

Work in progress

Journal of Behaviour Therapy and Experimental Psychiatry. In press

Running Head: Responsibility, fear of guilt and hypothesis-testing

The Role of Responsibility and Fear of Guilt in Hypothesis-Testing

Francesco Mancini * (mancini@apc.it)

Scuola di Specializzazione in Psicoterapia Cognitiva

Associazione di Psicologia Cognitiva (APC)

Via Marcantonio Colonna, 60, 00100-Rome, Italy

Amelia Gangemi (gangemi@unica.it)

Scuola di Specializzazione in Psicoterapia Cognitiva

Associazione di Psicologia Cognitiva (APC)

Via Marcantonio Colonna, 60, 00100-Rome, Italy

Department of Psychology, University of Cagliari

Via Is Mirrionis, 1

Cagliari, Italy

*Corresponding author. Tel.: +39-06-3216801; fax: +39-06-3222743. E-mail
address: mancini@apc.it (F. Mancini)

Abstract

Recent theories argue that both perceived responsibility and fear of guilt increase obsessive-like behaviours. We propose that hypothesis-testing might account for this effect. Both perceived responsibility and fear of guilt, would influence subjects' hypothesis-testing, by inducing a *prudential* style. This style implies focusing on and confirming the worst hypothesis, and reiterating the testing process. In our experiment, we manipulated the responsibility and fear of guilt of 236 normal volunteers who executed a deductive task. The results show that perceived responsibility is the main factor that influenced individuals' hypothesis-testing. Fear of guilt has however a significant additive effect. Guilt-fearing participants preferred to carry on with the diagnostic process, even when faced with initial favorable evidence, whereas participants in the responsibility condition only did so when confronted with an unfavorable evidence. Implications for the understanding of obsessive-compulsive disorder (OCD) are discussed.

Keywords: Fear of guilt from behaving irresponsibly; Responsibility; Hypothesis-Testing; Obsessive-Compulsive Disorder.

Role of Fear of Guilt at Behaving Irresponsibly in Hypothesis-Testing

1. Introduction

The idea that obsessions and compulsions are a consequence of undue scrupulousness and an exaggerated tendency towards feeling guilty is a longstanding one. Taylor (as cited in Insel, 1990), who first gave a medical description of Obsessive Compulsive Disorder (OCD), indeed suggested that the disorder could depend on an overweening moral sense. Freud, when speaking of the “rat man”, attached considerable importance to guilt feelings in determining OCD, just as McFall and Wollersheim (1979), Rachman (e.g. 1993; 2002) and Salkovskis (e.g. 1985; Salkovskis and Forrester, 2002) stressed the importance of the sense of responsibility. Van Oppen and Arntz (1994) compared OCD to other anxiety disorders, depression, and resentment and concluded that OCD is characterized by fear of guilt. Moreover, Ladouceur and colleagues (Ladouceur Rhéaume, Freeston, Aublet, Jean and Lachance, 1995) induced responsibility in non-clinical subjects by telling them that the errors they made during the experimental task would lead to harmful and undeserved outcomes. Experimental subjects displayed a greater number of hesitations and checks and reported more guilt feelings than control subjects. There thus exists a longstanding and important tradition of relating OCD to undue moral concerns.

In a previous paper (Mancini and Gangemi, 2004a) we argued that the mental state generating obsessive activity is not so much a sense of responsibility, but the fear of guilt of behaving irresponsibly, namely the fear that one’s behaviour may not be up to the level of one’s duties. In a previous study (Mancini, D’Olimpio and Cieri, 2004) we also showed that inducing in normal subjects the responsibility for the outcome of a task

Work in progress

implies that the subjects perform the task with greater uncertainty, checking and hesitations, etc. than normal non responsible subjects. In other words, the responsible subjects perform the task in a more “obsessive-like” mode than non responsible subjects. In the same study we also showed that the task is performed in an even more “obsessive-like” way by responsible subjects who are fearful of committing errors.

But what cognitive ingredients shape the mind of responsible persons and those who are fearful of feeling guilty for behaving irresponsibly?

For an agent to feel responsible the following ingredients must be active in his mind (Conte and Castelfranchi, 1985):

- he must assume a duty exists that prescribes a given outcome
- he must assume that this duty is incumbent upon him
- he must deem that fulfilling this duty is one of his goals
- he must assume that a causal link exists between an action/omission of him, even when only potentially present in his domain of competence, and the outcome. If he assumed the absence of a causal link he would no longer feel responsible, as “*ad impossibilia nemo tenetur*”
- he must assume he is free to act or to omit to act. If he were to assume he was prevented from acting or compelled to act or to omit, he would not feel responsible for the outcome. It should be noted that:

“Sometimes we say that we really cannot do a certain action X. Actually we could do it materially, but we choose not to do it because the costs of doing X would be very high; that is, the costs would entail the thwarting of numerous other goals, or goals of greater importance than the discarded X” (Poggi, 1994).

