HOW RATIONAL BELIEFS AND IRRATIONAL BELIEFS AFFECT PEOPLE'S INFERENCES: AN EXPERIMENTAL INVESTIGATION

Frank W. Bond and Windy Dryden

Goldsmiths College, University of London, U.K.

Abstract. Rational Emotive Behaviour Therapy (REBT) hypothesizes that the functionality of inferences is primarily affected by the preferential and demanding nature of rational and irrational beliefs, respectively. It is then, secondarily, influenced by the functional and dysfunctional contents to which rational and irrational beliefs, respectively, refer. This hypothesis was tested by asking 96 participants to imagine themselves holding one of four specific beliefs: a rational belief with a preference and a functional content, an irrational belief with a demand and a dysfunctional content, a rational belief with a functional content and no preference, and an irrational belief with a dysfunctional content and no demand. Participants imagined themselves holding their belief in an imaginary context, whilst rating the extent of their agreement to 14 functional and dysfunctional inferences. Contrary to REBT theory, results indicated that rational and irrational beliefs had the same magnitude of effect on the functionality of inferences, whether they referred to a preference/demand + contents, or only contents. The discussion maintains that preferences and demands may not constitute the principal mechanism through which rational and irrational beliefs affect the functionality of inferences. Instead, consistent with Beck's cognitive therapy, belief contents may constitute this primary mechanism.

Keywords: Rational Emotive Behaviour Therapy, rational beliefs, irrational beliefs, cognitive-behaviour therapy, inferences.

Introduction

Rational Emotive Behaviour Therapy (REBT) is arguably the first cognitive-behaviour therapy (e.g., Ellis, 1957), and Albert Ellis, its creator and greatest promulgator, is regarded by clinical and counselling psychologists in North America as one of the most influential of all psychotherapists (Smith, 1982; Warner, 1991). Despite its impact on professional psychology, the scientific foundations of REBT can be said to be shaky (e.g., Bond & Dryden, 1996a; Haaga & Davison, 1993; Kendall et al., 1995). In contrast, other cognitive-behaviour therapies, and in particular Beck's (1976) Cognitive Therapy, now have strong empirical underpinnings. The present study sought to provide experimental evidence with which to judge the scientific merit of an aspect of

Reprint requests to Frank W. Bond, Department of Psychology, City University, Northampton Square, London EC1V 0HB, U.K. Email: f.w.bond@city.ac.uk

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REBT's theory of psychopathology. In particular, this experiment examined one of its central hypotheses, which concerns the principal mechanism by which rational and irrational beliefs affect subsequent psychological events.

REBT, like many cognitive-behaviour therapies, maintains that rational beliefs lead to helpful, functional, or beneficial emotions *and* inferences (i.e. judgements about events that go beyond the data at hand), and that irrational beliefs lead to unhelpful, dysfunctional, or self-defeating emotions *and* inferences (Ellis, 1962, 1994). In REBT (e.g., Ellis, 1994), emotions and inferences are helpful, or functional, to the extent that they facilitate people's medium to long-term goals, and they are unhelpful, or dysfunctional, to the extent that they thwart people's medium to long-term goals. For example, depression is considered an unhelpful emotion, because people experiencing it often display passivity, avoidance, and inertia (Beck, Rush, Shaw, & Emery, 1979), which are characteristics that are not frequently associated with goal achievement. In contrast, relativistic and realistic inferences, such as "I can work with people who have different values than my own" is thought to be a functional inference, because it will tend to promote acceptance and co-operation, which can be useful for goal achievement.

REBT theorists such as Ellis (e.g., Dryden & Ellis, 1988; Ellis, 1994) hypothesize that it is *primarily* the preferential nature of a belief that makes it rational (e.g., "I would *prefer* to control my anxiety, but it is not necessary"), and that it is *primarily* the demanding, absolutistic character of a belief that makes it irrational (e.g., "I *must* control my anxiety"). Thus, preferences and demands are the components of rational and irrational beliefs, respectively, that overwhelmingly determine the helpfulness, or functionality, of emotions and inferences. REBT does suggest, however, that emotions and inferences are, to a lesser extent, affected by another element of rational and irrational beliefs, which is called the "secondary belief".

