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Does indignation lead to generosity? An experimental investigation

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L'indignation génère-t-elle la générosité? Une étude expérimentale

Résumé

Nous étudions expérimentalement l'impact des émotions sur le comportement moral des joueurs dans un jeu de l'échange de dons. Nous utilisons la méthode d'induction pour créer en laboratoire, avant le début du jeu, un état affectif positif, négatif ou neutre chez les sujets. Nos résultats indiquent l'efficacité de l'induction : les sujets qui ont vu un extrait de film comique reportent davantage (moins) d'émotions positives (négatives) que ceux qui ont regardé un extrait révoltant. Nous observons que les décisions des joueurs diffèrent significativement en fonction des conditions expérimentales : en particulier, les joueurs 2 qui font l'expérience d'états neutres ou positifs ont tendance à récompenser davantage un transfert positif (réciprocité) tandis que ceux qui ont ressenti des émotions d'indignation, de culpabilité ou de honte adoptent un comportement généreux inconditionnel et ne jouent pas la réciprocité. Nous interprétons ces résultats en faisant l'hypothèse que l'émotion d'indignation permet à l'individu de se révéler à lui-même les valeurs morales qu'il est prêt à défendre.

Mots-clés : Emotions, valeurs morales, jeu de l'échange de dons

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Abstract

We test the effect of emotions on moral behaviour in a one shot gift-exchange game. Using the emotional induction technique, we induce either positive or negative emotions to the subjects before they play the game. We also consider a control treatment, without any affect manipulation. Emotional induction was effective: participants who saw the shocking and appalling movie reported significantly stronger negative emotions and weaker positive emotions than those who saw the funny movie. We find that players' choices differ significantly across emotional conditions: we observe essentially that second movers who experience positive or neutral emotions do reciprocate whereas subjects overwhelmed with indignation, anger or guilt feelings show a very strong unconditional generous behaviour and do not reciprocate at all. We argue that indignation has a strong proactive force which allows subjects to reveal to themselves their own true values.

Keywords: Emotions; moral values; gift-exchange game

JEL : A120 ; C700 ; C910

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1. Introduction

In an influential literature review in social psychology, Schwarz and Clore (1996) observed that most of the psychological studies of the emotions have “focused on the influence of feelings on cognitive processing” and that, consequently, “attention to the impact of feelings on behaviour has been more limited”. Therefore, the lack of evidence on the role that emotions play in influencing behaviour probably explains why emotions have been generally neglected in the economical studies. In his literature review, Elster (1998) thus argued in conclusion that “the more urgent task is to understand how emotions interact with other motivations to produce behaviour”. Recently, many economical experimental studies have tried successfully to achieve this task. Initially, this strand of research was based upon the simplest psychological theory of emotion which assumes that emotion directly causes behaviour. Fear makes you flee; anger makes you fight, and so forth. This direct causation theory is well established in the psychological literature which regards emotions as “action readiness” (Frijda, 1986). From the economist point of view, this theory has the advantage of appealing to common sense. For example, we could suggest that anger might be the underlying cause of the frequent, unpredicted rejections in ultimatum games. Pillutla and Murningham (1996) showed indeed that intentional low offers lead to feelings of anger and, ultimately, spiteful behaviour in an ultimatum game. More recently, Bosman, Sutter and van Winden (2005) pointed out that anger or irritation enhance destruction of income in a power-to-take game.

In all these previous bargaining experiments, emotion is produced as a consequence of the interaction of the two players but is nonetheless directly causing behaviour. As far as the offer is perceived as unfair and intentional (Blount, 1995), feelings of anger that follow this unexpected perception trigger rejection of the proposal. Recently, however, a few experimental studies have shown that the relationship between emotion and behaviour might be much more complicated than expected (see, for instance, Lin, Chuang, Kao & Kung 2006; Ketelaar and Au, 2003). From our own point of view, one kind of these interesting findings can be found in the recent study of Kirchsteiger, Rigotti and Rustichini (2006, thereafter “KRR”). The authors show that “moral dimensions of behaviour can be significantly influenced by emotional aspects”. They use a mood induction procedure and find that, in a gift-exchange game, a bad induced-mood implies more reciprocity while a good induced-mood implies more generosity. Their results seem to fit the view that emotion or mood directly causes behaviour insofar as the emotional or mood state precedes the behaviour. However, as Isen (1984) pointed out, it is methodologically very difficult to know whether the apparent consequences of negative emotions are direct results of the emotion or stem instead from the individual’s effort to counteract the emotion. As a matter of fact, KRR do explain their results using mood maintenance or mood repair theories: in their setting, individuals in a good mood try to maintain their mood, while individuals in a bad mood try to change their mood. In this view, reciprocal or generous behaviours are performed in order either to feel better or to continue to feel good. Consequently, in this case, the impact of emotion or mood on behaviour seems to be rather indirect, much more complicated and, in some manner, very difficult to predict.

However, as Baumeister, Vosh, DeWall and Zhang (2007) pointed out, the indirect cognitive relationship between emotion and behaviour may be much more pervasive in a real context than the direct one, essentially because, as human beings living in a complex human cultural society, we probably need a more complex emotional process to cope with our

environment. Accordingly, KRR's experiment represents a very useful first step toward understanding how different emotional or mood states may alter moral behaviour. In line with Capra (2004), they implicitly assume that if it is the emotional affective state that is causing subjects to be, for instance, fair, generous or reciprocal, then successfully inducing positive or negative moods may also affect their choices.

In this paper, we also study the interaction between affective states and behaviour in experimental analysis. However, in line with what psychologists (but not economists) generally do, we distinguish between emotions and mood. Emotions are elicited by a particular target or cause, often include physiological reactions and action sequences, and are relatively intense and short-lived (Frijda, 1986). In contrast, moods are more diffuse, take the form of a general positive (pleasant) or negative (unpleasant) feeling, and tend not to be focused on a specific cause. A key distinction between emotions and moods is thus that emotions are a differentiated response to a specific situation. Put differently, emotions are triggered by an identifiable event. From the economist point of view, emotions specifically arise when one evaluates an event as relevant for one's concerns, preferences or values. In an experimental context, this distinction may be very useful if the main purpose of the research is to understand which emotional process is responsible for a change in behaviour. Particularly, the strong cognitive dimension of emotion may help experimentalists to understand why specific emotions (such as anger, guilt, shame, pride, and so on) are capable of influencing moral behaviour in a rather specific experimental context.