If the agent assumes he has failed in the goal of attaining the prescribed goal he will feel guilty, and we may speak of feeling guilty of acting irresponsibly. We use the

Work in progress

expression feeling guilty at behaving irresponsibly to distinguish it from other guilt feelings, in particular survivor's guilt feelings and feeling guilty for intentional faults. In the survivor's guilt feelings one feels guilty simply because there is the realization of having been undeservedly fortunate with respect to someone else who was equally undeservedly unlucky. It should be noted that in order to experience these guilt feelings there is no need to assume the existence of a causal link between one's action/omission and the harm caused to the victim and it is not even necessary to assume one has not fulfilled a duty. In guilt feelings due to an intentional fault, unlike feeling guilty of behaving irresponsibly, it is assumed that one's action/omission was intentional. Those who suffer from intentional guilt feelings knew they were doing wrong, wanted to do wrong and were free to do good.

The person who feels responsible will prior to performing the task and the outcome, implicitly or explicitly formulate hypotheses concerning the likelihood of his performance meeting his sense of duty or not. These predictions may be optimistic, as when the individual believes that his/her behaviour is appropriate. For instance, take the case of a responsible and optimistic surgeon who foresees that his/her performance will meet the required standards of professional behaviour. Although she/he may be conscious that there is a possibility of her/him performing poorly, she/he probably considers it only an improbable exception. Or, there may be pessimistic predictions, as when an individual foresees that his/her behaviour will not meet his/her moral standards, or the potential that she/he will act unfairly in a given situation. Here, we are dealing with a fear of guilt arising from perceived irresponsibility, and it is this that is associated with anxiety (Mancini & Gangemi, 2004a).

Work in progress

In the current experiment we investigated whether subjects made fearful of guilt for behaving irresponsibly checked hypotheses relating to their responsibility more prudentially than subjects made to feel responsible, and whether the latter were more prudent than those who were not made to feel responsible.

In other words, we aimed to investigate whether the caution induced by responsibility or fear of guilt of behaving irresponsibly, affected not only behaviour and emotional states, as was demonstrated by Mancini, D'Olimpio and Cieri (2004), but also danger and safety hypotheses testing. We expected that a state called the *prudential* mode would be involved in this (Mancini & Gangemi, 2004b). In this mode, individuals focus on their hypothesis of danger, search for examples to confirm the danger hypothesis, consider counter-examples falsifying the danger hypothesis insufficient, and adhere to the danger hypothesis by continuing to engage in the hypothesis-testing process.

The present study also served the purpose of replicating the results of preceding experiments (Mancini and Gangemi, 2004b) in which we showed that subjects fearful of feeling guilty for behaving irresponsibly check safety and danger hypotheses related to the outcome for which they feel responsible more prudently than subjects not made to feel responsible.

In particular, the current study intends to investigate the influence of responsibility and additional fear of behaving guilty, on prudential hypothesis-testing in a non-clinical sample. In the experiment, participants were presented with a number of modified Wason selection tasks (WSTs)¹ (Wason, 1966). Their performances were evaluated under three different conditions: perceived responsibility, perceived responsibility plus fear of guilt, and no responsibility. Perceived responsibility and fear

Work in progress

of guilt were each independently manipulated by giving differential instructions to different groups of subjects.

We expected that participants assigned to the perceived responsibility plus fear of guilt condition would exhibit persistence in the diagnostic testing process, focusing on the danger hypothesis and seeking to confirm information about it, regardless of the initial diagnosis (benign vs. malignant). By contrast, we expected that individuals assigned to the perceived responsibility condition would carry on with the diagnostic testing process, focusing on and confirming the worst case diagnosis, only in the case of the initial malignant diagnosis. We assume indeed that one who feels both responsible and fearful of not meeting his/her responsibility will be more prudent, that is, he/she will avoid underestimating a danger, hypothesizing a malignant diagnosis even in the presence of an initial benign diagnosis.

2. Method*2.1. Participants and Design*

A total of 236 unscreened volunteer students from the University of Palermo participated in the experiment. Their mean age was 25, the range being 19-34. None of them had any prior experience with the WST.

As shown in Table 1, participants were randomly assigned to one of the three Mental States conditions (perceived responsibility plus fear of guilt -PR+FG-, perceived responsibility -PR-, and no responsibility -NR-). For each experimental condition (Mental state), they were randomly assigned to one of the two different Initial Diagnoses (benign and malignant). The design was thus 3 x 2 independent groups with the factors: Mental state (PR+FG; PR; NR) and Initial Diagnosis (benign and malignant).

