Aversion to Risk and Guilt

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Much research has shown that cognitive processes are largely guided by individuals' states of mind (Mancini & Gangemi, submitted paper; Smeets, de Jong, & Mayer, 2000). In this paper, we specifically consider a state of mind characterized by guilt for having acted irresponsibly. This state is currently considered the breeding ground for the obsessive-compulsive disorder (Rachman, 2002; Salkovskis & Forrester, 2002). Our aim is to examine the impact of this state of mind on decision under risk. We hypothesize that individuals' choices (risk seeking/risk aversion) depend on how they evaluate themselves, as guilty or as victims of a wrong, and thus on moral values. People who evaluate themselves as guilty are expected to show a risk-averse preference. People who evaluate themselves as victims are expected to show a risk-seeking preference. In two different experiments, we demonstrated that non-clinical participants' aversion to risky choices and preference for risky choices vary as a function of their moral role (guilty/victim). As predicted, in both the experiments, participants experienced intolerance for risk, making more riskless choices, in the context of guilt. Thus, aversion to risk-taking is actually affected by a mental state of guilt. Copyright © 2004 John Wiley & Sons, Ltd.

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INTRODUCTION

Can mental states influence individuals’ reasoning processes, such as decision under risk? And in particular, does a mental state characterized by guilt for having acted irresponsibly play a role in aversion to risk-taking?

In a series of recent studies, researchers demonstrated that mental states affect cognitive processes and specifically performance in reasoning tasks (Mancini & Gangemi, 2002a, submitted paper; Smeets et al., 2000).

For instance, there is increasing evidence that people are generally prone to selectively search for danger-confirming information when asked to judge the validity of conditional rules (if p, then q) in the context of general threats (de Jong, Haenen, Schmidt, & Mayer, 1998; de Jong, Mayer, & van den Hout, 1997; Evans & Over, 1996; Kirby, 1994; Mancini & Gangemi, 2002a, 2003; Manktelow & Over, 1991; Smeets et al., 2000).

de Jong et al. (1997, 1998) and Smeets et al. (2000) in a series of recent experiments found that participants adopted a verificationistic strategy in the case of danger rules (if p, then danger) and tended to look for falsifications in the case of safety rules (if p, then safety). These findings suggest that a state of mind characterized by threats entails the activation of a goal-oriented ‘better safe than sorry’ reasoning strategy (and specifically of a danger-confirming reasoning pattern) in the participants.

Mental states can also affect cognitive processes in a variety of anxiety disorders, including hypochondriasis, PD, PTSD (Engelhard, Macklin, McNally, van den Hout, & Arntz, 2003; Engelhard, van den Hout, Arntz, & McNally, 2002; Smeets et al., 2000). For instance, Smeets and colleagues (2000) showed that phobic patients display a threat
confirming reasoning bias in the domain of their concerns. In a series of researches the authors found that in these patients the mere perception of threat is sufficient to activate a danger-confirming reasoning pattern, which logically serves to maintain or even enhance phobic fears. The finding that such a threat-confirming algorithm is present in anxiety patients in the context of their specific phobic concern may help to explain the refractoriness of phobicogenic (e.g. hypochondriacal) beliefs in the face of falsifying information.

Of course, this available empirical evidence suggests that the influence of mental states on cognitive processes may well be relevant to other complaints in which irrational anxiety plays a central role, for example in obsessive-compulsive disorder.

Following this perspective, in this paper, we specifically discuss a state of mind characterized by guilt for having acted irresponsibly, that is, a mental state connected to individuals’ failure to live up to their own responsibilities (Mancini, 2001).

This state of mind is currently considered the breeding ground for the obsessive-compulsive disorder (OCD) (Niler & Beck, 1989; Rachman, 2002; Rachman & Hodgson, 1980; Rasmussen & Eisen, 1991; Shafran, Watkins, & Charman, 1996; Salkovskis & Forrester, 2002; Steketee, Grayson, & Foa, 1987). Rachman (2002) and Salkovskis and Forrester (2002) assume that individuals’ obsessions and compulsions can be explained by feelings of guilt and thus by a deep moral worry.

Our aim is to examine the influence of this mental state (guilt judgment under risk.

In their studies on decision under risk, Kahneman and Tversky (1979, 1984; Tversky & Kahneman, 1981) suggest that a decision problem can be framed in multiple ways that give rise to different preferences. In particular, the authors demonstrated that people’s decisions under risk are influenced by whether choices are framed as losses or as gains (formulation effect).

For example, consider the following pair of decisions.

