of the responders. Specifically, participants, after reading the verbal description of the

responder, were asked to match the description they had just read with the photo that, among the three photo presented, was the one portraying the responder in question. In the intuitive condition participants were asked to rely on their first impression in completing the task, they had few seconds (3 sec) to do that, and were mainly presented with the photo only. Conversely, in the analytical condition they were hinted at engaging in a deeper analysis of the responder's characteristics, they had more time (30 sec), and were presented with both the verbal description and the photos simultaneously.

To devise the tasks, the photos corresponding to each responder were identified. Specifically, for each responder a correct photo and two wrong photos were chosen. The photo which was identified as the "correct" one was that in which all the details reported in the verbal description were present. In each "wrong" photo, on the contrary, one of the detail reported in the verbal description was missing. All the details which were taken into account for each responder were reported as follows.

a. Marco's details: casual clothes; beard.

In the correct photo they were both present. In the first wrong photo the casual clothes only were present, and in the second one the beard only.

b. Grazia's details: glasses; pearl necklace.

In the correct photo they were both present. In the first wrong photo the glasses only were present, and in the second one the pearl necklace only.

c. Gianni's details: greying hair; wedding ring.

In the correct photo both details were present. In the first wrong photo the greying hair only was present, in the second one the wedding ring only.

d. Marina's details: blond hair; smoker.

In the correct photo both details were present. In the first wrong photo the blond hair only was present, in the second one the cigarette only. The complete set of material is reported in Appendix III.

This study presents a within-subject 2X2 experimental design. The type of responder variable consists of two levels corresponding to *acceptors* and

rejecters, whereas the mode of thinking variable shows two levels corresponding to the *intuitive* and *analytical processing*.

3.2.2.2 Pretests

Before the experimental stage could start, the responders' photos which were included in the experimental task were evaluated across a series of pretests. The aim of these pretests was twofold. First, they aimed at verifying that the three photos corresponding to each responder were homogeneous as for specific features, such as likeableness, attractiveness, humbleness, and friendliness. Second, they aimed at assessing whether the four correct photos (one for each character) were rated as homogeneous as for the same four features. In fact, it was held it necessary to make sure that within the three photos corresponding to each responder the ratings were not different as for the features which could be defined as "external" (not distinctive of each psychological portrait) and, at the same time, that the four correct photos were rated as equivalent as for these features. This was necessary to make sure that the four photos did not differ as for the features which were not supposed to be distinctive for each responder's portrait.

In each pre-test the procedure was the same. Participants were presented with 12 photos (4 correct and 8 wrong photos). After looking at each photo, subjects were requested to evaluate the photo with regard to the four features just mentioned (likeableness, attractiveness, friendliness and humbleness) on a semantic differential scale.

In the following paragraphs the series of pre-tests we carried out to test the photos are reported.

3.2.2.2.1 Pretest 1

Participants

The experimental sample was composed of 16 undergraduates aged from 19 to 26 (mean age = 23.5 yrs).

Analyses and Results

The assumption of univariant normality was assessed before the analyses. The skewness values were within -.95 and .56 and kurtosis values ranged from -.77 to .25. Then, Mauchly's test was used to assess the assumption of sphericity. Results allowed to assume the sphericity. On each of the features considered a repeated measure ANOVA was computed in order to compare the mean ratings of the three photo proposed for each responder. Results are reported in Table 3.9. For each responder, the photo marked with 1 is the correct photo, whereas the photo 2 and 3 are the wrong photos.

Features	Responder	Photo	Mean	SD	$F_{(2,30)}$	P	η^2
	Marco	1	5.18	1.08			
		2	5.68	1.54	2.143	.135	.088
Likeableness		3	5.67	1.07			
	Grazia	1	5.37	1.18			
		2	5.50	1.54	1.236	.305	.065
		3	4.93	1.34			
	Gianni	1	3.81	1.02			
		2	4.37	1.33	4.098	<.05	.233
		3	3.06	1.46			
	Marina	1	4.12	0.95			
		2	3.75	1.52	1.647	.209	.178
		3	3.50	1.35			
	Marco	1	4.25	0.96			
		2	4.18	1.67	0.015	.985	.001
Attractiveness		3	4.19	1.21			
	Grazia	1	3.06	1.43			
		2	3.76	1.56	4.936	<.005	.266
		3	3.02	1.53			
	Gianni	1	3.43	1.42			
		2	3.93	1.03	6.103	<.05	.198
		3	3.75	1.26			
	Marina	1	5.81	1.30			
		2	4.93	1.34	3.075	.061	.201
		3	5.35	1.18			
	Marco	1	4.81	0.80			
		2	5.25	1.37	1.485	.243	..159
Humbleness		3	5.25	1.38			
	Grazia	1	4.37	1.75			
		2	4.62	1.56	0.313	.734	.077
		3	4.35	1.36			
	Gianni	1	2.62	1.58			
		2	3.12	0.98	2.329	.115	.097
		3	2.31	1.31			
	Marina	1	2.87	1.34			
		2	3.43	1.05	0.758	.477	.085
		3	3.00	1.46			
	Marco	1	5.18	1.14			
		2	5.68	1.09	1.467	.247	.153
Friendliness		3	5.25	1.56			
	Grazia	1	5.31	1.19			
		2	5.32	1.24	0.205	.701	.075
		3	5.06	1.42			
	Gianni	1	3.25	1.65			
		2	3.37	1.25	5.061	<.05	.164
		3	3.00	1.26			
	Marina	1	3.81	1.42			
		2	4.00	1.54	0.535	.591	.054
		3	3.50	0.97			

Tab. 3.9 – Repeated-measure ANOVAs comparing ratings obtained by each responder's photo on each feature

Results showed that within the photos proposed for each responder both Marco and Marina's photos turned out to be homogeneous for all features. On the contrary, Grazia's photos were homogeneous for all features with the exception of attractiveness since photo 2 was rated higher than the other two. As for Gianni's photos it emerged that photo 3 was rated less likeable and friendly as compared to the other two, and photo 1 was evaluated as being less attractive than the other two photos.

Then, in order to compare the ratings of each correct photo on each feature four repeated measure ANOVAs were computed. Results are reported in Table 3.10.

Features	Responders	Mean	SD	$F_{(3,45)}$	P	η^2
Likeableness	Marco	5.18	1.08	3.727	<.05	.165
	Grazia	5.37	1.18			
	Gianni	3.81	1.02			
	Marina	4.12	0.95			
Attractiveness	Marco	4.25	0.96	3.751	<.05	.153
	Grazia	3.62	1.43			
	Gianni	3.43	1,42			
	Marina	5.81	1.30			
Humbleness	Marco	4.81	0.80	5.411	<.05	.322
	Grazia	4.37	1.75			
	Gianni	2.62	1.58			
	Marina	2.87	1.34			
Friendliness	Marco	5.18	1.14	2.856	<.05	.088
	Grazia	5.31	1.19			
	Gianni	3.25	1.65			
	Marina	3.81	1.42			

Tab. 3.10 – Repeated-measure ANOVAs comparing ratings of the correct photos on each feature

Results highlighted that the correct photos were not rated as homogeneous as for none of the feature considered. Specifically, Gianni's correct photo turned out to be different form the others' correct photos. It was rated as less likeable, attractive, humble and friendly than the others.

Given these results, it was decided to change some of the photos. Grazia's photo 2, which turned out to be more attractive than the other two photos, was changed. A photo of a less attractive and older lady was employed. Then, since

all Gianni photos' ratings diverged from the others', we decided to replace all three photos. Photos of younger and more smiling men were selected (see Appendix III).

3.2.2.2.2 Pretest 2

Participants

The experimental sample was composed of 27 undergraduates aged from 18 to 27 (mean age = 24.5 yrs).

Analyses and Results

Before computing the analyses the assumption of univariant normality was assessed. The skewness values ranged from -.93 to 1.02 and kurtosis values ranged from -1.06 to .43.

Then, the assumption of sphericity was checked through Mauchly's test which turned out to be not significant for all feature considered. A repeated measure ANOVA was carried out on every feature to compare the mean ratings obtained on the three photos corresponding to each responder. Results are reported in Table 3.11.

Features	Responder	Photo	Mean	SD	$F_{(2,52)}$	P	η^2
Likeableness	Marco	1	4.07	1.43			
		2	1.78	0.75	23.493	<.001	.678
		3	4.30	1.48			
	Grazia	1	4.37	1.04			
		2	4.96	1.12	2.537	.089	.075
		3	4.44	1.25			
	Gianni	1	2.74	1.16			
		2	2.93	1.43	0.109	.897	.023
		3	2.85	1.81			
	Marina	1	2.96	1.40			
		2	2.89	1.36	0.314	.762	.035
		3	2.74	1.65			
Attractiveness	Marco	1	4.22	1.18			
		2	3.84	1.01	19.433	<.001	.598
		3	2.48	1.05			
	Grazia	1	3.63	1.54			
		2	2.33	1.41	4.165	<.05	.266
		3	3.67	1.34			
	Gianni	1	2.75	1.13			
		2	4.48	1.57	23.237	<.001	.693
		3	2.84	0.90			
	Marina	1	3.04	0.94			
		2	4.63	0.56	5.331	<.05	.288
		3	4.56	0.67			
Humbleness	Marco	1	4.15	1.46			
		2	2.89	1.45	17.373	<.001	.512
		3	4.85	1.09			
	Grazia	1	3.93	1.23			
		2	4.96	1.48	5.827	<.05	.244
		3	4.26	1.55			
	Gianni	1	2.59	1.36			
		2	3.07	1.17	1.371	.276	.132
		3	3.07	1.26			
	Marina	1	3.78	1.36			
		2	3.07	1.26	3.166	<.05	.354
		3	3.04	1.28			
Friendliness	Marco	1	4.70	1.26			
		2	3.70	1.48	23.102	<.001	.786
		3	5.81	1.03			
	Grazia	1	5.48	1.69			
		2	5.81	1.38	0.453	.638	.042
		3	5.63	1.57			
	Gianni	1	4.04	1.55			
		2	4.04	1.40	0.079	.924	.009
		3	3.89	1.82			

Marina	1	3.89	1.28			
	2	4.07	1.59	0.230	.795	.013
	3	3.85	1.35			

Tab. 3.11– Repeated-measure ANOVAs comparing ratings obtained by each responder's photo on each feature

Results showed that Marco's photos were not rated as homogeneous. Specifically, photo 1 was rated as more attractive than the other two; photo 2 was rated as less humble and friendly as compared to the other two; and, finally, photo 3 was rated as more likeable and friendly than the other two photos. Grazia's photo 2 was rated as less humble than the other two photos, probably because photo 2 was the only photo portraying a woman who did not look at the watcher. Gianni's photo 2 was evaluated as more attractive than the other two photos, probably because the man in photo 2 looked like a younger man. Finally, Marina's photo 1 was rated as more humble than the other tow, probably because of her modest clothes.

Next, four repeated measure ANOVAs were computed in order to compare the ratings of each correct photo on each feature. Results are reported in Table 3.12.

Features	Responders	Mean	SD	$F_{(3,78)}$	P	η^2
Likeableness	Marco	4.07	1.43			
	Grazia	4.37	1.04	9.710	<.001	.213
	Gianni	2.74	1.16			
	Marina	2.96	1.40			
Attractiveness	Marco	4.22	1.18			
	Grazia	3.63	1.54	21.426	<.001	.677
	Gianni	2.75	1.13			
	Marina	3.04	0.94			
Humbleness	Marco	4.15	1.46			
	Grazia	3.93	1.28	7.348	<.001	.198
	Gianni	2.95	1.36			
	Marina	3.78	1.36			
Friendliness	Marco	4.70	1.26			
	Grazia	5.48	1.69	7.115	<.001	.176
	Gianni	4.04	1.55			
	Marina	3.89	1.28			

Tab. 3.12 – Repeated-measure ANOVAs comparing ratings of the correct photos on each feature

Results highlighted that the photos were rated as not homogeneous as for all the features considered. In particular, Gianni and Marina were rated as less likeable than the other two responders' photos. Marco was evaluated as more attractive and humble than the others. Finally, Marina was rated as less friendly as compared to the others.

Given these results, Grazia's photo 2, in which it was portrayed the only woman not looking at the observer, was replaced with another photo of the same person, who, this time, is looking at the watcher. Gianni's photo 2 was changed because the man in the photo was perceived as more attractive than the others, so it was replaced with a photo of an less attractive and older man. Lastly, since Marco's ratings were different from the others, in that they were more attractive and humble, all Marco's photos were replaced with photos of less attractive and humble men.

3.2.2.2.3 Pretest 3

Participants

The experimental sample was composed of 12 undergraduates aged from 18 to 25 (mean age = 21.5 yrs).

Analyses and Results

The skewness values ranger from -1.01 to .45 and the kurtosis values ranger from -.55 to .66, thus confirming the assumption of univariant normality.

Then, prior to the analyses of variance, Mauchly's test was used to test the assumption of sphericity, Since Mauchly's test was not significant in all cases, the sphericity could be assumed. On each of the features considered, a repeated measure ANOVA was computed in order to compare the mean ratings obtained by the different responders. Results are reported in Table 3.13.

Features	Responder	Photo	Mean	SD	$F_{(2,22)}$	p	η^2
Likeableness	Marco	1	4.91	1.67			
		2	4.75	1.65	0.116	.891	.043
		3	4.83	1.58			
	Grazia	1	4.25	1.35			
		2	4.66	1.55	0.826	.451	.067
		3	4.75	1.81			
	Gianni	1	4.58	1.78			
		2	3.41	1.67	1.403	.267	.093
		3	3.91	1.62			
	Marina	1	5.16	1.40			
		2	4.58	1.50	0.685	.514	.055
		3	4.50	1.00			
Attractiveness	Marco	1	4.83	1.26			
		2	4.08	1.56	1.571	.230	.101
		3	4.33	1.37			
	Grazia	1	3.83	1.33			
		2	3.50	1.56	1.000	.359	.089
		3	3.08	1.55			
	Gianni	1	4.41	0.96			
		2	3.58	1.56	1.505	.244	.105
		3	4.33	1.37			
	Marina	1	5.16	1.40			
		2	5.66	1.43	4.915	<.05	.263
		3	5.91	1.44			
Humbleness	Marco	1	4.25	1.48			
		2	4.83	1.19	0.576	.571	.044
		3	4.58	1.62			
	Grazia	1	4.33	1.07			
		2	3.91	1.62	0.277	.760	.022
		3	4.41	1.88			
	Gianni	1	3.83	1.26			
		2	2.91	1.62	2.229	.131	.073
		3	3.33	0.78			
	Marina	1	3.91	1.37			
		2	3.66	1.87	0.127	.881	.010
		3	3.58	1.73			
Friendliness	Marco	1	4.50	1.83			
		2	5.00	1.65	1.296	.294	.122
		3	5.08	1.56			
	Grazia	1	4.58	1.78			
		2	5.00	1.89	0.733	.492	.083
		3	5.41	1.79			
	Gianni	1	4.75	1.28			
		2	3.58	1.56	1.994	.160	.154
		3	4.33	1.49			
	Marina	1	4.00	1.53			
		2	4.83	1.46	1.000	.384	.086
		3	4.58	1.56			

Tab. 3.13– Repeated-measure ANOVAs comparing ratings obtained by each responder's photo on each feature

Results showed that all responders' photos were rated as homogeneous, except for Marina's photo 1 which turned out to be more attractive than the others and Marina's photo 3 which was rated as less attractive than the others.

Then, in order to compare the ratings of each correct photo on each feature four repeated measures ANOVAs were computed. Results are reported in Table 3.14.

Features	Responders	Mean	SD	$F_{(3,33)}$	P	η^2
Likeableness	Marco	4.91	1.67	0.869	.467	.082
	Grazia	4.25	1.35			
	Gianni	4.58	1.78			
	Marina	4.16	1.40			
Attractiveness	Marco	4.83	1.26	2.262	.100	.066
	Grazia	3.83	1.33			
	Gianni	4.41	0.96			
	Marina	5.16	1.40			
Humbleness	Marco	4.25	1.48	0.447	.721	.008
	Grazia	4.33	1.07			
	Gianni	3.83	1.26			
	Marina	3.91	1.37			
Friendliness	Marco	4.50	1.83	0.587	.628	.014
	Grazia	4.58	1.78			
	Gianni	4.75	1.28			
	Marina	4.00	1.53			

Tab. 3.14 – Repeated-measure ANOVAs comparing ratings of the correct photos on each feature

Even though results highlighted that all responders' photos were rated as homogeneous as for all features considered, Marina photo's rating value for attractiveness was higher than the others' ratings. As a consequence, all Marina's photos were replaced with photos of women who were less attractive and less young in order to make even more homogeneous the evaluations.

3.2.2.2.4 Pretest 4

Participants

The experimental sample was composed of 16 undergraduates aged from 20 to 25 (mean age = 24.3 yrs).

Analyses and Results

The skewness values varied from -.87 to .33, whereas the kurtosis values varied from -.76 to .89. These values allowed to confirm the assumption of univariant normality. Before carrying out the ANOVAs, Mauchly's test was used to assess the assumption of sphericity. Since Mauchly's test was not significant for all variables, the sphericity was assumed. A repeated measure ANOVA was carried out on each of the features to compare the mean ratings obtained on the three photos corresponding to each responder. Results are reported in Table 3.15.

