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Guilt and Focusing in Decision-making

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ABSTRACT

In this paper we examined the impact of a specific emotion, guilt, on focusing in decision-making. Through the *focusing* mechanism, when making decisions, individuals tend to restrict their thoughts to what is explicitly represented in the decisional task, disregarding alternatives. In this paper, three experiments are performed to investigate whether an emotional state of guilt can critically guide individuals' focusing, and even prevailing over the *focusing* mechanism. Guilty emotional state was induced by asking participants to write about a guilty related life event. The emotional state was thus neither generated by nor related to the tasks used in the experiments. Results of the first two studies show that guilt affects focusing in decision-making in the case of only one explicitly specified option (a positive or a negative one). Guilty participants, when presented with a stated option that has predominantly positive characteristics, prefer other, unspecified options over the positive one. Guilty participants faced with a stated option that has predominantly negative features tend to prefer it to other, unspecified, options, instead. Finally, experiment 3 shows that guilty participants presented with two different options (a negative vs. a positive one) having different degrees of explicitness (i.e. they are not equally represented in the decision frame), focus on the negative option, even though the latter was not explicitly represented but only hinted at the end of the text. Overall, these results suggest that guilt emotion state can play a crucial role in either strengthening or reducing the *focusing* mechanism. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS emotion; guilt; focusing; mechanism; cognition

INTRODUCTION

A large body of research has clearly demonstrated that in general, cognitive processes are largely guided by individuals' emotional states (for reviews, see, Forgas, 1995; Loewenstein & Lerner, 2002; Schwarz, 1990), even if the source of the emotions has no relation to the target decisions, judgements, or inferences. Initially, research in this field followed a valence-based approach to emotions (e.g. Damasio, 1994; Johnson & Tversky, 1983; Schwarz & Clore, 1983), contrasting the effects of positive versus negative-emotional states

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on judgement, choice and inference (for reviews, see DeSteno, Petty, Wegener, & Rucker, 2000; Forgas, 1995; Lerner & Keltner, 2000). These studies did not specifically investigate whether and how different emotions of the same valence (for example, fear and anger) had different effects on cognitive processes. Only recently, have a number of studies systematically examined the influence of specific emotions on specific processes such as decision-making or hypothesis-testing. (e.g. Lerner & Keltner, 2000, 2001; Lerner, Gonzalez, Small, & Fischhoff, 2003; Lerner, Small, & Loewenstein, 2004; Mellers, Schwartz, & Ritov, 1999; Raghunathan & Pham, 1999). According to the appraisal tendency approach, several authors argued that each emotion is defined by a tendency to perceive new events and objects in ways that are consistent with the original cognitive-appraisal dimensions of the emotion (see, Lerner & Keltner, 2000). Following this approach, they generated specific predictions concerning how and when specific emotions influence choices. For example, Lerner and Keltner (2000, 2001) examined the influence of two emotions of the same valence but differing appraisals (anger and fear) on risk perception. The authors showed that fear and anger have opposite effects on risk estimation. Fearful people made pessimistic judgements of future events and were risk-averse, whereas angry people made optimistic judgements and expressed risk-seeking choices.

Following this line of research, we recently examined the impact of a specific emotional state, guilt, on a specific cognitive process, hypothesis-testing. The interest in the influence this emotion can have on cognitive processes is due to the fact that the sense of guilt together with the sense of responsibility, and the consequent fear of behaving guiltily and irresponsibly, are involved in almost all judgements and decisions people make in everyday life. In three different experiments we demonstrated that guilt emotion may influence the way in which people control both their danger and safety hypotheses (Mancini & Gangemi, 2004). In these experiments individuals who felt guilty and normal controls were given modified Wason Selection Tasks (WSTs) (Wason, 1966).[1] Guilt feelings were manipulated by asking participants to role-play as doctors, and to assume they had made several mistaken diagnoses in the past, due to superficiality and inattention. They were further asked to assume that they alone were responsible for diagnosing a patient's medical condition. All participants were faced with two hypotheses/diagnoses: Safety hypothesis, a diagnosis of influenza, and a Danger hypothesis, a diagnosis of SARS. Both the diagnoses were equally explicitly represented in the task. Participants were then asked to say (a) whether they preferred to continue or not in the diagnostic process, and if so, then (b) which hypothesis/diagnosis they wanted to test (safety vs. danger) and (c) by which strategy (verifying vs. falsifying) they intended to test the chosen hypothesis. The results indicate that a guilty emotional state may involve a peculiar hypothesis-testing process that we named the *prudential* mode. Here, individuals focus on their hypothesis of danger, search for examples with which to confirm the danger hypothesis, consider counter-examples falsifying the danger hypothesis insufficient, and subscribe to the danger hypothesis by continuing to engage in the hypothesis-testing process. Thus in these experiments guilt emotion critically affects focusing in hypothesis testing, leading to focusing *prudentially* on the negative hypothesis.

It is worth noting that these results are not entirely consistent with the earlier data from Legrenzi and colleagues (Legrenzi, Girotto, & Johnson-Laird, 1993) and Jones and colleagues (Jones, Frisch, Yurak, & Kim, 1998) on *focusing* in decision-making, demonstrating that when the available options are equally explicitly represented in the frame of the decision people pay equal attention to each of the available alternatives. In general, according to focusing literature (e.g. Kahneman & Tversky, 1979; Lichtenstein & Slovic, 1971; Shafir, Simonson, & Tversky, 1993), in making decisions, people focus their attention only on

[1]The WST is a pencil and paper problem which asks subjects to verify if a conditional rule of the form *if p, then q* has been violated by any of the four instances for which the subject has incomplete information. Originally, each instance is represented by a card. One side of the card shows whether the antecedent is true or false (i.e. whether *p* or *not-p* is the case), and the other side of the card shows whether the consequent is true or false (i.e. whether *q* or *not-q* is the case). The subject was permitted to see only one side of each card and was asked to say which card(s) he/she would turn over to see if any of them violated the rule. The four cards represented the values *p*, *not-p*, *q*, and *not-q*.

those aspects of the problem which are explicitly represented, while they tend to pay less attention to those aspects that are represented only implicitly, failing to make a thorough search for alternatives (Legrenzi et al., 1993; Jones et al., 1998). Jones and colleagues found that people focused their attention on the single option explicitly represented in the decision frame (i.e. moving to New York city). They also showed that if participants were to reframe the decision as a choice in which other alternative courses of action were also made explicit (i.e. should I move to New York or stay in Chicago?), then the same decision was less likely. Other studies in other related areas demonstrated that the effect of focusing comes into play regardless of the actual task, e.g. the hypothesis testing or the decision, performed by the subject (e.g. Fischoff, Slovic, & Lichtenstein, 1978; Friedman & Neumann, 1980; Gettys, Mehle, & Fisher, 1986).

As noted above, in our experiments both the danger and safety hypotheses were specified equally, i.e. they had the same degree of explicitness. According to focusing research we thus expected that individuals would pay equal attention to both the alternatives. On the contrary, we found that participants prudentially focused on the negative hypothesis, failing to consider the positive alternative, although it was equally clearly represented. These results thus suggest that when individuals are presented with positive and negative hypotheses, both of which are explicitly represented, what they focus on depends upon the activated emotional state, in our case, guilt.