Work in progress

We preferred to use this experimental design (i.e. each subject experiencing only one condition, rather than use an own control type of design) in order to avoid the participants' performance being influenced by such variables as fatigue or carry-over effects.

2.2. *Materials and procedure*

Participants were tested in four groups. They were given a decisional task described in a booklet and accompanied by written instructions, a story and a modified WST. After completing the modified WST, a questionnaire was administered in order to check the effectiveness of instruction manipulation (induction of responsibility and fear of guilt). More specifically, each task consisted of a story, an initial diagnosis, two expert systems and conditional rules, as well as four scenarios representing the antecedents and the consequents of the conditional rule. (see Appendix A)

At the beginning of the experimental session, a researcher briefly explained the procedure and the participants filled in the informed consent form. They had to solve the problem individually.

2.2.1. The Story and Introductory Instructions. In the PR conditions, the task instructions intended to activate only responsibility. Participants were asked to imagine that they were doctors and to assume that they alone were responsible for diagnosing a patient's medical condition. In the PR+FG condition, participants were further informed that they had performed very poorly, and had made serious errors in several diagnoses. Moreover they were telling they were feeling guilt about this and fearful of making new serious mistakes. In the NR condition the task instructions did not relate to responsibility or fear of guilt.

Work in progress

More specifically, in the PR+FG condition, the subjects were asked to identify with a story in which the ingredients of guilt of behaving irresponsibly were illustrated. The character of the story with whom the subjects were asked to identify was a medical doctor. By definition a doctor is responsible for his/her patients and in order to reinforce his responsibility, it was also stated that the doctor was the only one on duty and therefore the only one responsible.

To induce fear of not meeting one's responsibility the participants were asked to imagine the possibility of committing blameable mistakes. To reinforce this they were asked to think they had already committed several errors in the recent past – not errors of incapacity but mistakes due to negligence and therefore errors that implied guilt of not meeting their responsibilities. Past errors were mentioned to induce fear of guilt more intensely.

It should be noted that the errors referred to in the story were attributed to negligence and not to incapacity and the negative implications of the errors were of a moral nature. Using the Manipulation Check Questionnaire (see below) we checked whether the participants really identified with the story and in particular whether responsibility and the fear of committing errors were induced.

2.2.2. Initial Diagnoses. In all three experimental conditions (PR+FG; PR; NR), they were then presented only one of the two initial diagnoses: Leukaemia (malignant diagnosis) / Influenza (benign diagnosis). Moreover, in order to clarify that none of the patients can suffer from both diseases, all participants read that it is absolutely impossible for a patient to suffer from both Influenza and leukaemia at the same time. Then, participants were asked to say whether they preferred to continue the diagnostic process or not.

Work in progress

2.2.3. *Expert Systems and Conditional Rules.* For all three conditions (PR+FG; PR; NR), participants who preferred to continue the diagnostic process were instructed to indicate which medical diagnosis expert system (leukaemia expert system vs. Influenza expert system) they needed to ask a question in order to check the validity of the corresponding conditional rules:

- *if one has the same symptoms as my patient, then Influenza (safety rule)*
- *if one has the same symptoms as my patient, then Leukaemia (danger rule)*

2.2.4. *The Modified WST and the Four Scenarios.* After having chosen which system they wanted to consult, all participants were presented a modified version of the WST in order to check the validity of the corresponding conditional rule (danger/safety). Following de Jong et al. (1997; 1998), we modified the original WST in order to make the task more concrete and easier to understand. In line with a previous study (Mancini & Gangemi, 2004b), the four Wason selection cards were represented by four different scenarios. The scenarios were all presented at the same time.

Two scenarios referred to the antecedent of the rule (p and $not-p$). In particular, the propositions set out in the two “antecedent scenarios” were as follows:

- “ p ”: *Same symptoms as your patient*
 “ $not-p$ ”: *Different symptoms than your patient*

For each scenario participants could choose between two questions representing the two possible consequents (q : Do the patients suffer from Leukaemia? $not-q$: Do the patients suffer from Influenza?). For example, participants who chose the first scenario could select one of the two following questions:

- Scenario 1: *Same symptoms as your patient (p)*
Do the patients suffer from Leukaemia? (q)

Work in progress

Do the patients suffer from Influenza? (not-q)

The other two scenarios represented the consequents of the conditional rule (q and $not-q$):

“ q ”: *Patients have Leukaemia*

“not q ”: *Patients have Influenza*

Also in this case, for each scenario participants could choose between two questions representing two possible antecedents (p : Do the patients show the same symptoms as my patient? $not-p$: Do the patients show different symptoms than my patient?)

