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Your morals might be your moods

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Abstract

We test the effect of mood on behavior in a gift-exchange game. To induce a 'bad mood', second movers watched a sad movie before playing the game; to induce a 'good mood', they watched a funny movie. Mood induction was effective: subjects who saw the funny movie reported a significantly better mood than those who saw the sad movie. These two moods lead to significant differences in behavior. We find that a bad mood implies more reciprocity while a good mood implies more generosity. Furthermore, first movers make more money when second movers are in a bad mood.

JEL classification: C73; C93; L83

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1. Introduction

Although many economists may agree that mood and emotions have a significant influence on behavior, most may feel they have nothing to do with rational decision-making and

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should be left out of the realm of economics. A milder position is that mood and emotions[1] produce noise around some average behavior that is predicted by rational decision-making, but are useless in trying to provide more accurate predictions. Our main conclusion is that there is strong empirical evidence against the hypothesis that mood and emotions do not affect behavior systematically in economic situations. Furthermore, we measure how a specific mood makes a difference: individuals in a good mood respond to the behavior of their opponents much less than individuals in a bad mood.

While the relationship between affect and behavior is a central theme of modern psychology (see Zajonc, 1998; Lewis and Haviland-Jones, 2000, as Elster, 1998 notes, emotions have been generally neglected by the economics profession.[2] One reason for this is probably the lack of evidence on the role that emotions play in influencing behavior.[3] Our objective is to take a first step toward filling this void. Our first claim is that mood produces a shift in the mean behavior, and therefore it is useful in predicting actions of economic agents. This, however, is not enough.

Evidence of a systematic shift is necessary to justify the introduction of emotions into economic theory. Even if one is convinced that emotions should be considered by economists, there is no evidence to suggest what the actual effects are. For example, arguing that emotions are relevant for decision-making, Loewenstein (2000) suggests they can be incorporated using a "state-dependent" utility function. In order to do this appropriately, though, one needs to know how this state dependency works in detail. For example, the marginal utility of consumption can be positively or negatively affected by a bad mood, and no model with emotions can be operationalized until we know which of these alternatives to use. Therefore, by measuring accurately how different moods change the way subjects behave in an experiment, we provide a necessary step towards the adoption of theoretical models.

We study the interaction of moods and behavior using a methodological approach common in experimental psychology; some external stimuli are employed to make the subjects feel a particular way. To influence individuals' emotional states, we adopt the *mood induction* procedure considered most successful in psychology since it employs audio-visual stimuli (see Westermann et al., 1996 for a comprehensive comparison of mood induction procedures.) Subjects watch a short excerpt from a movie that is meant to induce one of two moods. A funny movie induces a positive affect state that, for simplicity, we call "good mood". A depressive movie induces a negative affect state that, again for simplicity, we call "bad mood".[4] After mood induction has taken place, subjects take part in an economic experiment so that we can verify whether different induced moods are reflected by different behaviors.

[1] Psychologists typically distinguish between emotions and mood, the former denoting transitory and specific feelings and the latter a generally unspecific and longer lasting psychological state (for a discussion, see Davidson, 1994; Frijda, 1994). However, since our work does not rely on this distinction, we use the terms interchangeably.

[2] There are a few notable exceptions, such as Loewenstein (2000), Hirshleifer (1987) and Frank (1988).

[3] In fact, Elster argues that "The more urgent task is to understand how emotions interact with other motivations to produce behavior." (Elster, 1998, 73).

[4] The literature reviewed in Westermann et al. shows that similar movies produce similar moods, so the mood induction procedure is not too sensitive to the specific movie chosen. A similar point is also made by Gross and Levenson (1995).

The economic experiment is based on the gift-exchange game, which is similar to the investment game. This game is played by two individuals acting sequentially. The first mover has a sum of money and can transfer some of it to the second mover. The second mover receives the transfer and then chooses an effort level. Higher effort is more costly to the second mover, but it increases the first mover's payoff. Using this game, the following behavior has been documented in a variety of different settings, second movers exert effort even when it implies a positive cost and no benefit.[5] These studies have also highlighted how reciprocal behavior emerges in this game; second movers effort is increasing in the transfer they receive.[6] These results have been rationalized using theories that highlight the interaction between purely 'selfish' and more 'moral' aspects of preferences.[7]

In our experiment, the mood of second movers in the gift-exchange game is manipulated. Before starting the game, we induce either a good mood or a bad mood. We first record the evaluation that subjects give of their own mood and find that those in the first treatments significantly more often consider themselves in a better mood than those in the second treatment. This evidence justifies the use of the term 'happy' and "sad" in the rest of the analysis. We then observe subjects' behavior. Players' choices differ across moods. In other words, if the mood is seen as a 'treatment' variable, effort choices are significantly different across treatments. In a bad mood, effort depends positively on the transfer received. This behavior is consistent with the reciprocal behavior typically observed in the gift-exchange literature. In a good mood, this dependence is much weaker. Surprisingly, players in a good mood reciprocate much less than players in a bad mood; in fact, they almost do not reciprocate at all. Fig. 1 summarizes these conclusions, using the results from our regression analysis.