Our experiment is devoted to study the impact of emotions on human moral behaviour in a gift-exchange game. In the gift-exchange literature, numerous studies have recently shown that frequently players do not maximize their monetary payoffs¹. Many theoretical models² interpret this evidence by assuming that players' behaviour is motivated by a desire for fairness, altruism and/or reciprocity. In other words, these theories suggest that moral or social norms shape individuals' behaviour. In our analysis, our main purpose is to understand which emotions are responsible for causing subjects to adopt these moral values in a gift-exchange context. In order to influence individuals' emotional states, we adopt an emotional-induction procedure. The game scheduled is similar to that of KRR, which allows us useful comparisons. However, apart from the crucial distinction between emotions and moods, our experiment differs from that of KRR in two specific points. On one hand, in our experimental design, the emotions of both players are manipulated in two different emotional treatments. During the experiment, subjects watch a short sequence of a funny or a shocking movie that is meant to induce either positive or negative emotions. On the other hand, we run a control treatment (without any affective state manipulation) and consider it as the neutral emotional condition.

Our main results are as follows. Using the emotional induction technique, we induce either positive or negative emotions to the participants before they play the game. We first report the evaluation that subjects give of their own emotions and find that those in the positive (negative) emotional condition experience strong positive (negative) emotions. We then observe subjects' behaviour. Players' choices differ significantly across emotional conditions. We find that players overwhelmed with strong feelings of indignation, anger or even guilt choose on average higher transfer as well as significant higher effort than players who feel positive (e.g., joy or laughter) or neutral emotions. Besides, we show that second movers with positive or neutral emotions adopt behavioural strategies which are plainly consistent with the reciprocal behaviour typically observed in the gift-exchange literature, whereas participants with negative feelings do not exhibit any reciprocal behaviour. This effect is rather surprising

¹ See Fehr, Kirchsteiger and Riedl (1993) or Charness (2004).

² See, for instance, Andreoni, (1990), Bolton and Ockenfels (2000) or Dufwenberg and Kirchsteiger (2003).

since the negative emotional treatment is the only case we are aware of in which reciprocal behaviour is completely absent in the gift-exchange game. In fact, as already emphasized by KRR, our study highlights the importance of the difference between reciprocity and generosity. In the exchange game, generosity corresponds to effort incurred even when no transfer is received, while reciprocity corresponds to higher effort that rewards a larger transfer.

The remainder of the paper is divided as follows. In section 2, we present the experimental design in detail, including the emotional-induction procedure. In section 3, we consider the main empirical results and measure the effect of emotions on behaviour. In section 4, we provide some psychological and philosophical theoretical insights which can explain our experimental results. In section 5, we briefly conclude.

2. Experimental design

The economic experiment is based on the one-shot gift-exchange game. In our experiment, there were three different conditions: two specific experimental treatments (“Ring” and “Milgram”) were preceded by an emotional-induction phase involving 190 subjects and an unspecific one (“Control”) without any induction phase involving 74 other subjects. We assume that the Control treatment (“C”) – without any affect manipulation – is emotionally neutral. All sessions took place in April 2007 at the University of Bordeaux, France. All subjects were recruited in the compulsory course “Intermediate Microeconomics” and were consequently first-year undergraduate students in their second semester, implying that they had been given no previous course in Game Theory. Overall, two hundred and sixty-six undergraduate students (96 of whom were female) participated in the experiment. The classroom experiment introduces non-monetary incentives³. The instructions read: “During the experiment, you could earn, depending on your choices, some experimental points. These points will be fully added to your final grade in Intermediate Microeconomics. The conversion rate is the following: 10 experimental units = 0.1 extra points”.

The experiment uses only pen and paper and all materials related to it were in French⁴.

2.1. Analysis of the game

The gift-exchange game is played sequentially by two players. In the first stage, player A receives one hundred and fifty experimental points and can transfer some of it to player B. In the second stage, player B learns the transfer and then has to decide an effort level. Effort is costly for player B but beneficial to player A. In particular, for any given transfer, higher effort reduces player B’s payoff but increases player A’s payoff. Let $t \in [0, 150]$ denote the transfer chosen by player A and $e \in [0, 1]$ denote the effort chosen by player B. The payoffs are as follows: $\Pi_A = (150 - t)e$ (1) and $\Pi_B = t - c(e)$ (2) where $c(e)$ is the cost of effort, a function increasing in e . The schedule of cost as a function of effort is shown below:

e	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
c(e)	0	2	4	8	12	16	20	24	30	36

³ Brañas-Garzas (2007) uses a similar incentive scheme in a Dictator game experiment.

⁴ The materials, including instructions and various questionnaires, are available from the authors upon request.

Assuming players are selfish and only interested in maximizing their own earnings, the gift-exchange game has a unique sub-game perfect equilibrium. In the second stage, player B chooses the lowest feasible effort. Anticipating this strategy, player A chooses the lowest feasible transfer. Hence, the only sub-game perfect equilibrium is composed of a transfer $t=0$ and an effort ($e_{\min}=0.1$) independent of the transfer of the other player. Unfortunately, this outcome yields the lowest sum of payoffs for the two players. However, a large number of experimental studies have shown that many subjects do not play this way. Firstly, player B chooses on average an effort level above the minimal effort. Secondly, there is a positive relationship between effort and transfer. In most cases, it seems that many players make their choices according to considerations going beyond material self-interest. Roughly, three different theoretical approaches have been developed to capture these additional motives. In models of altruism, the income of another person enters directly into the player's utility function (Andreoni, 1990). In models of fairness, the agent's preferences depend positively on her earnings as well on the fairness of the whole income distribution across players (Bolton and Ockenfels, 2000). In models of reciprocity, individuals have a preference for rewarding kind intentions of the other player and for punishing unkind ones, independent of the final payoff distribution that results (see, for example, Dufwenberg and Kirchsteiger, 2003).

2.2 Emotional-induction procedure

At the beginning of each treatment, subjects are randomly assigned the role of player A or B. Then, we give them the instructions of the gift-exchange game. Afterwards, subjects answer a control questionnaire to check their understanding of the game and the way academic payoffs are determined. At this point, the emotional-induction phase begins. Apart from the control condition which we consider as emotionally neutral, two different emotional treatments are possible. Our emotional-procedure uses short excerpts from commercial movies, a very common practise in experimental psychology⁵. Before the projection, players are only informed that they are going to watch a 12 minutes sequence from a movie, but they are not told which movie they are about to see. Finally, at the end of each movie sequence, subjects answer a questionnaire related to the movie and to their *experienced* emotions.