We do not know, however, whether this emotional state affects the focusing process, leading to *prudentially* focus on the negative alternative, even when the problem is presented as a choice between two options (a negative and a positive one) which are specified with different degrees of explicitness, as in real world decisions. In real life we rarely deal with options or hypotheses that are all equally clearly specified, i.e. we often have to manage information that sheds light on some options or hypotheses but clouds other options.

In this paper, our aim is precisely to test whether guilt emotion can play a crucial role in causing or reducing the *focusing effect*, even prevailing over the formulation of the problem. If the *prudential mode* hypothesis is correct, then it should be possible to show that guilty feelings would lead to *prudentially* focus on the negative hypothesis, i.e. the one useful for preventing further or future guilt, even when it is implicit or else not explicitly represented in the decision frame (e.g. we have scant, incomplete information about it), and not only when it is explicitly and exhaustively represented (e.g. it is characterised by clear, relevant information).

To test this claim, three experiments were carried out. It is worth noting that in all experiments we directly manipulated participants' emotional states by asking them to write about a recent life event associated with one of three different emotional states: guilt, anger and neutral. The source of the emotions has thus no relation to the target decisions.

EXPERIMENT 1

In this experiment, we examined the effect of guilt on focusing in decision-making. The experiment was built on Jones et al. (1998) study 3. As in Jones and colleagues' experiment, all participants were presented with a short description of a decision. The task contained explicit, positive, fairly desirable options (i.e. buying a new car). Some of the participants had to list 5 to 10 reasonable things they could do as an alternative to pursuing the stated positive option just before making the decision, while others had to list the possible alternatives they thought of, but after making the decision.

In the present task, we tested three groups of volunteers assigned to three different emotional state induction conditions (guilt vs. anger vs. neutral). Emotional states were induced by asking participants to write about a guilty/angry/neutral related life event. The emotional states were thus neither generated by nor related to the task used in the experiment. Please note that we used an experimental design in which two different negative emotions (guilt vs. anger) were induced. In this way, we could demonstrate that our results stem from a specific guilt-emotional state effect, and not from a general negative emotional state

effect. To this aim, we included a measure of Negative Affect (Positive and Negative Affect Scale, PANAS; Watson, Clark, & Tellegen, 1988) to be sure that (a) in both the negative emotional state induction groups (guilt vs. anger) the manipulation of emotions would actually result in a negative emotional state, and (b) any differences that might emerge in the decisions made between these two groups stemmed from a specific emotional state effect.

We predicted that our participants who feel guilt: (a) would be more likely to divert attention from the positively stated option (i.e. buying a new car), preferring several different possible alternatives (unstated options), than both angry and control participants, regardless of the phase in which they were asked to list alternatives; (b) would produce a greater number of possible alternatives, than the other two experimental groups, also in this case regardless of the phase in which they were asked to list alternatives.

In cases in which the stated option is generally positive (as it is in the stimuli we used in this experiment), we hypothesise that guilty participants will show a preference for spontaneously diverting attention from the stated positive option, focusing instead on other unstated alternatives that are not quite as good or pleasing than the stated one (Jones et al., 1998). This defocusing strategy would probably be spontaneously adopted by guilty participants and should thus be independent of the phase of alternative generation. In fact, individuals who feel guilty should avoid choices implying unjust satisfaction. These choices could lead to further guilt.

By contrast, our angry and control participants will be more likely to prefer the stated positive possibility, except for those who are asked to generate reasonable alternatives before making the decision; they will be more likely to focus their attention on the unstated alternatives. This result would be consistent with those reported by Jones and colleagues: Participants who were asked to generate alternatives before decision-making would be more likely to think about other, unstated options that were just as good (if not better) than the stated option.

Method

Participants

A total of 155 volunteer students from the University of Rome participated in the experiment. Their average age was 20.8 years, the range being 18–34. Participants were randomly assigned to one of the three Emotional States (guilt vs. anger vs. neutral). For each experimental condition (Emotional State), they were randomly assigned to one of the two phases of Listing alternatives (before or after decision making). The design was thus 3×2 independent groups with the factors: Emotional State (guilt; anger; neutral) and Listing alternatives (before vs. after decision making). (see Table 1)

Table 1. Frequency (and percentage) choice of each option for each phase of listing alternative, across the three emotional state conditions of experiment 1

		Choice	
Emotional state/Phase of listing alternatives	N	Stated option	''do SE'' option
Guilt	**49**	**7 (14)**	**42 (86)**
Before-choice	24 (49)	4 (17)	20 (83)
After-choice	25 (51)	3 (12)	22 (88)
Anger	**56**	**29 (52)**	**27 (48)**
Before-choice	29 (52)	9 (31)	20 (69)
After-choice	27 (48)	20 (74)	7 (26)
Neutral	**50**	**26 (56)**	**24 (44)**
Before-choice	24 (48)	6 (25)	18 (75)
After-choice	26 (52)	20 (77)	6 (23)

Materials and procedure

Participants were tested in two groups. They received a decisional task set out in a booklet with written instructions and a scenario. After completing the decisional task, a questionnaire was administered in order to check the effectiveness of instruction manipulation (induction of guilt/anger/neutral emotional state). At the beginning of the experimental session, a researcher briefly explained the procedure and participants filled in the informed consent form. Participants had to solve the problem individually.

Affect induction. Following the procedure used by Schwarz and Clore (1983), emotional state was manipulated by having participants describe either a guilt-related (guilt induction group), or an anger-related (anger induction group) or a neutral-related (control group) personal life event. They were instructed to describe a guilt (anger, neutral) event in their recent life as vividly as possible and to include details of what they were feeling and thinking. Both groups were told they had 10 minutes to write the biographical event.

The scenario. All participants then read the same scenario used in Jones et al. (1998) study 3:

> As a birthday present, one of your relatives (from whom you rarely hear) sends you a surprise gift of 2000 Euro.

The option choice. After having read the appropriate task instructions, all ''guilty'', ''angry'' and control participants assigned to the after decision-making condition were given the following instructions:

> You're not sure what to buy with the money, but one option would be to buy *an old car. At this point, you need to make a decision. Will you buy the old car, or will you do something else?*
> *a. Buy a car*
> *b. Do something else*

After making their choice, participants were asked whether they had thought of anything else that they could do besides buying the car. If so, they had to write down the alternatives.

All ''guilty'', ''angry'' and control participants in the before decision-making condition read the same decision, except that their version included the following, additional instructions:

> Before making your choice, think about what the ''something else'' option would involve. Take a few moments and try to think of 5–10 other reasonable things that you could do besides buying a car. (Space was left for them to write down any alternatives).
> Now what decision would you make? Would you buy a car, or would you do one of the ''something else'' options that you listed above instead?

Finally, participants were asked to circle one of two options specified at the bottom of the page: (a) Buy a car; or (b) Do something else.

Measures

Manipulation check questionnaire-Part 1. After writing the event, a Manipulation Check Questionnaire—Part 1 was administered in order to check the effectiveness of the induction. Participants were asked how guilty/angry they felt after describing the event. Individuals rated their feelings of guilt/anger within the range from 0 to 100, with anchors at 0 (not at all guilty/angry) and 100 (totally guilty/angry).

