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BELIEFS AND INFERENCES: A TEST OF A RATIONAL-EMOTIVE HYPOTHESIS 1. PERFORMING IN AN ACADEMIC SEMINAR

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ABSTRACT: Subjects were asked to imagine that they were going to present an academic seminar. They were further asked to imagine (a) that they adhered to a rational belief or an irrational belief; (b) that they had made or had not made an effort in preparing for the seminar and (c) that their performance counted or did not count towards their final examination grade. Whilst in role, subjects were asked to make inferences about various aspects of their performance and the responses of others. While the results supported the hypothesis that imagining that one is holding an irrational belief leads to more negative inferences than holding a rational belief, it was also found that not making an effort in preparing for the siminar led subjects to make more negative inferences than making an effort. In addition, there were several two-way and three-way significant interactions between the independent variables. The results supported Ellis's (1985) recent formulation concerning the complex relationship between events and inferences (A), beliefs (B) and emotional and behavioral consequences of beliefs (C).

An important aspect of rational-emotive theory concerns the relationship between irrational beliefs and negatively distorted inferences

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(i.e. interpretations from data that negatively distort reality). Thus, Ellis (1977) has argued that (a) "For the most part . . . . you tend, as a human, to make antiempirical overgeneralizations because you have a hidden *must*urbatory agenda in your thinking" (p. 9) and (b) "If you really stayed with desires and preferences, and virtually never escalated them into needs and necessities, you would relatively rarely make antiempirical statements to yourself and others. But just as soon as you make your desires into dire needs, such unrealistic statements almost invariably follow - and follow, frequently in great numbers" (p. 9).

However, the hypothesis that negatively distorted inferences stem from irrational beliefs has attracted little empirical enquiry. It has, in fact, only been tested once, albeit indirectly. Tobacyk and Milford (1982) asked their subjects to complete Newmark, Frerking, Cook and Newmark's (1979) Irrational Belief Scale and Haney's (1954) Uncritical Inference Test and found that greater endorsement of irrational beliefs was significantly associated with lesser scores on the Uncritical Inference Test indicating less critical inference making. However, this study was not a *direct* test of the rational-emotive hypothesis linking irrational beliefs and distorted inferences, since the inferences under study were not *directly* related to *specific* irrational beliefs. Also the items in Newmark et al's. (1979) Irrational Belief Scale do not discriminate keenly between rational and irrational beliefs.

The present study, which used performance in an academic seminar as the environmental context, constitutes a more direct test of the irrational belief-negatively distorted inference hypothesis in that (a) inferences are directly linked to irrational and rational beliefs and (b) detailed discriminations are made between rational and irrational beliefs. On the latter point, both irrational and rational beliefs given to subjects contained a premise and a derivative from the premise, e.g., irrational belief: I want you to imagine that you truly believe that you absolutely have to give a good presentation (irrational premise) and that it would be really terrible if you didn't (irrational derivative); rational belief: I want you to imagine that you truly believe that you would really like to give a good presentation but that you don't have to (rational premise). It would be bad if you didn't, but not the end of the world (rational derivative). It was hypothesized that subjects who are asked to hold the irrational belief will make inferences about elements of the situation to be described which are more negative than subjects who are asked to hold the rational belief (albeit a strong version of the rational belief i.e. a very strong desire).

Since people do not hold beliefs about performance in a vacuum, two

other variables were introduced: (a) an "effort" variable whereby subjects were asked to imagine that they had prepared or not prepared for their seminar and (b) an "importance" variable whereby subjects were asked to imagine that their performance in the seminar counted or did not count towards their final examination classification. Rational-emotive theory does not specifically make predictions concerning the impact of such variables, per se, on the kinds of inferences that people will make about elements of the situation, nor does the theory predict how these variables will interact with belief variables with respect to the forming of inferences. However, it is hypothesized here that such variables (i.e. "effort" and "importance") will have either moderating or amplifying effects on the negativity of inferences made through interactions with belief variables. For example, if subjects are asked to hold an irrational belief about their performance, preparing for the performance will moderate the negativity of their inferences, while not preparing for the performance will amplify the negativity of their inferences.

