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Being of two minds: an ultimatum experiment investigating affective processes

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Abstract

We experimentally investigate how affective processes influence proposers' and responders' behaviour in the Ultimatum Game. Using a dual-system approach, we tax cognitive resources through time pressure and cognitive load to enhance the influence of affective processes on behaviour. We find that proposers offer more under time pressure and this seems to be due to strategic considerations rather than to other-regarding concerns. We also find that responders are more likely to reject under time pressure. Surprisingly, both proposers and responders appear to be unaffected by cognitive load manipulation.

JEL Classification: C72, C78, C91

Keywords: Ultimatum Game, dual-system theories, time pressure, cognitive load, Experimental Economics.

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1 Introduction

In economics it is mostly ignored how emotions affect decision-making. However, recent evidence suggests an interplay between emotion and deliberation in economic decision making (e.g., Sanfey *et al.*, 2003; McClure *et al.*, 2004; Bechara and Damasio, 2005). Here we investigate how affective processes influence proposers' and responders' behaviour in the Ultimatum Game. We address this question by using a dual-system approach to decision-making, which assumes that cognitive resources, which are scarce, are needed for both implementing deliberative processes and overriding affective processes (e.g., Bernheim and Rangel, 2004; Loewenstein and O'Donoghue, 2005; Benhabib and Bisin, 2005; Fudenberg and Levine, 2006).

To enhance the influence of affective processes on behaviour, we tax cognitive resources through time pressure and cognitive load. Many economic decisions are taken under intense time pressure, e.g. when trading on the stock market. It can be cognitively demanding when simultaneously engaging in multiple tasks, especially in tasks like those concerning business and investments, which are characterized by high complexity and information load. Understanding the impact of time pressure and cognitive load on decision-making is therefore quite important.

Our workhorse is the familiar Ultimatum Game. We are interested in both proposer and responder behaviour. While extensive research has been conducted on the affective aspects of responder behaviour, the affective aspects of proposer behaviour have been almost entirely disregarded. As regards responders, affect has been previously investigated mainly as a "hot" reaction to a specific unfair real offer. Instead, we adopt the "cold" strategy vector method, which, if anything, would tend to mitigate the observed effect.

The impact of cognitive load and time pressure on the deliberative system has been investigated in several studies, but none of them, to the best of our knowledge, considered both factors simultaneously. The experimental design

employed here allows us to disentangle the effect of cognitive load and time pressure on decision behaviour.

Our results show that proposers offer more under time pressure. Acceptance thresholds of proposer participants who were asked what they would accept as a responder and proposers' beliefs about the acceptance of their offers let us conjecture that the increasing generosity of proposers is due to strategic considerations rather than to other-regarding concerns. Consistent with previous results (Sutter *et al.*, 2003), we find that responders are more likely to reject under time pressure. Interestingly, our research shows that both proposer's and responder's decisions appear to be unaffected by cognitive load manipulation.

The remainder of the paper is organized as follows: the next two subsections review some related work and outline the behavioural predictions; Section 2 describes the experimental design and procedures; Section 3 presents the results; Section 4 discusses the findings; Section 5 concludes.

1.1 Related Literature

The idea that human thinking and decision-making are governed by two different but interacting systems has been increasingly recognized as influential in psychology. These two systems have been variously identified as rational and experiential systems (Epstein, 1994), associative and rule-based systems (Slo-man, 1996), hot and cool systems (Metcalf and Mischel, 1999), system 1 and system 2 (Stanovich, 1999; Kahneman and Frederick, 2002), and reflexive and reflective systems (Lieberman, 2003). Dual-process theories generally describe processes of System 1 (to use Stanovich's more generic terminology) as fast,¹ automatic, associative in nature, emotionally charged, and minimally demanding of cognitive resources. In contrast, processes of System 2 are slow, deliberately controlled, analytical, affect free, and maximally demanding of cognitive resources. Recently, a number of dual-process models have been proposed also

¹Rubinstein (2007) convincingly demonstrates that most biases in the sense of deviations from non-opportunistic or non-expected utility maximizing choices rely on fast decision making.

in economics, with applications to intertemporal choice (Bernheim and Rangel, 2004; Loewenstein and O'Donoghue, 2005; Benhabib and Bisin, 2005; Fudenberg and Levine, 2006), risk preferences (Loewenstein and O'Donoghue, 2005), labour supply (Goette and Huffman, 2007), and social preferences (Loewenstein and O'Donoghue, 2005). All these models view economic behaviour as determined by the interaction between two different systems, an affective and a deliberative system (Loewenstein and O'Donoghue, 2005). The affective system is the counterpart of System 1 in psychological models, and is considered to be myopic, activated by environmental stimuli, and primarily driven by affective states. The deliberative system is analogous to System 2 in psychological models and is generally described as goal-oriented and forward-looking.

This dual-system view is also supported at a neural level. Recent neuroimaging evidence indicates that affective and deliberative processes share some common neural components, but activate distinct neural areas. Deliberative processes are associated with the outer part of the brain (neocortex), in particular with anterior and dorsolateral regions of prefrontal cortex, while affective processes are associated with the inner part of the brain (the limbic system), which includes anterior and posterior cingulate cortex, insular cortex, orbitofrontal cortex, and the amygdala (Dolan, 2002; Cohen, 2005; Sanfey *et al.*, 2006).

What are the implications of these dual-process models of decision-making and the brain? Behaviour is seen as determined by the interaction between affective and deliberative processes which evaluate the same circumstances differently. For example, Knutson *et al.* (2005) showed that, unlike the deliberative system, the affective system more likely disregards probabilities. Using functional magnetic resonance imaging, they found that activity in subcortical regions (in particular, the nucleus accumbens) was proportional to the reward magnitude, while the activation of cortical regions (in particular, the mesial prefrontal cortex) was related to both magnitude of gain and probability. Different evaluations can generate conflicting motivations, and behaviour depends on which kind of processes is prevailing. For example, in a neuroimaging study

of intertemporal choice, McClure *et al.* (2004) found that the limbic system is particularly activated when the decision involves an immediate reward, while neocortical regions associated with deliberative processes remain unvaryingly activated in all decisions. Moreover, choices are predicted by the relative level of activation of the two systems.

Affective reactions are likely to have a larger influence on decision making than deliberative reactions when the affective system is stimulated or the deliberative system is weakened. The affective system can be stimulated in different ways. For example, affective processes are particularly sensitive to temporally, spatially, and socially near environmental stimuli (Loewenstein, 1996). Many studies have tried to stimulate the affective system through affective state induction techniques (for a meta-analysis, see Westermann *et al.*, 1996). These techniques includes procedures such as giving small presents, presenting stories, pictures, and movies, giving subjects fake feedback about their performance on a test, and asking subjects to provide a detailed report of a life-event. For example, Kirchsteiger *et al.* (2006) manipulated the affective state of second movers in a gift-exchange game by presenting one group with a funny movie and another with a depressing one. They found that a positive affective state is associated with more generosity, while a negative affective state is associated with more reciprocity.