**Decision 1:** Option A: $500 for sure
   Option B: 50% chance of winning $1000

**Decision 2:** You are given $1000
   Option A: Lose $500 for sure
   Option B: 50% chance of losing $1000

Formally, there is no difference between Decision 1 and Decision 2. However, there are important psychological differences between these two situations. Kahneman and Tversky (1984) showed that the majority (72%) of participants presented with Decision 1 chose Option A, while the majority of participants presented with Decision 2 chose Option B. That is, participants were risk averse when the decision was framed as gain, but risk seeking when it was framed as a loss (Kahneman & Tversky, 1979).

Following the representational approach of Tversky and Kahneman, in this paper it is argued that individuals’ (risk-seeking or risk-averse) choices mainly depend on the spontaneous framing of the decision problem in accordance with the induced mental state, guilt, rather than only in view of the gain–loss formulation effects (Tversky & Kahneman, 1981).

More specifically, we assume that naïve individuals’ risky decision processes and more specifically aversion to risk-taking would just depend on a guilt mental state, and thus on the subject’s feeling of failure to be up to his responsibility. In this perspective, we stressed the importance of moral assumptions, proposing that decisions under risk depend on how the subjects represent themselves, as guilty or as victims of a wrong.

Paying for one’s own faults when guilty, and fighting for one’s rights when the victim of a wrong, are moral values that come into play in the choices, and go beyond the formulation effect.²

We hypothesize that the effect of moral values on individuals’ choices leads to people who evaluate themselves as guilty tending to prefer a riskless choice and to avoid a risky choice. By contrast, we suggest that people who evaluate themselves as victims tend to prefer a risky choice. The victim perceives in the risky option a chance to obtain justice. In contrast, the riskless choice represents a abandonment of this opportunity (to obtain justice). The fact of preferring the risky option is equivalent to trying to obtain justice (Mancini & Gangemi, 2002b).

The purpose of this paper is to examine the impact of a state of mind characterized by guilt for having acted irresponsibly on decisions under risk.

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¹In general, a preference for a sure outcome over a gamble that has higher or equal expectation is called risk averse, and the rejection of a sure thing in favor of a gamble of lower or equal expectation is called risk seeking (Bernoulli, 1738/1954).

²Likewise, we assume that the same happens with choices concerning investments aimed at preventing an outcome.
Aversion to Risk and Guilt

We predicted that if individuals represented themselves as guilty, then their preferences would be risk averse, regardless of whether the questions were formulated as gains or as losses (formulation effect). In this case, riskless choice is the only one that has moral advantages for guilty subjects: it allows them to expiate or to rectify. By contrast, we expected that if individuals represented themselves as victims, then their preferences would be risk seeking, also in this case regardless of whether the questions were formulated as gains or as losses (formulation effect). A risky choice is the only one that has a moral advantage for individuals having suffered a wrong: it allows them to assert their rights.

In both the experiments, we considered choices whose outcomes were a pecuniary penalty imposed on the individual. We predicted that individuals faced with decisions under risk would take into account not only the expectations of monetary outcomes but also the moral implications of these outcomes.

EXPERIMENT 1

In this experiment we investigated the influence of guilt for having acted irresponsibly and thus of moral assumptions on aversion to risk-taking in a decisional task.

To this aim, we tested a group of non-clinical subjects by using two equivalent decision problems, in which we manipulated their moral role (guilty/victim) by giving differential instructions. In one version of the problem, the individual was guilty of a wrong (context of guilt); in the other version the individual was the victim of a wrong (context of innocence). Thus, in the guilty version, the participant was asked to assume he or she was actually guilty, whereas in the innocence version the participant was asked just the opposite: he or she was actually innocent.

Moreover, in the first condition (context of guilt), we compared the responses of two different groups of participants submitted to two formulations of the options following the story. The two kinds of option were options described as gains and options described as losses. In the second condition, we presented the same two kinds of option (gains/losses) in the context of innocence.

Method

Two hundred and twenty-eight undergraduate students of the University of Rome took part as volunteers in the experiment and were tested in large groups. Their mean age was 23 years; they ranged in age from 20 to 33. The tests were run in four independent groups, each receiving one of the four versions of the decision problem (cf. Table 1).

The design was 2 ¥ 2 independent groups with the factors story format (context of guilt or context of innocence) and question option format (gain or loss).

Participants received a paper with written instructions and a context story with its two-answer alternatives. Participants were told to read the question options (concerning a decision problem) carefully and to take whatever time they required.