There are a number of ethical issues involved in studying the relationship between beliefs, inferences and emotionality, the main one being the ethical problem of inducing subjects' distress by using experimental conditions that particularly involve activating clients' strongly held irrational beliefs. In order to overcome this ethical problem involved in studying the effect of beliefs in real-life situations, a role-playing paradigm was employed in this experiment and subjects were asked to function *as if* they held a rational or an irrational belief. Furthermore subjects were asked to imagine that they would be giving a seminar the next day; they did not, in fact, have to present the seminar in this experiment.

METHOD

Subjects

Ninety six male (n = 48) and female (n = 48) undergraduate students between the ages of 18-23 years (M = 21.0 years) served as subjects in the experiments.

Design and Procedure

A 2 × 2 × 2 factorial design was used to assess the effects of the independent variables (i.e. "belief", "effort" and "importance") on the

inferences subjects made about different aspects of the performance-oriented situation.

The two levels of the independent variables were as follows: (a) "beliefs": rational or irrational; (b) "effort": whether or not the student had prepared for the seminar and (c) "importance": whether or not the seminar performance counted toward the student's final degree result.

Subjects were first presented with a role outline containing the following instructions:

> "I would like you to imagine that you are going to present a seminar to your tutor and ten other students. The seminar will take place tomorrow morning and the subject matter has been covered in previous lectures, so everyone will have some knowledge of the topic."

Subjects were then given a description of a composite role they were to adopt according to which of the eight conditions they had been randomly assigned to. For example, if subjects were randomly assigned to the irrational belief condition where they had prepared for the seminar and where their performance did not count towards their final examination grade, they were told:

> "Your performance in the seminar does not count towards your final examination mark; and you have put in a lot of time and effort into preparing for the seminar. I want you to imagine that you truly believe that you absolutely have to give a good presentation and that it would be really terrible if you didn't".

An example of a condition containing a rational belief (high importance, low effort) is as follows:

> "Your performance in the seminar counts towards your final examination mark; and you have not put a lot of time and effort into preparing for the seminar. I want you to imagine that you truly believe that you would really like to give a good presentation but that you don't have to. It would be bad if you didn't, but not the end of the world."

Subjects were then given a card with the role outlined on it and asked to spend a few minutes absorbing it while putting themselves into the role and situation. Subsequently, subjects were asked whether or not they could complete a questionnaire in role rather than from their

own personal experience. If the answer was negative, subjects continued no further with the experiment. If the answer was positive, subjects completed a questionnaire which consisted of seventeen items where responses were made on a nine-point rating scale. The last item of the questionnaire asked subjects to what extent they considered they had been able to adopt their assigned role and if the responses were below 7 (9 = to a great extent; 0 = not at all) then their data were not included in the analysis (eleven subjects failed to meet this criterion and were subsequently replaced). Subjects kept their role card in front of them throughout for reference purposes.

The data were first analyzed according to the content of subjects' inferences (summed across target groups) that formed the basis of six dependent variables. These were subjects' predictions of the degree to which they and others would 1) evaluate their performance, (2) approve of them, (3) evaluate their effort, (4) criticize the originality of their work; the degree to which (5) others would ridicule them; and the degree to which (6) they would manifest symptoms of anxiety. The data were also analyzed according to whether subjects' were predicting their own responses or the responses of two other target groups present in the imagined situation: (a) their tutor and (b) other students. These data were summed across items of inference content.

RESULTS

Inference Content

Subjects' responses to the questionnaire were summed across target groups of self, tutor and other students and were divided into six groups of items pertaining to the six dependent content variables outlined above. Results are presented according to three independent variables.