These results are interesting for a variety of reasons. First, we document a strong interaction between mood and behavior in an economic environment. Bosman and van Winden (2002), Bosman and Riedl (2003), and Charness and Grosskopf (2001) also attempt to analyze this interaction. The former, though, only looks at emotion produced as a consequence of the interaction among two players. Our study goes in the opposite direction since we ask what the behavioral consequences are of specific moods. Bosman and Riedl, and Charness and Grosskopf are similar in this respect since they ask subjects about their mood before choices are made. However, Charness and Grosskopf do not influence the mood of subjects as we do. As a consequence, they find a weak relationship between emotions and behavior. By adopting the mood induction technique developed in psychology, we instead find moods have a strong effect on behavior. This difference highlights the usefulness of experimental psychology techniques for economics when one wants to study psychological phenomena.

[5] For a recent survey of this evidence, see Fehr and Gächter (2000).

[6] Reciprocal behavior in a different setting is studied in Berg et al. (1995).

[7] Altruism and inequity aversion theories assume preferences depend on others' payoffs as well as one's own payoff. For example, Fehr and Schmidt (1999) and Bolton and Ockenfels (2000) assume that some players' utility function includes as argument some measure of the distribution of payoffs among players, and they are averse to inequity. Reciprocity models use psychological games (introduced by Geanakoplos et al., 1989) and assume preferences depend on one's own payoff and beliefs about others' play. For example, Rabin (1993) and Dufwenberg and Kirchsteiger (2003) assume individuals like to return intentionally kind or unkind actions with actions of the same type. Finally, Charness and Rabin (2002), and Falk and Fischbacher (in press) propose a model where both intentions and the actual distribution of payoffs matter.

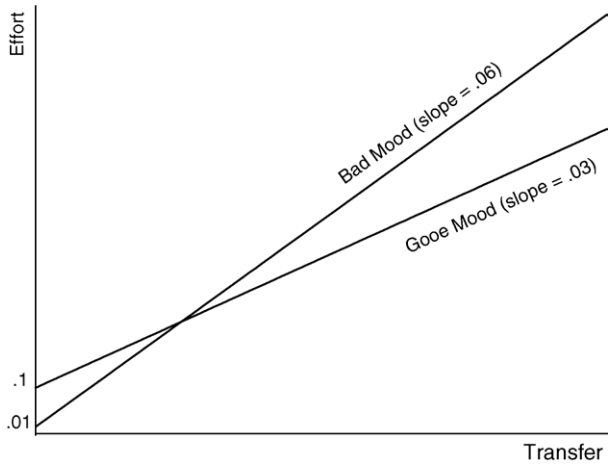

Fig. 1. Relationship between effort and transfer by mood.

Bosman and Riedl do not use these techniques, but they apply random monetary payments to induce mood. Furthermore, in their setup (first price sealed-bid auction) does not allow to test whether mood has an impact on moral behavior.

Second, we find that moral behavior changes in response to induced moods. This observation may be disturbing in itself. In addition, some assumptions underlying the theoretical research on reciprocity must now be reconsidered. Moral preferences are not stable with respect to a simple perturbation of the environment; they change with a player's mood.[8] In fact, we show that one's morals depend on one's moods. This effect is rather large and surprising since the good mood treatment in our experiment is the only case we are aware of in which reciprocal behavior is almost absent in the gift-exchange game.

Third, the lack of reciprocal behavior in a good mood implies that when the transfer received is high, subjects in a bad mood choose higher effort. Since high transfers are relatively more common, this difference in effort yields the conclusion that in our gift-exchange game first movers who face subjects in a bad mood as induced by our procedure do better than first movers who face subjects in a good mood. The effect is significant and large: the payoff of the first mover may change by roughly 30 per cent according to mood of the opponent. This result seems to contradict the findings in Bewley (2000); there, employers say they do not lower wages fearing the impact of employers' bad mood on productivity. A comparison is difficult, however, because in our case the bad mood is exogenous to the relationship between the players; in the case Bewley describes, it is caused by one of them.

Although our results may seem unsettling to economists, psychology offers a setting to put them into context. A large literature studying mood and behavior finds, with few exceptions, a positive correlation between good moods and helping (see, for example, Carlson et al., 1988; Morris, 1989; Isen, 2000). Individuals in a good mood appear more generous. The

[8] Some scholars argue forcefully that stability is necessary for a theory of behavior based on preferences to be interesting. For instance, see Becker (1976) and Stigler and Becker (1977).

negative relationship we find between good mood and reciprocity is not inconsistent with these findings. In fact, our study emphasizes the importance of the difference between reciprocity and generosity. In the gift-exchange game, the former is measured by the slope of the effort-transfer relationship while the latter is measured by the intercept of this relationship. Generosity corresponds to effort incurred even when no transfer is received, while reciprocity corresponds to higher effort that rewards a larger transfer. Since helping behavior is distinct from reciprocal behavior, we present a novel extension of the implications of mood on behavior. An economic experiment can thus extend and clarify some standard finding in psychology, highlighting the usefulness of using an experimental economics framework for psychology.