To elaborate, Ellis (1977, 1994) and Campbell (1985) indicate that, in REBT, rational and irrational beliefs consist of both a primary and a secondary belief. As can be seen in Table 1, the former expresses the preferential or demanding nature of the belief, which is represented, in REBT, by the terms "prefer" or "must", respectively (Dryden, 1994a). The secondary belief conveys a personally meaningful content, or theme, that is consistent with the functionality or dysfunctionality of the primary belief. For example, if the primary belief is irrational (e.g., "I must control my anxiety"), then the content of the secondary belief, which derives from the primary belief, will also be irrational, or dysfunctional, in nature (e.g., "... not having such control would be intolerable"). In contrast, if the primary belief is rational (e.g., "I would prefer to control my anxiety, but it is not necessary"), then the content of the secondary belief will also be rational, or functional, in nature (e.g., not having such control would be difficult to tolerate but not intolerable"). Consistent with this discussion, the term "REBT beliefs" refers to rational and irrational beliefs that are comprised of both primary and secondary beliefs. This experiment examined the REBT proposition that rational and irrational REBT beliefs have a greater effect on the functionality of inferences, than do rational and irrational secondary beliefs, which have a functional or dysfunctional content and no preference or demand (e.g., Dryden & Ellis, 1988; Dryden, 1994b).

Although this proposition is a defining feature of REBT theory and practice (e.g., Bond & Dryden, 1996a; Ellis, 1994), it has, perhaps understandably, never been empirically examined. As Bond and Dryden (1998) note, it is very difficult experimentally to

	Primary belief	Secondary belief	REBT belief	
Distinguishing characteristic	Communicates a preference or demand	Conveys a personally meaningful content, or theme, and no preference or demand	Primary belief + secondary belief	
Rational	"I would <i>prefer</i> to be certain of other people's opinions of me, but it is not essential"	" not having such certainty would make me a fallible person, but <i>not an inadequate</i> <i>individual</i> ".	"I would prefer to be certain of other people's opinions of me, but it is not essential; not having such certainty would make me a fallible person, but not an inadequate individual".	
Irrational	"I <i>must</i> be absolutely certain of other people's opinions of me "	" not having such certainty would make me <i>an inadequate</i> <i>individual</i> ".	"I must be absolutely certain of other people's opinions of me; not having such certainty would make me an inadequate individual".	

Table 1. Components of rational and irrational beliefs

test hypotheses regarding if and how internal events, such as rational and irrational beliefs, affect other internal events, such as inferences and emotions. Researchers cannot directly manipulate people's beliefs; that is, people's brains cannot be altered in some way so that a specific belief is isolated and its naturally occurring outcomes established. Cross-sectional correlational studies are, unfortunately, no more helpful in examining causal relationships amongst internal events. For example, if functional inferences were found to be more strongly related to rational REBT beliefs than to rational secondary beliefs, we could not conclude that it was the rational REBT beliefs that led to the functional inferences: the reverse could also be true.

To examine internal event-internal event causal hypotheses, such as the one being tested here, Bond and Dryden (1998) recommend using a role-playing methodology. Thus, internal events, such as rational and irrational beliefs, can be manipulated by having participants imagine themselves holding a specific belief. The effects of these beliefs can then be examined by having the participants endorse a set of inferences about an imagined situation, as if they truly held the belief that they were asked to imagine. Kendall et al. (1995) also indicate that role-playing experiments constitute a viable methodology for testing questions regarding irrational beliefs and their causal effects.