The deliberative system works slowly and relies on scarce processing resources. Therefore, factors such as time pressure, mental depletion, and cognitive load will tend to weaken deliberative processing in decision-making (Lobel and Loewenstein, 2005). It has to be noted that the deliberative system plays a role in self-regulation, including emotion regulation (e.g., Ochsner and Gross, 2005). Therefore, when it is weak, it is not only less involved in the decision-making process, but also loses control of the affective system.

Time pressure impacts on the role of the deliberative system in decision-making mainly in two ways.² First, since deliberation takes time, a shortage of

²Some researchers emphasize the effect of time pressure on the affective system, showing how time pressure may increase the level of arousal (for example, see Maule *et al.* (2000)).

time tends to reduce deliberative processing. Second, when time is constrained, it needs to be monitored. This activity absorbs a part of central processing resources (Zakay, 1993), crowding out deliberation and self-regulation.

A variety of factors, such as stress, exhaustion, sleep deprivation, and decision fatigue contribute to the depletion of mental resources. When these factors are at work, less resources are available for decision-making and self-regulation. Previous studies showed that performance in a task requiring mental resources, in particular working memory, decreases with time spent on the task (Dewitte *et al.*, 2003); prior exertion of self-regulation impairs cognitive performance on a reasoning task (Schmeichel *et al.*, 2003); making a series of choices in an effortful, deliberate manner impairs the subsequent exertion of self-control (Vohs *et al.*, 2007) and increases attraction to affective aspects of products (Bruyneel *et al.*, 2006).

Cognitive load is usually manipulated through a dual-task procedure in which subjects have to complete another task while performing the task of primary interest. Frequently used secondary tasks include memory tasks and vocal or manual reaction-time tasks. Cognitive load tends to weaken deliberative processing in decision-making because scarce resources must be allocated to different simultaneous tasks. In addition, less resources are available for self-regulation. Previous studies showed that people under higher cognitive load are more likely to choose an affect-laden option (Shiv and Fedorikhin, 1999), relax their restraining food consumption rules (Ward and Mann, 2000), discount delayed monetary rewards at higher rates (Hinson *et al.*, 2003), offer more in the Dictator Game (Cornelissen *et al.*, 2007), and are more likely to request an equal amount from a common resource pool (Roch *et al.*, 2000).

This study investigates affective decisions in the Ultimatum Game³ (Güth *et al.*, 1982), where both fair offers by proposer participants⁴ and rejection of

³The Ultimatum Game is a two-party game in which one party (the *proposer*) makes an offer to the other party (the *responder*) about how to split a sum of money between them. If the offer is accepted, the sum of money is split as agreed. If the offer is rejected, both players earn nothing.

⁴Cool anticipation of rejection of an unfair offer may also induce proposers to abstain from making unfair offers.

unfair offers by responder participants are viewed as more emotionally motivated. Using a dual-process approach, we try to weaken the deliberative system by taxing its resources through cognitive load and time pressure,⁵ so that the affective system exerts greater control over decisions.

1.2 Behavioural Predictions

On the responder side, we expect to observe higher rates of rejection when the deliberative system is weaker. When facing an unfair offer, the cognitive goal of gaining money and the affective goal of resisting unfairness are in conflict (Sanfey *et al.*, 2003). When the deliberative system is weaker, the affective goal is more likely to prevail. Emotional responses to Ultimatum offers result in higher rejection rates. In particular, previous studies found that the probability of rejection is positively correlated with the intensity of negative self-reported emotions (Pillutla and Murnighan, 1996; Bosman *et al.*, 2001), the level of physiological emotional response (van 't Wout *et al.*, 2006), and the activation of anterior insula (Sanfey *et al.*, 2003), a brain area associated with negative emotional states. Further, Xiao and Houser (2005) found that rejection rates fall when responders can express their negative emotions directly to proposers. Koenigs and Tranel (2007) found that subjects with damaged ventromedial prefrontal cortexes, a key brain area for emotion regulation, reject unfair offers at a higher rate than subjects in the control group. Finally, Sutter *et al.* (2003) found that time pressure is associated with higher rejection rates.

On the proposer side, predictions are more difficult. Previous studies almost entirely disregarded the affective underpinnings of proposer's behaviour. Proposers may be either strategically deliberating or intrinsically fair. Strategic considerations require time and cognitive resources. If these are constrained, proposers may fail to form definite expectations about what responders would accept and, thus, may opt for a "safe" equal split. Two approaches to other-

⁵In order to make the experimental design less complex, we decided to investigate the effect of time pressure and cognitive load, leaving the analysis of the effect of mental depletion for future research.

regarding concerns have been suggested. According to the intuitionist approach (Haidt, 2001), moral decisions are primarily driven by quick, automatic, effortless affective processes. According to van Winden (2007), “it is probably not so much cognition but emotion that plays a major role in the individual enforcement of, as well as the compliance with, norms like fairness” (p. 50). The findings of Roch *et al.* (2000) and Cornelissen *et al.* (2007) support the intuitionist hypothesis. In addition, assuming that instinctive responses require less response time than cognitive responses, Rubinstein (2007) found that equal division is the more instinctive choice in the Ultimatum Game. Following the intuitionist approach, disrupting deliberative processing should increase ultimatum offers. Considering both strategic and other-regarding concerns, the net effect of inhibiting deliberative processes should thus lead to more generosity by proposers.

In contrast, the rationalist approach views moral decisions as resulting from reasoning and reflection. As Moore and Loewenstein (2004) maintain, self-interest is automatic, unconscious, and viscerally compelling, whereas considering others generally requires thoughtful processing. The results reported by van den Bos *et al.* (2006) and Knoch *et al.* (2006) support the rationalist hypothesis. In van den Bos *et al.* (2006)’s experiments, subjects are more satisfied with advantageous unequal outcomes when their cognitive processing is limited (through either a cognitive-load or a time-pressure manipulation). Knoch *et al.* (2006) found that the disruption of the right dorsolateral prefrontal cortex, a brain area associated with deliberative processes, increases the acceptance rate of unfair ultimatum offers.⁶ Following this approach, disrupting deliberative processing should lower ultimatum offers. Considering both the strategic and the other-regarding components, the net effect of impairing deliberative processes seems unclear. We have tried to test these predictions experimentally. Our experimental design and procedures are detailed in the next section.

⁶However, subjects’ fairness judgments are not influenced by this manipulation, indicating that this area of the brain is crucial for the implementation of fairness-related responses.