The remainder of the paper is divided as follows. Section 2 presents the experimental design in detail, including the mood induction procedure. Section 3 presents the empirical results and measures the effect of mood on behavior. Section 4 concludes.

2. Experimental design

Each experimental session consisted of several rounds of the gift-exchange game. These were preceded by a mood-induction phase involving a subset of the subjects. All sessions took place at Tilburg University, The Netherlands, in June 1999 and May 2000. The experiment uses only pen and paper, and all materials related to it were in English.[9]

The game is played sequentially by two players. In the first stage, player 1 (the first mover) receives a fixed sum of money and transfers some of it to player 2 (the second mover). In the second stage, the second mover learns the transfer and then decides an effort level. Effort is costly to player 2 but beneficial to player 1.[10] In particular, for any given transfer, higher effort reduces player 2's payoff but increases player 1's payoff.

Let t denote the transfer chosen by player 1 and e denote the effort chosen by player 2. t can be any integer between 0 and 15, while e is a fraction between 0.1 and 1. The monetary payoffs are as follows:[11]

Player 1 makes

$$P_1(t, e) = (15 - t)e,$$

while player 2 makes

$$P_2(t, e) = t - c(e).$$

[9] The materials, including instructions and various questionnaires, are available online on the website of this journal.

[10] In the instructions, we use the term "conversion rate" to avoid negative perceptions. Here, we revert to the more intuitive name "effort."

[11] The unit of account is the Dutch Guilder; it was worth approximately half a US dollar when the experiment took place.

The cost function $c(e)$ is increasing and convex; its values for each possible effort are

e	$c(e)$
0.1	0.0
0.2	0.2
0.3	0.4
0.4	0.8
0.5	1.2
0.6	1.6
0.7	2.0
0.8	2.4
0.9	3.0
1.0	3.6

In a session, subjects play this game for a fixed number of rounds. During all rounds, each subject maintains the role of player 1 or 2. Players are always matched anonymously. The matching follows a round robin procedure so that a subject plays only once with each possible partner. Therefore, the number of rounds depends on the number of subjects in a session. We had sessions with 16, 14, 12, and 10 players, corresponding to 8, 7, 6, and 5 rounds, respectively. The only information players receive is the play of their counterpart in a round. In particular, players cannot observe the action of other pairs or the actions of their partners in previous rounds.

At the beginning of a session, subjects are randomly assigned the role of player 1 or 2 and then provided with the instructions for the gift-exchange game. These are read aloud by an experimenter in front of all participants. Afterwards, subjects answer a control questionnaire to check their understanding of game and the way payoffs are determined.

At this point, the mood induction phase begins. Subjects are told that player 2 will watch a short sequence from a movie. Therefore, player 1 leave the room to make this possible. At this point, two different treatments are possible. In the bad mood treatment subjects watch a sequence from *Schindler's List*, directed by Steven Spielberg, lasting approximately 5 min.[12] In the good mood treatment subjects watch a sequence from *City Lights*, directed and interpreted by Charles Chaplin, lasting approximately 5 min.[13] The content of each sequence is meant to induce a negative or positive affect state respectively.[14] The use of sequences from commercial movies and their choice is entirely consistent with common practice in experimental psychology.

At the end of the 5 min movie sequence, subjects answer a brief questionnaire related to the movie and their mood. Player 1 then come back into the room and the gift-exchange game starts.[15] After the game is played, all subjects answer another brief questionnaire aimed at

[12] The sequence is known as "liquidation of Krakow ghetto": it shows the Nazi troops ejecting families from their homes, making prisoners, and killing people. A more detailed description is in Supplementary data.

[13] The sequence is known as the "boxing fight": an hilarious episode with Charlie Chaplin dancing around the ring to avoid to punches of his opponent. A more detailed description is in Supplementary data.

[14] Before the projection players were only informed that they were going to watch a 5 min sequence from a movie, but they were not told which movie they were about to see.

[15] First movers waited in another room while the movie was shown. No communication among them took place during this time, and they were not told which movie second movers were watching.

collecting information about their mood. At this point all subjects are paid, privately and in cash, the amount won in each round they played.

2.1. Analysis of the game

Assuming players only care about their own earnings, the gift-exchange game has a unique sub-game perfect equilibrium. In the second stage, player 2 chooses the lowest feasible effort level. Anticipating this strategy, player 1 chooses the lowest feasible transfer. Hence, the only sub-game perfect equilibrium is composed of a transfer $t = 0$ and an effort $e = 0.1$ independent of the transfer of the other player.[16] However, abundant experimental evidence shows that many subjects do not play this way: player 2 chooses on average $e > 0.1$, and there is a positive relationship between e and t. A variety of different theoretical approaches have been developed to capture these additional motives.