Researchers such as Geller (1978) and Mixon (1979) conducted role-playing experiments that suggest that this methodology can produce data that are as externally valid and reliable as those that are produced by an involved participation methodology (i.e., a non role-playing experiment). Specifically, Geller and Mixon replicated Milgram's (1963) first obedience experiment, using two different role-playing procedures. Based upon their methodologies, Geller recommended role-playing procedures that may produce externally valid and reliable results.

In a series of five role-playing experiments, Bond and Dryden (1996b, 1997; Bond, Dryden, & Briscoe, in press) employed Geller's (1978) recommended role-playing procedures to examine several REBT hypotheses concerning causal relations amongst internal events. Bond and Dryden (1996b, 1997) asked participants to imagine themselves holding either a rational or an irrational REBT belief. Using this belief, they were asked to indicate the extent of their agreement to a list of inferences relating to an event that they were also imagining. Consistent with REBT theory (e.g., Dryden, 1994b, Ellis, 1994), results indicated that participants who held a rational belief endorsed inferences in a significantly more functional manner than those who held an irrational belief.

Contrary to REBT theory, however, Bond et al. (in press), in a similar role-playing experiment, showed that primary beliefs, on their own, cannot affect the functionality of inferences: to do so, they need to be attached to a secondary belief. Thus, in order to affect the helpfulness of inferences, it appears that rational and irrational beliefs cannot just refer to preferences and demands; they also need to refer to functional and dysfunctional contents, respectively.

Bond et al.'s (in press) findings suggest that primary beliefs (i.e., preferences and demands) do not constitute a terribly powerful mechanism by which rational and irrational REBT beliefs affect the functionality of inferences. It is still unclear, however, whether or not the functional or dysfunctional contents of the secondary beliefs can, on their own, affect the helpfulness of inferences, but that is what this experiment examined. If they could, then it would suggest that secondary belief contents, unlike preferences and demands, form a powerful mechanism by which rational and irrational REBT beliefs affect the functionality of inferences.

If secondary belief contents do affect the functionality of inferences, their effect may not be as strong as the one that rational and irrational REBT beliefs have (which, of course, possess primary and secondary components) (Bond & Dryden, 1996b, 1997; Bond et al., in press). For, even if primary beliefs, on their own, do not affect the functionality of inferences, it is possible that they interact with secondary belief contents to produce an effect that is greater than the one that the latter could achieve on its own. Whilst REBT does not specifically address this "interaction" proposition, the theory is consistent with it. We hypothesized, therefore, that rational and irrational REBT beliefs would have a greater effect on the functionality of inferences than secondary beliefs, on their own. Since REBT maintains that secondary belief contents affect psychological events such as emotions and inferences (secondarily to evaluations, of course), we predicted that secondary beliefs, on their own, would affect the helpfulness of inferences, but to a lesser extent than rational and irrational REBT beliefs.

Method

Participants

Ninety-six students from the University of London volunteered to take part in a study that would "help develop stress management techniques". Forty-eight of the

participants were male and the other 48 were female. Their ages ranged from 18 to 27 (M=21.17, SD=2.50). Participants studied a wide range of subject disciplines, but none studied psychology. No one was selected to partake in this experiment, if they, when queried, self-identified as having any emotional problems or had recently encountered any traumatic event. Participants received no payments of any kind.

Following Hulley and Cummings (1988), block randomization was employed, in order to assign participants to one of the four conditions (rational secondary belief, irrational secondary belief, rational REBT belief, irrational REBT belief). By using this sequential assignment method, each condition was assigned once, before a condition could be assigned again. Separate randomized block-assigned sequence lists were constructed for males and females so that groups were matched in terms of gender.

Design and materials

This experiment had a 2×2 randomized factorial design. The two independent variables were: (1) belief type: participants held an REBT belief, which had a primary and a secondary component, or a secondary belief. These two belief types differed in terms of (2) rationality: that is, they were either rational or irrational. The two independent variables, with two levels each, formed four conditions, which were

- (1) An irrational, REBT belief: I must be absolutely certain of other people's opinions of me; not having such certainty would make me an inadequate individual.
- (2) An irrational, secondary belief: If I am not certain of other people's opinions of me, then I am an inadequate individual.
- (3) *A rational, REBT belief*: I would prefer to be certain of other people's opinions of me, but it is not essential; not having such certainty would make me a fallible person, but not an inadequate individual.
- (4) A rational, secondary belief: If I am not certain of other people's opinions of me, then I am a fallible person, but not an inadequate individual.