Participants were instructed to read the questions carefully and to indicate in which scenario they definitely needed to ask only one of the two above-mentioned questions in order to check the validity of the conditional rule (danger/safety). The order of the four different scenarios was random. (see Appendix A)

2.3. Measures

2.3.1. Manipulation check questionnaire. Following the task, a questionnaire was administered in order to check whether the manipulation was effective. All participants were requested to fill in a 4-item questionnaire about the following dimensions: 1) fear of guilt (concern over mistakes) felt during the task (2 items: *How afraid were you of making errors in deciding? How afraid were you of taking hasty 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 the patient?*). Individuals rated their feelings of fear of guilt and responsibility by marking Visual Analogue Scales as follows: ratings of guilt were made 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). We expected that: a) both PR+FG and the PR subjects would

Work in progress

report more perceived responsibility than NR participants; b) PR+FG group subjects would experience more fear of guilt (concern about their mistakes) than both PR and NR conditions participants.

2.4. Dependent variables

Three dependent variables related to the decisional task were considered:

- 1) **persistence in diagnostic testing process:** continue/stop the diagnostic process (yes/no). We recorded the number of people who chose each of the two options
- 2) **focus on danger hypothesis:** which medical diagnosis expert system (Leukaemia expert system vs. Influenza expert system) participants needed to ask a question in order to check the validity of the corresponding conditional rules (safety rule: *if my patient's symptoms then Influenza* vs. danger rule: *if my patient's symptoms then Leukaemia*). We recorded the number of people who chose each of the two conditional rules.
- 3) **Seeking confirming information:** performance in the modified WST was analysed in terms of which scenario and which of the two above-mentioned set questions participants selected in order to check the validity of the conditional rule (danger/safety). We recorded the number of people who chose each of the response patterns.

Finally, as a manipulation check we analysed: 1) concern about mistakes felt during the task (Fear of Guilt); 2) Perceived Responsibility felt during the task. The average of the responses to the items pertaining to each dimension was considered as dependent variable.

3. Results

Work in progress

3.1. Fear of guilt and Perceived responsibility. As expected, an ANOVA revealed that the manipulations of perceived responsibility ($F_{2,233} = 16.02, p < .001$) and fear of guilt ($F_{2,233} = 24.51, p < .001$) were effective. Post-hoc comparisons (Sidak's post hoc test) revealed that participants in both the PR+FG and PR conditions reported significantly more perceived responsibility than the control group (PR+FG $M=61.25$ vs. NR $M=32.61, p=.001$; PR $M=52.08$ vs. NR $M=32.61, p=.001$). The PR+FG and PR groups did not differ significantly ($p=.204$). Post-hoc comparisons showed that participants in the PR+FG condition experienced significantly more fear of guilt than any other group (PR+FG $M=63.12$ vs. PR $M=46.01, p=0.001$; PR+FG $M=63.12$ vs. NR $M=29.68, p=.001$), and that the PR group reported significantly more fear of guilt than the control group (PR $M=46.01$ vs. NR $M=29.68, p=.003$). These results indicate that participants from both PR+FG and PR conditions understood and followed instructions, and accordingly perceived more responsibility and concern over mistakes. Mean condition scores of the manipulation check variables are shown in Figure 1.

3.2. Persistence in diagnostic testing process. The preferences expressed by participants for continuing/stopping the diagnostic process for the two different initial diagnoses (benign diagnosis vs. malignant diagnosis), across the three conditions (PR+FG; PR; NR) are shown in table 1. Participants' preferences were analysed by means of logistic regression with mental state condition (PR+FG, PR, NR) and diagnosis (influenza vs. leukemia) as predictors, and preference (continue YES/NO) as dependent variable. The NR condition served as reference category for the PR+FG and the PR conditions. Mental state condition X diagnosis interactions were included in the model, as they are essential for testing our hypotheses. A significant effect of mental state condition was found (Wald (2) = 25.92, $p < .001$). In both the PR+FG and the PR

Work in progress

condition significantly more participants chose for continuing the diagnostic process than in the NR condition (Wald (1) = 16.66, $p < .001$; Wald (1) = 17.81, $p < .001$). There was no main effect of diagnosis (Wald (1) = .25, $p = .62$). However, the mental state condition X diagnosis interaction was significant (Wald (2) = 6.85, $p = .033$). More specifically, only the PR vs. NR X diagnosis interaction was significant (Wald (1) = 6.08, $p = .014$). As can be seen in table 1, participants of the PR condition especially wanted to continue the diagnostic process when they started with the leukemia diagnosis, but not so much when starting with the influenza diagnosis. The PR+FG vs. NR X diagnosis interaction failed to reach significance (Wald (1) = 3.06, $p = .08$), indicating that, compared to the NR condition, there was no influence of diagnosis on the preferences in the PR+FG condition.