2 Method

2.1 Participants and Procedures

376 students (154 males and 222 females) at the Friedrich Schiller University in Jena (Germany) participated in the experiment. They were randomly assigned to one of the 8 conditions described in the next section. Participants were recruited through the online recruitment system ORSEE (Greiner, 2004). On their arrival at the laboratory, participants were seated in computer-equipped cubicles that do not allow communication or visual interaction among the participants. In order to prevent the use of external aids (e.g., paper and pencil, cellphone) during the experimental tasks, participants were asked to leave their personal belongings at the entrance.

The experiment was programmed and conducted using the Z-tree software (Fischbacher, 2007). Participants received written instructions⁷, which were first read individually by the participants and then aloud by a German-speaking collaborator to establish common knowledge. Understanding of the instructions was tested through an on-screen questionnaire that subjects were asked to answer before the experiment. Including payment, sessions lasted for about 50 minutes, and participants earned, on average, € 9.57 (including a show-up fee of € 2.50).

2.2 Treatments

The experiment has a 2 (cognitive load: load vs. no load) × 2 (time pressure: high vs. low) × 2 (incentives: low vs. high) between-subject design. The 8 treatments are summarized in Table 2.

[Insert Table 2 about here]

Cognitive load was manipulated through a dual-task procedure. Participants in the cognitive-load condition (*cl1*) were asked to memorize five 3-digit numbers

⁷The instructions are available upon request from the authors.

and keep them in mind while deciding in a Ultimatum Game (hereafter UG). In contrast, participants in the no cognitive-load condition (*cl0*) did not confront the memory task while deciding in the UG.

Time pressure was manipulated by setting a limit for deciding in the UG. Participants in the high time-pressure condition (*tp1*) had 15 seconds to decide as proposers, and 30 seconds to decide as responders. In contrast, participants in the low time-pressure condition (*tp0*) had 180 seconds for both kinds of decisions. A post-questionnaire confirmed that the manipulation was successful.⁸

In addition, we introduced monetary rewards to incentivize participants to exert effort in the memory task. Most research examining cognitive load did not employ real incentives (for an exception, see Benjamin *et al.* (2006)). In order to test the effect of financial incentives on performances in the memory task, we set two levels of incentives: €0.30 per digit in the high-incentive condition (*i1*) and €0.03 per digit in the low-incentive condition (*i0*). The payment rule for the memory task is detailed in the next subsection.

2.3 Interaction Structure

Four distinct stages can be identified in the experiment. In Stage 1, each participant is asked to mentally solve five multiplication problems.⁹ The problems are presented successively¹⁰ and involve two 2-digit numbers such that they result in a 3-digit number (e.g., $14 \times 16 = 224$). Each participant is asked to memorize the results of the problems and to keep them in mind until Stage 3, where she will be asked to recall them. If a participant calculates more than two problems correctly, she is given a provisional endowment of €15; otherwise, she is given a provisional endowment of €7. These endowments constitute the

⁸Participants indicated on a 5-point Likert scale (ranging from “not at all” to “very much”) whether they felt under time pressure while making decisions in UG. The average scores (3.34 and 1.51 for participants in the high time-pressure and in the low time-pressure condition respectively) were significantly different (Wilcoxon Rank-Sum Test, p-value < 0.001).

⁹The purpose of the multiplication task is to establish endowment legitimacy (Cherry *et al.*, 2002). One might argue that this analytic task favours the activation of analytical deliberative processing, affecting this way subsequent decision-making. If this is indeed the case, it would mitigate the effect of our manipulation, not enhance it.

¹⁰Once the participants enter the result, they pass to the next problem and cannot return to previous screens.

amount of money to be divided in the UG. To prevent participants from making their decisions in advance, they are informed about the size of these endowments only when decisions are made in the UG. To incentivize more choices, the actual performance in the multiplication task is revealed only at the end of the experiment.

In Stage 2 a UG is played. The strategy vector method is employed to collect choices in the game. Since the participants' role in the game is revealed only at the end of the experiment, each participant is asked to report her preferred options for each of the two roles in the game. As the proposer (referred to as role A), a participant has to state the offer she intends to make and, as a responder (referred to as role B), she has to state her reaction (i.e., acceptance or rejection) for each of the possible offers. The options available to the proposer depend on the endowment available (€15 or €7). Each natural number between 1 and the endowment available could be selected as an offer. Since at this stage they do not yet know their performance in the multiplication task, and thus their endowment, participants have to make a decision for both possible endowments. To summarize, subjects have to enter four distinct action profiles in the following order: proposer in the high endowment condition, proposer in the low endowment condition, responder in the high endowment condition, and responder in the low endowment condition.¹¹

In Stage 3, each participant is first asked for an assessment of her own and her partner's performance in the computations and in the recall task. Thus, four estimates are collected. Each correct guess is rewarded with €0.50. The participant is then asked to recall the results of the multiplication problems in the same order of appearance as in Stage 1. Real incentives are provided for the recall task; specifically, when the recalled number is equal to the computed number, each digit equal to the digit in the correct solution is rewarded with a certain amount of money. This payment procedure ensures against the introduction of "ad hoc" values to simplify recall. For example, if the correct solution

¹¹Participants failing to submit one or more choices pay a flat penalty of €1 to be subtracted from the show-up fee.

of a problem is 350, and the value entered is 358, but the value recalled is 350, then the participant earns nothing for this recall. If for the same problem the value recalled is 358, the participant is paid for 2 out of 3 digits.

In Stage 4, each participant is asked to estimate how likely the offer she made is accepted by the responder. In other terms, the participant is asked about her beliefs of acceptance of the offer made. This question is asked for both endowment levels. The task was incentivized and the payoffs for each combination of estimated probability and action of the responder are detailed in Table 1.

[Insert Table 1 about here]

The payoffs in Table 1 are defined according to a quadratic scoring rule (for a detailed explanation of the rule, see Schotter and Sopher (2007)). The probabilities of acceptance are defined over the values $\{0, 20, 40, 60, 80, 100\}$. According to the rule the payoffs associated to certain beliefs (π_b) are defined as follows: when the responder accepts, $\pi_b^A = 2 - \left(\frac{1}{10000} \times (2 \times (100 - p_a)^2)\right)$; similarly, when the responder rejects, $\pi_b^R = 2 - \left(\frac{1}{10000} \times (2 \times (100 - p_r)^2)\right)$. The rule penalizes both the situation in which less than full probability was assigned to an event when it happens and the situation in which some probability was assigned to an event when it does not happen. This mechanism should induce true beliefs over the alternative events. The payoffs obtained following this procedure are rounded and presented to the participants in a table resembling Table 1. In order to simplify the task and avoid mistakes, the participants are only confronted with the table and not with the equations for π_b^A and π_b^R .

After having stated their acceptance beliefs, the participants are informed about their actual role in the game - proposer or responder - and about the relevant endowment for the UG - high or low. The payoffs for each of the stages¹² and overall are then communicated to each participant.