Belief. There were significant main effects for the "belief" variable on all the dependent variables. Subjects in the "irrational belief" condition (a) made more negative predictions of their own and others' evaluations of their performance ($M = 16.92$; $SD = 3.40$) than those in "rational belief" condition ("RB") ($M = 14.06$; $SD = 4.29$) [$F = 16.79$; df = 1,88; $p < .001$]; (b) had more negative expectations of approval by self and others ($M = 16.98$; $SD = 3.01$) than "RB" subjects ($M = 13.77$; $SD = 3.94$) [$F = 23.88$; df = 1,.88; $p < .001$]; (c) made more negative predictions of their own and others evaluations' of their effort ($M = 16.71$;

$SD = 4.23$) than "RB" subjects ($M = 14.96$; $SD = 5.49$) [$F = 5.58$; df = 1,88; $p < .05$]; (d) expected more criticism (by self and others) of their originality ($M = 16.46$; $SD = 4.03$) than "RB" subjects ($M = 14.81$; $SD = 3.23$) [$F = 5.35$; df = 1,88; $p < .05$]; (e) expected more ridicule from others ($M = 9.23$; $SD = 3.24$) than "RB" subjects ($M = 7.33$; $SD = 2.47$) [$F = 11.69$; df = 1,88; $p < .001$] and (f) thought they were more likely to manifest physical symptoms of anxiety ($M = 13.50$; $SD = 3.40$) than "RB" subjects ($M = 11.56$; $SD = 3.46$) [$F = 9.60$; df = 1,88; $p < .01$].

There were also significant interaction effects between the independent variables of "belief" and "effort" on three of the dependent variables: (1) Subjects' predictions of their own and others' evaluation of their performance ($F = 5.87$; df = 1,88; $p < .05$). In this case, imagining that an effort had been made reduced the negative predictions made by subjects in both belief conditions, but this trend was more marked for subjects in the "rational belief' condition ($M = 16.67$; $SD = 4.23$ - no effort; $M = 11.46$; $SD = 2.36$ - effort) than in the "irrational belief" condition ($M = 17.83$; $SD = 3.33$ - no effort; $M = 16.00$; $SD = 3.28$ - effort). (2) Subjects' predictions of approval by self and others ($F = 13.54$; df = 1,88; $p < .05$). Here subjects in the "irrational belief" condition made more negative predictions ($M = 17.88$; $SD = 3.06$ - no effort; $M = 16.08$; $SD = 2.74$ - effort) than those in the "rational belief" condition ($M = 15.24$; $SD = 4.15$ - no effort; $M = 12.55$; $SD = 3.10$ - effort) regardless of level of effort, although the effects of type of belief were attenuated to some degree by having prepared for the seminar particularly in the "rational belief" condition. Finally, (3) Subjects' expectations of ridicule by others ($F = 5.61$; df = 1,88; $p < .05$). In this case whether subjects had made an effort ($M = 7.42$; $SD = 2.72$) or not ($M = 7.25$; $SD = 3.17$) had no effect on their predictions of ridicule when they adhered to a rational belief, whereas subjects in the "irrational belief" condition were more likely to expect ridicule if they had made an effort ($M = 10.63$; $SD = 2.48$) than if they had not ($M = 7.83$; $SD = 2.51$).

Effort. There were significant main effects for the "effort" variable on all dependent variables except approval by self and others. Subjects in the "no effort" condition (a) made more negative predictions about self and others' evaluation of their performance ($M = 17.25$; $SD = 3.81$) than those in the "effort" condition ("E") ($M = 13.73$; $SD = 3.64$) {$F = 25.55$; df = 1,88; $p < .001$}; (b) made more negative predictions about self and others' evaluations of their effort ($M = 19.04$;

$SD = 4.16$) than "E" subjects ($M = 12.63$; $SD = 3.36$) [$F = 74.93$, df = 1,88; $p < .001$]; (c) expected more criticism of their originality from self and others ($M = 16.77$; $SD = 3.87$) than "E" subjects ($M = 14.50$; $SD = 3.23$) [$F = 10.27$; df = 1,88; $p < .01$]; (d) expected more ridicule from others ($M = 9.02$; $SD = 2.84$) than "E" subjects ($M = 7.54$; $SD = 3.04$) [$F = 7.12$; df = 1,88; $p < .01$] and (e) thought they were more likely to manifest physical symptoms of anxiety ($M = 13.94$; $SD = 2.91$) than "E" subjects ($M = 11.13$; $SD = 3.60$) [$F = 20.22$; df = 1,88; $p < .001$].