In the "Ring" treatment ("R"), participants were induced to feel strong positive emotions such as joy, laughter or even elation. In order to reach this pleasant emotional state, we asked subjects to watch a sequence from *City Lights*, directed and interpreted by Charles Chaplin, lasting approximately 12 minutes. The sequence is known as the "boxing fight", a screamingly funny episode with Charlie Chaplin dancing around the ring in order to avoid the punches of his big opponent. As a matter of fact, this short sequence had already been used in KRR's study to induce successfully a positive mood. Thus, we expected that the hilarious sequence would have the same positive emotional effects on our subjects.

In the "Milgram" treatment ("M"), our targeted negative emotions included indignation, anger, guilt or even shame. Consequently, we were looking for a short movie sequence meant to induce these specific emotions⁶. In the literature, KRR induced a bad mood

⁵ As a matter of fact, different affect-inducing techniques are possible (see Westermann, Spies, Stahl and Hesse, 1996). For instance, memory elicitation (where subjects are asked to write a story about a specific emotional event from their lives) and experience of success/failure during experimental games have also been used in the experimental literature (see Ketelaar and Au (2003) or Capra (2004)).

⁶ Unfortunately, there is no consensus among the vast psychological literature on emotion how to differentiate between negative emotions (Frijda, 1986; Ortony, Clore and Collins, 1988). In particular, emotion theorists do not agree about the precise eliciting conditions for emotions they see as distinct ones. Thus, in our design, this made it difficult to predict which distinct negative emotions could be induced by audiovisual methods.

using a well-known picture about the liquidation of the ghetto during the Second World War. Clearly, as the authors recognize it, the impressive episode is much more capable of triggering sad or depressive feelings than capable of eliciting our targeted emotions. Similarly, the sequence used in Lin et al. (2005) is also devoted to induce sadness. In our negative emotional treatment, subjects watch a 12-min sequence from *I comme Icare*, interpreted by Y. Montand and directed by H. Verneuil. In our opinion, the content of the sequence is really meant to induce negative emotions and specifically indignation feelings. Indeed, this short sequence is shocking and appalling insofar as it is related to the famous Milgram (1974) obedience experiment⁷. Undoubtedly, the sequence from *I come Icare* is a very faithful impressive description of the obedience experiment. However, we anticipated that many subjects wouldn't have ever heard before of the scientific experiment. Consequently, just at the end of the appalling movie, in a deep silence, we let them read the following sentence: "The short sequence you have just seen describes faithfully a *real experiment* carried out in the seventies by a social psychologist, named Stanley Milgram. Milgram's experiment remains very famous... Indeed, Milgram showed that 63.5% of the subjects obey until the end of the experiment (until 450 volts)". Clearly, we hoped that the knowledge of the experiment's results would probably accentuate the emotional impact of the sequence and, consequently, we expected that the "Milgram" treatment would achieve to induce strongly our targeted negative emotions. Our results below show that our intuition was not ill-founded.

As mentioned before, at the end of each picture, subjects answer a brief questionnaire related to the movie. In the "M" treatment, we specifically needed to know whether the subjects have already seen before the sequence from *I comme Icare* or not and whether they have already known something about the Milgram experiment before. Finally, we make sure that, at the end of each emotional induction phase, the game begin as soon as possible, remembering that affective-induced states do not necessary last very long⁸.

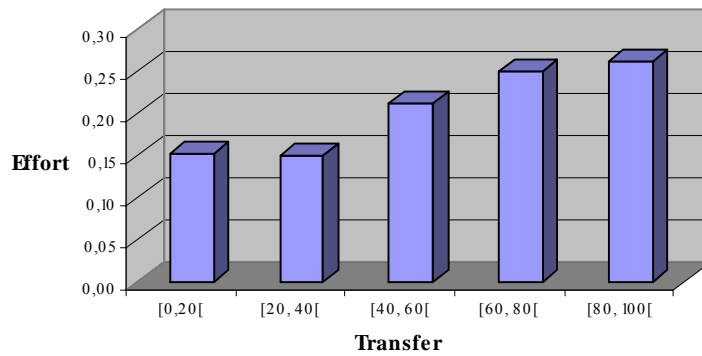
3. The evidence

To begin with, we briefly describe the results as average over the three conditions. Similarly to other gift-exchange experiments, players do not play the sub-game perfect equilibrium: the average transfer of player A is 45, while the average effort of player B is above the minimal effort and equals to 0.21. As we can see in figure 1 below, the *aggregated* data also display the typical positive relationship between transfer and effort.

⁷ In this social psychology experiment, the subjects were recruited in order to take part in a study which is concerned with the effects of punishment and memory: so, they were assigned the role of teachers, while an accomplice of the experimenter played the role of the learner. During the experiment, the experimenter persuaded the subject to give what the subject believed were painful electrical shocks to the learner when he gave wrong answers. The learner, a professional actor, was visible to the subject through a glass window. The experiment was repeated under a wide variety of conditions but very often with the same result: a significant fraction of the population administers the maximum dosage...

⁸ KRR reported that the effect of mood induction was weakened by the end of the game. In the same vein, Ketelaar and Au (2003) observed that the effects of their guilt induction procedure were rather short-lived and explained that "the aversive negative feeling state – produced by writing a story – has a short half-life" (p. 440).

Fig1: Effort by transfer ranges



However, even if our results do not differ substantially from those observed in the gift-exchange literature, we notice that our students (especially participants in the Control condition – see below) seem to be, on the whole, less fair, generous or reciprocal than usual. For instance, second movers choose minimal effort 79 times, corresponding to 60 percent of the observations. Comparatively, in a rather similar setting, Fehr, Kirchsteiger and Riedl (1993) observed that the average effort chosen by players B was 0.4 and that the minimum effort level was chosen in 16% of the all cases. This proportion is equal to 21% in Charness (2004) while the average effort level amounts to 0.31. We believe that these differences indicate that students probably consider extra-credit points more valuable than small amount of money. This idea is consistent with Brañas-Garzas’ (2007) results in a dictator game.

We now focus on the interaction between emotions and behaviour. We start from the emotional-induction procedure results and then look at players’ choices. The main result is that negative emotions induce significantly different behaviours than either positive or neutral emotions. These differences are first assessed in non-parametric terms and then measured more precisely using regression analysis.