Features	Responder	Photo	Mean	SD	$F_{(2,30)}$	P	η^2
	Marco	1	4.85	1.35			
		2	4.40	1.29	1.575	.229	.103
Likeableness		3	4.10	1.03			
	Grazia	1	4.75	1.23			
		2	4.90	1.34	0.098	.907	.002
		3	4.80	1.33			
	Gianni	1	4.13	1.20			
		2	3.70	1.29	3.498	.060	.283
		3	4.45	1.07			
	Marina	1	4.25	1.48			
		2	4.06	1.28	1.932	.162	.135
		3	3.81	1.36			
	Marco	1	4.60	1.32			
		2	3.85	1.56	3.067	.058	.310
Attractiveness		3	4.45	1.41			
	Grazia	1	4.05	1.22			
		2	3.35	0.83	2.319	.112	.189
		3	3.30	1.45			
	Gianni	1	4.30	1.74			
		2	3.90	0.98	1.901	.310	.154
		3	4.20	1.32			
	Marina	1	5.31	1.07			
		2	4.31	1.13	2.913	.087	.203
		3	4.81	1.32			
	Marco	1	4.20	1.33			
		2	4.00	1.55	0.329	.729	.064
Humbleness		3	4.20	1.41			
	Grazia	1	4.25	1.03			
		2	4.30	1.49	0.243	.785	.043
		3	4.05	1.29			
	Gianni	1	3.10	0.85			
		2	2.55	1.07	3.033	.077	.213
		3	3.40	0.98			
	Marina	1	3.56	1.41			
		2	3.10	1.08	0.161	.694	.052
		3	2.75	1.39			
	Marco	1	4.95	1.02			
		2	4.45	1.37	1.610	.213	.312
Friendliness		3	4.70	0.89			
	Grazia	1	4.20	1.08			
		2	4.35	1.52	3.895	.063	.258
		3	3.80	1.48			
	Gianni	1	3.98	0.85			
		2	4.10	0.99	2.345	.113	.231
		3	3.30	1.06			
	Marina	1	3.37	1.40			
		2	4.31	1.08	1.118	.307	.299
		3	3.81	1.10			

Tab. 3.15– Repeated-measure ANOVAs comparing ratings obtained by each responder's photo on each feature

Results showed that the ratings of all responders on each feature were completely homogeneous, thus allowing to conclude that the three photos corresponding to each responder were not different in terms of those features, such as likeableness and attractiveness, which could interfere in the subsequent experimental stage.

Next, in order to compare the ratings of the correct photos four repeated measure ANOVAs were computed. Results are shown in Table 3.16.

Features	Responders	Mean	SD	$F_{(3,45)}$	P	η^2
Likeableness	Marco	4.85	1.35	4.315	.085	.277
	Grazia	4.75	1.23			
	Gianni	4.13	1.20			
	Marina	4.25	1.48			
Attractiveness	Marco	4.60	1.32	3.751	.055	.177
	Grazia	4.05	1.22			
	Gianni	4.30	1.74			
	Marina	5.31	1.07			
Humbleness	Marco	4.20	1.33	2.143	.135	.121
	Grazia	4.25	1.03			
	Gianni	3.10	0.85			
	Marina	3.56	1.41			
Friendliness	Marco	4.95	1.02	2.838	.058	.153
	Grazia	4.20	1.08			
	Gianni	3.98	0.85			
	Marina	3.37	1.40			

Tab. 3.16 – Repeated-measure ANOVAs comparing ratings of the correct photos on each feature

Also the correct photos of each responder were rated as homogeneous as for the features considered. Making sure that the photos did not differ in terms of features that were not intended to be distinctive of each responder's portrait, we could employ the set of photos in the experimental stage. However, prior to this application, we decided to test both verbal descriptions and the corresponding photos simultaneously to ensure that also the assembled material obtained the same ratings.

3.2.2.2.5 Pretest 5

Once both verbal descriptions (cfr.3.2.2.) and corresponding photos have been tested and found out to be employable in the subsequent experimental stage, they were assembled and evaluated together. Participants were presented with the four responders' verbal descriptions and their corresponding correct photos and were requested to rate them on a differential scale as for the same features which were evaluated in the pre-tests (cfr. 4.2.2.). The four responders' portraits were expected to be homogeneous as for "external" features (likeableness, attractiveness, friendliness and humbleness), but different as for "internal" features which contribute to define the distinctive profile of each character (altruism, sense of justice, honesty, personal dignity, unselfishness, generosity).

Participants

The experimental sample was composed of 30 undergraduates aged from 19 to 28 (mean age = 23.6 yrs).

Analyses and Results

The univariant normality could be assumed since all skewness values ranged from -.88 to .55 and kurtosis values ranger from -1.01 to .46.

Then, prior to the analysis of variance, Mauchly's test was employed to test the assumption of sphericity. All tests were not significant, thus allowing to assume the sphericity.

On each of the features considered, a repeated measure ANOVA was computed in order to compare the mean ratings obtained by the different responders. Results are reported in Table 3.17.

Features	Responders	Mean	SD	$F_{(3,87)}$	P	η^2
Likeableness	Marco	4.75	1.42	0.758	.477	.050.
	Grazia	4.64	1.24			
	Gianni	4.23	0.89			
	Marina	4.10	1.32			
Altrusim	Marco	5.43	1.07	4.098	<.05	.235
	Grazia	4.98	1.34			
	Gianni	3.24	1.54			
	Marina	3.57	1.14			
Sense of justice	Marco	5.25	1.28	18.972	<.001	.601
	Grazia	6.32	1.68			
	Gianni	2.98	1.25			
	Marina	3.13	1.34			
Attractiveness	Marco	4.67	1.55	3.077	.080	.172
	Grazia	3.52	1.05			
	Gianni	3.98	1.17			
	Marina	4.91	1.42			
Humbleness	Marco	4.25	1.43	2.154	.167	.088
	Grazia	4.50	1.39			
	Gianni	3.56	1.25			
	Marina	3.68	1.09			
Honesty	Marco	5.71	1.04	23.907	<.001	.682
	Grazia	6.22	1.00			
	Gianni	3.09	0.98			
	Marina	4.01	1.21			
Personal dignity	Marco	5.87	1.60	12.435	<.001	.402
	Grazia	6.08	1.34			
	Gianni	3.76	1.09			
	Marina	4.12	1.23			
Unselfishness	Marco	6.12	1.12	24.675	<.001	.701
	Grazia	5.57	1.23			
	Gianni	2.98	1.33			
	Marina	3.43	1.24			
Friendliness	Marco	4.89	1.44	4.008	.076	.257
	Grazia	4.77	1.53			
	Gianni	3.88	1.20			
	Marina	3.66	1.11			
Generosity	Marco	5.79	1.00	7.674	<.001	.358
	Grazia	4.40	1.03			
	Gianni	3.12	1.12			
	Marina	3.44	1.31			

Tab. 3.17 – Repeated-measure ANOVAs comparing ratings obtained by each responder's portrait on each feature

Results were in line with what was expected. In fact, all responders' portraits (resulting from the verbal description and the photo assembled) were rated as not homogeneous as for the features which contribute to define each distinctive profile (altruism, sense of justice, honesty, personal dignity, unselfishness, generosity) and homogeneous as for the "external" features (likeableness, attractiveness, friendliness and humbleness).

Given these results, all material could be employed in the subsequent experimental phase.

3.2.2.3 Participants

Participants were 65 undergraduate students, 20 males and 45 females, recruited from the Catholic University of Milan. Their age ranged between 20 and 27 years (mean age = 22.9 yrs). They were volunteers who neither were paid nor received course credits. Before recruiting participants the experimenter ensured that they did not attend any cognitive psychology or economics courses and had no notions about the Ultimatum Game.

3.2.2.4 Procedure

Participants were asked to play the role of the proposer in a four rounds of one-shot Ultimatum Game.

Each participant was requested to complete four rounds Ultimatum Game playing the role of the proposer with each of the four fictitious responders and splitting the sum of 100 euros. As in classic versions of the Ultimatum Game (Camerer & Thaler, 1995) in Study 3 participants had to split 10 euros. However, there was evidence that raising the size of the stakes from 10 to 100 euros had little effect on proposers' offers (Hoffman, McCabe & Smith, 1996). Starting from this work and in order to avoid participants not taking the task seriously enough, the sum given to the proposer was raised to 100 euros.

In two out of four rounds participants were induced to process information about the responder in an intuitive way, in the other two rounds in an analytical way. The order of the two thinking modes were counterbalanced across rounds.

After reading the instructions of the game, participants were told that they would have not known responders personally, but they would have read some information about them in order to become acknowledged of the other player before making him/her on offer. Information consisted of the psychological portraits. Afterwards proposers were asked to match the description they had just read with a photo that, in their opinion, was the one portraying the responder. To do that, in the intuitive condition participants were asked to trust their first impression in completing the task, they had few seconds (3 sec), and were mainly presented with the photo only. Conversely, in the analytical condition they were hinted at engaging in a deeper analysis of the responder's characteristics, they had more time (30 sec), and were presented with both the verbal description and the photos simultaneously. Figure 3.1 and 3.2 schematize the entire sequence of both the intuitive and analytical tasks.

In order to counterbalance the order and the sequence of both the intuitive vs. analytical condition and the type of responder 8 different sequences were devised. One out of the 8 sequences employed in the study is entirely reported in Appendix III.

Each participant was presented with a sequence which was randomly assigned to him/her. The entire sequence was presented on a computer screen through Power Point software.

General instructions (UG)	Verbal description (responder)	Task explanation	Three photos + verbal description	Photo identification	Offer

25 sec   30 sec

Fig. 3.1. Scheme of the analytical task

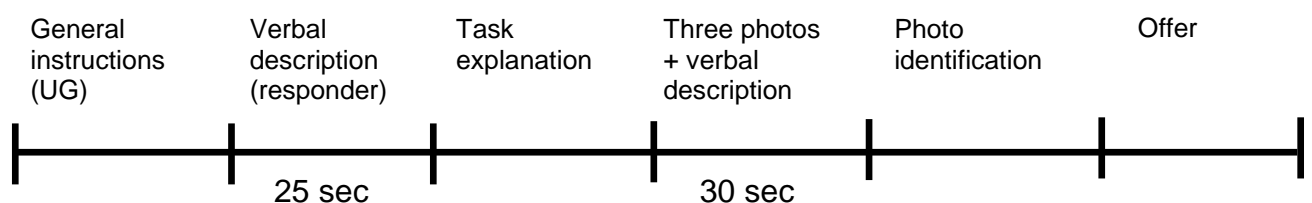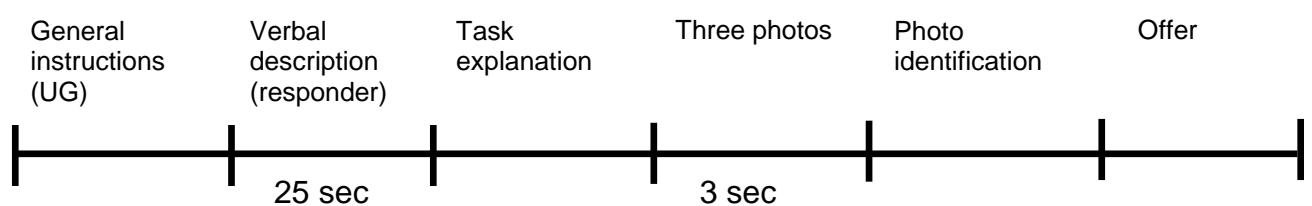| General instructions (UG)	Verbal description (responder)	Task explanation	Three photos	Photo identification	Offer

25 sec   3 sec

Fig. 3.2. Scheme of the intuitive task

3.2.3 Results

Analyses proceeded as follows. The first analyses we carried out aimed at corroborating what emerged in Study 3, so we verified the existence of differences among the offers made by participants to the different responders. Next, we investigated whether the intuitive vs. analytical modes of thinking affected the amount of money offered by participants.

3.2.3.1 Activation of mindreading processes

A one-way repeated measure ANOVA was carried out on the data collected to confirm that participants were able to differentiate their offers according to the psychological portraits of each responder.

Prior to the analysis the assumption of univariant normality was assessed on the offers made to each responder by getting skewness and kurtosis and dividing these by the standard errors. The skewness value was .-75, whereas the kurtosis value was .-87 as for the offers made to Marco; for the offers made to Grazia the skewness was -.55 and the kurtosis .53; for the offers made to Gianni the skewness value was .87, whereas the kurtosis -.11; for the offers made to Marina the skewness was -1.10 and the kurtosis -.10.

In Table 3.18 the mean values of money that the proposers offered to each responder are reported.

Responder	Mean	SD
Marco	49.31	14.43
Grazia	49.13	9.45
Gianni	40.34	15.86
Marina	40.51	12.63

Tab. 3.18 – Mean values of money offered to each responder

Prior to the ANOVA, the assumption of sphericity was assessed by using the Mauchly's sphericity test. Since Mauchly's test did not turn out to be significant (Mauchly's $W(5) = 0.699$, $p = .059$) the sphericity could be assumed.

A one-way repeated measure ANOVA showed that mean offers proposed to the four responders were significantly different ($F\ (3,192) = 6.479$, $p < .001$). Responses confirmed the findings resulting from our previous study. Proposers offered larger amount of money to those responders (Marco and Grazia) who

were supposed to reject low offers and smaller sum of money to those (Gianni and Marina) who were supposed to accept even low offers Contrast analyses allowed us to conclude that Marco and Grace, who received mean offers not significantly different, obtained higher sums of money than the other two players (see Table 3.19).

Responders	Mean difference	$F_{(1,64)}$	P	η^2
Gianni – Grazia	-8.793	8.119	<.010	.225
Gianni – Marco	-8.966	7.534	<.010	.212
Gianni –Marina	-.172	0.008	.928	.000
Grazia – Marco	-.172	0.005	.946	.000
Grazia – Marina	8.621	10.066	<.005	.264
Marco – Marina	8.793	8.038	<.010	.223

Tab. 3.19 – Contrast analyses comparing each couple of responder under the mean offered amount of money

Thus, both Study 3 and 4 showed that the characters who were described by attributing them psychological features which are supposed to induce them either to accept (Gianni and Marina) or to refuse (Grazia and Marco) unfair offers actually received, respectively, lower and higher sums of money, so proving that mindreading allowed undergraduates to figure out the possible reactions of their counterparts.

3.2.3.2 Intuitive and analytical modes of thinking

Considering the effects produced by the two modes of thinking on how participants split money, we calculated the mean values of money offered under the analytical and the intuitive thinking by collapsing the four different responders. As reported in Table 3.20, a one-sample t-test showed that intuitive and analytical processing did not lead participants to give significantly different sums of money to the responders.

Mode of thinking	Mean	SD	$t_{(64)}$	p
Intuitive	44.45	12.34	0.418	.679
Analytical	43.59	11.94		

Tab. 3.20 - Mean offers under the two modes of thinking and one-sample t-test

However, if we consider the offers received by each responder separately under the two modes of thinking, it turned out that the offers coherently varied according to the different types of responders (see Table 3.21). In fact, even though the differences did not reach the significance level except for Marco's offers, results highlighted that intuitive thinking led participants to give higher offers than analytical thinking to those responders who could be defined as "rejecters" (Marco and Grazia), whereas analytical processing induced them to make higher offers than intuitive processing to "acceptors" (Gianni and Marina).

Responder	Instruction	Mean	SD	$F_{(1,64)}$	P	η^2
Marco	Intuitive	54.66	15.05	4.868	<.05	.153
	Analytical	43.57	11.67			
Grazia	Intuitive	52.14	9.74	2.921	.099	.098
	Analytical	46.33	8.54			
Gianni	Intuitive	35.35	14.99	2.853	.103	.096
	Analytical	45.00	15.69			
Marina	Intuitive	37.85	11.21	1.209	.281	.043
	Analytical	43.00	13.73			

Tab. 3.21 - One-way ANOVAs comparing mean offers given to each responder under the two modes of thinking

Starting from these results in order to verify the existence of an interaction effect between these two factors, a repeated measure ANOVA assuming the type of responder (acceptors vs. rejecters) and the mode of thinking (intuitive vs. analytical) as independent within-subject variables was computed. Before carrying out the analysis of variance the aggregated means of acceptors (Gianni and Marina) and rejecters (Marco and Grazia) were calculated. Mean values are reported in Table 3.22.

Type of responder	Modes of thinking	Mean	SD
Acceptors	Intuitive	39.31	14.62
	Analytical	41.55	13.95
Rejecters	Intuitive	53.44	12.61
	Analytical	45.00	10.08

Tab. 3.22 - Mean offers made to acceptors and rejecters under the two modes of thinking

Since Mauchly's sphericity test was not significant (Mauchly's W = 0.778, p = .098) the sphericity was assumed. The repeated measure ANOVA confirmed that the main effect of the types of responder factor was significant ($F(1,64)$ = 14.702, p <.001), whereas it showed that the main effect of modes of thinking factor was not significant ($F(1,64)$ = 1.255, p =.272). However, interestingly, the interaction effect between the two factors reached the significance level ($F(1,64)$ = 4.878, p <.05), as shown in Figure 3.3.
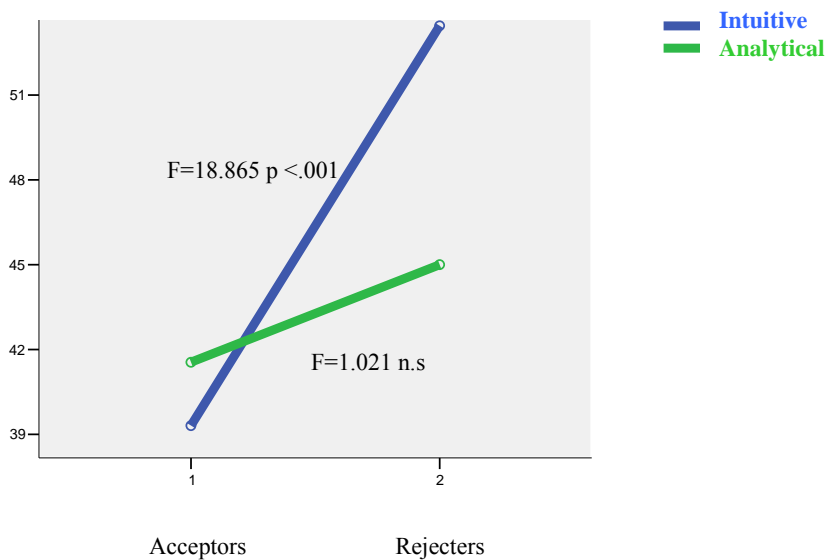

Fig. 3.3. Interaction effect type of responder * mode of thinking

Figure 3 clarifies the meaning of the interaction effect between the two factors. When people are induced to think intuitively they are better at distinguishing their offers according to the psychological features of the opponents. That is, intuitive thinking leads people to behave in a more strategic way as compared to analytical thinking, which, in turn, results in a less prominent differentiation of the offers with regard of the responders' portraits. In fact, only in the intuitive condition the difference between the offers made to the acceptors and rejecters turned out to be statistically significant, whereas under the analytical thinking offers to acceptors and rejecters, even they were consistent with the psychological profiles of the responders, did not differ significantly.

In order to exclude a possible effect due to the fact that in the processing task participants matched the description of the other player with a wrong photo (that

is a photo which did not correspond to the features mentioned in the verbal description), and consequently based their offers on different visual cues, we counted the right and wrong photo identifications for each character under the two conditions. Table 3.23 showed that the distributions of the right and wrong responses were similar in the intuitive and analytical conditions, so allowing us to maintain that decisions were influenced only by the way in which the psychological portrait of the responder was processed.