Note that the beliefs in the secondary belief condition are not phrased in the same way as are the secondary beliefs in the REBT belief condition: they had to be reworded in order to make sense. However, as can be seen in Table 1, the beliefs in the secondary belief condition have the distinguishing characteristic of secondary beliefs: a personally meaningful content and no preference or demand. They are, therefore, consistent with REBT's definition of secondary beliefs.

Participants in each condition rated the extent of their agreement to 14 inferences that were developed for Bond and Dryden (1997) and also used in Bond et al. (in press). As can be seen in Table 2, seven of these inferences were stated in a functional manner (2, 4, 5, 6, 8, 9, 11) and seven were stated in a dysfunctional manner (1, 3, 7, 10, 12, 13, 14). Each inference was attached to a 9-point Likert-type scale that ranged from 1 "strongly agree" to 9 "strongly disagree". When scoring this measure, the scale attached to the dysfunctional inference, and a score of 1 indicated a very functional inference. In the present experiment, the internal reliability (i.e., Cronbach alpha coefficient) of this measure was .911.

Table 2. The 14 inferences that comprised the outcome variable

- 1. People in the bar will think that I am pathetic.
- 2. People in the bar will think that I am attractive.
- 3. People in the bar will think that I have no pride in myself.
- 4. People in the bar will see that I am calm and not anxious.
- 5. I will feel proud of myself for going over to talk to this attractive person.
- 6. People will admire me for going over to talk to this person.
- 7. People will think that I am obnoxious for going over to talk to this attractive person.
- 8. This attractive person will want to speak to me.
- 9. I am attractive enough to speak with this person.
- 10. My heart will race uncontrollably when I speak with this attractive person.
- 11. I will have the confidence to talk to this person.
- 12. I will "freeze" when I start talking to this person.
- 13. My hands will shake when I am speaking to this person.
- 14. I will embarrass the attractive person terribly.

Procedure

Students at the University of London were approached and asked if they would like to participate in a study that would help to develop stress management techniques. They were told that they would not actually be placed in a stressful situation, but that they would have to imagine themselves in one. Those who volunteered were tested individually, and each sat at a small desk that faced a blank, white wall. There was a chair next to the desk, which faced the participants (on their left). It was on this chair that the experimenter sat to explain the experimental rationale and procedure. Both were standardized and are presently summarized in some detail.

The role-playing procedure employed was the same one that was used by Bond and Dryden (1996b, 1997; Bond et al., in press), and it was consistent with Geller's (1978) recommendations. For example, as will be seen, it involved a scenario with which students could identify, and which was scripted. Furthermore, all of the scripted details were written down for participants to consult during the role-play, and each person was tested individually. Also, volunteers were able to practise one segment of the role-play, before integrating it to another part. Finally, participants were twice asked to rate the extent to which they were able to imagine themselves in the role-playing scenario.

At the beginning of the experiment, participants were told that this study formed part of a series that was investigating how people can best cope with stressful situations. They were then handed a card on which was written the belief that corresponded to the condition to which they were randomly assigned. Referring to this card, the experimenter said, "On this card is written a belief which I would like you to imagine having during this study. As you can see, it reads ... (and the experimenter read the appropriate belief aloud). Now, if you will please spend a couple of minutes imagining yourself holding this belief".