3.1 Emotional-induction

In this section, we show that the experienced emotions of subjects are affected by the movie according to what was planned and anticipated. The simplest measure of this phenomenon is given by the subjects’ description of their own emotions (Frijda (1986)). A few economic experimental studies have already employed successfully this subjective method⁹. After seeing the movie, and before playing the game, we give the players a list of eight emotion names and ask them to report the intensity of each emotion on a 7-point scale, ranging from ‘no emotion at all’ to ‘high intensity of the emotion’. The list included the following emotions: anger, joy, indignation, laughter, guilt, surprise, shame and elation¹⁰. In the “M” treatment, we also ask the players to complete a questionnaire containing the two following questions: 1. “Have you already seen this movie before?” and 2. “Have you already heard of Milgram’s obedience experiment before?” We anticipated that the subjects who would answer ‘yes’ to the two previous questions would probably undergo less intense

⁹ See Bosman, et al., 2005; Lin et al., 2005; Ketelaar et al., 2003, Ben-Shakhar, Bornstein, Hopfensitz and van Winden, 2007.

¹⁰ Both positive and negative emotions are included in both emotional conditions. However, elation and shame, which were not expected to be relevant in the negative and positive emotional conditions respectively, are only included in their relevant emotional treatment.

emotions than the others. Intensity scores measures concerning the emotions experienced by subjects in the negative (“M”) and positive (“R”) emotional treatments are presented in table 1.

Table 1 - Intensity scores of experienced emotions (mean and standard deviation)

Emotion ^a	M	R
Anger	2.7 (1.9)	1.3 (1.0)
Joy	1.3 (0.8)	3.8 (1.6)
Indignation	4.2 (1.8)	1.9 (1.3)
Laughter	2.7 (1.3)	5.6 (1.2)
Guilt	2.7 (1.8)	1.4 (0.9)
Surprise	3.5 (2.0)	3.9 (1.7)
Shame ^b	2.8 (2.0)	-
Elation ^b	-	3.2 (1.7)

^a The intensity scale for emotions ranges from 1 (no emotion) to 7 (high intensity).

^b Notice that elation (shame) intensity is only measured in the Ring (Milgram) treatment.

Our results confirm the effectiveness of our emotional manipulation. Participants in the “M” treatment always report stronger negative emotions and weaker positive emotions than participants in the “R” treatment. The differences between the two emotional treatments are striking and highly significant. For example, the average answer in the “M” condition for indignation is 4.2 while it is only 1.9 in the “R” condition. In the same way, the average answers for joy are 1.3 and 3.8 respectively. Applying a one-tailed Mann-Whitney U-test, we obtain that, for all experienced emotions (apart from surprise), the Mann-Whitney statistic is always higher than 3.5, which implies a p-value smaller than 0.001. Therefore, we can conclude that subjects who participated in the “Ring” treatment felt differently than subjects who participated in the “Milgram” treatment.

Unsurprisingly, we observe that, for the emotion of surprise, the differences between the two treatments are still significant but less pronounced (U-test, p-value= 0.015, one-tailed). In our opinion, this is essentially due both to the whole unusual experimental context which undoubtedly strike all subjects and to the peculiarities shared by each excerpt of movie. Interestingly, for this peculiar emotion, we find differences among the 66 subjects who reported their own emotions in the “M” condition. Among them, 27 had never heard a word about Milgram before the beginning of the experiment (M_{Never}), 33 were aware of the famous obedience experiment context but had never seen the movie before ($M_{\text{Obedience}}$) and, lastly, 6 had already seen the movie before (M_{Icare}). In table 2, we indicate the main emotional scores for these three categories of subjects.

Table 2 - Mean intensity scores of experienced negative emotions in “M” treatment

Emotion ^a	M_{Never} (N=27)	$M_{\text{Obedience}}$ (N=33)	M_{Icare} (N=6)
Anger	3.1	2.6	2.2
Indignation	4.3	4.4	2.8
Guilt	2.7	3.1	1.7
Surprise	4.5	3.0	2.3
Shame	2.5	3.4	2.8

^a The intensity scale for emotions ranges from 1 (no emotion) to 7 (high intensity).

As can be observed from table 2, the intensity of surprise is weaker for the subjects who were aware of the Milgram experiment before (U-test, $z=3.15$, p-value < 0.001, one-

tailed). Specifically, those who had already seen the short sequence (M_{Icare}), and consequently probably knew the impressive results of the obedience experiment, report significantly less intense emotions than the others. This result is clearly consistent with the fact that the less an emotion eliciting event is expected, the higher the emotional intensity (Ortony et al., 1988). Interestingly, the knowledge of the social psychology study alone ($M_{Obedience}$) does not seem to lower indignation feelings. As a matter of fact, it may even have reinforced guilt and shame feelings. From our own point of view, this result is a mere proof that the short appalling movie has indeed the emotional moral impact which was expected¹¹. These scores' differences among participants in the negative emotional treatment also show that the information provided by the self-report method is reliable¹².

3.2 Emotions and behaviour: summary statistics and non-parametric tests

Having verified subjects report significantly different levels of positive and negative emotions as a consequence of the emotional-induction procedure, we now study their choices. Firstly, we consider some summary statistics for the game. The average values presented in table 3 show that transfer and effort are higher in the negative emotional treatment than in the two other conditions.

Table 3 - Summary statistics by emotional treatments: mean and standard deviation

Variables	C (control, N=37)	R (positive emotions, N=62)	M (negative emotions, N=33)
Transfer	41 (24)	44 (10)	49 (25)
Effort	0.16 (0.13)	0.20 (0.16)	0.28 (0.10)
Payoffs A	16 (11)	20 (15)	28 (27)
Payoffs B	39 (23)	41 (18)	45 (24)

To begin with, we consider the first movers (players A). We observe that the average transfer in the “M” treatment is slightly higher than in the “R” treatment (+11%) and than in the Control treatment (+20%). Applying a one-tailed U-test, we find that these differences are not significant at a 10 percent level (p-value=0.13). Considering the median transfer, we cannot reject either the null hypothesis that the median transfer in the M treatment is the same that either in the R treatment ($\chi^2=1.18$; p-value=0.277) or in the Control treatment ($\chi^2=0.73$; p-value= 0.391). Considering three transfer ranges (low <40, mid [40, 60[, and high ≥ 60), our data show that participants in the “M” treatment do not transfer, on average, more experimental points than in the two other conditions. However, low transfers are less frequent in the “M” condition (18%) than in the other conditions (32 or 31%). On the contrary, high transfers are chosen in 39 and 25 percent of all negative and positive emotions observations respectively.