Responder	Mode of thinking	Right	Wrong
Marco	Intuitive	21	11
	Analytical	23	10
Grazia	Intuitive	25	6
	Analytical	28	6
Gianni	Intuitive	13	19
	Analytical	17	16
Marina	Intuitive	22	15
	Analytical	27	11

Tab. 3.23 - Distribution of right and wrong photo identification for each responder under the two modes of thinking

These results were confirmed by two-way ANOVAs carried out for each responder by considering the right vs wrong photo identification and the intuitive vs. analytical mode of thinking as independent variables: in no case significant interaction effect emerged (see Table 3.24).

Responder	Mode of thinking	Photo identification	Mean	SD	Interaction effect (mode of thinking * photo identification)		
					$F_{(1,64)}$	P	η^2
Marco	Intuitive	Right	54.28	15.11	0.042	.839	.002
		Wrong	55.00	16.03			
	Analytical	Right	42.14	15.23			
		Wrong	45.00	7.63			
Grazia	Intuitive	Right	52.30	10.12	0.057	.813	.003
		Wrong	50.00	9.74			
	Analytical	Right	45.43	8.54			
		Wrong	47.22	9.78			
Gianni	Intuitive	Right	38.33	16.02	0.167	.687	.070
		Wrong	33.12	14.86			
	Analytical	Right	47.72	14.32			
		Wrong	39.50	18.92			
Marina	Intuitive	Right	38.75	16.63	2.933	.099	.105
		Wrong	47.85	8.09			
	Analytical	Right	40.00	11.54			
		Wrong	32.50	9.57			

Tab. 3.24 - Mean offers given to each responder by participants who matched the right or wrong photos to the verbal description under the two modes of thinking

Results indicates that the right vs. wrong photo identification did not interact with the intuitive vs. analytical mode of thinking in determining the amount of money offered by participants to the responders.

3.2.4 Discussion

The aims of Study 4 were to deepen both the role of mindreading and the modes of thinking in a strategic interactive context. By employing the Ultimatum Game as a setting useful to shed light on how people face the conflict arising by the opposite tendencies of maximizing self-interest and of considering the other persons' perspective, we were specifically interested in:

- corroborating the evidence coming out from Study 3 regarding the fact that individuals can apply relevant mindreading processes in order to identify the psychological features of their partners so to realize when they can risk to offer low sums of money by presuming that the counterpart will accept them;

- verifying whether different modes of thinking affect how persons share given money with another player.

As for the first issue, Study 4 confirmed what we found in the previous study, thus confirming that people can modulate their monetary offers strategically in order to be sure that their proposals would have been accepted. Relying on the responders' psychological portraits people could vary their behaviour accordingly, thus indicating that the activation of relevant and consistent mindreading processes occurred. The findings of the present study provide further support to the conclusion we drew in Study 4, that is proposers probably realize when low offers may be rejected, so they maximize their gain by acting "as if" they are fair. This apparent taste for fairness conceals in reality a great ability to be strategic by making those specific decisions which imply a renounce to the maximum "impossible" gain in favour of a less-than-maximum "possible" one.

As for the two modes of thinking, it turned out that in the intuitive task proposers made offers which were clearly different in relation to the type of responder they were playing with. Specifically, under both intuitive and analytical conditions proposers offered more money to those responders who were supposed to reject low offers and less money to those who were supposed to accept even low offers, but, this differentiation sharpened in the intuitive condition. It seems that intuitive thinking can lead people to a more strategic and functional behaviour when making monetary decisions which imply the consideration of the opponent's psychological features.

Intuition intensifies the ability, that people already possess, of behaving strategically when making economic decisions. Some possible explanations could be found by turning to the specific features of the task that people were asked to deal with in the present experiment. In fact, it has to be kept in mind that the efficiency of analytical and intuitive mode of thinking should not to be evaluated in an absolute way since their accuracy is modulated by the properties of the task that they face (Hammond et al., 1987; McMackin & Slovic, 2000). A

first characteristic which is worth taking into account is the amount of information people have to process during the task. Specifically, participants were requested to "picture" the other player by dealing with and then putting together a considerable amount of information presented trough different forms, verbal and visual together, in order to complete the task. In fact, they got information both reading the detailed responder's description and looking at his/her photo, so that they had to handle information set in two different codes, the verbal and the visual ones. According to some recent studies (Dijksterhuis, 2004; Dijksterhuis et al., 2006) these stimuli characteristics, that is the presence of numerous relevant attributes to be processed should lead to an optimization of the decision at hand under the intuitive mode of thinking. The relative superiority of intuition under this circumstances could be explained through the limited processing capacity of the brain (Miller, 1956). In fact, when dealing with a large amount of relevant information, people run into a low processing capacity which did not allow them to take all information into account. This could be the case of the present work: the sheer amount of information involved in the task may be too much for deliberate analysis to tackle. Conversely, instead of a careful and detailed analysis of all information, it could be more efficient and functional employing a rapid integration of the information into global and holistic "impressions". Further evidence comes from other studies (Pelham & Neter, 1995) which found that the inferiority of a deep analytical thought in making decisions with large amount of information can be explained by the fact that analytical processing reduces the chance that people take crucial information into consideration. Ironically, when information are too much, engaging into a precise and accurate analysis allows people neither to concentrate on all information at hand, nor to pick up and focus on those information which would be necessary and crucial to make that decision adequately.

A part from the large amount of information, another characteristic of the task which is worth considering is the object of the elaboration (intuitive or

analytical) processes, that is the other player whom people were playing with. The "picturing" of other people is a common activity which probably is quite familiar to everyone. Previous research have shown that people can make affective judgments involving inferences others' traits from photos quickly and almost automatically (Willis & Todorov, 2006). The importance of this ability is testified by the fact that people learn very early to understand others' psychological characteristics and predict others' behaviours. In fact, from the ability to grasp the essence of the people surrounding us, from the capacity to rapidly catch the psychological features of the people whom we continuously interact with, it depends the probability of living serenely and successfully. For this reason, people are quite used to "deal with" others' psychological portraits, thus making the task of processing others' psychological profile a quite habitual task. People are probably very familiar with this kind of task, and, as a consequence, they have developed across years a relevant expertise. Once people become familiar with and expert in picturing other people, this expertise could lead, to some extent, to automaticity. It could be the case that people are used to form an opinion about another person rapidly, almost automatically, without engaging in a detailed analysis of each single feature, but, rather, taking into account the entirety of that person. People have an implicit learning, accumulated across years, concerning the evaluation of others' features. As a consequence, the intuitive thinking, which stems from implicit learning, could represent a better way of picturing the person we are interacting with as compared to the analytical thinking. Intuition could be the result of the experience that people have gained which allows them to form holistic, and complete impression of the other, in considerable low amount of time. For this reason, in our experiment, intuitive thinking could have led to a better differentiation of the responder types because this mode of elaboration is the most familiar and habitual way employed when picturing the others. Moreover, given the intrinsic quality of intuitive thinking, that is allowing to grasp the object to be evaluated in its entirety, it constitutes a better way to capture the

essence of a person as compared to the analytical thinking which, conversely, breaks up the object into details that makes it difficult to form a global impression going beyond each single particular (Stephen & Pham, 2008).

A further explanation for the superiority of intuition in our studies could be found if considering the output of intuitive processing. Different studies highlighted that intuition-based decisions tend to be more "gist-based" (Reyna & Brainerd, 1995), that is relying on intuition leads to invoke condensed representations of the situation than relying on analysis which, conversely, induces to invoke more intricate representations of the situation (Epstein & Pacini, 1999; Stephen & Pham, 2008). The reliance on intuitive thinking should lead to simpler, clearer (Stephen & Pham, 2008), more unambiguous (van Dijk & Zeelenberg, 2006) and polarized (Dijksterhuis, 2004) representation of the situation at hand as compared to the reliance on analytical thinking. Ambiguity and uncertainty are poor represented in intuition (Kahneman, 2003), thus making intuitive thinking result in dichotomous representations. On the contrary, analytical thinking produces more elaborate construals that also include various implications and considerations resulting in less clear defined representations of the situation. In our experiment, this could have led people to clearly distinguish the different types of responder under the intuitive thinking, whereas they were induced to represent them in a less polarized way under the analytical thinking. This could explain why proposals made under the intuitive thinking were clearly differentiated in low or high offers, whereas proposals made under the analytical thinking were in-between.

Finally, an additional explanation for our results could derive from some studies carried out in the field of mindreading and empathy. An important finding concerns the fact that efficient mindreading abilities mostly rely on automatic processes. It seems that people represent the others' mental states in terms of their own states, almost without being aware of it (Singer & Fehr, 2005). This mechanism could be explained by turning to the fact that, without thinking, the perceived intentions and expectations of other automatically activate brain

networks that also represent our own intentions and expectations. Some authors suggest that the so-called "mirror neurons", which are supposed to represent the neural basis for mindreading and empathy, might provide people with an automatic simulation of others' actions, intentions, and expectations (Gallese & Goldman, 1998; Preston & de Waal, 2002). For this reason it could be argued that the intuitive thinking, which implies a rapid and automatic evaluation of the situation at hand, is more suitable for dealing with the attribution of mental states to the others. This could further accounts for intuition being the best way of processing information about others' psychological portraits.

In conclusion, we are induced to believe that the activation of mindreading processes leads to behaviours which change depending on the psychological characteristics of the responders. Furthermore we can conclude that these behaviours are modulated by the joint effect of the other player's psychological portrait and the mode of thinking employed in processing the information concerning him/her.

3.3 STUDY 5

3.3.1 Aims

Study 5, a part from corroborating the findings coming out from both Study 3 and 4, was specifically aimed at verifying whether the individual style (intuitive vs. analytical) affect the amount of money offered by participants. We did not expect an effect of the individual style *per se*, but, rather a modulation of the effect of the thinking mode (activated by the intuitive vs. analytical task) we had previously found (see Study 4) on the offers made to the responders. Specifically, we hypothesized that the existence of a fit between individual style and mode of thinking (e.g. both intuitive) led to a more strategic decisional

behaviour, that is a greater differentiation of the offers depending on the psychological portraits of the opponents.

Additionally, even though it could be considered as a secondary aim, and not the main goal of Study 5, we were interested in investigating whether participants' physiological activation varied depending on both the intuitive vs. analytical individual style and the intuitive vs. analytical modes of thinking during the Ultimatum Game. In fact, in case it would emerge behavioural differences between intuition and analysis, it would be interesting to control for the participants' physiological activation corresponding to both intuitive and analytical strategies and styles. This could be necessary in order to clarify whether these behavioural differences depend on a different level of arousal and physiological activation or on the specific quality of each type of elaboration process. We expected that the physiological activation was higher as for the intuitive people and for the intuitive thinking as compared to the analytical people and the analytical thinking.

3.3.2 Method

3.3.2.1 Materials

The version of the Ultimatum Game employed in Study 4 was used (cfr. 4.2.2.). In the present study, however, stimuli were presented through STIM-II software in order to make it possible to simultaneously register the physiological indexes with Biofeedback.

The study presents a mixed 2X2X2 experimental design. The type of responder variable is within-subject and shows two levels corresponding to the *acceptors* and *rejecters*. The mode of thinking is a within-subject variable which involves two levels corresponding to the *intuitive* and *analytical processing*. The individual style is between-subject with two levels corresponding to the *intuitive* and *analytical individual style*.

3.3.2.2 Participants

The experimental sample consisted of the 29 participants who, in Study 2, were identified as people showing either an "extreme" analytical or "extreme" intuitive cognitive and decision profile (cfr. 3.3.4). Specifically, 13 participants were classified as intuitive people (2 males and 11 females; ranged from 19 to 32 years, mean age = 22.9 yrs), whereas 16 participants as analytical people (2 males and 14 females; ranged from 18 to 48 years, mean age = 27.1 yrs).

3.3.2.3 Procedure

Data were collected in January 2008. The procedure was the same used in Study 4. Participants were requested to play the role of the proposer in four rounds Ultimatum Game, each round with one of the four different fictitious responders. In each round they were asked to split 100 euros with the other player. As in Study 3, in two out of four rounds participants were induced to process information about the responder in an intuitive way, in the other two rounds in an analytical way. The order and the sequence of the two thinking modes and the type of responders were counterbalanced across rounds. Each participant was randomly assigned one out of the 8 sequences.

In the present study while participants were playing Ultimatum Game, the physiological indexes of were continuously recorded. Before starting the Ultimatum Game 1 minute of baseline was recorded. Presentation of the stimuli in the Ultimatum Game and pressing a response key were synchronized with the sampling computer. All testing was done in a quite and dimly-lit room on a computer. Stimuli were presented through STIM-II software and physiological indexes were simultaneously recorded with Biofeedback.

Since the experimental procedure was quite long and complex, including also the physiological registration, participants received a breakfast voucher after the experimental session took place.

3.3.3 Results

Statistical analysis were as follows. First, we tested the existence of differences among the offers made by participants to the different types of responder, thus providing further confirmations to the findings coming out from Study 3 and 4. Then, we verified the effect of the mode of thinking (intuitive vs. analytical) on the amount of money offered by participants, so to corroborate what emerged from Study 4. Next, we investigated how individual style (intuitive vs. analytical) affected the sums of money offered to the responders, and, more in details, the possible interaction effect between individual style and mode of thinking employed. Finally, we controlled for the physiological pattern of activation depending on the individual style and mode of thinking.

3.3.3.1 Activation of mindreading processes

Before carrying out the analyses it was assessed the assumption of univariant normality on the offers made to each responder by getting skewness and kurtosis and dividing these by the standard errors. The skewness value was -.01, whereas the kurtosis value was -.41 as for the offers made to Marco; for the offers made to Grazia the skewness was -.52 and the kurtosis 1.84; for the offers made to Gianni the skewness value was -.79, whereas the kurtosis value was .05; for the offers made to Marina the skewness was 1.35 and the kurtosis 1.45. Since kurtosis and skewness values of the offers made to marina and the kurtosis value of the offers made to Marina were out of standard parameters (+1 to -1 range; Marcoulides & Hershberger, 1997), the outlier analysis was computed in order to identify any possible outlier for these two variables. Two outliers were After deleting the outliers, the skewness and kurtosis values were calculated again. All skewness and kurtosis values turned out to be included between +1 and -1, thus allowing to conclude that the assumption of normality was kept. Specifically, the skewness values ranged from -.82 to .20, whereas the kurtosis values ranged from -.53 to .85. As a consequence, the experimental sample was then constituted of 27 participants.

After assessing the assumption of univariant normality, a repeated measure ANOVA was carried out in order to verify whether participants could differentiate their offers depending on the responders' psychological portraits. Prior to the analysis, the sphericity assumption was checked by using Mauchly's sphericity test. It turned out to be not significant (Mauchly's $W(5) = 0.946$, $p = .927$), thus indicating that the assumption was not violated.

In Table 3.25 the mean values of money offered to each responder were reported.

Responder	Mean	SD
Marco	54.03	18.11
Grazia	50.55	14.95
Gianni	38.66	15.51
Marina	33.33	11.51

Tab. 3.25 – Mean values of money offered to each responder

A one-way repeated measure ANOVA confirmed that the offers proposed to the four responders were significantly different ($F (3,78) = 16.697$, $p <.001$). As emerged in both Study 3 and 4, responses confirmed that proposers could differentiate their offers depending on the psychological portrait of the specific responder they were playing with.

Contrast analyses provided further evidence that, as already emerged in both previous studies, proposers offered more money to potentially "rejecters" responders (Marco and Grazia) as compared to "acceptors" responders (Gianni and Marina) (see Table 3.26).

Responders	Mean difference	$F_{(1,26)}$	P	η^2
Gianni – Grazia	-11.889	21.669	< .005	.455
Gianni – Marco	-15.370	20.929	< .001	.446
Gianni –Marina	5.333	2.916	.100	.101
Grazia – Marco	-3.481	1.253	.273	.046
Grazia – Marina	-17.222	23.961	< .001	.479
Marco – Marina	-20.704	35.023	< .001	.574

Tab. 3.26 – Contrast analyses comparing each couple of responder under the mean offered amount of money

3.3.3.2 Intuitive and analytical modes of thinking

In order to test the effect of the two different modes of thinking on the offers made by participants to the responders, the mean values of money offered under the two modes of thinking were calculated by collapsing the four different responders. Table 3.27 shows the results of the one-sample t-test computed on the offers under the intuitive and analytical thinking.

Mode of thinking	Mean	SD	t (26)	P
Intuitive	43.14	15.14	-0.919	.366
Analytical	44.97	15.54		

Tab. 3.27 - Mean offers under the two modes of thinking and one-sample t-test

As in Study 4, the t-test was not significant, thus confirming that the offers made under the two modes of thinking were not significantly different. However, as previously found, considering the offers received by each responder separately under the two modes of thinking, it turned out that, even if the differences did not reach the significance level, intuitive thinking induced participants to offer larger amount of money than analytical thinking to those responders who could be defined as "rejecters" (Marco and Grazia), whereas analytical processing induced them to make higher offers than intuitive processing to "acceptors" (Gianni and Marina). Results of the one-way ANOVAs are reported in Table 3.28.

Responder	Mode of thinking	Mean	SD	$F_{(1,26)}$	P	η^2
Marco	Intuitive	54.35	21.55	0.025	.875	.008
	Analytical	53.20	14.22			
Grazia	Intuitive	51.78	12.50	0.203	.656	.008
	Analytical	46.00	17.30			
Gianni	Intuitive	34.66	16.48	1.998	.169	.062
	Analytical	42.42	12.16			
Marina	Intuitive	31.78	11.02	1.665	.208	.061
	Analytical	35.00	12.24			

Tab. 3.28 - One-way ANOVAs comparing mean offers given to each responder under the two modes of thinking

Given these results, in order to verify the existence of an interaction effect between the type of responder and the mode of thinking variables, a repeated measure ANOVA was carried out. After calculating the aggregated mean values of the type of responder and modes of thinking (see Table 3.29), a repeated measure ANOVA was computed assuming the type of responder (acceptors vs. rejecters) and the mode of thinking (intuitive vs. analytical) as within-subjects factors.