After participants indicated that they had imagined themselves holding their belief, they were then handed a card on which was written the "attractive stranger scenario". This scenario was: you are sitting in the Union bar and notice a person whom you find attractive. You decide to talk to that person so you get up to do so. As you're walking over, you notice yourself getting fairly anxious. When the experimenter had handed the participants this card, he said, "As you can see, on this card is written a situation, which says that . . ." (and the experimenter then read the attractive stranger scenario). The experimenter then said, "Please spend a couple of minutes imagining yourself in this situation, whilst holding the belief that I just gave you". After a few minutes, participants were then asked, "On a scale from 1 to 9, to what extent can you picture yourself in this situation, whilst holding your belief? One means that to no extent can you picture yourself in this situation, whilst holding your belief? In this situation, whilst holding your belief? If participants responded to this question with an answer that was less than 7, they were thanked for participanting in the study and dismissed. For this reason, seven participants were excused from the study and later replaced by others.

Participants who responded with an answer of 7 or above to this question were then given the inference measure and asked to read the instructions at the top of the first page, which read: Please indicate your agreement with these statements by placing a tick in the appropriate slot whilst (1) holding your belief and (2) imagining yourself feeling anxious about talking to the attractive person in the Union bar. Thank you for participating in this experiment.

About the rating form, participants were told: "contained in this form are 14 statements that refer to the situation that you have just imagined. As you can see from the instructions, I would like you to..." (and the experimenter then reiterated the instructions). As an example of how to complete the form, participants were given the following example statement to respond to, whilst the experimenter was present. It said, "I will have a good conversation with this attractive person" and was on a Likerttype scale that ranged from 1 ("to no extent") to 9 ("to a great extent"). After completing the example, participants were asked to describe what they were supposed to do in the experiment. They were then told that they could ask questions at any time, whilst completing the measure.

The last statement on the questionnaire (number 15) was another manipulation check, which read: I was able to hold my belief and imagine myself in the Union bar, whilst responding to these statements. If participants' ratings on this last item was above 3, their data were excluded from the study. For this reason, the data of five participants were dropped from the experiment and replaced with data from other participants that were selected later. This exclusion point coupled with the first one resulted in having to replace 12 people. Based upon criteria recommended by Drew and Hardman (1985), there was not a differential loss of participants between comparison conditions. At the end of the experiment, each volunteer was debriefed fully.

Results

We first conducted a 2×2 ANOVA to test our hypothesis that REBT and secondary beliefs would affect the functionality of inferences. The effects of interest were first the interaction and, if significant, then the four possible pairwise comparisons between the category means. A Bonferroni adjustment of alpha was made only for the four tests of simple effects. Thus, an alpha level of .05 was employed for the interaction effect, but it was set at .01 for the tests of simple effects. There was no benefit in testing the main

	Rationality		Pairwise comparisons ANOVAs for simple effects		
Belief type	Rational	Irrational	ES	F ratio	df
REBT					
М	4.63	5.85		8.67**	1,94
SD	1.19	1.15	0.084		
Secondary					
M	3.97	6.57		58.29***	1,94
SD	1.04	1.05	0.383		

 Table 3. Means, Standard Deviations, and tests of simple effects for the functionality of inferences scale according to rationality and belief type

Note. The higher the score is, the more dysfunctional the inference.

ANOVA = Analysis of Variance; ES = Effect Size, as measured by partial eta-squared (η^2). **p < .01. ***p < .001.

effects for rationality and belief type, as they did not inform any of our hypotheses (Pedhazur & Schmelkin, 1992; Tabachnick & Fidell, 1996).

Our hypothesis that the effect of rational and irrational REBT beliefs would be greater than the effect of rational and irrational secondary beliefs on the functionality of inferences was tested by comparing these two effect sizes, which were measured by eta-squared (η^2). Specifically, η^2 is equivalent to r^2 (Jaccard, Turrisi, & Wan, 1990; Pedhazur & Schmelkin, 1992), thus the square root of the two η^2 scores were transformed to z scores by using Fisher's transformation of r, and the test of z score differences was conducted (McNemar, 1969).