The problem format for the context of guilt was as follows:

As you come back home, you find a €1,200 speeding fine. You remember perfectly that you exceeded the speed limit that day, although you knew that there was a reasonable limit to respect and that speed traps were in place.

You know you made a mistake and so you consider it a just fine.

In the innocence version these sentences read:

As you come back home, you find a €1,200 speeding fine. You remember perfectly that
you did not use your car that day, but you are also absolutely sure that you cannot prove it.

You know you did not do anything wrong and so you consider it an unjust fine.

The question format with gain options was as follows:

On the fine it is written that you can choose between two options:

- **a**—if you pay directly, you will save €400.
- **b**—if you appeal against the sentence, there is a one-third probability that you will save €1,200 and a two-thirds probability that you will not save anything.

First examine both decisions, then indicate the option you prefer.

In the loss version these sentences read:

- **a**—if you pay directly, you will pay €800.
- **b**—if you appeal against the sentence, there is a one-third probability that you will not pay anything and a two-thirds probability that you will pay €1,200.

In all four conditions, participants were instructed to indicate which answer alternative they chose (a or b).

The expectations of monetary outcomes in the two versions of the decision problems were indistinguishable.

The order of the two different options was randomized.

After the decisional task had been completed, a questionnaire was administered in order to check the effectiveness of the manipulation of the instructions (induction of guilt).

All participants were requested to fill in a three-item questionnaire (Manipulation Check Questionnaire) about guilt due to the fine during the task, and about the fairness of the penalty. Individuals rated their feelings of guilt (two items) and the fairness of the penalty (one item) by marking visual analogue scales (VAS scales) as follows: ratings of guilt were made within the range from 0 to 100, with anchors at 0 (not at all guilty) and 100 (totally guilty); ratings of the fairness of the penalty were made within the range from 0 to 100, with anchors at 0 (not at all just) and 100 (totally just).

If the manipulation was effective, ‘guilty’ participants would report more guilt from the fine and would evaluate it as more just.

**Results**

**Manipulation Check Questionnaire**

The analysis conducted on the manipulation check variables revealed that the manipulation of guilt was effective. ‘Guilty’ participants perceived more guilt from the fine ($M = 71.6, SD = 11.4$) than participants in the other condition (context of innocence) ($M = 24.5, SD = 11.5$) ($t(226) = 31.557; p < 0.001$). Moreover, as regards the fairness of the penalty, ‘guilty’ participants evaluated it as more just ($M = 70.5, SD = 12.4$) than ‘innocent’ participants ($M = 27, SD = 11.5$) ($t(226) = 27.336; p < 0.001$).

These results show that participants in the guilt condition understood and adhered to instructions, and accordingly perceived more guilt.

**Decision Problem**

The responses that participants gave for each of the four conditions are shown in Table 1.

We examined the effect of our independent variables (story format versus question option format) on participants’ choice.

A logistic regression model of participants’ choices was tested. The predictors entered included story format, question option format and their interaction.

The model was statistically significant, $\chi^2(3, N = 228) = 131.67; p < 0.001$.

As predicted, Wald statistics revealed that only the story format predictor was significant ($p < 0.001$). Participants’ risk-aversion responses occurred significantly more often when the outcome of the problem resulted from the protagonist’s failure to behave responsibly and specifically from her or his infringement of a duty (context of guilt). A clear majority of respondents (85%) prefer saving €400 to a gamble that offers a one-third chance of saving €1,200. By contrast, risk-seeking responses occur much more often when the outcome of the problem infringes the protagonist’s right (context of innocence). A larger majority of participants (86%) made a risk-seeking choice of the gamble (option b) over the sure loss of €800. The other two predictors (question option format; story format and question option format interaction) were not significant.

The results of Experiment 1 support our predictions. Regardless of the question option format (the framing effect invoked by Kahneman and Tversky), the story format appears to be a determinant of individuals’ preferences (risk-seeking or risk-aversion). Therefore, participants’ answers appeared to be based on the framing of the deci-
sion problem in accordance with the induced mental state (guilty or victim), rather than on the descriptions of the outcomes as given in the options.

A theoretical issue that remains unresolved by this experiment is whether the effect of our moral manipulation on participants’ choices can actually be viewed as a framing effect. The case in which the fine is levied legitimately might not be a mere re-description of the case in which the fine is imposed illegitimately. Placed in the fair-fine condition, subjects might be willing to pay it right away because they were asked to just imagine that they agreed with the judgment. Maybe, for self-presentational reasons, few subjects asked to accept that interpretation would then state their unwillingness to pay the fine, especially if they can recoup a part of the expense. In the unfair-fine subjects could opt for the risky choice, because they would not be willing to accept judgments of others that are blatantly wrong. In other words, the two cases might differ in objective terms.