Type of responder	Modes of thinking	Mean	SD
Acceptors	Intuitive	33.20	8.48
	Analytical	38.38	6.44
Rejecters	Intuitive	52.07	8.31
	Analytical	49.37	15.64

Tab. 3.29 - Mean offers made to acceptors and rejecters under the two modes of thinking

The assumption of sphericity was verified through Mauchly's sphericity test which was not significant (Mauchly's W = 0.655, p =.101). The repeated measure ANOVA confirmed that the main effect of the types of responder factor was significant ($F(1,26) = 63.527$ $p < .001$), whereas it showed that the main effect of modes of thinking factor was not significant ($F (1,26) = 0.382$, $p =.539$). However, interestingly, the interaction effect between the two factors reached the significance level ($F(1,26) = 7.645$, $p < .05$), as shown in Figure 3.4.
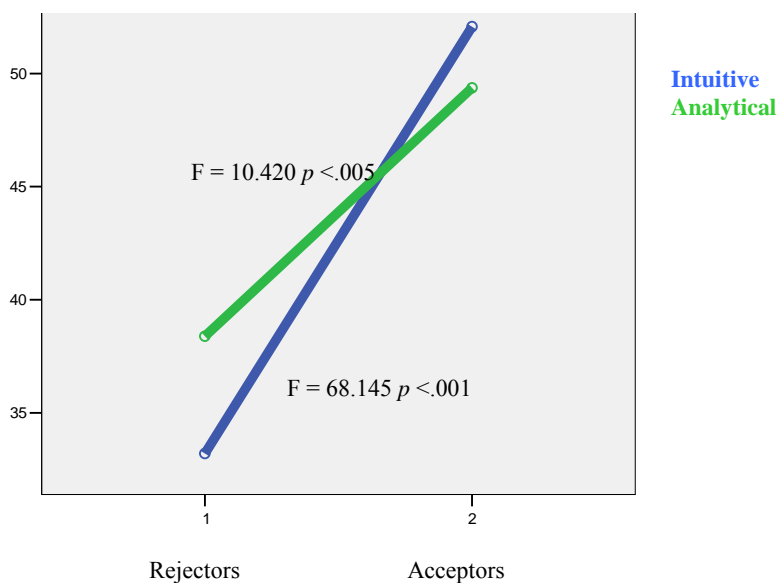

Fig. 3.4. Interaction effect type of responder * mode of thinking

As already found in Study 4, it turned out that the intuitive mode of thinking induced people to a better differentiation of their offers according to the characteristics of the responders. These results highlight that intuition makes people behave in a more strategic way compared to analysis which results in a less pronounced difference between the offers made to the two types of responders. Even if, contrary to Study 4, in the present study also in the analytical condition people can make different offers according to the opponent's features, the same trend emerges. In fact, also in this study the intuitive thinking leads to a more pronounced differentiation between the offers as compared to the analytical condition. The slight difference is probably due to typology of experimental sample employed in this study, whose components have been accurately selected as compared to the previous study's sample which was randomly chosen.

As in Study 4, the right and wrong photo identifications for each character under the two conditions were counted in order to exclude a possible effect due to the fact that an incorrect matching photo-verbal description would have influenced the participants' offering behaviour. As shown in Table 30, the distributions of the right and wrong responses were similar in the intuitive and analytical conditions. Both this distribution and the results of two-way ANOVAs computed for each responder by considering the right vs. wrong photo identification and the intuitive vs. analytical thinking as independent factors allowed us to conclude that offers were influenced only by the way in which the psychological portrait of the responder was processed. In fact, as in Study 4, no interaction effect between photo identifications and modes of thinking emerged (see Table 3.30).

Responder	Mode of thinking	Photo identification	Mean	SD	Interaction effect (mode of thinking * photo identification)		
					$F_{(1,26)}$	p	η^2
Marco	Intuitive	Right (11)	54.63	11.24	2.039	.167	.085
		Wrong (11)	40.00	28.28			
	Analytical	Right (3)	51.63	22.46			
		Wrong (2)	65.00	7.07			
Grazia	Intuitive	Right (12)	52.08	13.04	2.135	.158	.088
		Wrong (12)	52.29	12.05			
	Analytical	Right (2)	49.00	14.49			
		Wrong (1)	55.00	21.21			
Gianni	Intuitive	Right (11)	33.63	18.04	0.250	.622	.011
		Wrong (3)	35.00	21.21			
	Analytical	Right (8)	45.00	13.09			
		Wrong (5)	38.80	12.23			
Marina	Intuitive	Right (10)	30.50	11.65	0.003	.954	.001
		Wrong (11)	33.30	11.54			
	Analytical	Right (3)	34.50	12.12			
		Wrong (3)	36.66	15.27			

Tab. 3.30– Distribution of right and wrong identifications (frequencies are reported in brackets in the "photo identification" column), mean offers given to each responder by participants who matched the right or wrong photos to the verbal description under the two modes of thinking, and ANOVAs' results

3.3.3.3 Intuitive and analytical style

First, we verified whether the participants' individual style affected the total amount of money they offered, regardless to both the type of responder and the mode of thinking employed.

Before comparing the mean values of money offered by intuitive and analytical participants through a one-way ANOVA, the assumption of homogeneous variances was tested by using Levene's test (Levene, 1960). Since p-value was not significant ($p = .422$), the analysis of variance was possible.

In Table 3.31 ANOVA's results are reported.

Individual style	Mean	SD	F	P	η^2
Intuitive	43.25	13.22	0.123	.729	.070
Analytical	44.76	9.28			

Tab. 3.31 - Mean offers given by intuitive and analytical participants and one-way ANOVA

Results showed that the mean values of offered made by intuitive and analytical people were almost the same, thus revealing that the individual style did not influence the total amount of money offered to the responders.

Next, we investigated whether the offers varied depending on both the participants' individual style and the mode of thinking employed. Prior to the application of the analysis of variance, Levene's test was used to verify the assumption that variances were equal across samples. For each variable the resulting p-value of Levene's test were not statistically significant (p =.981 as for intuitive and p =.105 for analytical).Then two one-way ANOVAs were carried out assuming the individual style as independent variable and the total amount of offer made under the two modes of thinking as dependent variables. Results are reported in Table 3.32.

Individual style	Mode of thinking	Mean	SD	F	p	η^2
Intuitive	Intuitive	41.36	16.17	.144	.707	.059
	Analytical	45.13	21.61			
Analytical	Intuitive	43.15	15.05	.132	.718	.060
	Analytical	47.00	10.29			

Tab. 3.32 - One-way ANOVAs comparing mean offers given by intuitive and analytical participants under the two modes of thinking

No significant differences emerged, thus highlighting that intuitive or analytical people did not make different offers when they process information about the responders in an intuitive or analytical way.

Then, we verified whether the offers varied as a function of both the participants' individual style and the type of responder to whom the offers were made.

Before running the analyses of variance, the assumption of homogeneous variances was tested by using Levene's test. Since p-value were not significant (p = .452 as for the acceptors and p =.132 for the rejecters), the analysis of variance was possible. Two one-way ANOVAs were carried out assuming the individual style as independent factor and the amount of offers given to acceptors and rejecters as dependent factors. Results are reported in Table 3.33.

Type of responder	Individual style	Mean	SD	F	P	η²
Acceptors	Intuitive	33.18	9.55	1.231	.278	.047
	Analytical	37.93	11.77			
Rejecters	Intuitive	53.31	20.55	.035	.853	.010
	Analytical	52.21	9.64			

Tab. 3.33 - One-way ANOVAs comparing mean offers given by intuitive and analytical participants to the different types of responder

The analysis showed that no significant differences emerged. However, in line with what we found in Study 4, it turned out that intuitive people showed a greater differentiation of the offers than analytical people depending of the other players' features. These results suggested that, rather than being influential on the offers *per sè*, the participants' individual style probably interacted with the other variables, such as the type of responder, in modulating the amount of money offered by participants.

As a consequence, in order to verify the existence of possible interaction effects among the variables considered, a mixed ANOVA was carried out by assuming the participants' individual style as between-subject variable, the type of responder and the mode of thinking as within-subject variables. Prior to the ANOVA, the Mauchly's test was used to assess the assumption of sphericity. Since it was not significant (Mauchly's W = 0.587, p = .121), the sphericity could be assumed. Table 3.34 reports the mean values of money offered by intuitive and analytical participants under the two modes of thinking to the different types of responder.

Type of responder	Individual style	Mode of thinking	Mean	SD
Acceptors	Intuitive	Intuitive	33.75	5.68
		Analytical	32.50	10.15
	Analytical	Intuitive	33.12	8.18
		Analytical	42.75	4.11
Rejecters	Intuitive	Intuitive	51.31	12.39
		Analytical	52.59	14.07
	Analytical	Intuitive	52.69	16.55
		Analytical	47.12	15.11

Tab. 3.34 - Mean offers by intuitive and analytical participants under the two modes of thinking to the different types of responder

The mixed ANOVA's results are reported in Table 3.35.

Effects	$F_{(1,26)}$	p	η^2
Type of responder	86.449	<.001	.776
Mode of thinking	0.661	.424	.026
Type of responder * mode of thinking	2.989	<.05	.074
Type of responder * individual style	1.766	.196	.066
Mode of thinking * individual style	0.059	.811	.020
Type of responder * mode of thinking * individual style	1.561	.223	.059

Tab. 3.35 - Mixed ANOVA comparing mean offers given by intuitive and analytical participants under the two modes of thinking to the different types of responder

Results confirmed the main effect of the type of responder and the interaction effect between the type of responder and the mode of thinking on the offers, whereas no other significant effects emerged. Nevertheless, comparing the mean offers made by intuitive and analytical people under the two modes of thinking, it came out that intuitive people offered almost the same amount of money to either acceptors or rejecters when they think intuitively or analytically. Conversely, analytical people offered the same money as the intuitive people only when they think intuitively, whereas they offered sums of money which slightly diverged from all the other offers when they think analytically. Specifically, when analytical people were induced to think analytically they offered less money to the rejecters and more money to the acceptors as compared to all the other experimental conditions. This behaviour can be defined as inadequate, since it leads people to make the choices that do not allow them to gain as much as possible given the psychological portraits of the responders. Figure 3.5 and 3.6 visually represents the mean offers to acceptors and rejecters under the "match" condition (intuitive people thinking intuitively; analytical people thinking analytically) and the "mismatch" condition (intuitive people thinking analytically; analytical people thinking intuitively). The "match" condition scheme shows that in the analytical case (style and thinking)

the difference between offers made to acceptors and rejecters are less prominent as compared to the intuitive one. In both "mismatch" conditions, conversely, offers are exactly the same, and, in addition, they are similar to the intuitive-match condition. It seems that the combination of analytical style and analytical thinking leads to the least functional behaviour as compared to all the other conditions.
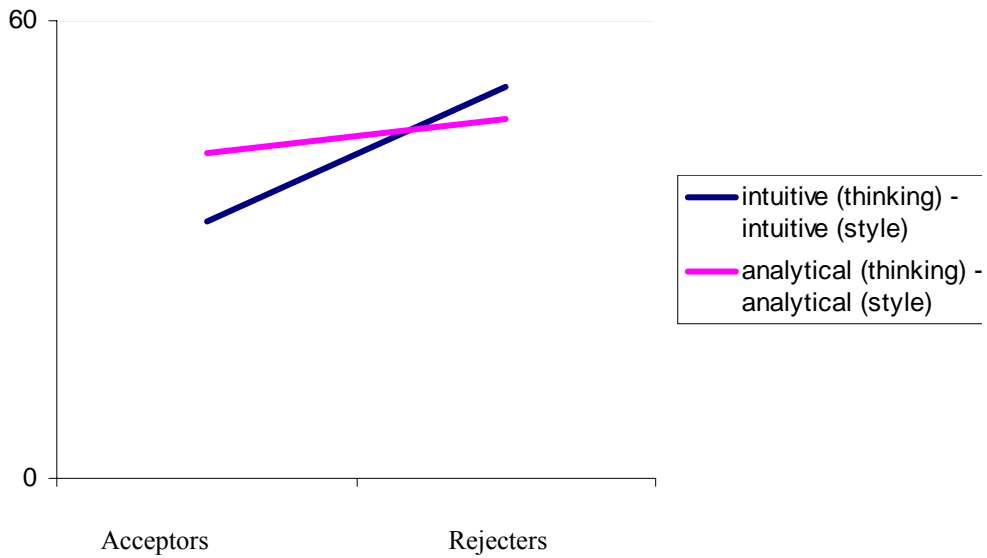

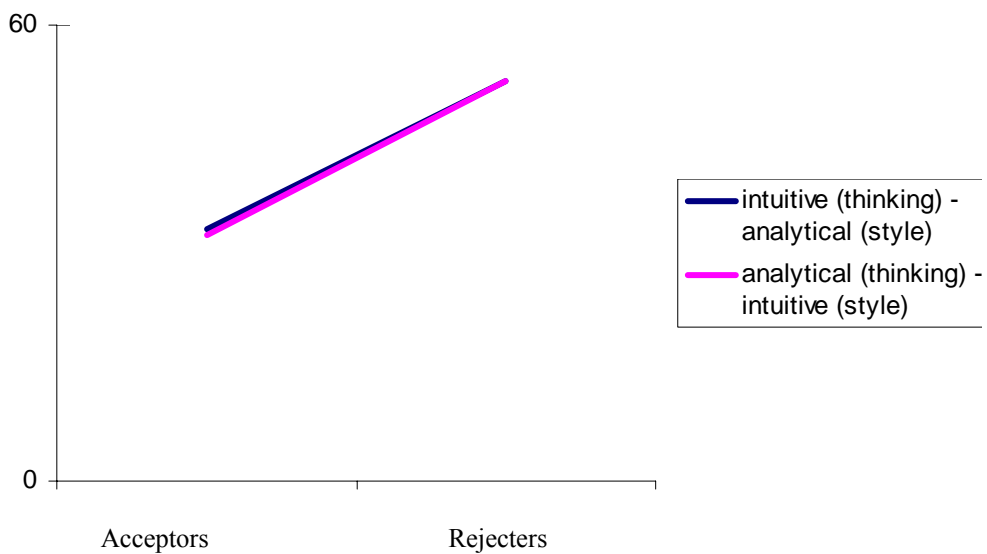Fig. 3.5. "Match condition": correspondence between individual style and mode of thinking

Fig. 3.6. "Mismatch condition": non-correspondence between individual style and mode of thinking

3.3.3.4 Learning effect

If Ultimatum Game has been played more than once, it can be the case the some order effects can rise (Roth & Erev, 1995). In addition, a certain form of learning can develop across rounds representing an intervenient variable whose influence should be detected. In fact, however, the order and the sequence of all experimental conditions have been counterbalanced across participants, it held it necessary to control these possible effects.

As a consequence, the mean values of money offered in the 1st round of the game to each responder were compared to both the total mean offers made to the same responder and to the offers made in all the other rounds (2nd, 3rd, and 4th rounds).

Before running the one-sample t-tests, the assumption of univariant normality was assessed. All the skewness values ranged from -.89 to .37, and the kurtosis values ranged from -.65 to .99, thus normality could be assumed. In Table 3.36 t-tests results are reported.

Responders	1st round	2nd round	3rd round	4th round	total mean	t (1st round – total mean)	t (1st round – 2nd round)	t (1st round – 3rd round)	t (1st round – 4th round)
Marco	47.15 (17.04)	48.50 (21.38)	59.44 (11.84)	60.60 (24.42)	54.03 (18.11)	-1.069 P =.326	0.156 p =.882	3.117 p =.070	1.232 p =.285
Grazia	46.66 (13.66)	47.14 (7.55)	52.00 (23.87)	55.00 (15.41)	50.55 (14.95)	-0.696 p =.517	0.155 p =.882	0.496 p =.646	1.616 P =.145
Gianni	45.00 (6.12)	40.00 (18.70)	38.57 (18.64)	28.16 (16.97)	38.66 (15.51)	3.135 p =.055	-0.598 p =.582	-0.912 p =.397	-2.429 p =.059
Marina	29.00 (8.94)	36.11 (8.93)	29.16 (14.28)	36.42 (13.75)	33.33 (11.51)	-1.075 p =.343	2.387 p =.052	0.029 p =.978	1.429 p =.203

Tab. 3.36- Mean offers (SD in brackets) to each responder for each round and t-test comparing the mean offers of the first round with the other rounds and the total mean offers for each responder

Results highlighted that no differences between the offers made in the 1st round and the offers made in all the other rounds to each responder were signifcant, thus allowing to exclude any possible order and learning effects.

Then, the offers made in the 1st round under either the intuitive or the analytical mode of thinking were compared to the total mean offers made under the same mode of thinking and to the offers made in all the other subsequent rounds. Prior to the analyses, the skewness and kurtosis values were calculated. All values were within the +1 and -1 range, thus allowing to assume the univariant normal distribution of the data. T-tests results are reported in Table 3.37.

Mode of thinking	1st round	2nd round	3rd round	4th round	total mean	t (1st round – total mean)	t (1st round – 2nd round)	t (1st round – 3rd round)	t (1st round – 4th round)
Intuitive	43.84 (12.60)	41.85 (11.42)	42.85 (22.33)	40.35 (18.85)	43.14 (15.14)	0.142 p =.890	-0.649 p =.527	-0.165 p =.872	-0.691 p =.502
Analytical	42.14 (14.10)	42.15 (17.28)	49.23 (17.42)	50.53 (22.11)	44.97 (15.54)	-1.087 p =.297	0.005 p =.996	1.472 p =.167	1.372 p =.195

Tab. 3.37- Mean offers (SD in brackets) under the two modes of thinking for each round and t-test comparing the mean offers of the first round with the other rounds and the total mean offers under each mode of thinking

In conclusion, results allowed to conclude that the offers made in the 1st round were not different from the total mean offers and the offers made in all other subsequent rounds both with respect to the type of responder and the mode of thinking.

3.3.3.5 Physiological activation

Most neurobiological studies identified a correspondence between specific mental process and neural events. This correspondence (or non-correspondence) can contribute to deepening the understanding of the mental processes in hand.

The series of subsequent analyses reported below was carried out in order to verify the existence of different pattern of physiological activation depending on the participants' individual style, the mode of thinking, and the type of responder. The Ultimatum Game literature has recently been extended to the investigation of the neurobiological bases of the game. However, neuroimaging techniques (Sanfey et al., 2003) and ERP methodology (Polezzi et al., 2008) have been mainly employed (Sanfey et al., 2003), whereas, to our knowledge,

only one study implied the registration of the autonomic activity connected to decisions in the Ultimatum Game as a measure of emotional and attentional arousal (van't Wout et a., 2006). However, this study measured the responder's autonomic activity associated with the rejection of unfair offers. Hence, no previous studies have been conducted to investigate the proposer's autonomic activation, and no other studies researched into the autonomic activity connected with intuition and analysis, neither intended as mode of thinking, nor as individual style.