¹²If one or both participants in a pair fail to submit the strategy profile relative to their actual role and the relevant endowment, both receive nothing for the UG task, since payoffs cannot be calculated. The earnings from Stage 4 are paid only to the proposers.

The sequence of stages just described refers to the conditions with cognitive load (i.e., *cl1*). The conditions without cognitive load (i.e., *cl0*) differ only in the order of Stage 2 and Stage 3, so that the memory task and the UG are not concurrent.

3 Data Analysis

3.1 Proposers' Behaviour

3.1.1 Offers

Table 3 provides descriptive statistics for offers in the UG in the high-endowment condition (€15).

[Insert Table 3 about here]

The mean offer is €6.19 and the median offer is €7.00, revealing a strong concern of proposers for equity. The mean offer represents about 41% of the large pie of €15, and the median offer corresponds to one of the two nearly equal splits available to the proposer.¹³

Table 3 allows us to compare the offers in the UG under different experimental treatments. When comparing treatments differing only in time pressure, a tendency to offer more under higher time pressure is observed. Moreover, in 3 out of the 4 treatments with low time pressure the median offer (€6.00) is lower than that of the pooled observations (€7.00).

The impact of time pressure on some of the offers is confirmed by non-parametric tests (Wilcoxon Rank-Sum Test). In the absence of cognitive load and with incentives kept constant across comparisons, a statistically significant

¹³Given that the available endowment is not even, no symmetric equitable splitting is available to the decision maker. Thus, in the high endowment condition the allocation of 8 to oneself and 7 to the other and the allocation of 7 to oneself and 8 to the other may be interpreted as fair splits. The same reasoning applies to the low endowment condition, with the two fair options equal to (4,3) and (3,4).

difference in the distribution of offers is registered ($cl0.tp0.i0$ vs. $cl0.tp1.i0$, p-value=0.0025; $cl0.tp0.i1$ vs. $cl0.tp1.i1$, p-value=0.031).

Table 4 provides descriptive statistics for offers in UG in the low-endowment condition (€7). The mean and the median offers are very close to the “equal split ” of offering €3 to the counterpart. As had to be expected, less variability across treatments is observed in the low-endowment condition (compare Tables 3 and 4).

[Insert Table 4 about here]

3.1.2 Beliefs

Proposers were asked to estimate the probability that their offer would be accepted by responders. These beliefs are reported in Tables 5 (high-endowment condition) and 6 (low-endowment condition). According to the procedure described in section 2.1 above, the values in the tables represent the degree of certainty that the offer made will be accepted by the responder.

[Insert Tables 5 and 6 about here]

As the pooled figures in the first row indicate, proposers’ confidence of acceptance is higher in the high-endowment condition than in the low-endowment condition (77.69% vs. 72.19%). Statistically significant differences at a level of 0.05 in the treatments $cl1.tp1.i1$, $cl0.tp0.i1$ and $cl0.tp1.i1$ are detected by pairwise Wilcoxon Signed-Rank Tests (p-value=0.013; p-value=0.001; p-value=0.027, respectively). The mean and median values reported in Table 5 indicate a small variance of beliefs across treatments. The few differences detected by the Wilcoxon Rank-Sum Test do not suggest a systematic effect of one of the experimental factors on the observed variable.

In comparison, the corresponding data in Table 6 are characterized by higher variability. Wilcoxon Rank-Sum tests detect some significant differences across treatments. In particular, with no cognitive load, time pressure increases the certainty of beliefs when incentives are low ($cl0.tp0.i0$ vs. $cl0.tp1.i0$, p-value=0.013)

and decreases the certainty of beliefs when incentives are high (*cl0.tp0.i1* vs. *cl0.tp1.i1*, $p\text{-value}=0.038$). There are no statistically significant differences in the other comparisons.

Data about the earnings in the belief-elicitation stage provide additional information on the correctness and certainty of beliefs. Indeed, the higher the earnings from the belief stage, the more correct the belief for a given level of certainty and vice versa. On average, belief earnings are higher in the high-endowment condition than in the low-endowment condition (€1.71 vs. €1.60). The difference is statistically significant according to a Wilcoxon Signed-Rank Test ($p\text{-value} < 0.001$). Thus, proposers in the high-endowment condition are, on average, more accurate and certain about the acceptance of their offer.

3.1.3 Regression Analysis

Table 7 reports the results of a Tobit Regression of the offers in UG. This specification has been chosen to account for the limits imposed to the offers in the experiment. The dependent variable Offers is regressed on the explanatory treatment variables - Time Pressure, Cognitive Load, and Incentives - and on the number of correct recalls (Correct Recall) in the memory task.¹⁴ This last variable provides a proxy of the actual effort in the memory task and a control on possible wealth effects in the game. The interactions between Cognitive Load and Time Pressure (TPCL), Cognitive Load and Incentives (IncCL), and Cognitive Load and Correct Recall (CRCL) are also included in the model.

[Insert Table 7 about here]

In the high-endowment condition (first column of Table 7), a significant positive impact of time pressure on the offer is registered. The other explanatory variables do not have a significant impact on the dependent variable. In the low endowment condition (second column of Table 7), only incentives and correct

¹⁴Here we do not employ the number of rewarded recalls, but the number of correct recalls regardless of the correctness of the computation. The latter provides a better measure of actual cognitive effort in the memory task.

recalls have a marginally positive, respectively negative significant impact (i.e., 0.1 level of significance) on the amount offered. In both endowment conditions, the model as a whole is statistically significant, but the explanatory power (i.e., Pseudo R^2) of the two estimations is very low (≤ 0.02).

The lack of a systematic impact of the experimental factors on the certainty of beliefs is confirmed by an Ordinary Least Squares analysis in which the certainty of beliefs is regressed on the explanatory variables employed in the model estimation reported in Table 7. In both endowment conditions, the joint null hypothesis that all the explanatory factors have no impact on beliefs is not rejected at the conventional significance levels (p-value > 0.1). Consequently, the full estimation results are not reported.

3.2 Responders' Behaviour

3.2.1 Responses

The acceptance rates of each potential offer in each of the experimental treatments are illustrated in Figure 1 for the high-endowment condition and in Figure 2 for the low-endowment condition.

[Insert Figures 1 and 2 about here]

In both endowment conditions, the rate of acceptance decreases nearly linearly for offers lower than the asymmetric equitable splitting (€8 - €7 in the high-endowment condition and €4 - €3 in the low-endowment condition). This is in line with previous findings and goes against the standard economic prediction, based on material opportunism, that all positive offers should be accepted.