Manipulation check questionnaire-Part 2. Following the decisional task, all participants were requested to fill in a 4-item questionnaire about the following dimensions: (1) concerns about future or further guilt felt during the task (2 items: *How fearful of guilty did you feel for consequences of your decisions*? *How afraid were you of taking guilty decisions*?) (2) responsibility felt during the task (2 items: *How responsible did you feel for the decision you took? How responsible did you feel for consequences of your decisions*?). Individuals rated their feelings of fear of guilt and responsibility within the range of 0 to 100, with anchors at 0 (not at all fearful of guilt) and 100 (totally fearful of guilt); ratings of responsibility were made within the range from 0 to 100, with anchors at 0 (not at all responsible) and 100 (extremely responsible).

If the manipulation was effective, guilty participants should report more concern about future or further guilt and more perceived responsibility than participants in the other two conditions (anger; neutral).

PANAS Scales. At the end of the decisional task, all participants were asked to complete the PANAS Scales. The PANAS consists of 20 emotions terms on which participants indicate their present feelings (1 = *very slightly* or *not at all,* 5 = *extremely*). These 20 items are grouped around two subsets, one measuring positive affect (10) and one measuring negative affect (10), and both subsets were averaged to form reliable scales (αs 0.73 and 0.88, respectively). Items were coded such that higher numbers reflect greater negative emotional state.

Dependent variables

Two dependent variables related to the decisional task were considered: (1) option choice (we recorded the number of people who chose each of the two options); (2) number of alternatives (measured as the mean number of ''alternatives'' generated). Moreover, we considered four dependent variables evaluated through the manipulation check questionnaires: (1) guilt felt after describing the guilt related event; (2) anger felt after describing the anger related event; (3) concerns about future and further guilt felt during the task; (4) perceived responsibility felt during the task. As regards the latter two, the average of the responses to the items pertaining to each dimension was considered. Finally, the ''negative emotional state'' dependent variable assessed through the PANAS was considered. The measure for quantifying the negative emotional state in each group (guilt; angry; control) was PANAS negative scale score (0–50) calculated, by summing the ratings across items.

Results

Manipulation Check Questionnaires

We analysed the data for guilt felt after the emotional state induction (Manipulation Check Questionnaire—Part 1) using univariate ANOVA. Results revealed that the induction was effective ($F(2, 152) = 28.65$, $p < 0.001$). Planned comparisons of the means using Sidak's *post hoc* test were made on the basis of ANOVA results. *Post hoc* comparisons ($p < 0.001$) revealed that after writing about the past life event involving guilt, individuals perceived more guilty feelings ($M = 70.86$; $SD = 24.89$) than either a neutral story ($M = 38.02$; $SD = 26.80$), and an anger-related story ($M = 35.71$; $SD = 26.45$). Conversely, neutral and ''angry'' groups did not differ significantly in guilty feeling ratings ($p = 0.95$).

In order to verify also the effectiveness of the anger emotional state induction (Manipulation Check Questionnaire—Part 1), we analysed the data for ''angry'' feelings felt after writing about the anger-related event using ANOVA. The anger emotional state manipulation was found to be effective, $F(2, 152) = 35.25$, $p < 0.001$. *Post hoc* comparisons ($p < 0.001$) revealed that participants perceived more angry feelings after having written an anger-related story ($M = 70.48$; $SD = 24.5$) than either a neutral story ($M = 33.8$;

$SD = 25.16$), or a guilt-related story ($M = 35.42$; $SD = 27$). Conversely, neutral and ''guilty'' groups did not differ significantly in ''angry'' feeling ratings ($p = 0.98$).

As regards our Manipulation Check Questionnaire—Part 2 completed by participants immediately after the decisional task, we found, once again, that the manipulation of guilt emotional state was effective (Perceived responsibility ($F(2, 152) = 38.63$, $p < 0.001$; Concerns about future or further guilt ($F(2, 152) = 33.52$, $p < 0.001$). *Post hoc* comparisons ($p < 0.001$) showed that guilty participants perceived more responsibility ($M = 71.22$; $SD = 23.87$), and concerns about future or further guilt ($M = 72.55$; $SD = 26.66$) than either control participants (Perceived Responsibility: $M = 32.54$; $SD = 27.48$; Concerns about future or further guilt: $M = 36.26$; $SD = 26.34$), or ''angry'' participants (Perceived Responsibility: $M = 30.43$; $SD = 27.05$; Concerns about future or further guilt: $M = 33$; $SD = 27$). Conversely, neutral and ''angry'' groups did not differ significantly in guilty feeling ratings (Perceived Responsibility: $P = 0.97$; Concerns about future or further guilt: $P = 0.90$).

These results show that participants in the guilty condition understood and carried instructions, and accordingly perceived more responsibility and concerns about future or further guilt.

PANAS—negative scale ratings

To determine whether the manipulation of both guilt emotion and anger emotion resulted in a negative emotional state, a one-way analysis of variance on individuals' PANAS negative subtotal was performed. Although a significant difference among the three groups was found ($F(2, 152) = 62.89$, $p < 0.001$), as expected, *post hoc* comparisons ($p < 0.001$) showed that participants rated higher in negative affect after having written both a guilty story ($M = 27.12$; $SD = 6.1$) and an anger story ($M = 25.51$; $SD = 6.9$), than a neutral story ($M = 14.42$; $SD = 5.3$), no differences were found between guilty and angry participants in negative affect felt ($p = 0.46$). Thus, any differences emerging in decisions made between these two groups would stem from a specific emotional state effect.

The option choice

Participants' preferences for the two different options (for example, Car—option A vs. Do something else—option B) across the three emotional state conditions (guilt vs. anger vs. neutral) and the two listing alternatives conditions (before vs. after decision-making) are shown in Table 1.

Participants' preferences were analysed by means of logistic regression with Emotional State (guilt, anger, neutral) and Emotional State × Listing alternatives (before or after decision making) interactions as predictors. The option choice made participants was the dependent variable. The neutral emotional state condition served as reference category for the guilt and anger conditions. As predicted, a significant effect of Emotional State was found, Wald $(2) = 16.2$, $p < 0.001$. In the guilty emotional state significantly more participants chose the option of ''doing something else'' (option B), than in the neutral emotional state, Wald $(1) = 9.35$, $p < 0.005$. By contrast, in the angry emotional state vs. neutral emotional state no differences were found in the option choice made by participants, Wald $(1) = 3.44$, $p = 0.07$. In both the conditions participants preferred the option of ''buying the car'' (option A).

The Emotional State × Listing alternatives interaction was also significant, Wald $(2) = 9.87$, $p < 0.002$. More specifically, only the anger versus neutral × listing alternatives interaction was significant, Wald $(1) = 9.65$, $p < 0.003$. As can be seen in Table 1, in the before-decision condition angry participants significantly preferred the option of doing something else (option B), while in the after-decision condition, they significantly preferred option A (e.g. buying the car). In the angry condition the preference for either option A or option B was thus modulated by the phase in which participants were asked to list alternatives (only the before-decision condition lead to a clear increase in preference for the option of doing something else). By contrast, the guilty emotional state × listing alternatives interaction failed to reach significance, Wald

(1) = 0.21, $p < 0.64$, indicating that compared to the neutral emotional state, there was no influence of the phase of listing alternatives on the option choice made by guilty participants. Indeed, for guilty participants in both phases of listing alternatives there was a preference for the option B (i.e. doing something else).