¹¹ Finally, we must notice that participants who had already seen the film and heard about Milgram before (M_{Icare}) still report stronger indignation feelings than participants in the “Ring” treatment (U-test, $z= 1,81$, p-value< 0.04, one-tailed). This result is consistent with the psychological law of conservation of emotional momentum which stipulates that “time does not soften emotion (...) emotional events retain their power to elicit emotions indefinitely” Frijda (1986, p. 354).

¹² In a recent study, Ben-Shakhar et al. (2007) used both physiological and self-report measures of emotions in a one-shot power-to-take game and reported that both methods provided evidence for the role of emotions in the decision to punish through destruction of income. According to them (p. 321), the presence of the correlations between self-report measures of emotion responses and the physiological measures of emotional arousal “provide further justification for the use of self-reports in the study of reciprocity”.

These statistics explain why on average participants with negative emotions transfer more to the second mover than participants who feel joy, laughter or even no emotion. Specifically, high (low) transfers seem to be (less) more frequent with subjects overwhelmed with indignation or anger feelings.

We now consider the second movers (players B). As previously shown in table 3, we observe that the effort levels differences between emotional treatments are striking. The average effort in the “M” treatment is considerably higher than in the “R” treatment (+35%) and than in the Control treatment (+72%). Using a one-tailed U-test, we can conclude that participants who feel negative emotions do make significantly stronger efforts than subjects who experience either positive (p-value = 0.011) or neutral (p-value = 0.002) emotions¹³. As mentioned earlier, considering the whole data, second movers often choose the minimal effort level in our one-shot gift exchange game (60%). However, we also observe strong significant differences between treatments. In the Control treatment, without any emotional-induction phase, 78.4 percent of all subjects choose minimal effort. Comparatively, this percentage is equal to 62.3 in the positive emotional treatment (“R”) and only 36.4 in the negative emotional treatment (“M”). Using a non-parametric test, we show that the selfish second mover’s behaviour is highly significantly less frequent in the negative emotional condition than either in the neutral ($\chi_2 = 11.02$; *p-value* = 0.0009) or in the positive emotional condition ($\chi_2 = 4.79$; *p-value* = 0.0286). We do not find, however, any significant differences between the “C” and “R” conditions ($\chi_2 = 0.45$; *p-value* = 0.5046).

Finally, our data suggest that, the relationship between effort and transfer appears clearly different across the three conditions. Surprisingly, average effort does not increase in the transfer payment in the negative emotional treatment, i.e., subjects with negative emotions do not seem to adopt reciprocal behaviour. As an indicator for the presence and the importance of reciprocal behaviour, we have calculated Spearman rank-correlation coefficients between transfers and effort levels calculated over all 11 values of transfers actually chosen ($t \in [0, 150]$). They are as follows: -0.024 and 0.92 (p-value < 0.0004) in the negative and in the pooled positive and neutral treatments, respectively. While the effort reciprocal hypothesis is clearly confirmed by the pooled data which show a clear correlation between transfer and effort, we are astonished to find that there is no correlation in the negative emotional condition. Subjects who experienced strong negative feelings seem to choose higher effort levels than in the others, but not for reciprocal motives. The Spearman rank correlation coefficient just measures the degree of the monotonic relationship between transfer and effort levels.

Consequently, we need to measure more precisely this relationship using regression analysis. To test the relationship between effort and transfer, we fit the following regression:

$$(3) e_i = \alpha + \beta X_i + \varepsilon_i,$$

where e_i is the effort chosen by the i^{th} subject in the role of player B after receiving t_i of the player A, who was the partner of B, X_i is a vector of independent variables, ε_i is an error term with the usual properties. Our regressors are the following: *Transfer*, a variable equal to the transfer t_i player B_{*i*} receives before choosing effort e_i ; *negative emotions*, a dummy variable equal to one if i was in the “M” treatment and zero otherwise; *negative emotions* multiplied by

¹³ We also perform a *two-tailed* non-parametric U-test on the average effort behaviour differences between the neutral and the positive emotional treatment. Interestingly, we can reject the null hypothesis at the 10% level (p-value = 0,062) that the distribution function which generates effort data in the R treatment is the same distribution function that generates the effort data in the Control treatment. Our results thus confirm those of KRR, stipulating that moods (or rather positive emotions) do affect moral behaviour.

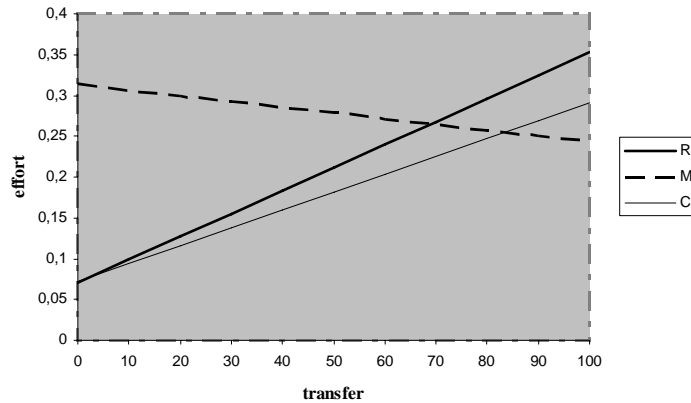
t_i ; *Female*, a dummy variable equal to one if i is a female and zero otherwise; *Female* multiplied by t_i . The non-parametric tests performed previously highlight differences in behaviour across treatments that should be reflected in the coefficients of the variables *negative emotions* and *negative emotions x transfer*. Player's gender is the only observed characteristic we can include in the estimation, the distribution of gender being nonetheless approximately the same between the pooled neutral and negative treatment and the negative treatment. Table 4 below reports the results of our estimation.

Table 4 - Regressions with pooled data, random effects, N = 132, R2 = 0.150

	coefficient	t-statistic	p-value
Constant	0,0784 0,0500	1,5680	0,1194
Transfer	0,0028 0,0010	2,7436	0,007
Negative emotions	0,2410 0,0738	3,2667	0,0014
Negative emotions x transfer	-0,0033 0,0014	-2,3370	0,0210
Female	-0,0101 0,0643	-0,1567	0,8758
Female x transfer	-0,0007 0,0013	-0,5499	0,5833

We first observe the coefficient of the variable *transfer* which is, as expected, positive and significant at the 1% level. We are mostly interested in the coefficients related to the emotional affective state: *negative emotions* and *negative emotions x transfer*. As can be shown from table 4, these coefficients are both significant and can be used to precise the relationship between negative emotions and behaviour. The variable *negative emotions* is strongly positive and highly significant; the coefficient equals 0.24. Therefore, players B with negative emotions choose higher levels of efforts, no matter what transfer they receive. However, the variable *negative emotions x transfer* appears to be negative and highly significant; the coefficient equals -0.003 . Therefore, second movers endowed with negative emotions such as indignation or guilt feelings do not adopt any reciprocal behaviour. Figure 2 below summarizes these results, using the estimates from our regression analysis. While the positive relationship between transfers and effort is confirmed for the neutral and positive treatments ("C" and "R"), we observe that effort do not increase at all in transfer payment in the negative emotional condition ("M").