There were also significant interaction effects between the independent variables of "effort" and "importance" on two of the dependent variables: (1) Subjects' predictions of approval by self and others ($F = 7.80$; df = 1,88; $p < .01$). If seminar performance did not count towards final examination grade, subjects in the "effort" condition ($M = 14.42$; $SD = 3.73$) made less negative predictions about approval than subjects in the "no effort" condition ($M = 16.88$; $SD = 3.18$). However, if seminar performance did count towards the final examination garde, having made an effort ($M = 15.71$; $SD = 4.41$) or not ($M = 14.50$; $SD = 3.65$) had little effect on subjects' predictions about approval. (2) Subjects' predictions about self and others' evaluations of their effort ($F = 5.58$; df = 1,88; $p < .05$). Subjects in the "effort" condition made less negative predictions on this dependent variable than subjects in the "no effort" condition whether or not the seminar performance counted towards the final exam grade. However, this decrease was more marked for subjects for whom seminar performance did not count towards the final exam grade ($M = 19.92$; $SD = 5.14$ - no effort; $M = 11.75$; $SD = 2.70$ - effort) than for subjects for whom seminar performance did thus count ($M = 18.17$; $SD = 2.97$ - no effort; $M = 13.50$; $SD = 3.56$ - effort).

Importance. There was a significant main effect for the "importance" independent variable only with respect to one dependent variable: subjects' expectations of experiencing physical symptoms of anxiety ($F = 7.28$; df = 1,88; $p < .01$). Subjects for whom seminar performance would count towards their final examination grade were more likely to predict that they would manifest physical symptoms of anxiety ($M = 13.38$; $SD = 2.72$) than subjects for whom seminar performance would not count towards their final exam grade ($M = 11.69$; $SD = 4.08$).

There was also a significant three-way interaction between all three independent variables with respect to subjects' expectations of ridicule

by others ($F = 3.97$; df = 1,88; $p < .05$). If the subjects made an effort, they were less likely to make negative predictions about being ridiculed if they were thinking rationally and their seminar performance did not count towards their final exam grade ($M = 6.83$; $SD = 2.70$) than if it did count ($M = 8.00$; $SD = 2.13$). Whereas subjects who had likewise made an effort were more likely to make negative predictions about being ridiculed if they were thinking irrationally and their seminar performance did not count towards their final exam grade ($M = 11.67$; $SD = 2.82$) than if it did count ($M = 9.58$; $SD = 3.26$). However, if the subjects had not made an effort the effects were reversed. They were more likely to make negative predictions about being ridiculed if they were thinking rationally and their seminar performance did not count towards their final examination grade ($M = 7.50$; $SD = 2.39$) than if it did count ($M = 7.00$; $SD = 2.76$), whereas subjects were less likely to make negative predictions about being ridiculed if they were thinking irrationally and their seminar performance did not count towards their final exam grade ($M = 7.50$; $SD = 3.58$) than if it did count ($M = 8.17$; $SD = 1.56$).

Target Groups

In the second analysis subjects' responses to the questionnaire were summed across inference content and divided into three target groups. Here subjects' inferences were grouped according to whether the evaluating target group was (a) self; (b) tutor or (c) other students.

Belief. There were significant main effects for the "belief" variable on all the dependent (target group) variables. Subjects in the "irrational belief" condition anticipated more negative evaluation (a) from their tutor ($M = 26.44$; $SD = 4.14$) than did those in the "rational belief" condition ("RB") ($M = 23.23$; $SD = 5.69$) [$F = 14.18$; df = 1,88; $p < .001$); (b) from other students ($M = 25.94$; $SD = 4.40$) than did "RB" subjects ($M = 21.96$, $SD = 4.69$) [$F = 20.32$; df = 1,88, $p < .001$]; and (c) from themselves ($M = 37.15$; $SD = 7.87$) than did "RB" subjects ($M = 31.29$; $SD = 7.80$) [$F = 18.47$; df = 1,88, $p < .001$].