No of alternatives

There was a significant effect of the emotional state variable on the number of alternatives listed by our participants (Before-decision-making: $F(2, 74) = 22.68$, $p < 0.001$; After decision-making: $F(2, 75) = 15.71$, $p < 0.001$). In the before decision-making condition, *post hoc* comparisons ($p < 0.001$) revealed that guilty participants produced the highest number of alternatives ($M = 4.75$; $SD = 2.45$) compared to both those in the control condition ($M = 2.17$; $SD = 1.1$), and in the angry condition ($M = 1.90$; $SD = 1.14$). By contrast, neutral and ''angry'' groups did not differ significantly in the number of alternatives produced ($p = 0.91$).

Also in the after decision-making condition, *post hoc* comparisons ($p < 0.001$) revealed that guilty individuals generated the highest number of alternatives ($M = 2.68$; $SD = 1.66$ compared to both those in the control condition ($M = 0.96$; $SD = 0.91$), and in the angry condition ($M = 0.89$; $SD = 0.87$). Conversely, neutral and ''angry'' groups did not differ significantly in the number of alternatives produced ($p = 0.99$).

Discussion

We conclude from these results that individuals' decision-making strategy is affected by their emotional state. A guilty emotional state influences the focusing process, prevailing over the focusing effect. In a situation characterised by guilt, participants presented with a stated option with predominantly positive characteristics, preferred other, unspecified options, to the positive one, regardless of whether they were asked to list possible alternatives before or after making the decision. They therefore showed a prudential preference for diverting attention from the ''positive possibility'' (*defocusing*) although it was explicitly represented in the text, focusing instead on other unstated alternatives that were less satisfying or pleasing but morally more just, as well as more useful than the stated one (e.g. to pay university fees; to buy a PC; to attend an English course), even though they were not explicitly specified in the text. By contrast, in line with Jones et al.' (1998) results, both control and angry participants did not show this prudential defocusing effect. Indeed, they focused on the stated positive option, ignoring other possible alternatives. More specifically, they tended to prefer the stated positive possibility to other unspecified options, except when they were asked to produce alternatives before making the decision. Thus, we found a specific guilt emotion effect on option choices made by our participants. An important aspect of these results is that in the present study participants' emotional states were directly manipulated and they were thus unrelated to the event to be evaluated—the task.

EXPERIMENT 2

In this study, we used the same design as in Experiment 1, although using different stimulus materials. In this experiment, based on Jones et al' (1998) study 4, the task contained negative, undesirable options, (i.e. spending money on repairing a very old car). If the stated option is undesirable (negative option), we should expect that guilty participants would prudentially focus on the negative characteristics of this option, leading them to favour it, and to ignore other unspecified possible alternatives, regardless of the phase in which they were asked to list alternatives. Moreover, we should expect guilty participants to list a smaller number of possible alternatives than either the control group or the angry group, also in this case regardless of the phase of listing alternatives (before vs. after decision making). Both angry and control participants would be more

likely to divert their attention from the stated negative hypothesis, preferring the other unspecified alternatives, regardless of the phase in which they were asked to list alternatives.

In cases in which the stated option is generally negative (as in the stimuli we used in this experiment), we hypothesise that guilty participants will show a preference for focusing on the stated unfavourable option, ignoring instead the other unstated alternatives which might be better than the stated option. This focusing strategy would be spontaneously adopted by guilty participants and would thus be independent of the phase of listing alternatives. In fact, individuals who feel guilty should focus on those options, which do not imply an unjust satisfaction, in order to avoid further guilt.

By contrast, in cases where the stated option is an undesirable one, both angry and control participants would focus on the negative aspects of this possibility, preferring to reject it in favour of the ''do something else'' option, regardless of the phase of listing alternatives.

Method

Participants

A total of 171 volunteer students from the University of Rome participated in the experiment. Their average age was 20.9 years, the range being 18–34. Participants were randomly assigned to one of the three Emotional States (guilt vs. angry vs. control). For each experimental condition (Emotional State), they were randomly assigned to one of the two phases of Listing alternatives (before or after decision-making). The design was 3×2 independent groups with the factors: Emotional State (guilt vs. angry vs. control) and Listing alternatives (before vs. after decision-making). (see Table 2)

Materials and procedure

The materials and the procedure were the same as in Experiment 1.

Affect induction. As in the earlier experiment, emotional state was manipulated by asking participants to describe either a guilt (guilt induction group), or an angry (angry induction group) or a neutral (control group) personal life event.

The story. All participants had to read a scenario similar to that used in Jones et al.' (1998) study 4:

Table 2. Frequency (and percentage) of choice of each option for each phase of listing alternatives, across the three emotional state conditions of experiment 2

		Choice	
Emotional state/Phase of listing alternatives	N	Stated option	''do SE'' option
Guilt	**57**	**45 (79)**	**12 (21)**
Before-choice	32 (56)	26 (81)	6 (19)
After-choice	25 (44)	19 (76)	6 (24)
Anger	**58**	**8 (14)**	**50 (86)**
Before-choice	30 (52)	4 (13)	26 (87)
After-choice	28 (48)	4 (14)	24 (86)
Neutral	**56**	**7 (12)**	**49 (88)**
Before-choice	26 (46)	3 (12)	23 (88)
After-choice	30 (54)	4 (13)	26 (87)

> Imagine that you have a very old car, and that you have recently been in a serious accident with it. Your car wasn't in great condition before the accident, but now it is in really bad shape. The car is still driveable but there is a good chance that it will break down completely pretty soon. Furthermore, it looks really junky. To make matters worse, neither your parents, nor your insurance company will pay for it to be repaired. A man at the local auto repair shop has informed you that he can repair your car and return it to you in fairly good condition for about 2000 Euro. Obviously, this is a lot of money. However, you really need a reliable means of transport.

The option choice. All ''guilty'', ''angry'' and control participants assigned to the after decision-making condition were given the following to read:

> At this point, you need to make a decision. Would you spend 2000 Euro on repairing the car, or would you do something else?

After making their choice, participants were asked whether they have thought of anything else that they could do with 2000 Euro besides repairing the car. If so, they had to write down any alternatives.

All ''guilty'', ''angry'' and control participants in the before decision-making condition read the same decision, except that their version included the following additional instructions:

> Before making your choice, think about what the ''something else'' option would involve. Take a few moments and try to think of other reasonable things that you could do besides repairing your car. (Space was left for them to write down any alternatives).
> Now what decision would you make? Would you spend 2000 Euro on repairing your car, or would you do one of the ''something else'' options that you listed above instead?

Finally, participants were asked to circle one of two options written on the bottom of the page: (A) Spend 2000 Euro on repairing your car; or (B) Do something else.

Measures

Manipulation check questionnaires. Following the decisional task, the same questionnaires (*Manipulation check questionnaires*: Part 1 and Part 2) as in the previous experiment were administered in order to check whether instruction manipulation was effective.

PANAS Scales. At the end of the decisional task, all participants were asked to complete the PANAS Scales.