These theories can be divided into three rough categories. In models of *altruism* the income of another person enters positively into the player's utility function (see for example Andreoni, 1990). In models of *fairness* the agent's preferences depend positively on her earnings as well as on the fairness of the whole income distribution across players (see, for example, Fehr et al., 1993; Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). In models of *reciprocity* individuals want to return positive and negative favors (see Rabin, 1993; Dufwenberg and Kirchsteiger, 2003). More recently, Charness and Rabin (2002) have constructed a theory that encompasses both distributional concerns and reciprocity motives.

Summarizing, experiments show that frequently players do not maximize their monetary payoffs. Many theoretical models interpret this evidence by assuming that players' behavior is motivated by a desire for fairness, altruism, and/or reciprocity. In other words, these theories suggest that individuals do not only care about narrow self-interest; moral norms shape their behavior. In some sense, our experiment presents a simple stability test of the preferences proposed by these theories. We modify players' moods, a characteristic of the environment that should have no effect on individuals' choices, and see whether this is indeed the case. As it turns out, moods change moral behavior, and hence all the theories fail this stability test.

3. The evidence

One hundred and thirty undergraduate students (46 of whom were female) from Tilburg University participated in the experiment. There were 10 sessions, 5 for each mood, with a number of subjects per session varying between 10 and 16. Overall, the data consist of 437 observations of the gift-exchange game presented in the previous section.[17]

Since the aggregate results do not differ substantially from those in the gift-exchange literature, we discuss them only in Supplementary data, which is available on this journal's

[16] This outcome yields the lowest sum of payoffs for the players. Since this sum is equal to: $15e + t(1 - e) - c(e)$, the pair that maximizes it is minimum effort and maximum transfer, that is $e = 0.1$ and $t = 15$.

[17] For a table reporting the entire data, see this journal's website.

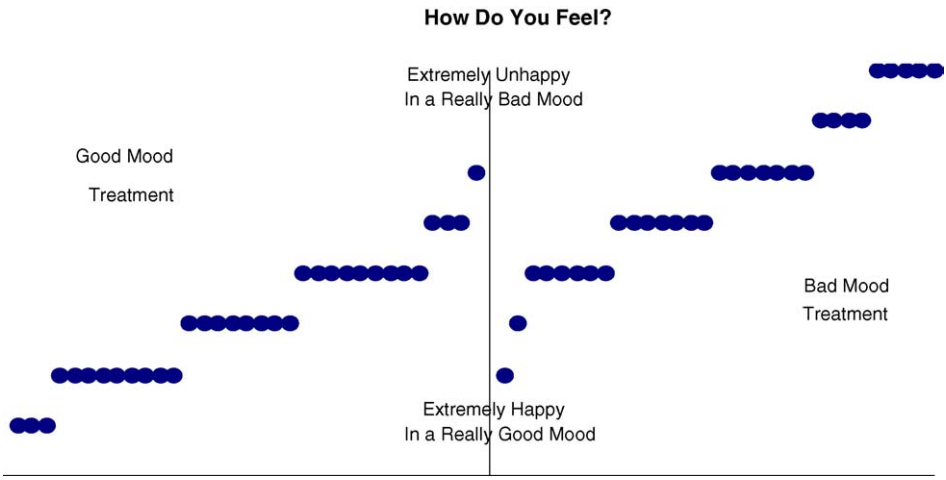

Fig. 2. Self-reported mood of second movers.

website.[18] Here, we focus on mood and behavior. We start from the mood induction procedure and then look at players' choices. The main result is that different moods induce significantly different behavior. This difference is first assessed in non-parametric terms and then measured more precisely using regression analysis. Throughout we concentrate on the behavior of the players who participated in the mood induction phase; that is, we analyze the behavior of the second movers. Clearly, given our set up, first movers are influenced by the mood induction procedure only through the choices of the second movers.

3.1. Mood induction

In this section, we show that the mood of subjects is affected by the movie. This step is important to establish that a difference in behavior among the two treatments is a consequence of the subjects' mood, as manipulated by the experimenters. The simplest measure of this phenomenon is given by the subjects description of their own mood. After seeing the movie, but before playing the game, second movers complete a questionnaire containing the question "How do you feel?"[19] Subjects can choose along an 8-point scale ranging from "1: extremely happy, in a really good mood" to "8: extremely unhappy, in a really bad mood". The average answer in the bad mood treatment is 5.6 (with a standard deviation 1.6), while it is 3.1 (standard deviation 1.3) in the good mood treatment. Fig. 2 shows the answer of each of the 65 individuals who participated in the experiment as second movers. On the left side are the individuals in the good mood treatment; on the right side are the individuals in the bad mood treatment. Along the vertical axes, higher points correspond to worse self-reported mood. Visually, the distribution of answers appears higher in the right side of the graph, suggesting that subjects in the bad mood treatment are in a worse mood.

[18] For the evidence on gift-exchange experiments, see Fehr et al. (1993), Charness (2000), and Charness and Haruvy (2002).

[19] The entire questionnaire is found in Supplementary data.