In particular, in the present study, since previous studies indicating which physiological measure was particularly suitable for the scope were lacking, it was decided to register a broad range of indexes. Specifically, the following indexes of autonomic activation were registered: skin conductance level (SCL), skin conductance response (SCR), electromyography (EMG), blood pressure volume (BVP), pulse volume amplitude (PVA), and pulse frequency (PF).

Before comparing the mean physiological indexes depending on the participants' individual style, the mode of thinking, and the type of responder, we verified that, as predictable, the physiological activation varied across the different phases of the experimental task. In particular, the mean values of the autonomic indexes recorded in the following phases were compared: a. reading of the responder's verbal description; b. explanation of the task to be completed (matching the description and the photo); c. presentation of the three photos; d. identification of the correct photo; e. proposal of offer.

Before carrying out the repeated measure ANOVAs, the assumption of sphericity was assessed by using Mauchly's tests. For each physiological index Mauchly's test turned out to be significant (scl: Mauchly's $W(9) = .101$, $p <.001$; scr: Mauchly's $W(9) = .260$, $p <.001$; emg: Mauchly's $W(9) = .031$, $p <.001$; bvp: Mauchly's $W(9) = .359$, $p <.005$; pva: Mauchly's $W(9) = .196$, $p <.001$; pf: Mauchly's $W(9) = .319$, $p <.005$), thus inducing us to use the Greenhouse-Geisser correction for violation of sphericity. ANOVAs results are reported in Table 3.38.

Physiological index	Phase	Mean	SD	F	p	η^2
SCL	Description reading	23.71	15.09			
	Task explanation	23.11	14.68			
	Photos presentation	23.38	14.78	14.213 (df 2.319, 57.979)	<.001	.362
	Photo identification	24.06	15.12			
	Offer proposal	24.58	15.12			
SCR	Description reading	-0.03	.04			
	Task explanation	-0.01	.03			
	Photos presentation	0.02	.08	4.352 (df 3.018, 75.438)	<.05	.148
	Photo identification	0.02	.08			
	Offer proposal	0.01	.09			
EMG	Description reading	13.42	13.60			
	Task explanation	13.36	13.91			
	Photos presentation	13.32	13.99	1.422 (df 1.715, 42.885)	.229	.054
	Photo identification	13.20	13.84			
	Offer proposal	13.09	13.65			
BVP	Description reading	74.68	9.18			
	Task explanation	74.63	9.21			
	Photos presentation	74.74	9.24	5.127 (df 2.927, 73.173)	<.05	.170
	Photo identification	74.32	9.12			
	Offer proposal	74.68	9.24			
PVA	Description reading	17.63	12.70			
	Task explanation	18.10	13.13			
	Photos presentation	17.78	12.97	10.529 (df 2.204, 55.103)	<.001	.296
	Photo identification	16.82	12.05			
	Offer proposal	15.55	11.06			
PF	Description reading	91.07	13.69			
	Task explanation	90.62	13.89			
	Photos presentation	89.31	13.28	6.282 (df 2.446, 61.162)	<.005	.133
	Photo identification	90.51	13.71			
	Offer proposal	92.30	14.11			

Tab. 3.38- Repeated measure ANOVAs comparing mean values of each physiological index registered depending on the different phases of the UG

Results showed that, as we expected, most physiological indexes varied across the different phases of the experimental task. In particular, it turned out that the autonomic activation was higher in those specific phases which implied an

active involvement of the participants, such as the "photo identification" and the "offer proposal".

Then, a series of one-way ANOVAs was computed in order to verify the existence of different pattern of physiological activation in intuitive and analytical people regardless of every other factors. Before running the analyses, the skewness and kurtosis values were calculated. The skewness values varied from -.57 to 1.02 and the kurtosis values ranged from -.38 to .02. So, the normal distribution of the data was assumed. The assumption of homogeneous variances was tested by using Levene's test. Since p-values were not significant (*p*-values varied from .27 to .98), the analysis of variance was possible. ANOVAs results are reported in Table 3.39.

Physiological index	Individual style	Mean	SD	$F_{(1,26)}$	P	η^2
SCL	Intuitive	26.22	19.60	0.876	.359	.013
	Analytical	20.75	5.34			
SCR	Intuitive	0.02	0.04	3.552	.072	.120
	Analytical	-0.02	0.05			
EMG	Intuitive	14.34	13.23	0.233	.634	.007
	Analytical	11.78	13.67			
BVP	Intuitive	75.20	9.70	0.134	.717	.004
	Analytical	73.83	9.13			
PVA	Intuitive	14.61	10.49	0.758	.392	.011
	Analytical	18.96	14.89			
PF	Intuitive	90.16	15.22	0.209	.652	.005
	Analytical	92.72	12.96			

Tab. 3.39- One-way ANOVAs comparing mean values of each physiological index registered depending on the individual style

Results highlighted that intuitive and analytical people did not differ in terms of any physiological index, thus indiciating that the individual style did not result in distinct autonomic pattern of activation.

Next, we investigated whether the different modes of thinking (intuitive vs. analytical) gave rise to difference in physiological activation. One-sample t-tests were computed for each index. Prior to the analyses, the skewness and kurtosis

values were calculated. Since the skewness values varied from -.55 to .87 and the kurtosis values ranged from -.20 to .12, the normal distribution of the data was assumed. Then, the assumption of homogeneous variances was tested by using Levene's test. Since p-values were not significant (*p*-values varied from .10 to .48), the analysis of variance was possible. T-tests' results are reported in Table 3.40.

Physiological index	Mode of thinking	Mean	SD	$t_{(26)}$	P	η^2
SCL	Intuitive	25.92	19.85	0.617	.440	.025
	Analytical	21.26	5.39			
SCR	Intuitive	0.01	0.02	2.763	.109	.103
	Analytical	-0.01	0.05			
EMG	Intuitive	14.64	14.31	0.286	.598	.012
	Analytical	11.69	13.61			
BVP	Intuitive	75.13	9.59	0.092	.764	.004
	Analytical	74.01	9.09			
PVA	Intuitive	16.42	11.56	0.110	.744	.005
	Analytical	18.06	13.63			
PF	Intuitive	89.37	14.41	0.307	.585	.013
	Analytical	92.38	13.02			

Tab. 3.40- One sample t-tests comparing mean values of each physiological index registered under the two modes of thinking

No differences between intuitive and analytical thinking emerged on any of the physiological index considered, thus leading us to conclude that the autonomic activation was not affected by the specific mode of elaboration employed.

The effect of the responder type on the values of physiological indexes was verified through a series of one-sample t-tests. Since both the assumption of univariant normal distribution (skewness and kurtosis values varied from -.95 to .77 as for the skewness and from -.34 to .52 as for the kurtosis) and sphericity (Mauchly's W(9) = .572, *p* =.102) were confirmed, we proceeded with the analyses. T-tests results are reported in Table 3.41.

Physiological index	Type of responder	Mean	SD	$t_{(26)}$	P
SCL	Acceptors	23.97	14.82	0.812	.424
	Rejecters	23.57	15.17		
SCR	Acceptors	0.006	0.04	0.719	.479
	Rejecters	0.001	0.04		
EMG	Acceptors	12.96	13.17	-0.967	.343
	Rejecters	13.59	14.57		
BVP	Acceptors	74.55	9.21	-1.130	.269
	Rejecters	74.65	9.18		
PVA	Acceptors	17.22	13.14	0.119	.976
	Rejecters	17.13	11.73		
PF	Acceptors	90.68	13.51	-0.251	.804
	Rejecters	90.84	13.98		

Tab. 3.41- One sample t-tests comparing mean values of each physiological index registered while playing UG with the different type of responder

Since no differences emerged in any case, results showed that the physiological activation was not affected by the type of responder the participants were playing with.

Finally, a mixed ANOVA was carried out for each physiological index to compare the mean values of each index depending on the specific responder who received the sum of money (acceptros vs. rejecters), the mode in which the responders' information were processed (intuitive vs. analytical) and the individual style (intuitive vs. analytical). Mean offers are reported in Table 3.42.

Physiological index	Type of responder	Individual style	Mode of thinking	Mean	SD
SCL	Acceptors	Intuitive	Intuitive	19.12	3.75
			Analytical	25.11	15.51
		Analytical	Intuitive	22.40	5.96
			Analytical	27.51	23.22
	Rejecters	Intuitive	Intuitive	19.15	3.82
			Analytical	23.03	14.59
		Analytical	Intuitive	23.15	6.42
			Analytical	27.09	24.46
SCR	Acceptors	Intuitive	Intuitive	-0.02	.09
			Analytical	0.03	.04
		Analytical	Intuitive	-0.01	.02
			Analytical	0.01	.02
	Rejecters	Intuitive	Intuitive	-0.01	.07
			Analytical	0.01	.03
		Analytical	Intuitive	-0.01	.05
			Analytical	0.01	.03
EMG	Acceptors	Intuitive	Intuitive	12.37	14.93
			Analytical	24.92	13.25
		Analytical	Intuitive	11.18	13.44
			Analytical	5.93	5.45
	Rejecters	Intuitive	Intuitive	12.70	15.49
			Analytical	26.01	15.51
		Analytical	Intuitive	10.99	13.71
			Analytical	7.10	10.03
BVP	Acceptors	Intuitive	Intuitive	70.42	10.87
			Analytical	76.59	9.32
		Analytical	Intuitive	76.44	7.44
			Analytical	74.02	10.32
	Rejecters	Intuitive	Intuitive	70.67	10.96
			Analytical	76.47	9.20
		Analytical	Intuitive	76.52	7.41
			Analytical	74.14	10.33
PVA	Acceptors	Intuitive	Intuitive	24.66	21.11
			Analytical	16.72	13.06
		Analytical	Intuitive	15.03	9.63
			Analytical	14.85	10.49
	Rejecters	Intuitive	Intuitive	20.72	14.96
			Analytical	19.17	14.53
		Analytical	Intuitive	14.46	9.71
			Analytical	15.70	10.48
PF	Acceptors	Intuitive	Intuitive	90.29	10.99
			Analytical	87.14	10.54
		Analytical	Intuitive	93.00	14.27
			Analytical	91.54	17.67
	Rejecters	Intuitive	Intuitive	90.41	10.03
			Analytical	86.78	11.39
		Analytical	Intuitive	94.66	16.41
			Analytical	90.82	16.69

Tab. 3.42 – Mean values of each physiological index depending on the individual style under the two modes of thinking while playing with the different types of responder

Prior to the mixed ANOVAs, Mauchly's test was used to verify the assumption of sphericity. All tests were not significant, thus confirming the assumption of sphericity. ANOVAs's results are reported in Table 3.43.

Physiological index	Effects	$F_{(1,22)}$	P	η^2
	Type of responder	0.305	.586	.014
	Mode of thinking	0.577	.456	.026
	Individual style	0.781	.386	.034
SCL	Type of responder * mode of thinking	2.835	.106	.114
	Type of responder * individual style	1.507	.232	.064
	Mode of thinking * individual style	0.010	.974	.001
	Type of responder * mode of thinking * individual style	0.236	.632	.011
	Type of responder	0.442	.513	.020
	Mode of thinking	2.902	.103	.117
	Individual style	0.120	.733	.005
SCR	Type of responder * mode of thinking	1.308	.265	.056
	Type of responder * individual style	0.142	.710	.006
	Mode of thinking * individual style	0.519	.479	.023
	Type of responder * mode of thinking * individual style	0.833	.371	.037
	Type of responder	0.763	.392	.034
	Mode of thinking	0.699	.412	.031
	Individual style	4.166	.053	.159
EMG	Type of responder * mode of thinking	0.586	.452	.026
	Type of responder * individual style	0.024	.877	.001
	Mode of thinking * individual style	3.065	.094	.122
	Type of responder * mode of thinking * individual style	0.050	.825	.002
	Type of responder	1.374	.254	.059
	Mode of thinking	0.224	.641	.010
	Individual style	0.213	.649	.010
BVP	Type of responder * mode of thinking	1.368	.255	.059
	Type of responder * individual style	0.050	.825	.002
	Mode of thinking * individual style	1.230	.279	.053
	Type of responder * mode of thinking * individual style	2.109	.161	.087
	Type of responder	0.243	.627	.011
	Mode of thinking	0.172	.682	.008
	Individual style	1.093	.307	.047
PVA	Type of responder * mode of thinking	10.077	<.05	.314
	Type of responder * individual style	0.516	.480	.023
	Mode of thinking * individual style	0.270	.608	.012
	Type of responder * mode of thinking * individual style	4.064	.056	.156
	Type of responder	0.066	.800	.003
	Mode of thinking	0.283	.600	.013
	Individual style	0.460	.505	.020
PF	Type of responder * mode of thinking	1.100	.306	.048
	Type of responder * individual style	0.186	.670	.008
	Mode of thinking * individual style	0.004	.948	.001
	Type of responder * mode of thinking * individual style	0.475	.498	.021

Tab. 3.43 - Mixed ANOVAs comparing mean values of physiological indexes depending on the individual style under the two modes of thinking while playing with the different types of responder

Results highlighted that no differences emerged. Neither main effects, nor interaction effects were found, thus confirming that the occurrence of different mental activities as revealed from the behavioural data did not correspond to the activation of different pattern of physiological events.

3.3.4 Discussion

The goals of Study 5 were manifold.

The first aim was to corroborate the findings from Study 3 and 4 concerning the role of mindreading processes in Ultimatum Game. Specifically, it was aimed at further substantiating the fact that individuals can apply relevant mindreading processes in order to identify the psychological features of their partners so to realize when they can risk to offer low sums of money by presuming that the counterpart will accept them.

The second aim was to provide further support to the finding coming out from Study 4 which claimed that different modes of thinking affect how people split money with the other player. In particular, it was intended to corroborate the conclusion that intuitive thinking leads people to better differentiate their offers depending on the psychological features of the responders they were playing with.

A part from corroborating the findings of Study 3 and 4, Study 5 was specifically aimed at verifying the effect of the individual style on the offers made by proposers. More in details, it was intended to investigate whether a fit between the individual style and the mode of thinking can improve the strategicity of the offers.

Finally, Study 5 was aimed at verifying whether the pattern of autonomic activation varied according to the individual style and the mode of thinking employed.

As for the first issue, Study 5 confirmed what emerged in the previous study, that is that people are able to vary their monetary offers strategically in order to minimize the probability that they would be rejected. The activation of relevant mindreading processes leads people to differentiate their offers consistently with the psychological portraits of the responders they are playing with. This finding provides further support to the capacity people possess of being strategic in that they make less-than-maximum possible offers in order to increase the probability of having these offers accepted. In conclusion, we can maintain that our studies provide evidence that people are capable of predicting others' actions and viewing the Ultimatum Game from the other players' perspectives. Putting themselves into others' shoes represents an ability that people clearly exert even when they are explicitly required to take care their personal economic gain.

As for the second issue, Study 5 confirmed the findings of our previous study. Results supported the outcome that intuitive thinking leads to clearly differentiated offers in relation to the responders' psychological portraits. Even though under both intuitive and analytical processing people offered more money to the so-called "rejecters" and less money to the "acceptors", it was only under the intuitive thinking that this differentiation intensifies and becomes more prominent. Strategic and functional offers, which take into consideration the psychological features of the responders, seem to be a function of intuition. In the discussion of Study 4 we discussed the superiority of intuition in inducing strategic and functional offers in terms of characteristics of the stimuli employed in the experiments, characteristics of the elaboration process implied in intuition, and characteristics of the output produced by intuitive thinking (cfr. 4.4).

As for the effect of individual style is concerned, it turned out that individual style (intuitive and analytical) does not affect directly the amount of money offered by participants, thus inducing us to exclude the possibility that people with an intuitive and analytical cognitive and decision style make different offers. The individual style *per sè* is not related to the behaviour people shows in

the Ultimatum Game. However, an interaction among the individual style, the mode of thinking, and the type of responder, even though it did not reach the level of statistical significance, was found. In fact, if we compare the mean offers made by intuitive and analytical people under the two modes of thinking, it emerges that when analytical people were induced to think analytically they offered less money to the rejecters and more to the acceptors as compared to analytical people thinking intuitively and intuitive people thinking both analytically and intuitively. It seems that when analytical people thought analytically they showed an inefficient behaviour, in that they were induced to make offers that did not allow to gain as much as possible given the specific constraints of responders' portraits. A possible explanation for these results can be found if considering our conclusion regarding the efficiency of intuitive mode of thinking on the differentiation of the offers. In fact, it could be the case that the negative influence of analytical thinking on the strategicity of the offers would be even worsened by the interaction with an individual style which is analytical too. While in the "mismatch" condition (intuitive style-analytical thinking; analytical style-intuitive thinking) the inefficiency of analysis, intended as either individual style or mode of thinking, was mitigated by the combination with intuition, meant as either individual style or mode of thinking, in the "match" condition, the negative influence of analysis was even worsened by the presence of another analytical element. Mismatch conditions could be thought as situations of compensation in which the negative effect of analytical factors were balanced by the intuitive element. The intuitive "match" condition, conversely, contained both advantages of both the intuitive style and thinking. It is not the match condition *per sè* which leads to better decisions (Betsch & Kunz, 2008), but, rather, the "added value" of intuition which induces to an optimization of the choice.

The fact that no direct relation between an individual's disposition to rely on intuition and analysis and the offers made during the Ultimatum Game was found seems to suggest that individual cognitive and decision styles can not be

considered as good predictors of how people perform in a behavioural task. Even though several studies testify the existence of a relation between styles and performance (Hough & Ogilvie, 2005; Pretz, 2008; Schmitt et al., 2008), others do not find any connection between them (Karlsson, unpublished). Our findings seem to place themselves in an intermediate position between these two extremes. In fact, we did not find a direct relation between style and behaviour, nevertheless individual style seemed to play a role, even probably a minor one, in modulating the resulting behaviour. Instead of pronouncing on a definitive and extreme position concerning the influence of individual style, it could be maintained that in the present study styles are not the most important factor in determining the participants' performance. Probably, as suggested by Hammond et al. (1996), the main influence comes from the joint effect of the mode of thinking employed and the specific characteristic of the task at hand. Participants' behaviour primarily results from both the analytical vs. intuitive way of processing information about the different type of responders and the features of the task employed, such as the specific object of the elaboration (responders' portraits), the characteristics of the elaboration process itself (features which are typical of the intuitive or analytical mode of thinking), and the properties of the processes' output. The minor role played by individual style in influencing behaviour could be also taken as an indirect prove of the flexibility which the construct of style implies. Specifically, styles are intended as preference, habits, tendencies to behave in a specific way. However, they are not meant as fixed and unchangeable, but, rather as flexible and adjustable depending on the situation at hand. Our results go in this direction, that is that probably when the properties of the situation are particularly relevant and play the major role, the influence of individual style, as a consequence, is reduced and, instead of being the major determinant of the situation, hold a secondary position.