Dependent variables

The dependent variables were the same as in Experiment 1.

Results

Manipulation Check Questionnaires

As in the previous experiment, the ANOVA performed on guilt felt after the emotional state induction (Manipulation Check Questionnaire—Part 1) revealed that the induction was effective ($F(2, 168) = 36.05$, $p < 0.001$). *Post hoc* comparisons ($p < 0.001$) revealed that after writing about the past life event involving guilt, individuals perceived more guilty feelings ($M = 72.81$; $SD = 24.36$) than either a neutral story

($M = 37.18$; $SD = 27.07$), and an anger-related story ($M = 34.29$; $SD = 27.08$). Conversely, neutral and ''angry'' groups did not differ significantly in guilt feeling ratings ($p = 0.92$).

In order to verify also the effectiveness of the anger emotional state induction (Manipulation Check Questionnaire—Part 1), we analysed the data for ''angry'' feelings felt after writing about the anger-related event using ANOVA. The anger emotional state manipulation was found to be effective, $F(2, 168) = 36.22$, $p < .001$. *Post hoc* comparisons ($p < 0.001$) revealed that participants perceived more angry feelings after having written an anger-related story ($M = 68.52$, $SD = 25.8$) than either a neutral story ($M = 34.23$; $SD = 23.9$), and a guilt-related story ($M = 33.49$; $SD = 25.84$). Conversely, neutral and ''guilty'' groups did not differ significantly in ''angry'' feeling ratings ($p = 0.99$).

As regards our Manipulation Check Questionnaire—Part 2 completed by participants immediately after the decisional task, we found, once again, that the manipulation of a guilty emotional state was effective (Perceived Responsibility: $F(2, 168) = 38.19$, $p < 0.001$; Concerns about future or further guilt: $F(2, 168) = 36.16$, $p < 0.001$). *Post hoc* comparisons ($p < 0.001$) revealed that guilty participants perceived more responsibility ($M = 71.18$; $SD = 25.24$), and concerns about future or further guilt ($M = 70.94$; $SD = 26.08$) than either control participants (Perceived Responsibility: $M = 34.25$; $SD = 26.11$; Concerns about future or further guilt: $M = 35.78$; $SD = 24.39$), and ''angry'' participants (Perceived Responsibility: $M = 33.76$; $SD = 27.26$; Concerns about future or further guilt: $M = 35.55$; $SD = 26.16$). Conversely, neutral and ''angry'' groups did not differ significantly in guilt feeling ratings (Perceived Responsibility: $p = 0.99$; Concerns about future or further guilt: $p = 1.0$).

PANAS—negative scale ratings

ANOVA performed on individuals' PANAS negative subtotal showed a significant difference among the three groups ($F(2,168) = 60.07$, $p < 0.001$). As in the earlier experiment, *post hoc* comparisons ($p < 0.001$) revealed that participants rated higher in negative affect after having written both a guilt-related story ($M = 26.6, SD = 6.2$) and an anger-related story ($M = 25.17$; $SD = 7$), than a neutral story ($M = 15.1$; $SD = 5.6$). No differences were found between guilty and angry participants in negative affect felt ($p = 0.49$).

The option choice

Participants' preferences for the two different options (for instance, Repairing the car—option A *vs.* Doing something else—option B) across the three emotional state conditions (guilt vs. anger vs. neutral) and the two listing alternatives conditions (before vs. after decision-making) are shown in Table 2.

Participants' preferences were analysed by means of logistic regression with Emotional state (guilt, anger, neutral) and Emotional state × Listing alternatives (before vs. after decision-making) interactions as predictors, and the option choice made participants as dependent variable. The neutral emotional state condition served as reference category for the guilt and anger conditions. As predicted, a significant effect of Emotional state was found, Wald (2) = 28.64, $p < 0.001$. In the guilty emotional state significantly more participants chose the option of ''repairing the car'' (option A), than in the neutral emotional state, Wald (1) = 25.09, $p < 0.001$. By contrast, in the angry emotional state versus neutral emotional state no differences were found in the option choice made by participants, Wald (1) = 0.06, $p = 0.81$. In both the conditions participants preferred the option of ''doing something else'' (option B).

An Emotional state × Listing alternatives interaction failed to reach significance, Wald (2) = 0.24, $p = 0.88$. More specifically, the guilty emotional state × listing alternatives interaction was not significant, Wald (1) = 4.81, $p < 0.03$, indicating that compared to the neutral emotional state, there was no influence of the phase of listing alternatives on the option choice made by guilty participants. Indeed, they preferred the negative stated option (i.e. Repairing the car), regardless of the phase of listing alternatives. Also the angry emotional state versus neutral emotional state × listing alternatives interaction failed to reach significance,

Wald (1) = 0.01, $p = 0.91$. In both the angry and neutral groups, participants preferred the option of doing something else (option B), regardless of the phase of listing alternatives.

No of alternatives

The emotional state variable had a significant effect on the number of alternatives listed in Before-decision-making condition: $F(2, 85) = 5.15$, $p < 0.01$. As predicted in this condition, *post hoc* comparisons ($p < 0.05$) revealed that guilty participants produced the lowest number of alternatives ($M = 1.1$; $SD = 0.9$) compared to both those in the control condition ($M = 2.31$; $SD = 2.05$), and in the angry condition ($M = 2.27$; $SD = 1.98$). By contrast, neutral and ''angry'' groups did not differ significantly in the number of alternatives produced ($p = 1$).

Also in the after decision-making condition, guilty individuals generated the lowest number of alternatives ($M = 1.8$; $SD = 1.63$) compared to both those in the control condition ($M = 2.70$; $SD = 2.12$), and in the angry condition ($M = 2.75$; $SD = 2.17$) although this difference was not significant $F(2, 80) = 1.86$, n.s.).

Discussion

The results of this experiment suggest that the emotional state characterised by guilt influenced the focusing process. Guilty participants faced with a stated option that has predominantly negative features tended to focus on it, ignoring other possible alternatives, regardless of the phase in which they were asked to list alternatives. Thus, they showed a preference to fix their attention on the ''stated negative possibility'' (*focusing*).

By contrast, both angry and control participants did not display this focusing effect. Indeed, they preferred other unspecified options to the negative one, regardless of whether they were asked to list reasonable alternatives before or after decision-making. They thus showed a preference to divert attention from the ''negative possibility'' (*defocusing*) although it was explicitly represented, focusing instead on other possible alternatives, even though they were not explicitly represented in the text.

These findings partially contradict those reported by Jones and colleagues. In their study 4, participants who were asked to generate alternatives before decision-making were more likely to choose the stated negative option. According to the authors, this was because, in thinking of alternatives to the negative option, the participants found most of them were more unattractive than the stated option. In contrast, our angry and control participants in the before decision-making condition, by generating alternatives, discovered possibilities which were more attractive than the stated negative one (e.g. spending the same money on a second-hand motorbike, or on a second-hand old-model car).

Thus, we confirm a specific guilt emotion effect on option choices made by our participants. It is worth noting that also in the present study participants' emotional states were directly manipulated and they were thus unrelated to the decision to be made.