Experiment 2 was conducted precisely in order to solve this theoretical question.

EXPERIMENT 2

In contrast to Experiment 1, where people had to pay a fine and felt that this payment was either strongly justified or unjustified, Experiment 2 manipulated participants’ mental state by asking them to write about a recent life event associated with their guilt or pride. Thus, in the new version of the decisional problem, subjects were not asked to imagine they were guilty or innocent as regards the penalty. The story in the task was now the same for both groups, the only difference being in the induced mental state (guilty/pride). In this way, the differences in individuals’ choices (risk-seeking or risk-averse) would only depend on the spontaneous framing of the decision problem in accordance with the induced mental states—guilt/pride.

More specifically, in this study we tested a group of non-clinical volunteer subjects assigned to two experimental conditions (guilt induction; pride induction). As in the previous experiment, in the first condition (guilt induction) we compared the responses of two different groups of participants submitted to two formulations of the options following the story. The two kinds of option were options described as gains and options described as losses. In the pride condition, we presented the same two kinds of option (gains/losses).

Consistent with the predictions and results of Experiment 1, the preferences of participants assigned to guilt induction condition would be risk averse, regardless of whether the questions were formulated as gains or as losses. By contrast, preferences of participants induced to experience pride would be risk seeking, regardless of whether the questions were formulated as gains or as losses.

Method

One hundred and thirty-two undergraduate students of the University of Rome participated as volunteers in the experiment and were tested in large groups. Their mean age was 19 years, they ranged in age from 18 to 25. As in the earlier experiment, the tests were run in four independent groups, each receiving one of the four versions of the decision problem (cf. Table 2).

The design was $2 \times 2$ independent groups with the factors mental state induction (guilt or pride) and question option format (gain or loss).

As in the previous experiments, participants received a paper with written instructions and a decisional problem with its two-answer alternatives. Participants were told to read the instructions and question options (concerning a decision problem) carefully.

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Table 2. Percentages (and frequencies) of the responses across the four conditions ($N = 132$) of experiment 2

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<thead>
<tr>
<th>Question option</th>
<th>Pride</th>
<th>Guilt</th>
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<td></td>
<td>Risk seeking</td>
<td>Risk aversion</td>
</tr>
<tr>
<td>Gain</td>
<td>30</td>
<td>67 (20)</td>
</tr>
<tr>
<td>Loss</td>
<td>30</td>
<td>80 (24)</td>
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3 We are grateful to David Mandel for bringing this alternative explanation to our attention.
Mental state was manipulated by having participants describe either a guilt or pride event in their personal life (Gasper & Clore, 1998). Participants in the guilt induction condition were asked to describe a guilt event in their recent life as vividly as possible and to include details of what they were feeling and thinking, whereas participants in the pride induction condition were instructed to describe a pride event in their recent life. All participants were told they had 15 min to recall and write the stories.

After writing the event, two VAS scales were administered in order to check the effectiveness of the induction (Manipulation Check Questionnaire—Part 1). Participants were asked how guilty/proud they felt after describing the event. As in Experiment 1, individuals rated their feelings of guilt and pride by marking visual analogue scales within the range from 0 to 100, with anchors at 0 (not at all guilty/proud) and 100 (totally guilty/proud).

Participants were then given the same decisional problem as presented in Experiment 1, but in a neutral version, in which they were not told whether they were guilty or victims as regards the fine. The neutral version reads:

When you come back home, you find a €1,200 speeding fine.

The question formats with gain and loss options were the same as in the previous experiment.

Also in this study, in all four conditions, participants were instructed to indicate which answer alternatives they would choose. The order of the two different options was randomized.

As in Experiment 1, after completing the decisional task, all participants were requested to fill in three items about the guilt felt because of the fine during the task, and about the fairness of the penalty by marking visual analogue scales (Manipulation Check Questionnaire—Part 2).

Results

Manipulation Check Questionnaire

We analysed the data for guilt felt after the mental state induction (Manipulation Check Questionnaire—Part 1) using the t-test.

Results revealed that the induction was effective. After writing about the past life event involving guilt, individuals perceived more guilt ($M = 68.1$, $SD = 14.1$) than individuals in the pride condition ($M = 20.3$, $SD = 11.5$) ($t(130) = 9.776; p < 0.001$).