As for the autonomic activation, it turned out that most physiological indexes varied across the different phases of the experimental task. In particular, it

turned out that the autonomic activation was higher in the phases concerning the identification of the correct photo and the offer proposal. This, a part from confirming the alternation of different pattern of activation across the distinct phases of the task, reveals a higher activation in correspondence of those specific phases which implied an active involvement of the participants. In fact, as suggested previous research (Pochon et al., 2008), when a motor response is also required, this could influence and alter the pattern of activation. As to the participants' physiological activation during the analytical and intuitive thinking, no differences emerged. It seems that even though intuitive and analytical thinking can be considered as different mental processes as testified by the behavioural data we collected, these two mental activities do not correspond to different physiological pattern of activation. Whereas most neurobiological studies identify a correspondence between specific mental process and neural events, the present work detects a non-correspondence between these elements. Both cases can be informative. Specifically, if we consider that, despite the behavioural differences deriving from intuitive and analytical processing, the two modes of thinking do not correspond to different pattern of autonomic activation, we can draw some conclusion in this respect. Typically, autonomic activations vary depending on the involvement of either emotion or attention in the situation at hand (Bierman, Destrebecqz & Cleeremans, 2005; van't Wout et al., 2006). In particular, when a mental activity involves the implication of emotionally charged stimuli or it requires a great allocation of attentional resources, the corresponding physiological activation is particularly high. In the present study no differences were identified between the pattern of activation corresponding to intuitive and analytical thinking. This could be interpreted with the fact that intuition and analysis do not differ in terms of level of both emotion and attention involvement. Emotion and attention are probably not the proper elements which differentiate the two processes, thus confirming that the equivalence between intuition and emotion, on one side, and analysis and cognition, on the other side, should be taken very cautiously.

Intuition does not coincide with emotion, they are not synonyms, but, rather, they probably show some points of overlapping even if it is possible to keep them separate (Simon, 1987; Vaughan, 1990; Ray & Myers, 1990). It could be suggested that intuition is not necessarily emotionally charged and, at the same time, analysis is not necessarily emotionally free. However, since, to our knowledge, the autonomic activation corresponding to intuition and analysis has never been investigated before, the present study could be considered as a starting point for further deepening of the issue at hand.

CONCLUSIONS

There is little doubt that intuition and analysis play a fundamental role in our everyday decision-making. Even if this argument is not new (see Barnard, 1938), a great interest on it has gathered momentum recently (see Klein, 2003; Sadler-Smith, 2008). However, despite this acknowledgment of the importance of intuition and analysis in decision-making, there still exists a considerable conceptual confusion surrounding what intuition and analysis really are, how intuition and analysis work, and under which circumstances the employment of one mode of thinking is better than the other (Dane & Pratt, 2007). In fact, even though intuition and analysis have been the subject of research for a very long time, any agreement on these points has been reached yet.

The present work aimed at researching into the constructs of intuition and analysis in decision-making through an approach which tried to integrate different types of data in order to provide an outline of the topic at hand as comprehensive and multifaceted as possible.

The first part of the investigation concerned the study of intuition and analysis by employing self-report inventories devised to measure the individual preferences for relying on either intuition or analysis in decision making and, more in general, in cognitive functioning. Starting from the establishment of the varied conceptual and operational definitions of the constructs underlying the existing scales, the main purpose of the first two studies was to examine the relationship between different commonly used measures of cognitive and decision styles. Basing on these relations the goal was, then, to identify, if possible, broader stylistic profiles, which constituting dimensions, even if conceptually and operationally conceived in different ways and pertained to distinct fields, tap the same intuitive-analytical dimension. Findings from both Study 1 and 2 pointed out that these instruments are related one another in a

consistent way, so to make it possible to detect two distinct patterns of relationships, which roughly correspond to the analytical and intuitive styles. However, consistently with the purposed goal of identifying broader individual profile, these two styles are enriched by other aspects which contribute to better define them, thus providing a multifaceted profile, rather than only single dimensions, of these constructs. The two resulting profiles concern both the field of decision-making and the broader ambit of cognitive functioning and go beyond the intuitive-analytical dimension including more complex and differentiated stylistic dimensions. Within each profile the pattern of correlations among the instruments which claim to measure the same intuitive-analytical dimension, even if very high, does not indicate a complete coincidence. This suggests that each scale assesses specific features of the construct and, as a consequence, what the scales really measure is only partially the same construct. As discussed in Chapter 2 (cfr. 2.2.4), this finding could be explained by referring to the different levels of analysis implied in each instruments, that is the different operationalizations of the constructs, intended alternatively as habits, beliefs, or preferences (Leonard, Scholl & Kowalski, 1999). As a general implication for practice, we believe that researchers, when employing stylistic self-report inventories, should clarify and keep in mind which scale assesses the specific features of intuition and analysis they are interested in measuring. In particular, it should be useful to know when there is an overlap of the instruments and when they make unique contributions in order to make sure that what researchers would like to measure corresponds to what the scales they employ actually measure.

The two distinct patterns of correlations emerging from the studies not only suggest that individuals, when deciding, exhibit different styles and approaches, but, in addition, provide further support to the existence of the intuitive-analytical dimension. In particular, findings from Study 1 and 2 made a contribution to the debate over the nature of these concepts. In fact, as discussed in the Introduction, intuition and analysis can be treated as either opposite poles

along the same bipolar axis (Hayes & Allinson, 1994; Myers & McCaulley, 1985; Simon, 1987) or as two separate unipolar scales (Hodgkinsons & Sadler-Smith, 2003; Isenberg, 1984; Pacini & Epstein, 1999; Sauter, 1999) which can be complementary and concurrent. Our results, which indicated a slight negative correlation between intuition and analysis in decision-making inventories, contribute evidence to support that people who express a stronger preference for one style show a lower perspective for the other one, meaning that, even though individuals tend to use more than one decision-making style, they probably have a dominant style. Different styles could be conceived as alternative, but not mutually exclusive, ways of thinking and deciding. However, as far as the more general field of cognitive styles, our findings seem to suggest a complete independence between intuition and analysis, thus indicating that styles are alternative ways of behaving and, probably, one of them dominates the others. All in all, the different styles can be thought as alternative way of approaching a task, a problem, or a decision. This result induces us to conclude that styles are external manifestations of preferences, attitudes, and tendencies that individuals are able to adapt or change. Whether these "surface" manifestations could be conceptualized as expressions of more stable underlying dimensions, conceived, for example as personality traits (Curry, 1983), was not the proper aim of this research. Further research could investigate the relationships between decision and cognitive styles measures and personality instruments.

A different point which is worth deepening is the relationship between the mental abilities, as measured by the *Cognitive Reflection Test*, and all the stylistic measures. The relative independence of the former from the latter represents a very interesting result, since it seems to provide worthwhile evidence within the current debate concerning the relationship between analytical thinking and mental abilities, and, more in general, between styles and abilities. This finding, in fact, could count as evidence for the claim that style is different from ability, thus providing further support to the idea that no connection between analytical thinking and mental abilities does exist (Epstein

et al., 1996; Handley, Newstead & Wright, 2000) and, moreover, that styles can not be conceived as abilities, but rather as preferred ways of using abilities (Antonietti, 2003). As a consequence, even though in literature some relationships between individual differences and abilities are reported (Bruine de Bruin, Parker & Fischhoff, 2007; Newstead et al., 2004; Parker & Fishhoff, 2005), our findings represent a further step toward a better understanding of this topic, which seems to be better explained by considering individual style and mental abilities as independent.

The second part of the investigation intended to study intuition and analysis "in action", that is to assess the role of both intuitive-analytical strategies and individual styles within a specific strategic context, the Ultimatum Game. Starting from the establishment that mindreading abilities play a fundamental role to successfully interact in this game, findings of Study 3 provided evidence that people can spontaneously (namely, without being hinted at doing so) activate relevant mindreading processes in order to identify the psychological features of their opponents. This allowed them to realize when they could risk to offer low sums of money by presuming that the counterpart would have accepted them. Thanks to the activation of relevant mindreading processes, in fact, people could differentiate their offers consistently with the psychological portraits of the responders they are playing with. Study 3 showed that people are capable of predicting others' actions and viewing the Ultimatum Game from the other players' perspectives. "Putting themselves into others' shoes" represents an ability that people clearly exert even when they are explicitly required to take care of their personal economic gain. We believe that this constitutes a very interesting finding, in particular given that the study of mindreading processes in experimental economics is a line of research which has developed only recently. In fact, to our knowledge, very few attempts have been made to explore the role of mentalizing in economics interaction (Neale & Bazerman, 1983; Savitsky et al., 2005; Singer & Fehr, 2005) but, the few have resulted into very promising findings which are worth studying in depth through further investigations. Our

research goes in that direction.

Findings from Study 4 contributed to widen and qualify the results of Study 3. In fact, it turned out that the ability of mindreading and, thus, behaving strategically, is intensified and sharpened by the employment of intuitive thinking. In other words, we found that when people are required to process information about the other player's portrait intuitively, that is relying on their first impression, they can better differentiate the offers according to the types of responder as compared to the analytical way of thinking. It seems that intuitive thinking can lead people to a more strategic and functional behaviour when making monetary decisions which imply the consideration of the opponent's psychological features. The possible explanations of this result, which have been already discussed in the third chapter (cfr. 3.2.4), are several and varied. However, we argue that, whatever explanation is the most plausible, the finding concerning the superiority of intuition over analysis in this specific context deserves great attention. In fact, this result seems in line with the recently renewed interest arisen by the construct of intuition in economics and psychology research. This further substantiates the increasing amount of evidence which shows that, under specific circumstances, intuition can be not only as efficient as, but even more efficient than analysis. Furthermore, a practical implication should be derived from this finding. In fact, as discussed in the Introduction, intuition can be considered, at least partially, as a learned, as opposed to innate, faculty. Hence, if intuition can lead to equal and even better outcomes than analysis, we believe that intuition should be also educated (Hogarth, 2001) in order to improve the effectiveness of people's decision making.

Another important finding, resulting from Study 5, concerns the role of intuitive and analytical individual style in the context of the Ultimatum Game. After excluding the possibility that the individual style *per se* affects people's behaviour in the Ultimatum Game, we found an interesting interaction between the style and the mode of thinking employed. Contrary to the claim that a fit

between strategy and style (both intuitive or both analytical) leads to better outcomes (Betsch & Kunz, 2008), we found that the "added value" of intuition, intended as either strategy or style, plays the major role in inducing to an optimization of the choice. In other words, if at least one out of two elements (strategy or style) is intuitive, the consequent decision will be better than the condition which implies both analytical strategy and style. This result further corroborates our previous finding concerning the superiority of intuition in strategic contexts. Another interesting and challenging result emerged from Study 5. It turned out that individual styles can not be considered as good predictors of how people perform in a behavioural task. Even though several studies testified the existence of a relation between styles and performance (Hough & Ogilvie, 2005; Pretz, 2008; Schmitt et al., 2008), others failed to find any connection between them (Karlsson, unpublished). Our results can be placed in-between. In fact, we did not find a direct relation between style and behaviour, nevertheless individual style seemed to play a role, even probably a minor one, in modulating the resulting behaviour. This suggests that the main influence comes from the joint effect of the mode of thinking employed and the specific characteristic of the task at hand. The minor role played by individual style in influencing behaviour could be also taken as an indirect proof of the flexibility which the construct of style implies. Styles are not meant as fixed and unchangeable, but, rather as flexible and adjustable depending on the situation. Our results go in this direction, namely, that probably when the properties of the situation are particularly significant and play the major role, the influence of individual style holds a secondary position. Individual style does not cause deterministically a specific decision-making behaviour, but, conversely, people show a great ability of making appropriate shifts in their style to fit the problem at hand (see Hough & Ogilvie, 2005).

A last finding which is worth considering regards the pattern of autonomic activation which turned out to be similar in correspondence to intuition and analysis. Even though this was an ancillary aim of Study 5, we believe that this

provides good evidence that, in contrast with some dual-process models' claims (Epstein, 1994; Sinclair, 2003), intuition does not coincide with emotion. This finding further supports that the equivalence between intuition and emotion should be taken very cautiously. Intuition does not coincide with emotion, they are not synonyms, but, rather, they probably show some points of overlapping, even if it is possible to keep them separate (Simon, 1987; Vaughan, 1990; Ray & Myers, 1990). It could be argued that intuition is not necessarily emotionally charged and, at the same time, analysis is not necessarily emotionally free. The employment of alternative techniques, such as neurobiological measures, has been useful in providing evidence of a non-equivalence of two theoretical constructs. We are convinced that neurobiological data can provide sound evidence which constitute additional, and sometimes complementary, information about psychological issues, on condition that researchers proceed with caution in interpreting the resulting data.

This work presents also some limitations. As far as the first part of the research is concerned, the main drawback regards the use of self-report measures. In fact, the measurement of preference, beliefs, and abilities seems to be quite difficult through self-report inventories. In fact, they appear to grasp only partial aspects, thus providing a measurement which does not account for a comprehensive evaluation of the constructs. Nevertheless, at present, self-report measures are still the most commonly used method in studying stylistic differences in intuition and analysis. We believe that the collection of other types of data, in combination with self-report ones, can partially obviate this problem. Rather than suppressing the use of self-report measures, the integration with other sources of data could represent a good solution to overcome the difficulty which may derive from the employment of self-report questionnaires only.

Another possible limitation can come from the size of the experimental sample in Study 5 which may have affected the effect size of the results. The numerousness of the sample, however, is a direct consequence of the identification criteria employed in Study 2 to select those participants who

showed an "extreme" intuitive or analytical profile. In fact, in order to make sure that participants were undoubtedly intuitive or analytical, we adopted quite restrictive criteria (cfr. 2.2.3.5). As a consequence, only the few people falling in these two categories constituted the sample of Study 5. Maybe future research with an wider sample would be necessary to provide confirmation of the specific findings of Study 5.

On the whole, this work contributed to shed light on the influence that mindreading processes exerts in economic strategic games and, moreover, it helped to explore intuition and analysis through "intrinsic" and more ecological manipulations which, contrary to the commonly employed emotional and cognitive primes, constitute an integral part of the core experiment and are closer to the tasks that people usually deal with. What we found is that dual-process models only partially succeed in getting the plurality and the complexity of intuition and analysis, which, probably, are so multifaceted and subtle to be comprised in a series of dichotomies.

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APPENDIX I
INVENTORIES EMPLOYED IN STUDY 1 AND 2

GENERAL DECISION MAKING STYLE QUESTIONNAIRE

a. General Decision Making Style Questionnaire – English Version (Scott & Bruce, 1995)

1. I plan my important decisions carefully (R)
2. When making decisions, I rely upon my instincts (I)
3. I often need the assistance of other people when making important decisions (D)
4. I avoid making important decisions until the pressure is on (A)
5. I generally make snap decisions (S)
6. I double-check my information sources to be sure I have the right facts before making decisions (R)
7. When I make decisions, I tend to rely on my intuition (I)
8. I rarely make important decisions without consulting other people (D)
9. I postpone decision making whenever possible (A)
10. I often make decisions on the spur of the moment (S)
11. I make decisions in a logical and systematic way (R)
12. I generally make decisions that feel right to me (I)
13. If I have the support of others, it is easier for me to make important decisions (D)
14. I often procrastinate when it comes to making important decisions (A)
15. I make quick decisions (S)
16. My decision making requires careful thought (R)
17. When I make a decision, it is more important for me to feel the decision is right than to have a rational reason for it (I)
18. I use the advise of other people in making my important decisions (D)
19. I generally make important decisions at the last minute (A)
20. I often make impulsive decisions (S)
21. When making a decision, I consider various options in terms of a specific goal (R)
22. When I make a decision, I trust my inner feeling and reactions (I)
23. I like to have someone to steer me in the right direction when I am faced with important decisions (D)
24. I put off making many decisions because thinking about them makes me uneasy (A)
25. When making decisions, I do what seems natural at the moment (S)

b. General Decision Making Style Questionnaire – Italian Version (first translation – Study 1)

1. Pianifico attentamente le decisioni importanti (R)
2. Nel prendere decisioni faccio affidamento sul mio istinto (I)
3. Quando devo prendere decisioni importanti, spesso ho bisogno dell'aiuto di altre persone (D)
4. Evito di prendere decisioni importanti se c'è qualcuno o qualcosa che mi fa pressione (A)
5. Generalmente prendo decisioni repentine (S)
6. Prima di prendere una decisione ricontrollo le mie fonti di informazione per essere certo/a di possedere i dati pertinenti (R)
7. Nel prendere decisioni tendo a fare affidamento sul mio intuito (I)
8. Raramente prendo decisioni importanti senza consultare altre persone (D)
9. Appena mi è possibile rimando il momento di prendere decisioni (A)
10. Spesso prendo decisioni su due piedi (S)
11. Prendo decisioni in modo logico e sistematico (R)

12. Di solito decido in base a ciò che mi sembra giusto (I)
13. E' per me più semplice prendere decisioni importanti se ho il sostegno di altre persone (D)
14. Spesso, quando si tratta di prendere decisioni importanti, cerco di temporeggiare (A)
15. Prendo decisioni rapidamente (S)
16. Per prendere una decisione ho bisogno di un'attenta riflessione (R)
17. Quando prendo una decisione è per me più importante avere la sensazione che sia la decisione giusta piuttosto che aver trovato una giustificazione razionale per essa (I)
18. Quando devo prendere decisioni importanti mi avvalgo dei consigli di altre persone (D)
19. Generalmente prendo decisioni importanti all'ultimo minuto (A)
20. Spesso prendo decisioni in maniera impulsiva (S)
21. Quando prendo una decisione, prendo in considerazione le diverse possibilità che ho per raggiungere il mio obiettivo (R)
22. Quando prendo una decisione, mi affido alle mie sensazioni e reazioni interiori (I)
23. Quando devo affrontare decisioni importanti, mi fa piacere se qualcuno mi indirizza nella giusta direzione (D)
24. Rimando molte decisioni poiché mi fa sentire a disagio pensare ad esse (A)
25. Quando prendo decisioni faccio ciò che in quel momento mi sembra naturale (S)

c. General Decision Making Style Questionnaire – Italian Version
   (definitive version – items 14,17,24 modified – Study 2)