Fig 2 : Relationship between effort and transfer by treatments



As already emphasized by KRR, our results confirm the importance of the difference between reciprocity and generosity. In general, reciprocity means the non-strategic conditional willingness to reward kind acts (positive reciprocity) and to punish unkind ones (negative reciprocity) even if this is costly to reciprocate. Therefore, reciprocity must be distinguished from generosity or pure altruism. Whereas the former means a conditional behaviour, the latter implies an unconditional kindness. Technically, in the gift-exchange game, positive reciprocity is measured by the slope of the relationship between transfer and effort so that higher effort rewards a larger transfer. By contrast, generosity, which corresponds to effort incurred even when no transfer is received, is measured by the intercept of the effort-transfer relationship. The presence of strong generosity behaviour in the negative emotion treatment implies that, whatever the transfer they receive is, subjects with negative emotions choose in average higher effort than players with positive or neutral emotions. In our experiment, subjects who experience, before the beginning of the game, positive or neutral emotions do reciprocate whereas subjects overwhelmed with indignation, anger or guilt feelings show a very strong unconditional generous behaviour but do not adopt any reciprocal behaviour¹⁴.

4. Discussion: why should indignation lead to more generous behaviour?

Summarizing, by adopting the emotional induction technique, we find that emotions have a strong and significant effect on behaviour in our gift-exchange game. Specifically, moral behaviour changes in response to induced negative emotions. In our experiment, second movers who undergo indignation, anger or guilt feelings, before playing the game, do not show any usual conditional reciprocal behaviour but instead adopt a very strong and striking unconditional generous behaviour. We believe that our results are consistent with the “affect-as-information” social psychology model (Schwarz and Clore, 1983) which suggests that individuals who feel bad will evaluate their judgments differently. Although the “affect-as-information” model was originally developed to explain the impact of relatively free-context mood on judgment, Ketelaar and Au (2003) have recently shown that the affective cues of

¹⁴ Briefly, we also notice from table 3 that the average first mover’s payoff is 44 percent higher in the “M” treatment than in the “R” condition (U-test, p-value = 0.021, one-tailed): players’ B generosity allows their partners to obtain much more experimental points than players’ B reciprocity. However, we calculate that, on average, it costs much more to adopt an unconditional generous behaviour in the “M” treatment (5.1 experimental points) than to reciprocate in the “R” condition (2.6 experimental points). Nonetheless, in spite of their costly behaviour, second movers with negative emotions do better than second movers with positive ones.

specific emotions probably serve a similar informative function in a bargaining social context. Their findings suggest that guilt will serve as meaningful information to individuals who had violated an important social norm (for instance by not cooperating). In their first study, they show that, as claimed by Frank (1988), emotions are capable of provoking individuals to behave in ways that run contrary to their immediate self-interests in a repeated prisoner's dilemma game. Interestingly, the influence of emotions on behaviour may occur even if individuals are unaware of the source of their feelings¹⁵. In study 2, Ketelaar and Au (2003) observed that the vast majority of participants who reported feelings of guilt after negotiating an unfair proposal in an ultimatum game changed their strategy one week later and made a more generous offer to the same negotiation partner. By contrast, the majority of individuals who made similarly unfair proposals, but reported no feelings of guilt, continued adopting this strategy one week later. These results are thus consistent with the idea that the cognitive appraisal structure of guilt can help the individual in providing information about the long-term cost of unfairness in a repeated ultimatum game¹⁶.

A more precise interpretation of these results can help us to explain the behaviour of our own subjects. Indeed, in study 2, it is clear that emotion functions as an instructive feedback (Baumeister et al., 2007). First came the prior act, then guilt, and the guilt in turn prompted a change in later behaviour, which was chosen to avoid further guilt. Guilt urged the individual to reflect on what he or she had previously done and to revalue in light of social or moral norms his unfair decision. Therefore, he could probably extract lessons about how a different fair proposal might have yielded a better emotional outcome. The lesson was stored in memory along with some affective residues in the body, which Damasio (1994) terms "somatic makers". One week later, the affective residue – a brief twinge of guilty affect – became activated in a similar situation and led to a change in subsequent behaviour. In this case, guilt served usefully as a stimulus to a cognitive revision process. It signalled that one's behaviour was not successful and consequently suggested that it needed to be revised. The achievement of this cognitive revision had an explicit emotional consequence: when the same (bargaining) situation was repeated, emotion did not reappear, or perhaps only in a weaker way. So, the driving force for learning this moral lesson was the conscious emotion and the wish to avoid feeling guilty again on future, similar occasions. In that view, moral emotions (like other emotions) stimulated counterfactual thinking, helped subjects to learn from their mistakes and signalled that their behaviour, belief or even preference, was in conflict with their real environment.

In our experiment, we believe that the main purpose of negative emotions is also to influence indirectly behaviour by contributing to the revision cognitive process. However, two main characteristics of our experiment necessarily modify the previous interpretation. Firstly, the gift-exchange game was playing only once. Secondly, the emotional induction procedure took place before subjects played the game whereas, in Ketelaar and Au's (2003) first study, players were guilt-induced after numerous trials of the prisoner's dilemma game¹⁷.

¹⁵ Thus, individuals who undergo guilt feelings produced by an experimental "guilt induction" (i.e., writing a story) can "misattribute" their negative affect to their evaluation of the initially attractive option of defection. This occurs because defection is often seen as a blameworthy violation of cooperation. Consequently, subjects in the guilt condition display higher levels of cooperation compared to subjects in the control condition.

¹⁶ Interestingly, Ketelaar and Au (2003) noticed that these emotion effects were observed even though the reported intensity of guilt feelings was low. Therefore, we can assume that it is probably not just the intensity of affective feelings that motivates fairness or cooperation and that the presence (or the absence) of the cognitive affective information can also induce moral values.