As regards our manipulation check variables completed by participants immediately after the decisional task (Manipulation Check Questionnaire—Part 2), we found, once again, that the manipulation of guilt was effective. ‘Guilty’ participants perceived more guilt arising out of the fine ($M = 70$, $SD = 22.1$) ($t(130) = 4.036; p < 0.001$) than ‘proud’ participants ($M = 40.4$, $SD = 21$). Moreover, as regards the fairness of the penalty, guilty participants evaluated it as fairer ($M = 62.3$, $SD = 12.4$) than participants in the other condition ($M = 43.1$, $SD = 21.4$) ($t(130) = 4.055; p < 0.001$).

Decision Problem

The responses that the participants gave for each of the four conditions are shown in Table 2.

We examined the effect of our independent variables (story format versus question option format) on participants’ choice. A logistic regression model of participants’ choices was tested. The predictors entered included story format, question option format and their interaction. The model was statistically significant, $\chi^2(3, N = 132) = 37.728; p < 0.001$. As expected, Wald statistics revealed that only the story format predictor was significant ($p < 0.001$). Participants’ risk-aversion responses occurred more often when individuals evaluated themselves as guilty. A clear majority of respondents (78%) preferred saving €400 over a gamble offering a one-third chance of saving €1200. By contrast, risk-seeking responses occurred more often in the context of innocence. A larger majority of participants (73%) made a risk-seeking choice in which they preferred the gamble to the sure loss of €800.

The other two predictors (question option format; story format and question option–format interaction) were not significant.

Our hypotheses are fully supported by the data of this experiment. As in the previous study, participants’ choices seemed to be mainly based on the framing of the decision problem in accordance with the induced mental state (guilty or pride), and thus on moral assumptions, rather than on the descriptions of the options.

DISCUSSION

We started our paper with a question: does a mental state characterized by guilt for having acted irresponsibly play a role in aversion to risk-taking?

The findings of the present studies seem to point to an affirmative answer.
Aversion to Risk and Guilt

In two different experiments we found that a mental state of guilt for having behaved irresponsibly actually affects decision under risk, and in particular aversion to risky choices.

In general, the results of our experiments revealed that in non-clinical subjects preferences for risky or riskless choices vary as a function of their moral role (guilty/victim), and thus of moral assumptions.

Participants who were explicitly told they had behaved irresponsibly and guiltily tended to prefer a riskless choice, while participants who were told they were victims suffering injustice tended to make risky choices (Experiment 1).

The same results were obtained in a second experiment, in which mental state was induced by asking participants to write about a life event involving either guilt or pride.

Also in this case, ‘guilty’ participants preferred riskless choices. By contrast, ‘victims’ tended to prefer risky choices (Experiment 2).

Thus, our hypotheses were supported by the findings of both the experiments. Regardless of the question option format, the framing effect introduced by Kahneman and Tversky, a mental state of guilt appears to be the main determinant of individuals’ preferences (risk-seeking or risk-aversion).

Participants’ answers appeared to be based on the framing of the decision problem according to how they evaluated themselves, either as guilty or as victims of a wrong, rather than according to the descriptions of the outcomes as given in the options. Individuals who evaluated themselves as guilty showed intolerance for risk. As a consequence, they make more riskless choices. People who evaluated themselves as victims of a wrong instead displayed risk-seeking preferences.

Thus, moral assumptions seem to prevail over two formulation effect of Tversky and Kahneman.

Our initial question might be answered by saying that in non-clinical subjects a mental state of guilt can actually produce an aversion to risky choices.

From this point of view, we believe our results have possible useful implications for the understanding of OCD.

There is an wide literature showing that OCD is linked to a mental state characterized by guilt for having acted irresponsibly (Mancini, 2001; Rachmann, 2002; Salkovskis & Forrester, 2002). Moreover, several clinical and cognitivist authors assume that aversion to risk-taking or intolerance of risk is a relevant factor in a cognitive model of obsession and compulsion (e.g. Frost et al., 1993; Emmelkamp & Aardema, 1999; Sookman & Pinard, 1997; Steketee et al., 1998).

In this perspective, we might link OC patients’ risk-aversion to their moral assumptions. In other words, we might argue that the OCD aptitude to make riskless choices could depend on a state of mind of guilt, and thus on feelings of not living up to one’s own responsibilities.

If we are right in proposing that this OCD aptitude to make riskless choices depends on moral assumptions, then our study effort aimed at understanding the framing of a decision problem in accordance with moral values adds a useful contribution to our understanding of decision-making in OC patients.

Future researches building on the present findings might profitably examine the link between guilt arising from irresponsibility and aversion to risk-taking in patients with a diagnosis of OCD.

REFERENCES


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Many thanks for your assistance.

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