There was also a significant interaction effect between the independent "belief" and "effort" variables when the target group was the "tutor" ($F = 8.33$; df = 1,88; $p < .01$). This showed that subjects who did not exert an effort anticipated more negative evaluation from their tutor regardless of their beliefs ($M = 27.75$; $SD = 2.45$-irrational belief; $M = 27.00$; SD = 5.24 - rational belief) than those who had made an

effort. In the latter group of subjects, those in the "irrational belief" condition anticipated more negative evaluation from their tutor ($M = 25.13$; $SD = 5.03$) than those in the "rational belief" condition ($M = 19.46$; $SD = 3.04$).

Effort. There were significant main effects for the "effort" variable on two of the 'target group' dependent variables. Subjects who had not exerted an effort anticipated more negative evaluation (a) from their tutor ($M = 27.38$; $SD = 4.07$) than did those who had made an effort ('E') ($M = 22.29$; $SD = 5.01$) [$F = 35.59$; df = 1,88; $p < .001$] and (b) from themselves ($M = 38.23$; $SD = 6.99$) than did 'E' subjects ($M = 30.21$; $SD = 7.66$) [$F = 34.67$; df = 1,88; $< .001$).

There was also a significant interaction between the independent variables of "effort" and "importance" when the target group was "other students" ($F = 5.02$; df = 1,88, $p < .05$). This showed that when seminar performance counted towards subjects' final examination grade, having made an effort ($M = 24.21$; $SD = 5.39$) or not ($M = 23.22$; $SD = 4.96$ had no influence on their anticipations concerning seminar performance. However, when their performance did not count towards their final examination grade, those who had not made an effort anticipated more negative evaluation from other students ($M = 25.67$; $SD = 4.51$) than those who had made an effort ($M = 22.67$; $SD = 4.66$).

Importance. There were no signficant main effects for the "importance" variable and no further significant interactions.

DISCUSSION

Two points should be kept in mind about the design of this experiment that limit the extent to which generalizations can be made from the study's findings. First, a role-playing paradigm was employed in this experiment and subjects did not actually hold the beliefs they were asked to adopt. A true test of the rational-emotive hypothesis concerning the relationship between beliefs and inferences demands that inferences are assessed when individuals actually hold rational and irrational beliefs in specific situations. In our opinion, however, ethical considerations concerning inducing emotional distress should be borne in mind when devising such experiments. Secondly, only subjects who were clearly able to adopt the role assigned to them were included in this study.

Given the study's limitations, support for the hypothesis that irrational beliefs lead to more negative inferences than rational beliefs was obtained. However, the results also showed that subjects who imagined that they had not exerted an effort in preparing for the seminar made more negative inferences than subjects who imagined that they had made an effort. An inspection of the significant interaction effects between the "belief" and "effort" variables indicates that having made an effort in preparing for the seminar and adhering to a rational belief about one's performance "protected" subjects from making overly negative inferences more than each variable alone. An interesting exception here concerns inferences about being ridiculed; subjects who held an irrational belief about performance and who had made an effort in preparing for the seminar considered that they would more likely be ridiculed by other students than subjects in the three other groups in the "Belief x Effort" interaction, perhaps reflecting college student norms about the risks of disclosing that one has worked hard.

It can thus be concluded from this study that while holding irrational beliefs does lead to negatively distorted inferences, certain other factors of a person's situation also influence the negativity of inferences. In this experiment the "effort" variable led to subjects making more negative inferences than the "Importance" variable both as a main effect and in interaction with the "Belief" variable. Following on from the latter point, it is apparent that Ellis's (1977) earlier formulation concerning the relationship between beliefs and inferences is too simple and that inferences are the result of complex interactions between beliefs and other salient features of given situations. This better reflects Ellis's (1985) more recent view concerning the complex relationships between events and inferences (A), beliefs (B) and emotional and behavioural consequences of beliefs (C).

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