EXPERIMENT 3

In this experiment we further examined the influence of an emotional state characterised by guilt on focusing. This experiment differed from the earlier ones in three aspects. Firstly, it examined the influence of this emotional state on decision-making, in the case of two different options. Secondly, in this experiment the two options were two hypotheses. Participants were asked to choose which hypothesis, between one of danger and one of safety (i.e. a safety diagnosis: Influenza; a danger diagnosis: Leukaemia) they preferred to further investigate before making a final decision. Thirdly, these two hypotheses were not equally represented in the decision frame. In the real world, we often have to cope with possibilities which have different degrees of

explicitness, i.e. some of which can be explicitly and exhaustively represented (e.g. they are specified by clear, relevant information), while others may be implicit or else not explicitly represented (e.g. we have scant incomplete information about them).

In this study, all the participants were presented with a decisional task consisting of a medical diagnosis referring to a hypothetical patient. The task included two hypotheses, one of danger and one of safety; alternatively, one was very explicit and one was very implicit. The explicit hypothesis was detailed and thus clearly specified in the text, while the implicit hypothesis was only hinted at the end of the text.

As in the earlier experiments, emotional states were induced by asking participants to write about a guilty/angry/neutral- related life event. The emotional states were thus neither generated by nor related to the task used in this experiment. Also in this experiment, we used an experimental design in which two different negative emotional states (guilt vs. anger) were induced. In this way, we wanted to demonstrate that our results stem from a specific guilt-emotional state effect, and not from a general negative emotional state effect. We expected that our guilty participants would be more likely to prudentially focus on the ''danger hypothesis'' than both angry and control participants, even though it was not explicitly represented, but only hinted at the end of the text, and to show a prudential preference to detract attention from the ''safety hypothesis'', even though it was represented explicitly and in detail in the text. As a result, we predicted they would choose to investigate the danger-implicit hypothesis, selecting a higher number of questions about it, and choosing it as final decision.

By contrast, angry and control participants would be likely to focus their attention only on the positive explicitly represented hypothesis, regardless of whether it was a danger or a safety hypothesis. They would choose to investigate the explicit hypothesis, selecting a greater number of questions on it, and choosing it as final decision.

Method

Participants

A total of 183 volunteer students from the University of Rome participated in the experiment. Their average age was 24.4, the range being 21–42. Participants were randomly assigned to one of the three Emotional States (guilt vs. anger vs. neutral). For each Emotional state condition (guilt vs. anger vs. neutral), they were randomly assigned to one of the two different combinations of Diagnoses (safety-explicit + danger-implicit – SE + DI-; danger-explicit + safety-implicit – DE + SI). The design was 3×2 independent groups with the factors: Emotional State (guilt; anger; neutral) and Diagnoses (SE + DI; DE + SI). (see Table 4)

Materials and procedure

The procedure was the same as in the earlier experiments. The materials differed in the decisional task that was now a medical diagnosis of a hypothetical patient. It consisted of a scenario, a combination of Diagnoses, 12 mixed questions on the two illnesses related to the two different diagnoses (6 for Influenza-safety diagnosis; 6 for Leukaemia-danger diagnosis). (see Appendix A)

Affect induction. As in the earlier experiment, emotional state was manipulated by asking participants to describe either a guilt-related (guilt induction group), or an anger-related (angry induction group) or a neutral (control group) personal life event.

The scenario and the diagnostic task. All participants were then informed that they were a doctor in their ward. Their decisional task was a medical diagnosis of a hypothetical patient: *does the patient suffer from*

leukaemia or influenza? The diagnostic task was presented in two different forms: in the first form (SE + DI) the diagnosis of Influenza was explicit, detailed and clearly represented in the text, while the diagnosis of Leukaemia was implicit and only hinted at the end of the problem. In the second form (DE + SI) the diagnosis of Leukaemia was explicit and the diagnosis of Influenza was implicit. In all the experimental conditions (guilt; anger; neutral) participants were presented with only one of the two forms. Thus, in all conditions, after having read the appropriate task instructions, participants were presented with only one of the two following combinations of diagnoses:

- Diagnosis of *Influenza* (safety-explicit hypothesis) + Diagnosis of *Leukaemia* (danger-implicit hypothesis).
- Diagnosis of *Leukaemia* (danger-explicit hypothesis) + Diagnosis of *Influenza* (safety-implicit hypothesis).

Questions on illnesses-diagnoses. In all the experimental conditions (guilt; anger; neutral), in order to refer the patient to the right specialist, and thus to perform the task, participants were asked to choose from among the following 12 mixed questions (6 for Leukaemia; 6 for Influenza) the ones they considered the most useful to get answers to before taking the decision:

Influenza	Leukaemia
Are the patient's eyes reddened?	Does the patient complain of severe asthenia?
Has the patient got a cough?	Has the patient got an enlarged liver?
Does the patient complain of aching joints and bones?	Has the patient got an enlarged spleen?
Does the patient complain of slight general weakness?	Has the patient got swollen lymph nodes?
Has the patient got a sore throat?	Has the patient got ecchymoses?
Has the patient got a cold?	Has the patient got cutaneous bruises?

Medical specialist. Participants were then asked to choose the specialist among their colleagues they wanted the patient to be examined by:

- Expert in infectious diseases (in connection with the diagnosis of Influenza).
- Haematologist (in connection with the diagnosis of Leukaemia).

After having made their decision, participants were requested to indicate whether each symptom included in the above-mentioned reported questions was related to leukaemia or influenza. In this way we were always certain of the illness (diagnosis-hypothesis) they wanted to explore.

Measures

Manipulation check questionnaires. As in the earlier experiments, following the decisional task, two questionnaires (*Manipulation check questionnaires* a- Part 1 and Part2) were administered in order to check whether our emotional state manipulation was effective.

PANAS Scales. All participants were then asked to complete the PANAS Scales.

Dependent variables. Two dependent variables related to the decisional task were considered: (1) number of questions per illness (measured as the mean number of ''questions'' selected per illness); (2) decision made by participants regarding the medical specialist: the expert in infectious diseases versus the haematologist (we recorded the number of people who chose each of the two experts). Finally, the dependent variables

evaluated through the manipulation check questionnaires (Part–1 and Part–2) and the PANAS scales (negative scale score) were the same as in Experiments1 and 2.

Results

Manipulation Check Questionnaires

As in the previous experiment, the ANOVA performed on guilt felt after the emotional state induction (Manipulation Check Questionnaire—Part 1) revealed that the induction was effective ($F(2, 180) = 34.47$, $p < 0.001$). *Post hoc* comparisons ($p < 0.001$) revealed that after writing about the past life event involving guilt, individuals perceived more guilty feelings ($M = 70.9$; $SD = 25.23$) than either a neutral story ($M = 37.24$; $SD = 26.16$), or an anger-related story ($M = 36.62$; $SD = 26.6$). Conversely, neutral and ''angry'' groups did not differ significantly in guilty feeling ratings ($p = 0.99$).

In order to verify also the effectiveness of the anger emotional state induction (Manipulation Check Questionnaire—Part 1), we used ANOVA to analyse the data for ''angry'' feelings felt after writing about the anger-related event. The angry emotional state manipulation was found to be effective, $F(2, 180) = 39.27$, $p < 0.001$. *Post hoc* comparisons ($p < 0.001$) revealed that participants perceived more angry feelings after having written an anger-related story ($M = 70.21$; $SD = 24.34$) than either a neutral story ($M = 35.42$; $SD = 24.9$), and a guilt-related story ($M = 33.5$; $SD = 27.6$). Conversely, neutral and ''guilty'' groups did not differ significantly in ''angry'' feeling ratings ($p = 0.97$).