Taken together, the results indicate that in both experimental conditions there was more preference for continuation of the diagnostic process than in the control condition. Whereas in the PR condition this preference was modulated by diagnosis (only the malignant diagnosis lead to a clear increase in preference to continue the process), in the PR+FG condition in both diagnoses there was a preference to continue the diagnostic process. This conclusion was supported by the fact that only within the PR condition the effect of diagnosis was significant (Wald (1) = 7.37, $p = .007$); whereas within the PR+FG and the NR conditions the diagnosis effect failed to reach significance (Wald (1) = 3.43, $p = .06$; Wald (1) = .25, $p = .62$).

3.3. Focus on danger hypothesis. Participants' preferences for the two different conditional rules (danger rule vs. safety rule) across the three conditions (PR+FG; PR; NR) are shown in figure 2. Chi-square analyses were performed on the preferences expressed by subjects who chose to continue the diagnostic process. No significant

Work in progress

differences were found between PR+FG and PR conditions, in the medical expert system and in the corresponding rule/diagnosis choice made by participants ($\chi^2(1, N=125) = 0.2$, n.s.). In both the PR+FG and PR conditions, the preference expressed by participants was that predicted by our hypothesis. The vast majority of participants made a prudential choice, selecting the Leukaemia expert system and the corresponding danger conditional rule at a level significantly higher than that observed for the safety rule (Influenza expert system) (PR+FG condition: $\chi^2(1, N=66) = 26.7$, $p < .001$; PR condition: ($\chi^2(1, N=59) = 28.5$, $p < .001$). In contrast, in the NR condition no preference was deserved, $\chi^2(1, N=31) = .81$, n.s.

Significant differences were found among PR+FG and PR conditions vs. NR condition in the rule choice made by participants. In both the PR+FG and PR conditions, participants focussed on the danger rule at a level significantly higher than that observed in the NR condition (PR+FG vs. NR: $\chi^2(1, N=97) = 6.2$, $p < .05$; PR vs. NR: $\chi^2(1, N=90) = 7.8$, $p < .005$).

3.4. Seeking confirming information. The response patterns selected by the participants for the danger conditional rule across the three conditions (PR+FG; PR; NR) are shown in figure 3. Chi-square analyses were performed on the responses given by subjects who chose to continue the diagnostic process, and focused on the danger rule. As predicted, no significant differences were found between the PR+FG and PR conditions for the selected response patterns ($\chi^2(1, N=104) = .81$, n.s.). In both the conditions a large majority of participants who chose to carry on with the diagnostic process, focusing on the danger rule (danger hypothesis), made a confirming rule choice (p & q pattern) at a level significantly higher than that of the other response

Work in progress

patterns (PR+FG condition: $\chi^2(1, N=54) = 10.7, p < .001$; PR condition: $\chi^2(1, N=50) = 3.9, p < .05$). But no such effect was found in the NR condition, $\chi^2(1, N=18) = .22, n.s.$). Nevertheless, the PR+FG vs. NR and PR vs. NR conditions did not differ significantly, (PR+FG vs. NR: $\chi^2(1, N=72) = 1.73, n.s.$; PR vs. NR: $\chi^2(1, N=68) = .4, n.s.$).

4. Discussion

The current study compared the influence of responsibility with and without additional fear of guilt on (danger and safety) hypothesis-testing in a non-clinical sample. To this aim, these mental states were manipulated by giving differential instructions to different groups of subjects that executed a deductive task. All participants were faced with an initial hypothesis (safety versus danger). Next, they were asked to indicate a) whether they preferred to continue or not in the hypothesis-testing process, and if so, b) which hypothesis they wanted to test (safety versus danger), and c) by which strategy (verification versus falsification) they intended to test the chosen hypothesis.

Results can be summarized as follows. Perceived responsibility was the main factor that influenced individuals' hypothesis-testing. Both experimental conditions chose more often to continue the hypothesis testing process, and chose more often to test the danger hypothesis, than the control condition. Although in the expected direction, results on strategy failed to reach significance, probably due to lack of power. Fear of guilt had a significant additive effect. Guilt-fearing participants preferred to carry on with the diagnostic process, even if presented with an initial safety hypothesis, while participants in the perceived responsibility condition made the choice of continuing with the testing process particularly if they were faced with

Work in progress

unfavourable evidence (the initial danger hypothesis). If, however, they were faced with favourable evidence (the initial safety hypothesis) less PR subjects opted not to continue with the diagnostic process. In both experimental conditions (PR+FG; PR) individuals showed a significant preference to focus on the worst hypothesis.

Taken together, our findings thus demonstrate that responsibility, and in addition to that the fear of feeling guilty, guide individuals' danger and safety hypotheses-testing. Responsibility and fear of guilt seem to induce a prudential style of information seeking and hypothesis testing. That is, danger hypotheses tend to be confirmed, and to resist falsification. Moreover, we found that in normal participants the induction of fear of guilt for having acted irresponsibly entails a greater tendency to persist in preventive activities, in the case of initial safety hypothesis. Thus, fear of guilt seems to induce a prudential mode in a broader scope than responsibility alone.