Heterogeneity in the behaviour across treatments is observed in both endowment conditions. In the high-endowment conditions (Figure 1), focusing on values lower than €7, it can be observed that the highest rate of acceptance is registered in the treatment *cl1.tp0.i0* and the lowest is registered in the treatment *cl0.tp1.i0*. A Fisher's Exact Test shows that the difference between the two distributions is significant at least at the 0.1 level for all offers

lower than €7. The same test also shows that the highest number of statistically significant differences in acceptance across treatments is registered for offers of €5. Among the significant pairwise differences registered for this offer, there is evidence of a systematic impact of time pressure in the treatments with low incentives (*cl1.tp0.i0* vs. *cl1.tp1.i0*, p-value=0.009; *cl0.tp0.i0* vs. *cl0.tp1.i0*, p-value=0.001).

Similarly, in the low-endowment condition (Figure 2) the rejection rates in treatments *cl1.tp0.i0* and *cl0.tp1.i0* are, respectively, the highest and the lowest across treatments. A Fisher's Exact Test shows that the difference between the two distributions is statistically significant at least at 0.05 level for all offers lower than €4. The highest number of differences across treatments occurs when the offer is €1. At this offer, the experimental treatments with high time pressure are characterized by lower acceptance rates. Furthermore, a statistically significant difference exists between *cl0.tp0.i0* and *cl0.tp1.i0* (Fisher's Exact Test, p-value=0.037).

Minimum thresholds of acceptance (hereafter MTA) exhibit a monotonic rejection pattern.¹⁵ The mean MTA is €3.45 in the high-endowment condition and €2.20 in the low-endowment condition. This implies that, on average, offers lower than 23% of the initial endowment are rejected in the high-endowment condition, while offers lower than 31.4% of the initial endowment are rejected in the low-endowment condition. Focusing only on main factor effects, a statistically significant difference in MTA is registered between *cl0.tp1.i0* and *cl0.tp0.i0* (Wilcoxon Rank-Sum Test, p-value=0.038) in the high-endowment condition, and between *cl1.tp1.i0* and *cl1.tp0.i0* (Wilcoxon Rank-Sum Test, p-value=0.027) in the low-endowment condition. For both these comparisons, the MTA registered under high time pressure is higher than that under low time pressure.

¹⁵The number of non-monotonic choice vectors is equal to 11 in the high-endowment condition and equal to 13 in the low-endowment condition. All the 11 responders expressing a non-monotonic pattern of rejection in the high-endowment condition also exhibit non-monotonic rejections in the low-endowment condition.

3.2.2 Regression Analysis

Table 8 reports the estimated coefficients of a Random Effects Logit Regression of acceptance behaviour. The baseline in the regression is represented by the acceptance of “hyper-fair” offers (i.e., offers that are greater than the proposer-favoring equitable splitting).¹⁶

[Insert Table 8 about here]

In both the high-endowment and the low-endowment conditions, stronger time pressure reduces acceptance.¹⁷ The number of correct recalls has a positive, but weakly significant, effect. As expected, the data show that the lower the proposers’ offers the lower the likelihood of acceptance. Finally, the model specification is statistically significant in both endowment conditions.

This regression analysis provides an overview of responder behaviour for all possible offers in the game. The logistic regressions reported in Tables 9 and 10 offer a more detailed description of responder behaviour to a given “unfair” offer. The Tables report only the estimations that have at least a statistical significance at the 0.1 level.

[Insert Table 9 about here]

In the high-endowment condition (Table 9), no strongly significant effect is found for offers of €7. For offers of €6, a positive significant effect of the number of correct recalls is registered. The model estimation conditioned on offers of €5 provides some interesting results. First, a strong negative effect of time pressure is observed. Second, the number of correct recalls positively affects the likelihood of acceptance. Third, cognitive load increases acceptance but the effect is statistically significant only at the 0.1 level. Finally, the interaction between cognitive load and the number of correct recalls is significantly negative.

¹⁶In the high-endowment condition, all decisions to accept offers equal to or greater than €8 are aggregated in the baseline. Similarly, in the low-endowment condition, all decisions to accept offers equal to or greater than €4 are included in the baseline.

¹⁷The odds ratios computed from the coefficients reported in Table 8 are equal to 0.298 for the high-endowment condition, and to 0.308 for the low-endowment condition.

This suggests that for offers equal to $1/3$ (i.e., €5) of the endowment, exerting effort in the memory task produces an effect similar to that produced by time pressure.

[Insert Table 10 about here]

In the low-endowment condition (Table 10) only time pressure has a significant impact on the likelihood of acceptance when the offer is equal to €3. The effect is similar, both in magnitude and in direction, to that observed in the high-endowment condition.

An OLS regression of the MTA on the explanatory variables represented by the treatment variables (Time Pressure, Cognitive Load, and Incentives), the number of correct recalls (Correct Recall) in the memory task, and the interactions between Cognitive Load and Time Pressure (TPCL), Cognitive Load and Incentives (IncCL), and Cognitive Load and Correct Recall (CRCL) shows that time pressure has a significant positive effect on the MTA, both in the high-endowment (coefficient =0.575, p-value =0.095) and in the low-endowment (coefficient =0.311, p-value =0.067) conditions.

3.3 Other Findings

3.3.1 Offers and Minimum Threshold

The strategy vector method allows us to collect decision data of the same individual in both roles, proposer and responder. In the high-endowment condition, 14.4% of the participants with a monotonic acceptance pattern set their acceptance threshold equal to their offer in the UG. The mean spread between the MTA and the offer is – €2.64, and the spread between the two distributions is highly statistically significant (Wilcoxon Signed-Rank Test, $p - value < 0.001$). The number of participants equating their offers with their MTA (39.9%) is higher in the low-endowment condition; consequently, the spread between the MTA and the offer is lower than that in the high-endowment condition (mean €0.729). Again, this spread is statistically significant (Wilcoxon Signed-Rank

Test, $p - value < 0.001$). Therefore, when setting their offers, most proposers follow a “mark-up strategy” in which they send responders more than the minimum amount that they would accept themselves as responders.

When regressing the spread between MTAs and offers on the explanatory factors employed in the previous model estimation (see, for example, Table 7), no significant effect is registered in either of the endowment conditions. Moreover, the joint hypothesis of null effects is not rejected at conventional significance levels. This implies that the experimental manipulations do not affect the distance between participants’ actions as proposers and as responders.

3.3.2 Impact of Incentives

The mean number of digits correctly recalled is 6.41 (standard deviation 4.40). In qualitative terms, the differences across treatments are modest.¹⁸ Evidence in support of the positive impact of incentives on the observed performance comes from the comparison between treatment *cl1.tp1.i0* - number of correct recalls is 4.98 - and treatment *cl1.tp1.i1* - number of correct recalls is 7.15. The difference between the two distributions is statistically significant (Wilcoxon Rank-Sum Test, $p - value = 0.029$). In the other pairwise comparisons no significant effect of the incentives alone is registered. Some statistically significant differences across treatments are registered, but only in interaction with other experimental factors. This suggests that real incentives are particularly relevant when the environment calls for more cognitive effort. In fact, the impact of incentives is statistically significant only when both time pressure is high and memory task and decision-making are concurrent.