1. Pianifico attentamente le decisioni importanti (R)
2. Nel prendere decisioni faccio affidamento sul mio istinto (I)
3. Quando devo prendere decisioni importanti, spesso ho bisogno dell'aiuto di altre persone (D)
4. Evito di prendere decisioni importanti se c'è qualcuno o qualcosa che mi fa pressione (A)
5. Generalmente prendo decisioni repentine (S)
6. Prima di prendere una decisione ricontrollo le mie fonti di informazione per essere certo/a di possedere i dati pertinenti (R)
7. Nel prendere decisioni tendo a fare affidamento sul mio intuito (I)
8. Raramente prendo decisioni importanti senza consultare altre persone (D)
9. Appena mi è possibile rimando il momento di prendere decisioni (A)
10. Spesso prendo decisioni su due piedi (S)
11. Prendo decisioni in modo logico e sistematico (R)
12. Di solito decido in base a ciò che mi sembra giusto (I)
13. E' per me più semplice prendere decisioni importanti se ho il sostegno di altre persone (D)
14. Spesso rimando il momento in cui devo prendere decisioni importanti (A)
15. Prendo decisioni rapidamente (S)
16. Per prendere una decisione ho bisogno di un'attenta riflessione (R)
17. Quando prendo una decisione è per me più importante avere la sensazione che sia la decisione giusta piuttosto che trovare una giustificazione razionale (I)
18. Quando devo prendere decisioni importanti mi avvalgo dei consigli di altre persone (D)
19. Generalmente prendo decisioni importanti all'ultimo minuto (A)
20. Spesso prendo decisioni in maniera impulsiva (S)
21. Quando prendo una decisione, prendo in considerazione le diverse possibilità che ho per raggiungere il mio obiettivo (R)
22. Quando prendo una decisione, mi affido alle mie sensazioni e reazioni interiori (I)

23. Quando devo affrontare decisioni importanti, mi fa piacere se qualcuno mi indirizza nella giusta direzione (D)
24. Rimando molte decisioni poiché il pensare ad esse mi rende insicuro e ansioso (A)
25. Quando prendo decisioni faccio ciò che in quel momento mi sembra naturale (S)

MAXIMIZATION SCALE

a. Maximization Scale (English version – Schwartz et al. 2002)

1. When I watch TV, I channel surf, often scannino through the available options even while attempting to watch one program
2. When I am in the car listening to the radio, I often check other station sto see if something better is playing, even if I'm relatively satisfied with what I'm listening to
3. I treat relationships like clothing: I expect to try a lot on bifore I get the perfect fit
4. No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities
5. I often fantasize about living in ways that are quite different from my actual life
6. I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.)
7. I often find it difficult to shop for a gift for a friend
8. When shopping, I have a hard time finding clothes that I really love
9. Renting videos is really difficult. I'm always struggling to pick the best one
10. I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.
11. No matter what I do, I have the highest standards for myself
12. I never settle for second best
13. Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment

b. Maximization Scale (Italian version)

1. Quando guardo la televisione, faccio zapping (ossia passo da un canale all'altro), dando spesso un'occhiata ai vari programmi anche se ne sto guardando uno in particolare
2. Quando ascolto la radio in macchina, spesso cerco altre stazioni per sentire se c'è qualcosa di meglio, anche nel caso in cui sono abbastanza soddisfatto di ciò che sto ascoltando
3. Considero i rapporti interpersonali come vestiti: devo provarne molti prima di trovare quello perfetto
4. Indipendentemente dal grado di soddisfazione del mio lavoro attuale è comunque giusto per me stare all'erta per trovare opportunità migliori
5. Spesso mi trovo a fantasticare su come la mia vita potrebbe essere diversa da quello che attualmente è
6. Mi piacciono le graduatorie (i migliori film, i migliori cantanti, i migliori atleti, i migliori racconti, ecc.)
7. Spesso incontro difficoltà a trovare il regalo per un amico
8. Quando faccio acquisti, è per me veramente difficile scegliere un abito che mi piaccia veramente
9. Noleggiare una videocassetta è per me veramente difficile perché mi sforzo sempre di trovare la migliore

10. Ritengo che scrivere sia molto difficile, anche nel caso in cui si tratti solamente di scrivere una lettera a un amico, perché è difficile trovare il modo giusto per esprimere le cose. Spesso faccio molte minute anche nel caso di messaggi semplici
11. Indipendentemente da ciò che faccio, mi prefiggo degli obiettivi elevati
12. Non opto mai per una "seconda scelta"
13. Ogni volta che devo scegliere, cerco di immaginare tutte le possibili alternative, anche quelle che non sono presenti al momento

PREFERENCE FOR INTUITION AND DELIBERATION SCALE

a. Preference for Intuition and Deliberation scale (English translation of the original German scale – Betsch, 2004)

1. Before making decisions I first think them through (D)
2. I listen carefully to my deepest feelings (I)
3. Before making decisions I usually think about the goals I want to achieve (D)
4. With most decisions it makes sense to completely rely on your feelings (I)
5. I don't like situations that require me to rely on my intuition (I) *(recode)*
6. I think about myself (D)
7. I prefer making detailed plans rather than leaving things to chance (D)
8. I prefer drawing conclusions based on my feelings, my knowledge of Human nature, and my experience of life (I)
9. My feelings play an important role in my decisions (I)
10. I am a perfectionist (D)
11. I think about a decision particularly carefully if I have to justify it (D)
12. When it comes to trusting people, I can usually rely on my gut feelings (I)
13. When I have a problem I first analyze the facts and details before I decide (D)
14. I think before I act (D)
15. I prefer emotional people (I)
16. I think more about my plans and goals than other people do (D)
17. I am a very intuitive person (I)
18. I like emotional situations, discussions, and movies (I)

b. Preference for Intuition and Deliberation (Italian version)

1. Rifletto molto bene prima di prendere decisioni (D)
2. Presto molta attenzione alle mie sensazioni profonde (I)
3. Prima di prendere decisioni solitamente penso agli obiettivi che intendo raggiungere(D)
4. Nella maggioranza delle decisioni è bene affidarsi completamente alle proprie sensazioni (I)
5. Non mi piacciono le situazioni che richiedono di basarsi sul proprio intuito (I)
6. Rifletto riguardo a me stesso (D)
7. Preferisco fare progetti in maniera dettagliata piuttosto che lasciare tutto al caso (D)
8. Preferisco trarre conclusioni basandomi sulle mie sensazioni, sulla mia conoscenza della natura umana e sulla mia esperienza di vita (I)
9. Le mie sensazioni hanno un ruolo importante nelle mie decisioni (I)
10. Sono un perfezionista (D)
11. Rifletto attentamente su una decisione se poi devo rendere conto di essa (D)
12. Di solito mi baso sulle mie sensazioni quando si tratta di fidarsi delle persone (I)

13. Se ho un problema per prima cosa analizzo i fatti e i dettagli della situazione prima di prendere una decisione (D)
14. Rifletto prima di agire (D)
15. Mi piacciono le persone emotive (I)
16. Penso ai miei progetti e ai miei obiettivi più di quanto facciano le altre persone (D)
17. Sono una persona molto intuitiva (I)
18. Mi piacciono le situazioni, le discussioni e i film che suscitano emozioni (I)

STYLE OF LEARNING AND THINKING QUESTIONNAIRE

a. Style of Learning and Thinking (Italian version – Antonietti et al. 2005)

1. a. Mi piace leggere le spiegazioni di ciò che devo fare
    b. Preferisco che mi si mostri come devo fare le cose
2. a. Mi so esprimere bene a gesti
    b. Non so esprimermi a gesti; preferisco dire a voce ciò che penso e faccio affidamento su ciò che le persone dicono a parole.
3. a. Preferisco le lezioni in cui devo ascoltare le spiegazioni dell'insegnante.
    b. Preferisco le lezioni in cui posso muovermi, essere attivo e manipolare direttamente le cose.
4. a. Prendo gusto e mi diverto nel risolvere i problemi.
    b. Affronto con serietà i problemi da risolvere.
5. a. Per portare a termine un lavoro uso solo il materiale appropriato.
    b. Per portare a termine un lavoro sono in grado di utilizzare qualsiasi cosa abbia a disposizione.
6. a. Preferisco che lavori o compiti siano programmati così da sapere esattamente cosa fare
    b. Preferisco lavori o compiti aperti in modo che sia possibile apportare cambiamenti mentre si procede.
7. a. Agisco sulla base di sensazioni o supposizioni.
    b. Se posso, preferisco non agire sulla base di sensazioni o supposizioni.
8. a. Esprimo i miei sentimenti con semplici parole.
    b. Esprimo i miei sentimenti scrivendo poesie, disegnando, cantando, ballando.
9. a. Mi piace studiare teorie già dimostrate e certe.
    b. Mi piace studiare cose che potrebbero rivelarsi esatte.
10. a. Mi piace separare le idee e analizzarle una ad una.
    b. Mi piace collegare insieme molte idee.
11. a. Sono abile nel risolvere problemi ricorrendo a procedimenti logici.
    b. Sono abile nel risolvere problemi ricorrendo a intuizioni e sensazioni.
12. a. Quando risolvo problemi preferisco immaginare visivamente la situazione descritta.
    b. Mi piace analizzare i problemi leggendo attentamente il testo e ascoltando le spiegazioni dell'insegnante.
13. a. Imparo facilmente da insegnanti che spiegano le lezioni oralmente.
    b. Imparo facilmente da insegnanti che spiegano le lezioni con azioni.
14. a. Quando devo ricordare o pensare a qualcosa riesco bene se ricorro a parole.
    b. Quando devo ricordare o pensare a qualcosa riesco bene se ricorro a immagini o figure.
15. a. Mi piace vedere cose finite e complete.
    b. Mi piace organizzare e completare cose incompiute.
16. a. Sono un tipo riflessivo.
    b. Sono un tipo intuitivo.

17. a. Imparo facilmente particolari e fatti specifici.
    b. Imparo facilmente a partire da una visione generale.
18. a. Imparo e ricordo quelle cose che ho specificatamente studiato.
    b. Imparo e ricordo dettagli e fatti che apprendo dalle cose che accadono in torno a me.
19. a. Mi piace leggere storie su cose realmente accadute.
    b. Mi piace leggere storie su cose fantastiche.
20. a. E' divertente programmare quello che ho intenzione di fare.
    b. E' divertente sognare.
21. a. Mi piace ascoltare della musica quando leggo o studio.
    b. Mi piace il silenzio assoluto quando leggo o studio.
22. a. Mi piace disegnare copiando o completando un modello.
    b. Mi piace disegnare secondo le mie idee.
23. a. E' emozionante inventare qualcosa.
    b. E' emozionante perfezionare qualcosa.
24. a. Imparo meglio esplorando.
    b. Imparo meglio analizzando.
25. a. Mi piacciono le idee presentate in ordine.
    b. Mi piacciono le idee presentate con legami e relazioni tra di loro.
26. a. Sono abile nel ricordare nomi e parole.
    b. Sono abile nel ricordare suoni e motivi musicali.
27. a. Spesso ho la testa fra le nuvole.
    b. Non sono quasi mai distratto.
28. a. Studiando preferisco fare riassunti.
    b. Studiando preferisco sottolineare.

COGNITIVE REFLECTION TEST

a. Cognitive Reflection Test (English version – 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

2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?.........minutes

3. In a lake there is a patch of lily pads. Everyday the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?...............days

b. Cognitive Reflection Test (Italian version)

1. Una racchetta e una pallina da ping-pong costano, insieme, un euro e dieci centesimi. La racchetta costa un euro in più della pallina. Quanto costa la pallina?.......centesimi

2. Ci sono 5 macchine che producono 5 congegni in 5 minuti. Quanto tempo occorrerà a 100 macchine per produrre 100 congegni?.........minuti

3. In un lago ci sono delle ninfee che raddoppiano la loro superficie ogni giorno. Le ninfee impiegheranno 48 giorni a coprire tutto il lago. Quanti giorni impiegheranno a coprire la metà del lago?..............giorni

STUDY 3 - PRE-TEST 1: RESPONDERS' VERBAL DESCRIPTIONS

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone.

Ti verrà presentata la descrizione di 4 persone. Dopo aver letto la descrizione di una persona esprimi una valutazione per ognuna delle 10 caratteristiche riportate sotto la descrizione stessa. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle.

Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità. Ovviamente, essendo le qualità opposte, basta mettere una crocetta per ogni coppia di qualità.

GIANNI

Gianni è un uomo di mezza età, capelli corti e brizzolati. Lavora come consulente finanziario. Ha raggiunto questa posizione facendo molta gavetta ma anche grazie al suo essere accomodante alle sue doti persuasive e comunicative. Raggiunge sempre gli obiettivi che si pone, talvolta scendendo a compromessi. Era stato coinvolto in passato nel caso della vendita di azioni ormai svalutate a piccoli risparmiatori che avevano riposto la loro fiducia nell'istituto bancario presso cui Gianni lavora. In questo difficile periodo la moglie gli è stata particolarmente vicino.

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Marina è una giovane donna, bionda, di media statura, accanita fumatrice. Lavora presso uno studio legale che ha tra i suoi clienti molte aziende multinazionali. In passato ha dimostrato la sua ambizione e la sua voglio di emergere accentando di difendere una grossa multinazionale del tabacco a cui l'associazione antitumori aveva fatto causa. Questa causa è stata la sua occasione per emergere, anche perché molti dei suoi colleghi avevano rifiutato l'incarico per la bassa ricompensa economica.

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CORDIALE							SCONTROSO/A
AVARO/A							GENEROSO/A

Ti vengono dati 10 euro. Devi spartirli con la persona sotto descritta dandole una parte dei 10 euro. Se la persona accetta la spartizione che le proponi, ciascuno di voi riceverà il denaro (nella misura prevista dalla spartizione). Se la persona rifiuta la spartizione, nessuno di voi riceverà il denaro. La persona sa che hai 10 euro da spartire con lei e conosce le condizioni del gioco.

Il gioco ti sarà proposto quattro volte, ogni volta con una persona diversa. Ogni volta puoi cambiare la proposta di spartizione. Il tuo scopo è quello di **massimizzare il più possibile il tuo guadagno** *oppure* Devi essere il più possibile sicuro di guadagnare, con le quattro proposte, **almeno 25 euro**. Solo se totalizzerai almeno 25 euro il denaro ti verrà effettivamente dato *oppure* **non dire niente**. Prima di stabilire le spartizioni leggi le descrizioni delle quattro persone cui dovrai proporre la suddivisione dei 10 euro.

La prima persona cui devi proporre la spartizione dei 10 euro è GRAZIA.
Grazia è una donna sulla sessantina, occhiali, capelli grigi. Lavora da molti anni come magistrato presso il tribunale della sua città. È una persona che crede molto nei propri ideali e si batte per essi concretamente nel proprio lavoro. Il senso di giustizia, valore così importante per lei, le è stato trasmesso dalla sua famiglia a cui è molto legata, legame testimoniato anche dal gioiello di famiglia, una collana di perle, tramandatole dalla nonna. Per ricoprire il ruolo che ha ora, Grazie ha sempre rifiutato qualsiasi forma di favoritismo e ha sempre preferito affermarsi e farsi strada da sola.
Quanti euro proponi di dare a Grazia?   …. euro

La seconda persona cui devi proporre la spartizione dei 10 euro è MARINA.
Marina è una giovane donna, bionda, di media statura, fumatrice. Ha avuto da poco due gemelli e lavora presso uno studio legale che ha tra i suoi clienti molte importanti aziende. In passato ha dimostrato la sua ambizione e la sua voglia di emergere accentando di difendere una grossa azienda del tabacco. Questa causa è stata la sua occasione per farsi conoscere, anche perché molti dei suoi colleghi avevano rifiutato l'incarico per la bassa ricompensa economica.
Quanti euro proponi di dare a Marina?   …. euro

La terza persona cui devi proporre la spartizione dei 10 euro è MARCO.
Marco è medico pediatra, castano, con barba. Il suo stile di vita è anticonformista. Per il suo carattere litigioso non è m ai riuscito a trovare il suo ruolo negli ospedali italiani e così ha deciso di cercare la sua strada altrove. Infatti, dopo aver lavorato per diversi anni nell'associazione Medici Senza Frontiere, da due anni lavora presso l'ospedale che dirige in Ghana.
Quanti euro proponi di dare a Marco?   …. euro

La quarta persona cui devi proporre la spartizione dei 10 euro è GIANNI.
Gianni è un uomo di mezza età, capelli corti e brizzolati. Lavora come consulente finanziario. Ha raggiunto questa posizione facendo molta gavetta ma anche grazie al suo essere accomodante alle sue doti persuasive e comunicative. Raggiunge sempre gli obiettivi che si pone, talvolta scendendo a compromessi. Era stato coinvolto in passato nel caso della vendita di azioni ormai svalutate a piccoli risparmiatori che avevano riposto la loro fiducia nell'istituto bancario presso cui Gianni lavora. In questo difficile periodo la moglie gli è stata particolarmente vicino.
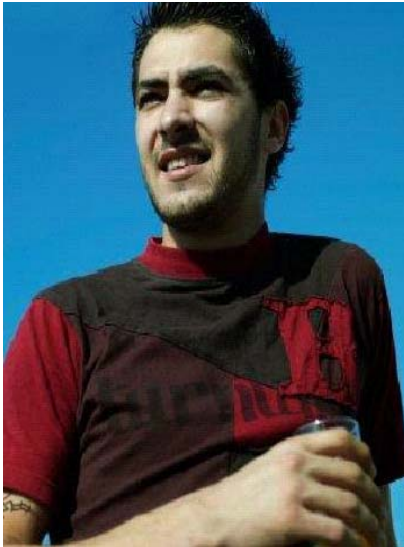   Quanti euro proponi di dare a Gianni?   …. euro

STUDY 4 – PRE-TEST 1: RESPONDERS' PHOTOS

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone. Ti verrà presentata una serie di foto di alcune persone. Dopo aver osservato ciascuna foto esprimi una valutazione per ognuna delle caratteristiche riportate sotto la foto stessa. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle. Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità.