In the current study, perceived responsibility and fear of guilt were induced by giving differential instructions to our participants. The analyses performed on the items of our Manipulation Check Questionnaire revealed that this induction was effective. The results indicate that participants from both PR+FG and PR conditions understood and followed instructions, and accordingly perceived more responsibility and fear of guilt. It may be argued that our manipulation check items measured fear of making mistakes, instead of fear of making guilty mistakes. Actually, in order to induce fear of committing blameable mistakes, our participants were asked to think they had already committed several errors in the recent past – not errors of incapacity but mistakes due to negligence and therefore errors that directly elicited guilty feelings for not meeting their responsibilities (cf. Appendix A). We therefore argue that they actually thought about the moral implications of their diagnostic errors.

Work in progress

We believe that our results have useful clinical implications for the understanding of OCD. Obsessive patients fear to be guilty for acting irresponsibly in a chronic fashion (Mancini, 2001; Mancini & Gangemi, 2004a), and thus it is plausible that OC patients tend to check danger and safety hypotheses in a *prudential mode*. We argue that it is precisely the *prudential mode* that would explain: a) the general tendency shown by obsessive patients to resist changing their danger beliefs in response to reassuring information provided by themselves and others; b) the repetitiveness and persistence of attempts to prevent, neutralize or avoid danger; c) the tendency to give credence to implausible danger hypotheses.

Clearly, as a direct application of the prudential-testing hypothesis to OC behaviours, the current study has a number of limitations. First, in this experiment we studied a non-clinical group of subjects. Whether or not the currently observed association between responsibility and on the one hand fear of guilt and *prudential* hypothesis-testing on the other hand is generalisable to the OCD population is still an empirical question. In any case, the fact that responsibility and fear of guilt influence the hypothesis testing process in nonclinical subjects suggests that it may be a robust phenomenon. Thus, we would expect this relationship to be stronger in a clinical sample of subjects who are particularly sensitive to issues of fear of behaving irresponsibly. Of special importance is the question whether OC patients are especially sensitive to conditions of fear of guilt, responsibility, or both. Second, the task used in the present study covers only a small part of the OC behaviours. Further investigations are thus needed to explore more fully whether prudential-testing strategies are associated with all typical OC behaviours.

Work in progress

Appendix A

Example of a task.

Perceived Responsibility plus Fear of Guilt Condition (PR+FG)

Benign initial diagnosis

You are the only doctor in your ward, and you're the only person responsible for several patients. In the last few months, although you had everything necessary, i.e. diagnostic equipment, time and medical know-how, you made several mistaken diagnoses owing to superficiality, inattention and lack of enthusiasm that led to serious consequences for your patients. You feel guilty about this and you are fearful of making new serious mistakes.

You're treating a patient, who shows several symptoms that are compatible with the "diagnosis of Influenza".

While you're dismissing him/her, you think: "and if it was a case of Leukaemia, which is often fatal?"

The treatment of Influenza is very simple: "go to bed, keep warm, drink milk". It has no side effects, and therefore it is completely innocuous.

The therapy for Leukaemia virus infection entails several risks (numerous and risky side effects) and it is very painful for the patient.

Moreover, you read that it is absolutely impossible for a patient to suffer from both Influenza and Leukaemia at the same time.

You want to be sure to prescribe the right therapy and so you consult a differential diagnosis medical expert system.

After you have entered the data, the expert system answers:

- We propose a diagnosis of Influenza

Do you think it is still useful and necessary to carry on with the diagnostic process?

YES

NO

If so, how?

You have two medical diagnosis expert systems at your disposal:

1) the first system is expert in diagnosing Influenza. Through this system you can test your hypothesis: if one has the same symptoms as my patient, then Influenza

2) the second system is expert in diagnosing Leukaemia. Through this system you can test your hypothesis: if one has the same symptoms as my patient, then Leukaemia

After choosing and ticking which system you want to consult, you can ask it a few set questions.

Work in progress

Scenario 1. Same symptoms as your patient

You can ask:

Do the patients suffer from Leukaemia? or

Do the patients suffer from Influenza?

Scenario 2. Different symptoms compared to those of your patient

You can ask:

Do the patients suffer from Leukaemia? or

Do the patients suffer from Influenza?

Scenario 3. Patients suffer from Leukaemia.

You can ask:

Do the patients show the same symptoms as my patient? or

Do the patients show different symptoms than my patient?

Scenario 4. Patients suffer from Influenza

You can ask:

Do the patients show the same symptoms as my patient? or

Do the patients show different symptoms than my patient?

Which scenario will you select and which question will you choose in order to validate or invalidate your idea?

References

Conte, R., & Castelfranchi, C. (1995). Cognitive and Social Action. London:

University College London.