¹⁸In a post-questionnaire, participants indicated on a 5-point Likert scale (ranging from “not at all” to “very much”) whether they found the memory task difficult. The average score for participants in the cognitive-load condition (3.31) did not significantly differ from that for participants in the no cognitive-load condition (3.18; Wilcoxon Rank-Sum Test, $p - value > 0.1$). In the cognitive-load condition, the average score for participants in the high-incentive condition (2.80) was significantly lower than that for participants in the low-incentive condition (3.56; Wilcoxon Rank-Sum Test, $p - value < 0.01$).

3.3.3 Confidence

Participants were asked to guess their own and their partner's performance in both the multiplication and the memory tasks. What emerges from the data is that, on average, participants tend to overestimate both their own performance and their partner's performance in the two tasks. In the multiplication task, participants computed on average 2.80 multiplication problems correctly, while the mean estimation of the number of problems correctly solved was 3.26 for participants themselves and 3.24 for their partners.

In the memory task, the mean performance¹⁹ was 2.21, whereas the mean estimated performance was 2.43 for participants themselves and 2.35 for their partners. The differences between the actual and the estimated performance are statistically significant at least at the 0.05 level for all four comparisons (Wilcoxon Signed-Rank Test). The estimations of own performances and those of one's partner do not statistically differ for the multiplication task (Wilcoxon Signed-Rank Test, $p - value = 0.820$), but the two measures differ for the memory task (Wilcoxon Signed-Rank Test, $p - value = 0.035$).

To summarize, participants tend to be overconfident about their cognitive skills and those of their partners and, at the same time, slightly underestimate the relative skills of their partners in the memory task.

3.3.4 Earnings

Participants' mean earnings in the experiment were €7.07 (excluding the show-up fee of €2.50) with high variability (standard deviation 4.18). Some statistically significant differences are registered across different treatments. Focusing on comparisons where the level of incentives is fixed and ignoring those differences due to the interaction of different experimental factors, earnings in treat-

¹⁹To render the estimation task less penalizing, we did not ask for a point estimate (i.e., the exact number of digits correctly recalled), but for an interval estimate (i.e., the interval in which the number of correctly recalled digits falls). We used four intervals: 0-3 digits, 4-7 digits, 8-11 digits, and 12-15 digits. Performances in the memory task are expressed in terms of intervals, not in terms of number of correctly recalled digits. To compare actual and estimated performances, the actual performance was recoded in terms of intervals.

ment *cl1.tp0.i0* are higher than those in treatment *cl1.tp1.i0* (Wilcoxon Rank-Sum Test, p -value = 0.032), while earnings in treatment *cl0.tp0.i1* are higher than those in treatment *cl0.tp1.i1* (Wilcoxon Rank-Sum Test, p -value = 0.014). Therefore, time pressure has a negative impact on the overall performance in the experiment.

4 Discussion

Proposers' behaviour

Most proposers split the available resources quite equally: on average, they offered more than 40% of the available resources in both endowment conditions (41.27% in the high-endowment condition and 42.29% in the low-endowment one) and even more under time pressure. Therefore, to the extent that time pressure weakens the deliberative system, the affective system induces proposers to make higher offers. Proposer behaviour may be either strategic or other-regarding. Regarding the strategic component, we hypothesized that time pressure would increase offers. In a possibly false consensus (Kuhlman and Wimberley, 1976), the proposer may expect the MTA of the responder to equal her own MTA when playing the role of responder. Playing strategically, the proposer thus should offer her own MTA. On average, MTAs are higher under high time pressure than under low time pressure, suggesting that strategic considerations are important.

Concerning the other-regarding component, we considered two competing hypotheses. According to the intuitionist approach, time pressure would increase offers, while, according to the rationalist view, time pressure would lower them. The difference between the amount proposers offer and the minimum amount they believe responders will accept (proxied by their own MTA) provides some insight into the other-regarding component of ultimatum offers. On average this difference is positive, indicating the presence of other-regarding concerns, but it is the same for both time-pressure conditions. Thus, the net

increase of the offers is mainly caused by the strategic component, while the other-regarding component remains unchanged. This finding is corroborated by proposers' confidence of acceptance. Although offers increase in the high time-pressure condition, the estimated probability that the offer is accepted by the responder remains constant. Thus, more generous offers are not perceived as more likely to be accepted, suggesting that the increase in offers reflects an increase in the expected MTA of the responder.

The positive effect of time pressure on the amount offered is significant only in the high-endowment condition and this can be attributed to the low variance observed in the low-endowment condition. Participants may have perceived low-endowment choices as less relevant. The actual level of endowment (high or low) in each pair was determined by the number of computation problems correctly solved by the participant in the actual role of proposer. Participants' estimations of their performance in the computation task and that of their partner's performance suggest that, on average, participants expected the high endowment.

In the low-endowment condition, offers are influenced by the level of incentives and the number of correct recalls in the memory task. The level of incentives in the memory task has a positive impact on the offer. When the incentives are high, participants have the opportunity to earn a non-negligible amount of money in the memory task. The possibility of earning this additional amount renders proposers more generous.

The number of correct recalls can be considered as a measure of actual cognitive effort exerted by participants in the memory task, and it has a negative impact on the amount offered. This finding suggests that when the amount of money to be divided is low (€7), their cognitive investment motivates proposers to demand more for themselves, possibly to compensate their effort. Participants' estimations of their performance in the memory task are significantly higher than those of their partners' performance. Thus, it could also be that proposers try to retain more for themselves because they feel they deserve it. Al-

ternatively, the number of correct recalls could indicate cognitive abilities (Frederick, 2005). According to this interpretation, cognitively more able proposers seem to behave more selfishly. However, previous findings on the relationship between cognitive abilities and offers are mixed. Benjamin *et al.* (2006) found a weak negative relationship between cognitive abilities and giving in a Dictator Game and Ben-Ner *et al.* (2004) found the same relationship only for women, whereas Brandstätter and Güth (2002) did not find any relationship, neither in the Dictator nor in the Ultimatum Game.

Contrary to what we expected, cognitive load did not have any effect on the amount offered. The cognitive load manipulation we used - requiring participants to remember a string of numbers while performing the task of interest - is common in psychology studies (e.g., Shiv and Fedorikhin, 1999; Roch *et al.*, 2000; Hinson *et al.*, 2003; Benjamin *et al.*, 2006). Unlike previous studies, we incentivized the task with a monetary reward for each digit correctly recalled. This difference in the procedure may account for the fact that, unlike previous studies, we did not find any effect of cognitive load. Participants' judgment about the difficulty of the task may indicate possible distorting effects of incentives. In the cognitive-load condition, participants who were given high incentives judged the memory task as significantly less difficult than participants who were given low incentives. Altogether our data question the effectiveness of cognitive load manipulation.