As regards our Manipulation Check Questionnaire—Part 2 completed by participants immediately after the decisional task, we found, once again, that the manipulation of guilt emotional state was effective (Perceived Responsibility: $F(2, 180) = 39.51$, $p < 0.001$; Concerns about future or further guilt: $F(2, 180) = 33.96$, $p < 0.001$). *Post hoc* comparisons ($p < 0.001$) revealed that guilty participants perceived more responsibility ($M = 68.02$; $SD = 25.4$), and concerns about future or further guilt ($M = 71.25$; $SD = 28.4$) than either control participants (Perceived Responsibility: $M = 31.23$; $SD = 26.9$; Concerns about future or further guilt: $M = 35.70$; $SD = 26.16$), and ''angry'' participants (Perceived Responsibility: $M = 31.03$; $SD = 26.61$; Concerns about future or further guilt: $M = 35$; $SD = 28.19$). Conversely, neutral and ''angry'' groups did not differ significantly in guilty feeling ratings (Perceived Responsibility: $p = 1$; Concerns about future or further guilt: $p = 0.99$).

PANAS—negative scale ratings

ANOVA performed on individuals' PANAS negative subtotal showed a significant difference among the three groups ($F(2, 180) = 79.43$, $p < 0.001$). As in the earlier experiment, *post hoc* comparisons ($p < 0.001$) revealed that participants rated higher in negative affect after having written both a guilty story ($M = 26.7$; $SD = 6.8$) and an anger story ($M = 25.7$; $SD = 6.9$), than a neutral story ($M = 13.7$; $SD = 4.9$). No differences were found between guilty and angry participants in negative affect felt ($p = 0.79$).

Number of questions per illness

The number of questions selected by participants per illness (Influenza; Leukaemia) was analysed by means of ANOVA with Emotional State (guilt; anger; neutral) and Diagnoses (SE + DI; DE + SI) as between *S* factors. Since the differential instructions provided to the three groups were intended to yield differences in focusing mechanism only for the danger-implicit hypothesis, we expected an emotional state by diagnoses type interaction, with the three groups differing only in the danger-implicit hypothesis condition. Significant emotional state by diagnoses type interaction was indeed found for the number of questions on Influenza ($F(2, 177) = 5.75$, $p < 0.01$) and for the number of questions on Leukaemia ($F(2, 177) = 3.74$, $p < 0.05$), with the three groups differing only in the danger-implicit hypothesis condition. As expected, guilty participants

Table 3. Mean number of questions selected per illness for each of the two different combinations of diagnoses across the three emotional state conditions of experiment 3

		No of symptoms of Leukemia		No of symptoms of Influenza	
Emotional state	Diagnosis	*M*	*SD*	*M*	*SD*
Guilt	SE + DI	3.43	1.79	1.90	1.89
Anger		1.67	1.55	3.52	2.2
Neutral		1.6	1.5	3.97	1.52
Guilt	DE + SI	3.6	1.6	1.87	1.8
Anger		3	1.88	1.9	1.37
Neutral		3.39	1.49	1.77	1.49

chose a higher number of questions on Leukaemia ($M = 3.43$; $SD = 1.8$) and a lower number of questions on Influenza ($M = 1.9$; $SD = 1.89$) than either angry (questions on Leukaemia $M = 1.6$, $SD = 1.5$, $t(61) = 4.18$, $p < 0.001$; questions on Influenza: $M = 3.5$, $SD = 2.2$, $t(61) = -2.94$, $p < 0.01$) and control participants (questions on Leukaemia: $M = 1.6$, $SD = 1.5$, t $(58) = 4.21$, $p < 0.001$; questions on Influenza: $M = 3.9$, $SD = 1.5$, $t(58 = -4.42, p < 0.001$). Moreover, neutral and ''angry'' groups did not differ significantly in the number of questions on Leukaemia ($p = 0.86$) and Influenza ($p = 0.36$). The mean number of questions selected per illness (Influenza vs. Leukaemia) as a function of Emotional State (guilt; anger; neutral) and Diagnosis (SE + DI; DE + SI) is shown in Table 3.

Medical specialist

The percentage of participants choosing each medical specialist as a function of the three emotional states and of the two diagnoses is shown in Table 4. A logistic regression model of participants' choices was tested. Since the differential instructions provided to the three groups were intended to produce differences in choosing the medical specialist only for the danger-implicit diagnosis, Emotional State × Diagnosis interactions were included in the model. The neutral emotional state condition served as reference category for the guilt and anger emotional state conditions. As predicted, the Emotional State × Diagnosis type interaction was significant (Wald (2) = 23.28, $p < 0.001$). More specifically, only the angry emotional state versus neutral emotional state × diagnosis interaction was significant, Wald (1) = 19.03, $p < 0.001$. Angry

Table 4. Frequency (and percentage) choice of each medical specialist for each of the two different combinations of Diagnoses across the three Emotional state conditions of experiment 3

		Medical Specialist	
Emotional state/Diagnosis	N	Haematologist	Expert Infectious Disease
Guilt	**60**	**51 (53)**	**9 (47)**
SE + DI	30 (50)	24 (80)	6 (20)
DE + SI	30 (50)	27 (90)	3 (10)
Anger	**62**	**27 (47)**	**35 (53)**
SE + DI	33 (53)	7 (21)	26 (79)
DE + SI	29 (47)	20 (69)	9 (31)
Neutral	**61**	**34 (47)**	**27 (53)**
SE + DI	30 (49)	5 (17)	25 (83)
DE + SI	31 (51)	29 (93)	2 (7)

participants were more likely to prefer the haematologist only in the in DE + SI condition. They preferred the expert in infectious disease in the other diagnosis type condition. By contrast, the guilty emotional state versus neutral emotional state × diagnosis interaction failed to reach significance (Wald (1) = 1.74, $p = 0.18$), indicating that there was no influence of the diagnosis on the preference expressed by participants in the guilty emotional state. Thus, guilty participants preferred the haematologist in both diagnoses. This conclusion is supported by the fact that *within* both the anger emotional state condition (Wald (1) = 13.01, $p < 0.001$), and the neutral emotional state condition (Wald (1) = 23.69, $p < 0.001$) the effect of Diagnosis was significant, whereas within the guilt emotional state condition the Diagnosis effect failed to reach significance, Wald (1) = 1.13, $p = 0.28$.

Discussion

In this experiment, we examined the influence of guilt emotional state on decision-making in the case of two different options (hypotheses) that had different degrees of explicitness, as is the case in many real-world decisions. Participants were presented with a diagnostic task, and were asked to choose which diagnosis between a danger (Leukaemia) and a safety one (Influenza) they preferred to further investigate before making a final decision. Despite the differences, the present results further confirm the findings of the previous experiments. It appears, once again, that guilt influences individuals' focusing and prevails over the focusing effect. Indeed, our guilty participants preferred to prudentially focus on the ''danger diagnosis'', even though it was not explicitly represented, but only hinted at the end of the text. They diverted attention from the ''safety diagnosis'', even though it was represented explicitly and in detail in the task. As a result, they chose to further investigate the danger-implicit diagnosis, selecting a higher number of questions about it, and choosing it as their final decision.