Insel, T.R. (1990). Phenomenology of obsessive-compulsive disorder. Journal of

Clinical Psychiatry, 51, 4-8.

Ladouceur, R., Rhéaume, J., Freeston, M.H., Aublet, F., Jean, K., Lachance, S.,

Langlois, F., & De Pokomandy-Morin, K. (1995). Experimental manipulations of responsibility: an analogue test for models of obsessive-compulsive disorder.

Behaviour Research and Therapy, 33, 937-946.

Mancini, F. (2001). El trastorno obsesivo-compulsivo. Revista de Psicoterapia, 42, 7-

25.

Work in progress

- Mancini, F., D'Olimpio, F. & Cieri, L. (2004). Manipulation of responsibility in non-clinical subjects: Does expectation of failure exacerbate obsessive-compulsive behaviours? *Behaviour Research and Therapy*, 42, 449-457.
- Mancini, F. & Gangemi, A. (2004a). Fear of guilt of behaving irresponsibly in obsessive-compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, 35, 109-120.
- Mancini, F. & Gangemi, A. (2004b). The Influence of Responsibility and Guilt on Hypothesis-Testing Process. *Thinking and Reasoning*, 10, 289-320.
- McFall, M.E. & Wolkersheim, J.P. (1979). Obsessive-compulsive neurosis: a cognitive-behavioural formulation and approach to treatment. *Cognitive Therapy and Research*, 3, 333-348.
- Poggi, I. (1994). Giustificarsi. In C. Castelfranchi, R. D'Amico, & I. Poggi (Eds.), *I sensi di colpa*. Firenze: Giunti
- Rachman, S. (1993). Obsessions, responsibility and guilt. *Behaviour Research and Therapy*, 31, 149-154.
- Rachman, S. (2002). A cognitive theory of compulsive checking. *Behaviour Research and Therapy*, 40, 625-640.
- Salkovskis, P.M. (1985). Obsessional-compulsive problems: a cognitive-behavioral analysis. *Behaviour Research and Therapy*, 23, 571-583.
- Salkovskis, P.M., & Forrester, E. (2002). Responsibility. In R.O. Frost, & G. Steketee (Eds.), *Cognitive Approaches to Obsessions and Compulsions*. Oxford: Pergamon.
- Van Oppen, P., & Arntz, A.. (1994). Cognitive therapy for Obsessive-Compulsive Disorder. *Behavior Research and Therapy*, 32, 79-87.

Work in progress

Wason, P.C. (1966). Reasoning. In B.M. Foss (Ed.), *New horizons in psychology* (pp135-151). Harmondsworth, UK: Penguin.

Footnote

The WST is a paper and pencil task which asks subject to verify if a conditional rule of the form *if p, then q* has been violated by any of the four instances on which the subject has incomplete information. Originally, each instance was represented by a card. One side of a 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 is permitted to see only one side of each card and is asked to say which card(s) he/she would turn over to see if any of them violates the rule. The four cards represent the values *p*, *not-p*, *q*, and *not-q*.

Work in progress

Table 1

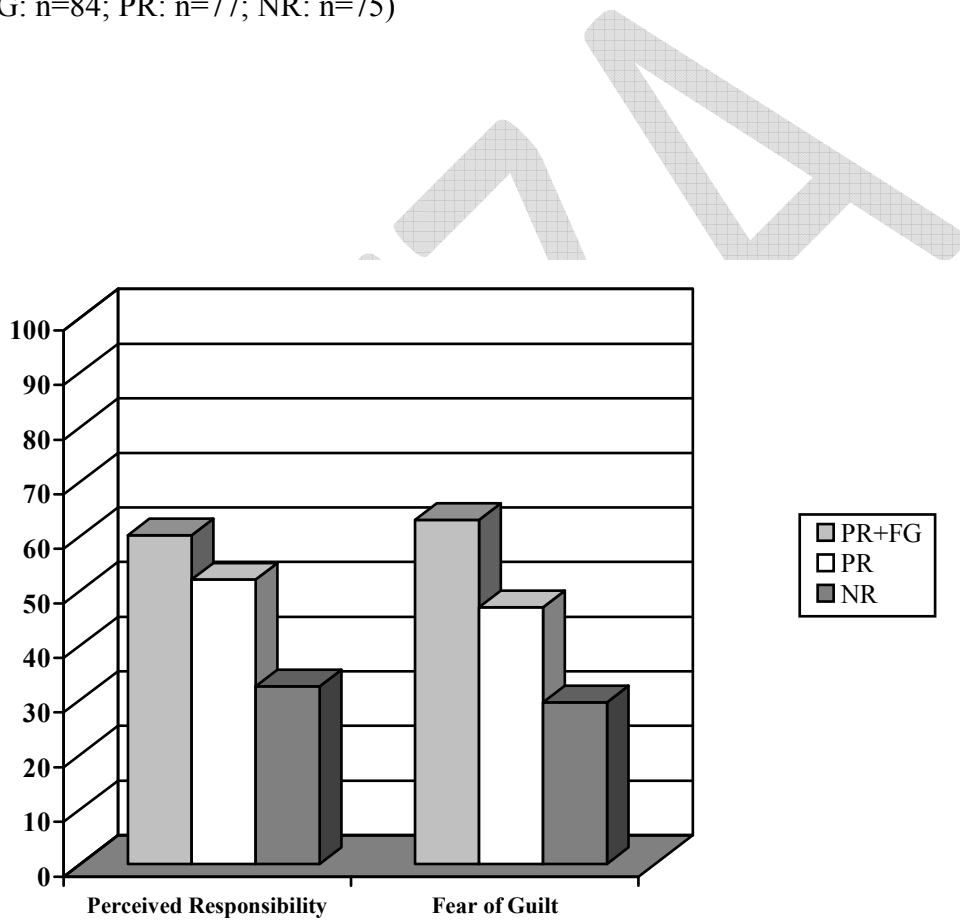
Frequencies (and percentages) of preferences expressed by participants to continue/ stop the diagnostic process across the three conditions