¹⁷ Therefore, a long lasting cognitive revision wasn't possible in our experiment. Moreover, the subjects who behave selfishly hadn't any chance to show after their prior decision that the emotional moral lesson they might have learned by playing the game had lead them to adopt afterwards a more kind or reciprocal behaviour.

From our own point of view, two mechanisms can explain the unconditional kind behaviour appeared in the “M” treatment. We first resort to the important role of anticipated emotion. We then turn to the genuine intuition that was at the starting point of the experimental design.

In fact, the view of emotion as a feedback system suggests that anticipation of emotional outcomes when the individual is currently already experiencing emotion may have played a role in steering the second movers away from choosing the minimal effort. In particular, an unpleasant negative emotion may have motivated the subject in the “M” treatment to act in ways that held the promise of mood repair. Negative emotions (or even bad mood) lead indeed to a wish to feel better and consequently individuals are eager to engage in a variety of prosocial behaviours aimed at producing change in their emotional states. However, the effects of mood on behaviour are still unclear in the psychological literature¹⁸. It may be difficult to disentangle these effects in an economic experimental context. We can probably only assume that bad mood may push individuals to adopt prosocial behaviours as a stratagem to make them feel better. The question about what kind of prosocial behaviours it may be seems to be unsettled. As a matter of fact, in our experiment, negative emotions seem to promote generosity whereas in KRR's experiment bad mood seem to cause reciprocal behaviour. In all cases, kindness or reciprocation are probably done to produce a change in mood.

The psychological distinction between emotion and mood can be here very useful to spin out our interpretation. This distinction points out that emotions are triggered by an identifiable event whereas moods are generally not focused on a specific cause (Frijda, 1986). In our experimental design, as expected, indignation feelings were successfully triggered by the impressive obedience experiment results. Our genuine intuition was that indignation or anger feelings would be able to provoke individuals to adopt moral behaviours. We anticipated that induced indignation could influence indirectly behaviour in this context. However, as assumed previously, we can't assert that the main purpose of indignation is to change behaviour by contributing to the revision process. Most emotions contribute to the cognitive revision process, while signalling that our behaviours or preferences are in conflict with our real environment. Then the revision process helps us to cope with our environment while the completion of the revision leads to accommodation, a long-term habituation which implies that emotion does not reappear, or only in a weaker way. However, indignation is not likely to be subject to accommodation. On the contrary, indignation does resist accommodation thereby revealing that one of our fundamental priorities is at stake. For instance, we can be sure that we are still prone to fight injustice as we realize that unfair situations still trigger our indignation. Put differently, our real moral values are revealed by the fact that emotion resists accommodation (Livet, 2001).

In our negative emotional treatment, we observe essentially that second movers adopt an unconditional generous behaviour and do not reciprocate at all. We argue that indignation does lead them to sustain generosity rather than reciprocity. In fact, we shouldn't be surprised that a moral emotion *leads* to a moral behavioural change. As recently highlighted by Elster (2006), moral values tell us to assist unconditionally anyone in distress. Moral values can thus be proactive while social norms are more reactive. Reciprocity has thus indeed a strong conditional aspect in that it is triggered by the behaviour of others. On the contrary,

¹⁸ Although the evidence surveyed in Isen (2000) establishes a positive relationship between good mood and helping behaviour, Cialdini, Darby and Vincent (1973) showed nonetheless that sometimes sadness promotes helping. In a similar vein, Hertel, Neuhof, Theuer and Kerr (2000) found a positive relationship between negative affect and cooperation while on the contrary Konow and Earley (2002) found a positive relationship between good mood and cooperative behaviour in dictator's games.

generosity is typically unconditional. Accordingly, in the “M” treatment, players' B high effort levels do not depend on the amount of the transfer they receive. On the contrary, in the “R” condition, positive emotions seem to strengthen reciprocal behaviour compared with the neutral emotion treatment (see footnote n°14). In a word, indignation permits us to reveal to ourselves our moral values while joy, laughter or elation feelings are more likely to promote a social norm of reciprocity. Comparatively, we do not expect sadness to cause unconditional behaviour in the KRR's bad mood design. Sadness is nonetheless capable of strengthening reciprocity because reciprocity does counteract sadness.

Our detailed experimental results allow us to precise the proactive role of indignation. Previously, we have already pointed out differences among the subjects who reported their own emotions in the “M” treatment. Particularly, we show that those who had already seen the movie before (M_{Icare}) reported less intense indignation feelings than the others. Interestingly, we now observe that their emotional moral reaction is less pronounced: those who had already seen the film before choose on average an effort level (0.24) which is lower than the average effort level for the whole treatment (0.28)¹⁹. Hence, the intensity of the emotion does seem to strengthen the behavioural moral change. Besides, we can also consider the behavioural differences between those who had never heard a word about Milgram before the beginning of the experiment (M_{Never}) and those who were aware of the famous obedience experiment context but had never seen the movie before ($M_{\text{Obedience}}$): the former group seems to be more generous than the latter one considering that average effort levels are equal to 0.32 and 0.26 respectively. However, this gap cannot be attributed to any emotional intensity level differences, as far as indignation is concerned (4.3 and 4.4 respectively). Those who were aware of the Milgram experiment before ($M_{\text{Obedience}}$) have nonetheless stronger guilt and shame feelings ((3.1; 3.4) and (2.7; 2.5) respectively). On the other hand, they seem to be less angry than the others (2.6 and 3.1 respectively) and less surprised (3.0 and 4.5 respectively). Thus, as a first attempt, these results could help us to precise the whole impact of indignation on moral behaviour: there would be a cognitive conscious effect added to an impulsive rather unconscious one. We believe that those who already knew the obedience experiment moral consequences are able to sustain consciously their genuine moral values. However, indignation is even much more capable of triggering moral reactions when subjects are dumbfounded from an impressive moral situation.

Summarizing, the impact of indignation suggests why generous moral behaviour rather than reciprocal one thus emerges in the “M” treatment. More often, moral emotions (like guilt and shame) help subjects to learn from their mistakes and signal that their behaviour is inappropriate. However, indignation has a strong proactive force which allows subjects to reveal to themselves their own true values. Besides, indignation may have even more the strong capacity to push individuals to put their values in concrete form.