By contrast, as a result of the focusing effect, both the angry and control participants fixed their attention only on the explicitly represented diagnosis, selecting a greater number of questions about it, and choosing it as their final decision, regardless of whether it was a danger or a safety one.

GENERAL DISCUSSION

The aim of this paper was to demonstrate that reasoning processes can be affected by a specific emotional state characterised by guilt. The present experiments tested the influence of this emotional state on focusing in decision-making. To this aim we observed three groups of participants assigned to three different emotional state induction conditions (guilt vs. anger vs. neutral). In all our studies two different negative emotional states (guilt vs. anger) were thus induced. In this way, we could demonstrate that our results stem from a specific guilt-emotional state effect, and not from a general negative emotional state effect. Emotional states were manipulated by getting participants to write about either a guilt-related or an anger-related or a neutral-related life event. The emotional states were thus neither generated by nor related to the task used in all the experiments.

In general, the results of these studies revealed that guilty emotional state has specific effects and can critically affect individuals' focusing, also prevailing over the *focusing mechanism*. According to this mechanism, individuals are likely to restrict their thoughts to what is explicitly represented in the decisional task, failing to make an exhaustive search for alternatives that are represented only implicitly (e.g. Legrenzi et al., 1993; Jones et al., 1998). The present experiments indicate that guilt has specific effects, reducing or causing this *focusing effect*. Although guilt and anger are emotional states of the same valence (negative), only participants who felt guilt when presented with a stated option having predominantly positive characteristics preferred other unspecified options to the positive one, regardless of whether they were asked to list possible alternatives before or after making the decision. Given that the stated option was relatively desirable, our guilty participants showed a preference for spontaneously diverting attention from it, focusing instead on other

unstated alternatives that were less satisfying or pleasing but morally more just, as well as more useful than the stated one (e.g. to pay university fees; to buy a PC; to attend an English course) (Experiment 1). Moreover, only guilty participants faced with a stated option that had predominantly negative features tended to focus on it, ignoring other possible alternatives, regardless of the phase in which they were asked to list alternatives. Given that the stated option was undesirable (negative option) they focused on the negative characteristics of this option, favouring it, and ignoring instead the other unstated alternatives (which were better than the stated option, e.g. spending the same money on a second-hand motorbike, or on a second-hand old-model car) (Experiment 2). Finally, in Experiment 3, we examined the influence of guilt feelings on decision-making in the case of two different options (hypotheses) having different degrees of explicitness (i.e. they were not represented equally in the decision frame), as in many real-world decisions. Despite the differences, the results of this study further confirm the findings of the earlier experiments: only guilt emotion influences individuals' focusing, even prevailing over the *focusing mechanism.* Participants who feel guilt prefer: (a) to prudentially focus on the ''danger hypothesis'', even though it is not explicitly represented, but only hinted at at the end of the text; (b) to prudentially divert attention from the ''safety hypothesis'', even though it is represented explicitly and in detail in the task. As a result, they choose to further investigate the danger-implicit hypothesis, selecting a larger number of questions about it, and choosing it as final decision.

These results are in line with the *prudential mode* hypothesis (Mancini & Gangemi, 2004). In making decisions guilt leads to *prudentially* focus on the worst case alternative even when it is implicit or else not explicitly represented in the decision frame (i.e. we have only scant, incomplete or almost no information about it), and not only when it is explicitly and exhaustively represented (i.e. characterised by clear, relevant and abundant information about it).

Overall, our findings are consistent with a growing body of evidence showing that individuals' emotional states influence cognitive processes, even prevailing over the formulation of the problem. For instance, Finucane and colleagues (Finucane, Alhakami, Slovic, & Johnson, 2000) described an ''affect heuristic'' by which people judge and decide on the basis of their emotions. Emotional states may serve as a cue for many important decisions (including decisions at risk). Using an overall, readily available emotional impression can be easier, and sometimes more helpful in evaluating the costs and benefits of a decision, than weighing the pros and cons, especially when the required judgement or decision is complex or mental resources are limited. This result implies that people base their judgements of an activity or a technology not only on what they *think* and *read* about it but also on what they *feel* about it. For example, information stating that the benefit is high for a technology such as nuclear power would lead to a more positive overall affect which would, in turn, decrease the perceived risk. Hence all these experiments demonstrate that the induced emotional state can guide the framing of the problem, leading to representations that differ according to how explicit they make the situation, and these differences then affect the conclusions that the reasoners draw (Slovic, Finucane, Peters, & MacGregor, 2002). While early work along these lines followed a valence-based approach, contrasting the effects of positive versus negative feeling states on judgement and choice (e.g. Damasio, 1994; Johnson & Tversky, 1983; Schwarz & Clore, 1983), more recent work has systematically examined the influences of specific emotions, mainly sadness, fear and anger, showing that different emotions of the same valence (e.g. fear, anger, sadness) differentially influence judgements and choices (e.g. Lerner & Keltner, 2000, 2001; Mellers, Schwartz, & Ritov, 1999). Our participants' choices support the earlier findings of Lerner and Keltner (2000, 2001) that judgements and choices are variously influenced by emotions of the same valence. They found that fearful people made pessimistic judgements about future events, whereas angry people made optimistic judgements, and that these opposing patterns emerge for naturally occurring and experimentally induced fear and anger. The present studies extend this line of research to guilt emotion and lead us to conclude that current feelings of guilt increase concerns about responsibility and the potential of future or further guilt (as reflected in the responsibility and concerns about future or further guilt measures). These feelings elicit a prudential mode that explores negative possibilities, and result in choices that take these negative possibilities into account.

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APPENDIX A

Experiment 3. Example of a task.

Safety-explicit hypothesis/danger-implicit hypothesis.

You are a doctor before a patient. Once you've evaluated his symptoms the diagnosis of ''influenza'' crosses your mind and you consider that, in a few days, the fever will pass and the patient will be able to go back home, to begin working again, to resume his hobbies, to start going to gym and playing five-a-side football again, etc.

But the symptoms might also be consistent with the diagnosis of leukaemia.

Now you have to decide by which specialist, among your colleagues, you want your patient to be examined and to this aim you must ascertain: is it influenza or not?

Before you take a decision, choose among the following questions the ones you consider more useful to inquire into so that you can refer your patient to the right medical specialist.

Are the patient's eyes reddened?	☐
Has the patient got a cold?	☐
Has the patient got a cough?	☐
Has the patient got ecchymoses?	☐
Does the patient complain of aching joints and bones?	☐
Does the patient complain of severe asthenia?	☐
Has the patient got an enlarged liver?	☐
Has the patient got an enlarged spleen?	☐
Has the patient got a sore throat?	☐
Has the patient got swollen lymph nodes?	☐
Does the patient complain of slight general weakness?	☐
Has the patient got cutaneous bruises?	☐

Now decide by which specialist, among your colleagues, you want your patient to be examined?

- Expert in infectious diseases (diagnosis of Influenza)
- Haematologist (diagnosis of Leukaemia)