Mental State	Initial Diagnosis	No. of Subjects	Carry on process	
			Yes	No
PR+FG				
	Benign diagnosis	44 (52)	31 (70)	13 (30)
	Malignant diagnosis	40 (48)	35 (87)	5 (13)
	Tot.	84	66 (79)	18 (21)
PR				
	Benign diagnosis	37 (48)	23 (62)	14 (38)
	Malignant diagnosis	40 (52)	36 (90)	4 (10)
	Tot.	77	59 (77)	18 (23)
NR				
	Benign diagnosis	41 (55)	18 (44)	23 (56)
	Malignant diagnosis	34 (45)	13 (38)	21 (62)
	Tot.	75	31 (41)	44(59)

Work in progress

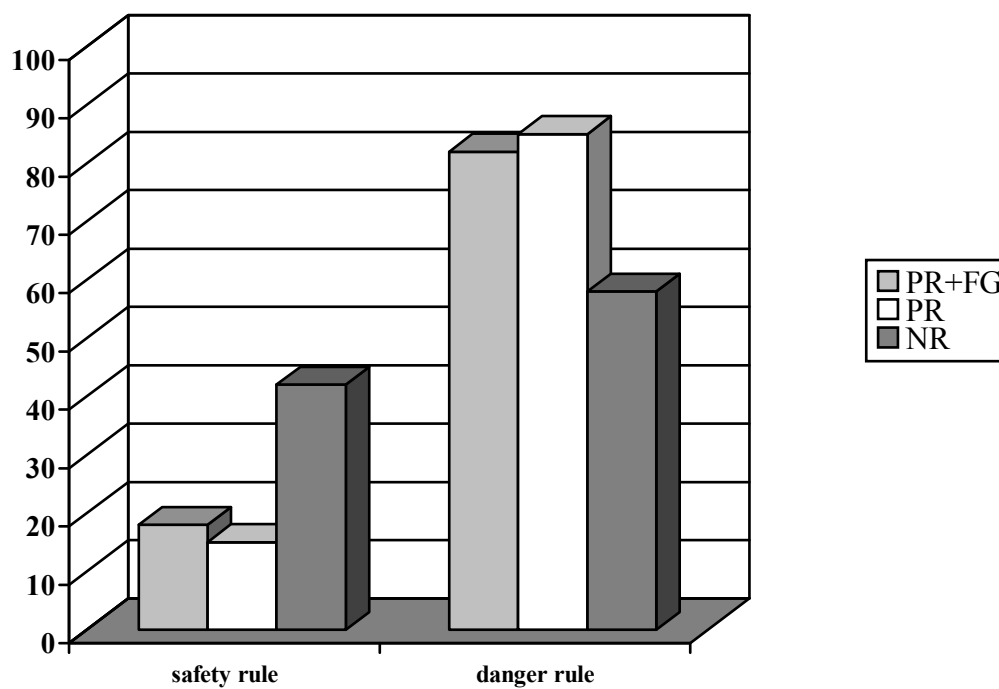
Figure 1. Mean scores of the manipulation check variables across the three conditions

(PR+FG: n=84; PR: n=77; NR: n=75)



Work in progress

Figure 2. Percentages choice of each conditional rule (danger rule vs. safety rule) across the three conditions (PR+FG: n=66; PR: n=59; NR: n=31)



Work in progress

Figure 3. Percentages of the response patterns selected by the participants for the danger conditional rule across the three conditions (PR+FG: n=54; PR; n=50; NR: n=18)