5. Conclusion

Our experiment is about the role of emotions and values in a one-shot gift-exchange game. Briefly, we find that there are significant differences in the behaviour that followed our emotional-induction procedure. Players with positive or neutral emotions and players with negative ones differ along two dimensions: reciprocity and generosity. While we find usual reciprocal behaviour among subjects with positive or neutral affective feelings states, individuals who feel negative ones do not give much as a function of what they received.

¹⁹ Notice however that their effort behaviour still remains significantly different compared with the neutral treatment (U-test, $z=1.73$, $p\text{-value} = 0.042$, one-tailed) or even with the positive treatment (U-test, $z=1.22$, $p\text{-value} = 0.111$, one-tailed).

However, they adopt some unconditional kindness. Based upon psychological theoretical insights, we argue that indignation leads those subjects to reveal their genuine values. As already pointed out by Levitt and List (2006), we find that the subjects who are overwhelmed with strong negative feelings such as anger or indignation are driven by an individual's desire to "do the right thing" or make the "moral" choice. Our study is consequently a first step in order to understand which specific emotions are capable of influencing moral behaviour in a rather specific experimental context.

Finally, our analysis has some useful political implications in numerous domains such as consumption, public health or environment. In line with recent psychological research, fear-appeal communications have been used recently to curb undesirable social behaviours such as smoking, drug use, and so on. From our own point of view, our study implies that other negative emotions such as guilt or indignation feelings could be used successfully in order to promote safety devices, over-the-counter diet programs or even environmental values.

References

- Andreoni J. (1990). Impure altruism and donations to public goods: a theory of warm glow giving. *Economic Journal* 100, 464-477.
- Baumeister R. F., Vohs K., DeWall N. & Zhang L. (2007). How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation. *Personality and Social Psychology Review* 11, 167-202.
- Ben-Shakhar G., Bornstein G., Hopfensitz A. & van Winden (2007). Reciprocity and emotions in bargaining using physiological and self-report measures. *Journal of Economic Psychology* 28, 314-323.
- Blount S. (1995). When Social Outcomes Aren't Fair: The Effect of Causal Attributions on Preferences. *Organizational Behavior and Human Decision Processes* 63, 131-144.
- Bolton G. & Ockenfels A. (2000). ERC: a theory of equity, reciprocity, and competition. *American Economic Review* 90, 166-193.
- Bosman R., Sutter M. & van Winden F. (2005). The impact of real effort and emotions in the power-to-take game. *Journal of Economic Psychology* 26, 407-429.
- Brañas-Garzas P. (2007). Promoting helping Behavior with framing in dictator games. *Journal of Economic Psychology* 28, 477-486.
- Capra C. M. (2004). Mood-Driven Behavior in Strategic Interactions. *American Economic Review* 94, 367-372.
- City Lights (1931). Director: Charlie Chaplin. DVD. Charles Chaplin Production.
- Charness G. (2004). Attribution and Reciprocity in an Experimental Labor Market. *Journal of Labor Economics* 22, 665-688.
- Cialdini R. B., Darby B. L. & Vincent J. E. (1973). Transgression and altruism: A case for hedonism. *Journal of Experimental Social Psychology* 9, 502-516.
- Damasio A. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Grosset/Putnam.
- Dufwenberg M. & Kirchsteiger G. (2003). A theory of sequential reciprocity. *Games and Economic Behavior* 47, 268-298.
- Elster J. (1998). Emotions and Economic Theory. *Journal of Economic Literature* 36, 47-74.
- Elster J. (2006). Fairness and Norms. *Social Research* 77, 365-376.

- Fehr E., Kirchsteiger G. & Riedl A. (1993). Does Fairness Prevent Market Clearing? An Experimental Investigation. *Quarterly Journal of Economics* 108, 437-459.
- Frank R. H. (1988). *Passions with reason: The Strategic role of the emotions*. NY: Norton.
- Frijda N. (1986). *The Emotions*. Cambridge University Press.
- Hertel G., Neuhof J., Theuer T. & Kerr N. (2000). Mood effects on cooperation in small groups: does positive mood simply lead to more cooperation? *Cognition and emotion* 14, 441-472.
- I come Icare (1979). Director: Jean Verneuil. Videocassette. Les productions du Tigre.
- Isen A.M. (1984). Toward understanding the role of affect in cognition. In R. S. Wyers & Srull T. K. (Eds.), *Handbook of social cognition* (vol. 3, 179-236), Hillsdale, NJ: L. Erlbaum.
- Isen A. M. (2000). Positive affect and decision making. In: Lewis M., Haviland-Jones J. M. (Eds.), *Handbook of emotions*, 2nd ed. The Guilford Press, New York and London, 417-435.
- Ketelaar T. & Au W. T. (2003). The effects of guilt feelings on the behaviour of uncooperative individuals in repeated social bargaining games: An affect-as-information interpretation of the role of emotion in social interaction. *Cognition and Emotion* 17, 429-453.
- Kirchsteiger G., Rigotti L. & Rustichini A. (2006). Your morals might be your moods. *Journal of Economic Behavior & Organization* 59, 155-172.
- Konow J. & Earley J. (2002). The Hedonistic Paradox: Is Homo Economicus Happier? Mimeo, Loyola Marimount University.
- Levitt S. D. & List J. A. (2006). What Do Laboratory Experiments Tell Us About the Real World? Working paper, University of Chicago.
- Lin C-H., Chuang S-H., Kao D.T. & Kung C-Y. (2006). The role of emotions in the endowment effect. *Journal of Economic Psychology* 27, 589-597.
- Livet P. (2001). Emotions associated to cognitive revision as a basis for values. In: Kaszniak A. (Eds.), *Emotions, Qualia, and Consciousness*, University of Arizona, USA.
- Milgram S. (1974). *Obedience to Authority*. McGraw-Hill.
- Ortony A., Clore G. L. & Collins A. (1988). *The Cognitive Structure of Emotions*. Cambridge, Cambridge University Press.
- Pillutla M. N. & Murnighan J.K. (1996). Unfairness, Anger, and Spite: Emotional rejections of Ultimatum Offers. *Organizational Behavior and Human Decision Processes* 68, 208-224.
- Schwarz N. & Clore G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology* 45, 513-523.
- Schwarz N. & Clore G. L. (1996). Feelings and phenomenal experiences. In E. Higgins, A. Kruglanski (Eds.), *Social Psychology: Handbook of basic principles*, NY: Guilford Press.
- Werstermann R., Spies K., Stahl G. & Hesse F. W. (1996). Relative effectiveness and validity of mood induction procedures: a meta analysis. *European Journal of Social Psychology* 26, 557-580.

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