Table 1
Summary statistics by mood

	Round	Transfer		Effort		Cost to transfer ratio	
		All	First	All	First	All	First
Good mood	Mean	5.068	5.382	0.283	0.282	0.110	0.116
	S.D.	3.32	2.55	0.24	0.22	0.19	0.20
Bad mood	Mean	5.372	5.387	0.322	0.329	0.105	0.108
	S.D.	2.76	2.17	0.22	0.18	0.10	0.08

		Payoff 1		Payoff 2		*N*	
		All	First	All	First	All	First
Good mood	Mean	2.498	2.503	4.508	4.865	238	34
	S.D.	2.08	1.84	3.12	2.36		
Bad mood	Mean	2.747	2.977	4.720	4.761	199	31
	S.D.	1.54	1.31	2.43	1.96		

This impression is strengthened by a non-parametric test. Using the Mann–Whitney procedure, we can test the null hypothesis that self-reported moods are drawn from the same distribution in the two treatments. The Mann–Whitney statistic equals 5.403, and it implies a p-value smaller than 0.0001. Therefore, subjects who participated in the bad mood treatment felt differently than subjects who participated in the good mood treatment. In fact, as hoped, they felt worse. We also measured self-reported mood at the end of the gift-exchange game, but the effect of mood induction is weakened by then.[20]

3.2. Mood and behavior: summary statistics and non-parametric tests

Having verified subjects feel, or at least say they feel, differently as a consequence of the mood induction procedure, we now study their choices. First, we consider some summary statistics for the game. Although important, these statistics hide the effect that different transfer levels have on the choice of effort. Loosely speaking, differences in behavior corresponding to the two treatments must be very strong to turn out significant at this stage. In the next section, we use regression analysis to gauge these effects more precisely. Since actions taken in successive rounds may depend on previous play, we also report the statistics for the first round of play separately. However, there seems to be no significant difference between these observations and the entire data set.

The average values presented in Table 1 show that transfer and effort are slightly larger in the bad mood treatment.[21] These first rough observations highlight different behavior between the two moods. At this point, however, we do not know whether the difference is significant. More refined tests are necessary, beginning with non-parametric tests of equality of distributions, and are presented next.

[20] We asked same "how do you feel?" question, and the Mann–Whitney statistic corresponding to equality of distributions across moods has p-value of 0.7675.

[21] The cost to transfer ratio is defined as $CT = c(e)/t$ and measures how much the second mover sacrifices own earnings to reward the first mover.

Table 2
Wilcoxon–Mann–Whitney tests; H^0 is equal distributions between good and bad mood data

	Effort		Cost to transfer ratio		Transfer	
	All rounds	First round	All rounds	First round	All rounds	First round
z	2.576	1.681	2.317	1.897	1.387	0.354
p-value	0.0100	0.0927	0.0205	0.0578	0.1654	0.7232

	Payoff 1		Payoff 2	
	All rounds	First round	All rounds	First round
z	2.921	1.920	0.893	−0.112
p-value	0.0035	0.0548	0.3717	0.9110

Unless otherwise noted, all the non-parametric tests use the Wilcoxon–Mann–Whitney statistic, which is approximately normally distributed. Table 2 reports zs and p-values for these test. They correspond to two-samples tests that all have the same null hypothesis H^0; the distribution function which generates data in the good mood treatment is the same distribution function that generates the data in the bad mood treatment.

Consider the first movers. Their behavior is not significantly different across moods in the first period of play. This is expected since they were not subject to the mood conditioning procedure. The behavior of second movers, however, is significantly different at a 10 percent level across moods already in the first round. The test for equality of distributions in the first round of play yields a p-value around 0.093 for the effort variable and 0.058 for the cost to transfer ratio. Equality appears unlikely in both cases. The effect of mood becomes significant at a 5 percent level when we consider the whole sample. The hypothesis that the observed sample of efforts comes from the same distribution under good and bad mood can be rejected strongly (p-value 0.01). The same conclusion applies to the cost to transfer ratio (p-value 0.02). Interestingly, the behavior of first movers is weakly affected by the second movers mood (p-value 0.165). This is not unexpected. If one considers roles instead of individuals the game is played repeatedly. Therefore, if the mood of the second movers influences their choices, it can eventually influences the behavior of first movers.

Since the relationship between effort and transfer appears different across the two moods, one wonders how big this effect is in terms of players' payoffs. This can be seen looking at players' payoffs by transfer and mood, as presented in Table 3. Transfers equal to 6, 7 or 8 are chosen in 50 percent of all negative mood observations and 35 percent and of all good

Table 3
average payoffs by transfer and mood

		Transfer										
		0	1	2	3	4	5	6	7	8	9	10
Good mood	Payoff 1	2.52	2.43	1.95	1.74	2.962	2.79	2.83	2.40	2.54	2.96	2.37
	Payoff 2	−0.24	0.78	1.83	2.91	3.68	40.50	5.40	6.37	7.14	7.73	8.75
Bad mood	Payoff 1	1.60	1.48	1.49	2.53	2.20	2.90	3.43	3.26	3.32	2.81	1.67
	Payoff 2	−0.01	0.99	1.97	2.71	3.78	4.51	5.21	6.10	6.85	7.70	9.33