MARCO

1.right photo   2. wrong photo   3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

GRAZIA

1. right photo   2. wrong photo   3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

GIANNI

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A						ANTIPATICO/A
SUPERBO/A						UMILE
ATTRAENTE						BRUTTO/A
SCONTROSO						CORDIALE

MARINA

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A						ANTIPATICO/A
SUPERBO/A						UMILE
ATTRAENTE						BRUTTO/A
SCONTROSO						CORDIALE

STUDY 4 – PRE-TEST 2: RESPONDERS' PHOTOS

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone. Ti verrà presentata una serie di foto di alcune persone. Dopo aver osservato ciascuna foto esprimi una valutazione per ognuna delle caratteristiche riportate sotto la foto stessa. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle. Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità.

MARCO

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

GRAZIA

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

GIANNI

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

MARINA

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

STUDY 4 – PRE-TEST 3: RESPONDERS' PHOTOS

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone. Ti verrà presentata una serie di foto di alcune persone. Dopo aver osservato ciascuna foto esprimi una valutazione per ognuna delle caratteristiche riportate sotto la foto stessa. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle. Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità.

MARCO

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A								ANTIPATICO/A
SUPERBO/A								UMILE
ATTRAENTE								BRUTTO/A
SCONTROSO								CORDIALE

GRAZIA

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A								ANTIPATICO/A
SUPERBO/A								UMILE
ATTRAENTE								BRUTTO/A
SCONTROSO								CORDIALE

GIANNI

1. right photo   2. wrong photo   3. wrong photo

SIMPATICO/A						ANTIPATICO/A
SUPERBO/A						UMILE
ATTRAENTE						BRUTTO/A
SCONTROSO						CORDIALE

MARINA

1. right photo   2. wrong photo   3. wrong photo

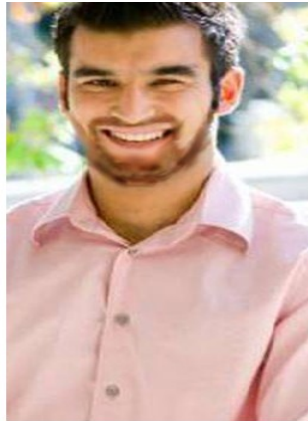|						
SIMPATICO/A						ANTIPATICO/A
SUPERBO/A						UMILE
ATTRAENTE						BRUTTO/A
SCONTROSO						CORDIALE

STUDY 4 – PRE-TEST 4: RESPONDERS' PHOTOS

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone. Ti verrà presentata una serie di foto di alcune persone. Dopo aver osservato ciascuna foto esprimi una valutazione per ognuna delle caratteristiche riportate sotto la foto stessa. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle. Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità.

MARCO

1.right photo

2. wrong photo

3. wrong photo

SIMPATICO/A								ANTIPATICO/A
SUPERBO/A								UMILE
ATTRAENTE								BRUTTO/A
SCONTROSO								CORDIALE

GRAZIA

1. right photo

2. wrong photo

3. wrong photo

SIMPATICO/A								ANTIPATICO/A
SUPERBO/A								UMILE
ATTRAENTE								BRUTTO/A
SCONTROSO								CORDIALE

GIANNI

1. right photo   2. wrong photo   3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

MARINA

1. right photo   2. wrong photo   3. wrong photo

SIMPATICO/A							ANTIPATICO/A
SUPERBO/A							UMILE
ATTRAENTE							BRUTTO/A
SCONTROSO							CORDIALE

Lo studio a cui stai per partecipare ha come scopo capire come ci si forma la prima impressione circa le persone. Ti verrà presentata la descrizione e la corrispondente foto di alcune persone. Dopo aver letto la descrizione e osservato la foto esprimi una valutazione per ognuna delle caratteristiche riportate sotto la descrizione e la foto stesse. Ciascuna caratteristica è definita da una coppia di opposti separati da 7 caselle. Esprimi la tua valutazione mettendo una crocetta nella casella che corrisponde al tuo parere. Più la casella è vicina a una qualità, più significa che tu ritieni che quella persona abbia quella qualità.

GRAZIA

Grazia è una donna sulla sessantina, occhiali, capelli grigi. Lavora da molti anni come magistrato presso il tribunale della sua città. È una persona che crede molto nei suoi ideali e si batte concretamente per essi nel proprio lavoro. Il senso di giustizia, valore così importante per lei, le è stato trasmesso dalla sua famiglia a cui è molto legata, legame testimoniato anche dal gioiello di famiglia, una collana di perle, tramandatole dalla nonna. Per ricoprire il ruolo che ha ora, Grazia ha sempre rifiutato qualsiasi forma di favoritismo e ha sempre preferito affermarsi e farsi strada da sola.

SIMPATICO/A								ANTIPATICO/A
EGOISTA								ALTRUISTA
HA SENSO DELLA GIUSTIZIA								NON HA SENSO DELLA GIUSTIZIA
BRUTTO/A								ATTRAENTE
UMILE								SUPERBO/A
ONESTO/A								DISONESTO/A
NON HA DIGNITA' PERSONALE								HA DIGNITA PERSONALE
OPPORTUNISTA								DISINTERESSATO/A
CORDIALE								SCONTROSO/A
AVARO/A								GENEROSO/A

MARINA

Marina è una giovane donna, bionda, di media statura, fumatrice. Ha da poco avuto due gemelli e lavora presso uno studio legale che ha tra i suoi clienti molte importanti aziende.

In passato ha dimostrato la sua ambizione e la sua voglia di emergere accettando di difendere una grossa azienda del tabacco. Questa causa è stata la sua occasione per farsi conoscere, anche perché molti dei suoi colleghi avevano rifiutato l'incarico per la bassa ricompensa economica.

SIMPATICO/A								ANTIPATICO/A
EGOISTA								ALTRUISTA
HA SENSO DELLA GIUSTIZIA								NON HA SENSO DELLA GIUSTIZIA
BRUTTO/A								ATTRAENTE
UMILE								SUPERBO/A
ONESTO/A								DISONESTO/A
NON HA DIGNITA' PERSONALE								HA DIGNITA PERSONALE
OPPORTUNISTA								DISINTERESSATO/A
CORDIALE								SCONTROSO/A
AVARO/A								GENEROSO/A

MARCO

Marco è medico pediatra, castano, con barba. Il suo stile di vita è anticonformista. Per il suo carattere litigioso non è mai riuscito a trovare il suo ruolo negli ospedali italiani e così ha deciso di cercare la sua strada altrove. Infatti, dopo aver lavorato per diversi anni nell'associazione Medici senza Frontiere, da due anni lavora presso l'ospedale che dirige in Ghana.

SIMPATICO/A							ANTIPATICO/A
EGOISTA							ALTRUISTA
HA SENSO DELLA GIUSTIZIA							NON HA SENSO DELLA GIUSTIZIA
BRUTTO/A							ATTRAENTE
UMILE							SUPERBO/A
ONESTO/A							DISONESTO/A
NON HA DIGNITA' PERSONALE							HA DIGNITA PERSONALE
OPPORTUNISTA							DISINTERESSATO/A
CORDIALE							SCONTROSO/A
AVARO/A							GENEROSO/A

GIANNI

Gianni è un uomo di mezza età, capelli corti e brizzolati. Lavora come consulente finanziario. Ha raggiunto questa posizione facendo molta gavetta ma anche grazie al suo essere accomodante e alle sue doti persuasive e comunicative. Raggiunge sempre gli obiettivi che si pone, talvolta scendendo a compromessi. Era stato coinvolto in passato nel caso della vendita di azioni ormai svalutate a piccoli risparmiatori che avevano riposto la loro fiducia nell'istituto bancario presso cui Gianni lavora. In questo difficile periodo la moglie gli è stata particolarmente vicino.

SIMPATICO/A							ANTIPATICO/A
EGOISTA							ALTRUISTA
HA SENSO DELLA GIUSTIZIA							NON HA SENSO DELLA GIUSTIZIA
BRUTTO/A							ATTRAENTE
UMILE							SUPERBO/A
ONESTO/A							DISONESTO/A
NON HA DIGNITA' PERSONALE							HA DIGNITA PERSONALE
OPPORTUNISTA							DISINTERESSATO/A
CORDIALE							SCONTROSO/A
AVARO/A							GENEROSO/A

STUDY 4 and 5 – ULTIMATUM GAME: INTUITIVE AND ANALYTICAL MODES OF THINKING

(The example of the intuitive task and the example of the analytical one are reported below. In brackets the presentation time of every slide; when time is not reported, no time constraints are set for that slide) .

1. ISTRUZIONI - 1 (20 sec.)

Lo studio cui stai per partecipare ha un duplice scopo:
- capire come ci si forma la prima impressione circa le persone;
- indagare come le persone valutano gli altri in maniera razionale.
Pertanto nel corso della prova sarai invitato a fare l'una o l'altra cosa.
Ogni volta ti sarà detto quale delle due cose - PRIMA IMPRESSIONE o VALUTAZIONE RAZIONALE - dovrai fare.

2. ISTRUZIONI – 2 (25 sec.)

Immagina di partecipare a questo gioco.
Ti vengono dati 10 euro. Devi spartirli con un altro giocatore (che ti verrà descritto durante il gioco) proponendogli/le a tuo piacere una parte dei 10 euro. Dopodiché lui/lei deciderà se accettare o meno l'offerta di spartizione. Se l'altro giocatore accetta la spartizione che gli/le proponi, ciascuno di voi riceverà il denaro. Se il giocatore rifiuta la spartizione, nessuno di voi riceverà il denaro.
L'altro giocatore sa che hai 10 euro da spartire con lui/lei e conosce le condizioni del gioco.

3. ISTRUZIONI – 3 (20 sec.)

Il gioco ti sarà proposto quattro volte, ogni volta con un giocatore diverso.
Non incontrerai di persona l'altro giocatore. Tuttavia ti verranno di volta in volta fornite delle informazioni su di lui/lei.
Ad ogni giocatore puoi fare una proposta di spartizione diversa.
Il tuo scopo è quello di guadagnare il più possibile.
Alla fine, dopo aver fatto le tue proposte a tutti i quattro giocatori, saprai se le hanno accettate o no.

4. ISTRUZIONI – 4

Le istruzioni ti sono chiare?
Hai qualche domanda da fare?
Se tutto è chiaro, incominciamo
(premere un tasto per continuare)

5. INTRODUZIONE (5 sec.)

ECCO IL **PRIMO GIOCATORE** AL QUALE DEVI PROPORRE LA SPARTIZIONE DEI 100 EURO.
PRIMA IMPRESSIONE

6. DESCRIZIONE PERSONAGGIO (25 sec.)

GRAZIA

Grazia è una donna sulla sessantina, occhiali, capelli grigi. Lavora da molti anni come magistrato presso il tribunale della sua città. E' una persona che crede molto nei propri ideali e si batte per essi concretamente nel proprio lavoro. Il senso di giustizia, valore così importante per lei, le è stato trasmesso dalla sua famiglia a cui è molto legata, legame testimoniato anche dal gioiello di famiglia, una collana di perle, tramandatole dalla nonna. Per ricoprire il ruolo che ha ora, Grazia ha sempre rifiutato qualsiasi forma di favoritismo e ha sempre preferito affermarsi e farsi strada da sola.

7. SPIEGAZIONE DEL TASK (10 sec.)

Ora che ti sei fatto un'idea dell'altro giocatore, abbina alla descrizione che hai appena letto

la foto che ti sembra corrisponda ad essa. È importante che tu selezioni l'immagine sulla base

dell'impressione che ti sei fatta.

Tieni conto che hai a disposizione solo 3 secondi per effettuare la tua scelta.

8. FOTO (3 sec.)

9. ABBINAMENTO DESCRIZIONE – FOTO

Sulla base dell'impressione che ti sei fatta, chi è Grazia? Scegli una delle tre foto.

10. OFFERTA

Dovendo spartire i 100 euro ricevuti, quanti euro proponi a Grazia?

11. INTRODUZIONE (5 sec.)

ECCO IL **SECONDO GIOCATORE** AL QUALE DEVI PROPORRE LA SPARTIZIONE
DEI 100 EURO.
PRIMA IMPRESSIONE

12. DESCRIZIONE PERSONAGGIO (25 sec.)

MARCO

Marco è medico pediatra, castano, con barba. Il suo stile di vita è anticonformista. Per il suo carattere litigioso non è mai riuscito a trovare il suo ruolo negli ospedali italiani e così ha deciso di cercare la sua strada altrove. Infatti, dopo aver lavorato per diversi anni nell'associazione Medici senza Frontiere, da due anni lavora presso l'ospedale che dirige in Ghana.

13. SPIEGAZIONE DEL TASK (10 sec.)

Ora che ti sei fatto un'idea dell'altro giocatore, abbina alla descrizione che hai appena letto

la foto che ti sembra corrisponda ad essa. È importante che tu selezioni l'immagine sulla base

dell'impressione che ti sei fatta.

Tieni conto che hai a disposizione solo 3 secondi per effettuare la tua scelta.

14. FOTO (3 sec.)
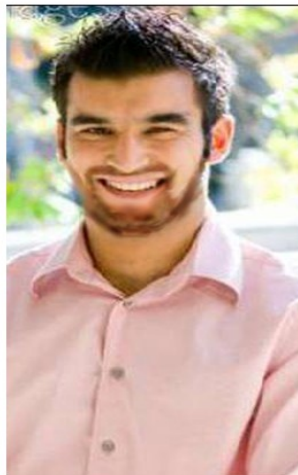
15. ABBINAMENTO DESCRIZIONE – FOTO

Sulla base dell'impressione che ti sei fatta, chi è Marco? Scegli una delle tre foto.

16. OFFERTA

Dovendo spartire i 100 euro ricevuti, quanti euro proponi a Marco?

17. INTRODUZIONE (5 sec.)

ECCO IL **TERZO** GIOCATORE AL QUALE DEVI PROPORRE LA SPARTIZIONE DEI 100 EURO.

VALUTAZIONE RAZIONALE

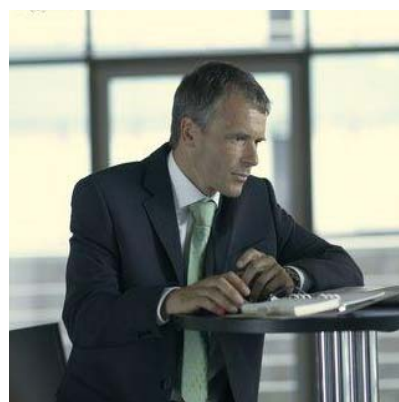18. DESCRIZIONE PERSONAGGIO (25 sec.)

GIANNI

Gianni è un uomo di mezza età, capelli corti e brizzolati. Lavora come consulente finanziario. Ha raggiunto questa posizione facendo molta gavetta ma anche grazie al suo essere accomodante e alle sue doti persuasive e comunicative. Raggiunge sempre gli obiettivi che si pone, talvolta scendendo a compromessi. Era stato coinvolto in passato nel caso della vendita di azioni ormai svalutate a piccoli risparmiatori che avevano riposto la loro fiducia nell'istituto bancario presso cui Gianni lavora. In questo difficile periodo la moglie gli è stata particolarmente vicino.

19. SPIEGAZIONE DEL TASK (15 sec.)

Ora che ti sei fatto un'idea dell'altro giocatore, abbina alla descrizione che hai appena letto la foto che ti sembra corrisponda ad essa. Rileggi attentamente le informazioni sul giocatore (ti verranno ora ripresentate). Sappi che solo una delle immagini proposte corrisponde a tutte le informazioni fornite dalla descrizione. Pertanto presta molta attenzione nell'effettuare l'abbinamento.

Tieni conto che hai a disposizione 30 secondi per effettuare la tua scelta.

20. FOTO E DESCRIZIONE (30 sec.)

Gianni è un uomo di mezza età, capelli corti e brizzolati. Lavora come consulente finanziario. Ha raggiunto questa posizione facendo molta gavetta ma anche grazie al suo essere accomodante e alle sue doti persuasive e comunicative. Raggiunge sempre gli obiettivi che si pone, talvolta scendendo a compromessi. Era stato coinvolto in passato nel caso della vendita di azioni ormai svalutate a piccoli risparmiatori che avevano riposto la loro fiducia

nell'istituto bancario presso cui Gianni lavora. In questo difficile periodo la moglie gli è stata particolarmente vicino.

21. ABBINAMENTO DECRIZIONE E FOTO

Sulla base dei ragionamenti che hai fatto, chi è Gianni? Scegli una delle tre foto.

22. OFFERTA

Dovendo spartire i 100 euro ricevuti, quanti euro proponi a Gianni?

23. INTRODUZIONE (5 sec.)

ECCO IL **QUARTO GIOCATORE** AL QUALE DEVI PROPORRE LA SPARTIZIONE DEI 100 EURO.

VALUTAZIONE RAZIONALE

24. DESCRIZIONE PERSONAGGIO (25 sec.)

MARINA

Marina è una giovane donna, bionda, di media statura, fumatrice. Ha da poco avuto due gemelli e lavora presso uno studio legale che ha tra i suoi clienti molte importanti aziende.
In passato ha dimostrato la sua ambizione e la sua voglia di emergere accettando di difendere una grossa azienda del tabacco. Questa causa è stata la sua occasione per farsi conoscere, anche perché molti dei suoi colleghi avevano rifiutato l'incarico per la bassa ricompensa economica.

25. SPIEGAZIONE DEL TASK (15 sec.)

Ora che ti sei fatto un'idea dell'altro giocatore, abbina alla descrizione che hai appena letto la foto che ti sembra corrisponda ad essa. Rileggi attentamente le informazioni sul giocatore (ti verranno ora ripresentate). Sappi che solo una delle immagini proposte corrisponde a tutte le informazioni fornite dalla descrizione. Pertanto presta molta attenzione nell'effettuare l'abbinamento.

Tieni conto che hai a disposizione 30 secondi per effettuare la tua scelta.

26. FOTO E DESCRIZIONE (30 sec.)

Marina è una giovane donna, bionda, di media statura, fumatrice. Ha da poco avuto due gemelli e lavora presso uno studio legale che ha tra i suoi clienti molte importanti aziende.
In passato ha dimostrato la sua ambizione e la sua voglia di emergere accettando di difendere una grossa azienda del tabacco. Questa causa è stata la sua occasione per farsi conoscere, anche perché molti dei suoi colleghi avevano rifiutato l'incarico per la bassa ricompensa economica.

27. ABBINAMENTO DECRIZIONE E FOTO

Sulla base dei ragionamenti che hai fatto, chi è Marina? Scegli una delle tre foto.

28. OFFERTA

Dovendo spartire i 100 euro ricevuti, quanti euro proponi a Marina?