Responders' behaviour

As expected, time pressure has a negative effect on the likelihood of acceptance, both in the high-endowment and in the low-endowment conditions. Therefore, when deliberation is inhibited by time pressure, affective processes inspire responders to reject. This result corroborates the findings of Sutter *et al.* (2003) about higher rejection rates under time pressure. The result is even more striking when considering that choices were elicited through the "cold" strategy vector method. Previous studies investigating the affective aspect of responder

behaviour (e.g., Sanfey *et al.*, 2003; Xiao and Houser, 2005; van 't Wout *et al.*, 2006) employed the *play method*, in which participants know their role when deciding and the responder replies to the actual offer. Thus, affective responses have been considered only in situations where emotional reactions are expected to be strong. Our findings show that affective reactions influence responder behaviour also in situations where the uncertainty of the own role as well as the actual offer may mitigate these reactions.

The positive, although weak, effect of the number of correct recalls on the likelihood of acceptance, both in the high-endowment and in the low-endowment conditions, can be explained by the motivation of responders to get at least something for their effort. Alternatively, if the number of correct recalls is seen as indicating cognitive abilities, our findings suggests that the behaviour of more cognitively able responders is closer to that predicted by standard economic theory. However, Brandstätter and Güth (2002) did not find any correlation between cognitive abilities and responder's behaviour.

Surprisingly, we did not find a general significant effect of cognitive load on the likelihood of acceptance.²⁰ However, when letting cognitive load (i.e., the simultaneity of memory and UG task) interact with the number of correct recalls (i.e., a rough measure of cognitive effort actually exerted in the memory task), a negative effect on the likelihood of acceptance is registered.

The greatest heterogeneity in acceptance behaviour across treatments was found for offers of €5 in the high-endowment condition (i.e., one third of the pie), suggesting that the tension between accepting and rejecting is possibly greatest for this level of offers.

Other findings

The impact of incentives on performance in the memory task provides some interesting methodological insights. Financial incentives improve performance

²⁰A weak effect was found only for offers of €5 in the high-endowment condition, but the direction of the relationship is opposite to that predicted: cognitive load increases the probability that an offer of €5 is accepted.

in the memory task only when the task is extremely demanding, i.e., when memory task and decision-making in the UG are concurrent and decision-making takes place under high time pressure.

Consistent with a large body of previous research (e.g., Larrick *et al.*, 2007), participants, on average, overestimated their performance in both the computation and the memory task. Participants also overestimated their partners' performance both in the computation and in the memory task, but perceived themselves as superior to their partners in the memory task and as equally good in the computation task.

5 Conclusions

This study examined the influence of affective processes on proposer and responder choices in the Ultimatum Game using a dual-system approach. To enhance the influence of affective processes on behaviour, we inhibited deliberative processes by taxing cognitive resources through time pressure and cognitive load. Our main results show that time pressure promotes more generous offers by proposers and more rejection by responders. In contrast, cognitive load does not affect proposer and responder behaviour. The present research suggests that affective processes play a role also when facing less vivid potential events, which less likely trigger emotional responses. These findings may be relevant also for other strategic interactions.

About proposers, we cannot disentangle genuine other-regarding behaviour from strategic behaviour. However, on the basis of acceptance thresholds of proposers who were asked what they would accept as a responder and proposers' beliefs about the acceptance of their offers, we surmise that higher offers under time pressure are chosen strategically.²¹

Different from the cognitive load procedure commonly used in psychology, we introduced financial incentives for the memory task. Future research should

²¹This conjecture could be corroborated using a one-person decision task, such as the Dictator Game.

investigate whether this methodological difference may account for the lack of effects of the cognitive load manipulation as reported here. The inconsistency of our results with previous findings suggests that slightly different cognitive load manipulations may have different effects on decision processing.

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A Tables

Table 1: Quadratic Scoring Rule for the Acceptance Beliefs

Certainty of acceptance	0%	20%	40%	60%	80%	100%
Earning when accepted	0.00	0.70	1.30	1.70	1.90	2.00
Earning when rejected	2.00	1.90	1.70	1.30	0.70	0.00

Table 2: Treatments

Treatment code	Cognitive Load	Time Pressure	Incentives
cl1.tp0.i0	Yes	Low	Low
cl1.tp0.i1	Yes	Low	High
cl1.tp1.i0	Yes	High	Low
cl1.tp1.i1	Yes	High	High
cl0.tp0.i0	No	Low	Low
cl0.tp0.i1	No	Low	High
cl0.tp1.i0	No	High	Low
cl0.tp1.i1	No	High	High

Table 3: Proposer Offers: high endowment condition

Treatment	N*	mean	std.dev.	median
Pooled	346	6.194	1.696	7.000
cl1.tp0.i0	48	5.729	1.567	6.000
cl1.tp0.i1	46	6.217	2.240	7.000
cl1.tp1.i0	40	5.800	2.210	7.000
cl1.tp1.i1	36	6.417	1.610	7.000
cl0.tp0.i0	48	6.000	1.414	6.000
cl0.tp0.i1	48	6.229	1.134	6.000
cl0.tp1.i0	43	6.628	1.415	7.000
cl0.tp1.i1	37	6.676	1.617	7.000

Table 4: Proposer Offers: low-endowment condition

Treatment	N*	mean	std.dev.	median
Pooled	374	2.957	0.917	3.000
cl1.tp0.i0	48	2.688	0.803	3.000
cl1.tp0.i1	46	3.022	1.238	3.000
cl1.tp1.i0	47	2.681	0.837	3.000
cl1.tp1.i1	46	3.065	0.929	3.000
cl0.tp0.i0	48	2.875	0.703	3.000
cl0.tp0.i1	48	3.146	0.922	3.000
cl0.tp1.i0	45	2.978	0.941	3.000
cl0.tp1.i1	46	3.217	0.786	3.000

Table 5: Proposer Acceptance Beliefs: high-endowment condition

Treatment	N*	mean	std.dev.	median
Pooled	346	77.688	19.122	80.000
cl1.tp0.i0	48	77.083	17.005	80.000
cl1.tp0.i1	46	76.957	23.839	80.000
cl1.tp1.i0	40	74.500	19.209	80.000
cl1.tp1.i1	36	77.222	18.610	80.000
cl0.tp0.i0	48	83.333	17.665	80.000
cl0.tp0.i1	48	76.667	15.065	80.000
cl0.tp1.i0	43	76.279	20.589	80.000
cl0.tp1.i1	37	78.919	20.519	80.000