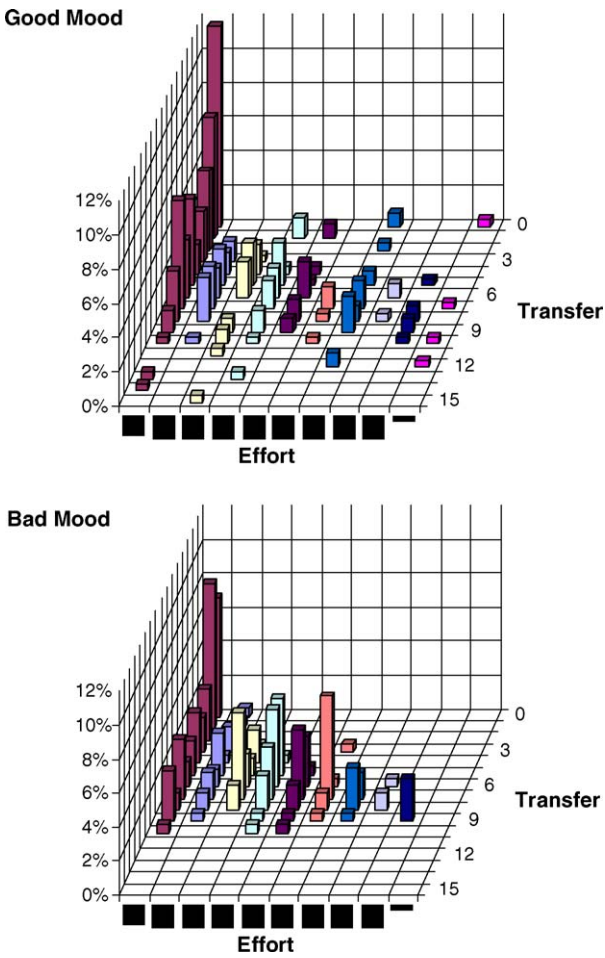

Fig. 3. Comparison between good and bad mood.

observations; furthermore, a transfer equal to seven constitutes the mode in both treatments. In these cases, effort has a sizeable impact on payoffs. Consider a first mover who has chosen a transfer equal to 7. If she faces a good mood opponent, her average payoff equals 2.4; if she faces a bad mood opponent, her average payoffs equals 3.26. This constitutes an increase in payoff of 36 percent. Differences of similar magnitude are obtained for transfers equal to 6 or 8 (21 and 31 percent, respectively). Therefore, a difference in moods implies not only a statistically significant difference in effort, but also a large difference in opponents' payoff.

The histograms in Fig. 3 report the percentage of times each pair transfer-effort was observed in the two treatments. Behavior in the good mood treatment appears relatively more scattered around. In particular, in the bad mood part of the diagram it is easier to observe the positive relationship between effort and transfer typical of reciprocal behavior. We perform a final non-parametric test on the difference between moods using the standard

deviation of effort choices for each transfer level.[22] The result is that effort levels are more unpredictable for individuals in a good mood. The usual Mann–Whitney test yields a p-value of 0.099, confirming a difference significant at a 10 percent level. Some psychologists have found a similar patterns: they suggest different moods influence the volatility of players' choices. For example, Hertel and Fiedler (1994) and Hertel et al. (2000) show that individuals in a good mood display more erratic behavior.

3.3. Regression analysis

In this section we measure more explicitly how the behavior of the second movers depends on mood. This can happen in two different ways. First, the behavior of second movers may differ in the two moods regardless of what first movers do. In addition, second movers may, depending on their mood, react differently to what first movers do. The analysis below shows these effects are both strong and significant.

The first step is to build a regression model to estimate these effects appropriately. Let e_{ir} be the effort chosen by the ith subject in the role of player 2 after seeing transfer t_{ir} of the player 1, who was the partner of i in round r. We estimate the following model:

$$e_{ir} = \alpha + \beta X_{ir} + \nu_i + \varepsilon_{ir}, \tag{3.1}$$

where X_{ir} is a vector of independent variables, ν_i represents unobserved characteristics of individual i, and ε_{ir} is an error term with the usual properties. One can estimate Eq. (3.1) under two different sets of assumptions. If we assume the variables ν are random, with mean zero, uncorrelated with X and ε, then we have the *random-effects model*. If we assume the ν are constant parameters, we have the *fixed-effects model*. The choice between these models may depend on the actual right hand side variables employed.

Our regressors are the following: *Transfer*, a variable equal to the transfer t_{ir} player 2_i receives before choosing effort e_{ir}; *good mood*, a dummy variable equal to one if i was in the good mood treatment and zero otherwise; *good mood* multiplied by t_{ir}; *Female,* a dummy variable equal to one if i is female and zero otherwise; *Female* multiplied by t_{ir}; Transfer ≤ 2 and Transfer $= i$, with $i = 10$–15, dummy variables equal to one when t_{ir} has the appropriate value and zero otherwise. The non-parametric tests of the previous section point to differences in behavior across moods that should be reflected in the coefficients of the variables *good mood* and *good mood* $\times$ *transfer*. Players' gender is the only observed individual characteristic we can include in the estimation.[23] The transfer variables are included to account for possible nonlinearities in the data at low and high transfer levels.[24] The main nonlinearity is due to censoring; to make sure this does not change our conclusions, we also estimated a Tobit model with results similar to the main results we report below.

[22] Given a transfer t, we compute the standard deviation of effort for each mood.

[23] There are 25 females Player 2, 11 in the good mood treatment and 14 in the bad mood. These numbers correspond to 32 and 45 percent of the respective populations. Therefore, the distribution of genders was slightly different across moods.

[24] The 'small transfer' dummy measures whether second movers choose the lowest possible effort unless they receive a large enough transfer. The 'high transfer' dummies are included because large transfer are very infrequent, particularly in the bad mood treatment.

Conspicuously absent from this list are "round" effects; in an alternative specification, we introduced a round variable to measure whether dynamics play a role in our results and concluded they do not.

Modeling ν_i carefully is important for two reasons. First, individuals may have different preferences and thus behave differently in the game. Second, individuals may react in different ways to the mood induction procedure. By introducing individual effects we measure systematic properties of behavior that may be induced by moods. The two estimation procedures are, in this respect, very different. The random effect estimator is appropriate only when there is no correlation between X and ε; otherwise the fixed effect model is necessary. The fixed effect estimator, however, cannot estimate some of the regressors we consider interesting.

This last point can be seen easily. For any variable z_{ir}, let individual and overall means be defined as

$$\bar{z}_i = \frac{\sum_{r=1}^{R} z_{ir}}{R} \text{ and } \bar{z} = \frac{\sum_{i=1}^{I} \bar{z}_i}{I}.$$

Eq. (3.1) implies

$$\bar{e}_i = \alpha + \beta \bar{X}_i + \nu_i + \bar{\varepsilon}_i \tag{3.2}$$

and

$$\bar{e} = \alpha + \beta \bar{X} + \bar{\nu} + \bar{\varepsilon}. \tag{3.3}$$

If we subtract Eq. (3.2) from (3.1) and then add Eq. (3.3) we get

$$e_{ir} - \bar{e}_i + \bar{e} = \alpha + \beta(X_{ir} - \bar{X}_i + \bar{X}) + \bar{\nu} + \varepsilon_{ir} - \bar{\varepsilon}_i + \bar{\varepsilon}. \tag{3.4}$$

Estimation of Eq. (3.4) is equivalent to estimation of Eq. (3.1). The advantage is that the ν_i have dropped out and one need not worry about unobserved individual effects. This fixed effect estimator, however, cannot estimate variables in X that do not change with the round index r, *good mood* and *female* in our case, since they are perfectly collinear with the constant in Eq. (3.4). It can only estimate their interactions with *Transfer*.

Summarizing, there is a trade-off between a more precise evaluation of the effect of the mood induction procedure and the risk of assuming incorrectly that ν_i, X and ε are uncorrelated. If they were, on the other hand, the fixed effect estimator would still provide the right answer since it does not depend on the individual effects. Table 4 below reports the results for both procedures. They do not appear systematically different, which makes us favor the random effect specification since it includes all the regressors of interest.[25] The comments below, then, pertain to the random effects regression.[26]

[25] The Hausman specification test for random effects is equal to 2.71 which for a χ^2 (10) distribution implies a p-value equal to 0.9874. It confirms that the difference between random and fixed effects estimates is not systematic.

[26] In Supplementary data, one can find the results for 'split sample' regressions, where the good and bad mood data are used separately. They are very similar to the one reported for the entire sample. We also tried other specifications, including ordered probit and tobit, to account for particular features of the data. Again, results are very similar to the ones described below and are available upon request.

Table 4
Regressions with pooled data; $N = 437$, $I = 65$

	Random effects			Fixed effects		
	R^2 0.269 coefficient	χ^2 255.27 t	p-value 0.000	R^2 0.239 coefficient	F 24.33 t	p-value 0.000
Constant	0.0144 0.0493	0.292	0.770	0.0687 0.0322	2.13	0.034
Transfer	0.0588 0.0059	9.939	0.000	0.0596 0.006	9.91	0.000
Good mood	0.0837 0.0483	1.760	0.078			
Good mood × transfer	−0.0219 0.0053	−4.157	0.000	−0.0231 0.0054	−4.28	0.000
Female	0.0159 0.0483	0.330	0.741			
Female × transfer	−0.0108 0.0053	−2.048	0.041	−0.0117 0.0054	−2.161	0.031
Transfer ≤ 2	0.0408 0.0323	1.264	0.206	0.0395 0.0328	1.203	0.23
Transfer = 10	−0.0635 0.0487	−1.304	0.192	−0.0657 0.0494	−1.331	0.184
Transfer = 11	−0.0845 0.1501	−0.563	0.573	−0.0678 0.152	60.656	0.656
Transfer = 12	0.2228 0.0921	2.42	0.016	0.2178 0.0935	2.330	0.02
Transfer = 13	−0.1412 0.1153	−1.224	0.221	−0.1239 0.1168	−1.06	0.29
Transfer = 14	−0.489 0.1565	−3.124	0.002	−0.4816 0.1591	−3.026	0.003
Transfer = 15	−0.421 0.1607	−2.620	0.009	−0.4337 0.1644	−2.638	0.009