Table 6: Proposer Acceptance Beliefs: low-endowment condition

Treatment	N*	mean	std.dev.	median
Pooled	374	72.193	23.040	80.000
cl1.tp0.i0	48	73.750	21.500	80.000
cl1.tp0.i1	46	73.043	23.178	80.000
cl1.tp1.i0	47	66.383	26.079	60.000
cl1.tp1.i1	46	75.217	23.546	80.000
cl0.tp0.i0	48	80.417	19.125	80.000
cl0.tp0.i1	48	64.583	23.786	60.000
cl0.tp1.i0	45	69.333	22.401	80.000
cl0.tp1.i1	46	74.783	21.678	80.000

Table 7: Proposer Behaviour (Tobit regression)

Acceptance	Coeff (Std. Err.)	
	High endowment	Low endowment
<i>Time Pressure</i>	0.507 (0.257)**	0.057 (0.140)
<i>Cognitive Load</i>	0.009 (0.594)	-0.318 (0.326)
<i>Incentives</i>	0.126 (0.255)	0.242 (0.140)*
<i>Correct Recall</i>	-0.038 (0.036)	-0.033 (0.020)*
<i>TPCL</i>	-0.337 (0.366)	-0.029 (0.198)
<i>IncCL</i>	0.510 (0.365)	0.155 (0.198)
<i>CRCL</i>	-0.042 (0.051)	0.005 (0.027)
<i>cons</i>	6.436 (0.438)***	3.210 (0.241)***
Obs	346	374
Prob > F	0.009	0.005
Pseudo R^2	0.014	0.020

*** (0.01); ** (0.05); * (0.1) significance level

Table 8: Responder Behaviour (Random-Effects Logistic Regression)

Acceptance	Coeff (Std. Err.)	
	High endowment	Low endowment
<i>Time Pressure</i>	-0.829 (0.347)**	-0.753 (0.384)**
<i>Cognitive Load</i>	0.333 (0.791)	1.285 (0.891)
<i>Incentives</i>	0.226 (0.348)	0.243 (0.382)
<i>Correct Recall</i>	0.101 (0.051)*	0.103 (0.055)*
<i>TPCL</i>	0.446 (0.482)	-0.322 (0.541)
<i>IncCL</i>	-0.506 (0.482)	-0.493 (0.542)
<i>CRCL</i>	-0.008 (0.067)	-0.070 (0.075)
<i>offer.7</i>	-1.029 (0.342)***	
<i>offer.6</i>	-2.245 (0.272)***	
<i>offer.5</i>	-3.425 (0.246)***	
<i>offer.4</i>	-5.339 (0.245)***	
<i>offer.3</i>	-6.504 (0.256)***	-2.160 (0.272)***
<i>offer.2</i>	-7.182 (0.265)***	-5.114 (0.277)***
<i>offer.1</i>	-7.659 (0.272)***	-6.144 (0.300)***
<i>cons</i>	5.399 (0.641)***	4.677 (0.693)***
Obs	351(15)	373(7)
Prob > χ^2	< 0.001	< 0.001

*** (0.01); ** (0.05); * (0.1) significance level

Table 9: Responder Behaviour (Logistic Regression): high-endowment condition

Acceptance	Coeff (Std. Err.)		
	Offer=7	Offer=6	Offer=5
<i>Time Pressure</i>	-0.706 (0.753)	-1.057(0.574)*	-1.248 (0.422)***
<i>Cognitive Load</i>	-1.521 (1.602)	1.120 (1.227)	1.731 (0.966)*
<i>Incentives</i>	-0.474 (0.754)	-0.508(0.558)	0.478 (0.411)
<i>Correct Recall</i>	0.122 (0.103)	0.171 (0.078)**	0.119 (0.058)**
<i>TPCL</i>	2.323 (1.363)*	-0.043(0.799)	0.370 (0.590)
<i>IncCL</i>	-0.490 (1.190)	0.560 (0.763)	-0.609 (0.576)
<i>CRCL</i>	0.163 (0.154)	-0.159 (0.105)	-0.160 (0.081)**
<i>cons</i>	2.551 (1.201)**	1.611 (0.887)*	0.770 (0.677)
Obs	351	351	351
Prob > chi2	0.067	0.041	0.004

***(0.01); **(0.05); *(0.1) significance level

Table 10: Responder Behaviour (Logistic Regression): low-endowment condition

Acceptance	Coeff (Std. Err.)	
	Offer=3	Offer=1
<i>Time Pressure</i>	-1.089 (0.510)**	-0.538 (0.310)*
<i>Cognitive Load</i>	0.903 (1.072)	0.937 (0.714)
<i>Incentives</i>	0.456 (0.474)	-0.064 (0.308)
<i>Correct Recall</i>	0.104 (0.066)	0.066 (0.045)
<i>TPCL</i>	0.222 (0.703)	-0.096 (0.431)
<i>IncCL</i>	-0.502 (0.662)	-0.194 (0.430)
<i>CRCL</i>	-0.089 (0.089)	-0.053 (0.060)
<i>cons</i>	1.481 (0.783)*	-0.856 (0.540)
Obs	373	373
Prob > chi2	0.075	0.073

*** (0.01); ** (0.05); * (0.1) significance level

B Figures

Figure 1: Acceptance Frequency: high-endowment condition

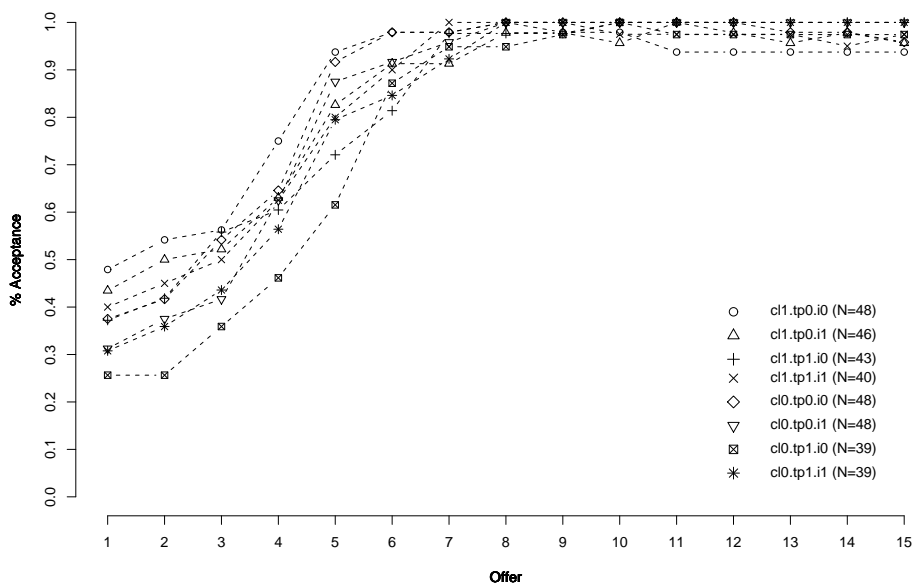


Figure 2: Acceptance Frequency: low-endowment condition