The coefficients we are most interested in are the ones representing the mood status: *good mood* and *good mood* × *transfer*. Since they are both significant, the regression analysis confirms that mood affects behavior. Their estimates can then be used to gauge this relationship more precisely. The constant is not significantly different from zero. *good mood* is instead positive and significant at a 10 percent level. Therefore, second movers choose higher levels of effort when in a good mood, no matter what transfer they receive. *Transfer* is highly significant and has a positive sign. Second movers' behavior is reciprocal: if the transfer received increases by one they will increase their effort by roughly 0.059. *Good mood* × *transfer* is negative and highly significant; the coefficient equals −0.022. Therefore, although we find evidence of reciprocal behavior consistent with previous studies on the gift-exchange game, good mood players appear very different. They respond about 40 percent less to the transfer they receive compared to players in a bad mood.

3.4. Summary of the empirical analysis: moods and morals

There are significant differences in the behavior that followed our mood induction experiment. Players in a good mood and players in a bad mood differ along two dimensions: generosity and reciprocity. Generosity is measured by the intercept of the regression in Table 4, reciprocity by its slope. They are both different across players' moods. We conclude that moral dimensions of behavior can be significantly influenced by emotional aspects that are completely exogenous to the decision task at end.

When in a good mood, individuals are more generous. They give without necessarily having received. This higher generosity in a good mood is in line with a long-standing literature in psychology. The evidence extensively surveyed in Carlson et al. (1988) and Isen (2000) establishes a positive relationship between good mood and helping behavior.

When in a good mood, individuals are less reciprocal. They give much less as a function of what they received. In fact, individuals in a good mood react to others with only about 60 percent of the intensity displayed by individuals in a bad mood. Their reaction, although significantly positive, is very moderate compared to that of the bad mood subjects. This result is novel and surprising particularly since, based on the previous evidence of a positive relationship between good mood and generosity, one is tempted to imagine a more general positive relationship between good mood and cooperative behavior. For example, Konow and Earley (2002) find a relationship of this kind in dictator's games. Some psychologists, however, have found a positive relationship between negative affect and cooperation (see Hertel and Fiedler, 1994; Hertel et al., 2000) that seems more consistent with our data and more in line with what we find, even though the games in those experiments are much more complicated and difficult to interpret relative to the simple gift-exchange game we used.

4. Conclusions

We test the effect mood has on the behavior of players in a gift-exchange game. There are two main conclusions. On one hand, reciprocal behavior is much reduced in players who went through a good mood treatment. On the other hand, these same players are more generous to others. These results suggest the need for a theory of behavior capable of accommodating the role of moods.

Psychologists' views of the evidence that moods affect behavior are based on cognitive interpretations of the role of moods and emotions. The idea of priming, for example, is used to explain why helping behavior is more frequent in subjects in a good mood. An individual in a good mood expects a more pleasant experience from social interaction and is therefore more willing to help. A second, related idea is mood maintenance. Current happiness depends on present actions and past happiness. Higher past happiness implies higher current happiness. In this setting, individuals in a good mood try to maintain their mood, while individuals in a bad mood try to change their mood. Under appropriate conditions, the optimal way to achieve this target when in a good mood turns out to be helping behavior.[27]

[27] This is the point made in Hermalin and Isen (2000).

Economists may be tempted to incorporate moods and emotions in a way similar to fairness and reciprocity theories. In particular, an individual's utility function can depend on mood. In our view, this extension does not seem promising for two reasons. First, it leads research into a vicious circle with theory trying to catch up with experimental evidence while instead there are good theoretical reasons to assume stable preferences.[28] Second, it increasingly leads into causal, immediate explanations of behavior; we act in a certain way because we have preferences, or norms, or now moods that motivate these actions. A different type of explanation is a functional one, based on the advantage, in terms of fitness (defined by biological or cultural factors), of a behavior.

The explanations of reciprocity provided in many of the papers quoted earlier are causal, not functional. These causal explanations (like the standard utility maximizing explanation in different settings) are not compatible with the environment's effect on behavior that we find here. We find that the intensity of reciprocity is smaller when subjects are in good mood. This result seems to require a new look at the cognitive theories explaining the connection between altruism and moods, or emotions. This should be the subject of further experimental and theoretical research.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2004.07.004.

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[28] For instance, Gary Becker (1976, 12) writes: "The assumption of stable preferences provides a stable foundation for generating predictions about responses to various changes, and prevents the analyst from succumbing to the temptation of simply postulating the required shift in preferences to "explain" all apparent contradictions to his predictions".

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