Consistent with our hypothesis, there was a significant interaction between rationality and belief type, F(1, 92) = 9.29, p = .003, $\eta^2 = .092$, but an examination of the simple effects did not yield findings that were consistent with our other prediction. Specifically, as hypothesized, people who imagined themselves holding rational beliefs endorsed inferences in a significantly more functional way than did those who imagined themselves holding irrational beliefs. As can be seen from Table 3 this was true whether the beliefs were of the REBT or the secondary type.

Contrary to predictions, however, the size, or magnitude, of these two effects, as measured by η^2 , did not differ significantly (z = 1.39, p > .05). Thus, rational and irrational secondary beliefs affected the functionality of inferences to the same extent as did rational and irrational REBT beliefs. This finding is consistent with tests of simple effects that showed that the functionality of inferences did not differ significantly between the rational REBT and the rational secondary beliefs conditions, F(1,94) = 2.40, p = .125, $\eta^2 = .025$. Likewise, the helpfulness of inferences did not differ significantly between the irrational REBT and the irrational secondary beliefs conditions, F(1,94) = 2.81, p = .097, $\eta^2 = .029$. It therefore appears that, although there was a significant interaction between rationality and belief type, it was not strong enough to produce significantly different effect sizes for rational and irrational REBT beliefs, on the one hand, and rational and irrational secondary beliefs, on the other.

Discussion

This study is unusual in that it experimentally tested a defining hypothesis of REBT theory and practice. In particular, it examined whether rational and irrational REBT

beliefs, which have a primary and a secondary component, have a greater effect on the functionality of inferences, than do secondary beliefs, which have a functional or dysfunctional content and no primary component. As hypothesized, both types of beliefs affected the functionality of inferences; however, contrary to predictions and REBT theory (e.g., Dryden, 1994b; Ellis, 1994), results indicated that REBT and secondary beliefs had the same magnitude of effect on the functionality of inferences.

Consistent with the findings of Bond et al. (in press), these results suggest that primary beliefs (i.e., demands and preferences) are not a principal mechanism through which rational and irrational REBT beliefs affect the functionality of inferences. Specifically, Bond et al. found that, in order to affect the helpfulness of inferences, rational and irrational beliefs cannot just refer to preferences and demands, they also need to refer to secondary belief contents. The present experiment extended these findings by showing that rational and irrational secondary beliefs, on their own, affect the functionality of inferences to the same degree as they do, when they are attached to primary beliefs. It appears, therefore, that it is the secondary belief contents that constitute the primary mechanism through which rational and irrational REBT beliefs affect the functionality of inferences.

The findings from Bond et al. (in press) and the present experiment clearly do not support REBT's distinguishing proposition, that is, demands and preferences, as represented by the terms "must" and "prefer", constitute the principal mechanism through which REBT beliefs affect the functionality of inferences. Rather, these findings appear to support the contention that secondary belief contents constitute this key mechanism. It appears, then, that these results are consistent with other cognitive-behavioural therapy theories, such as Beck's cognitive therapy (e.g., Beck, 1976; Beck et al., 1979). These maintain that personally meaningful contents, not primary beliefs, constitute the principal mechanism through which beliefs affect emotions and inferences. Whilst the present experiment and the one by Bond et al. were not designed to test this cognitive therapy hypothesis, their findings certainly do not contradict it. If further studies, employing different methodologies (discussed presently), replicate these findings, then REBT theorists may wish to hypothesize that personally meaningful contents constitute the mechanism through which beliefs affect the functionality of inferences.

It is possible that demands and preferences are important components of rational and irrational beliefs, but that the REBT terms "prefer" and "must" do not naturally capture the respective meanings of these concepts. This hypothesis is consistent with the need in REBT practice always to teach clients its strict meanings of the terms "must" and "prefer" (Bond & Dryden, 1996a). One cannot, however, teach participants in a study the REBT meanings of these terms, without threatening the study's internal validity. Thus, if REBT proponents purport, as they do, that "must" and "prefer" represent the concepts of a demand and a preference, respectively (e.g., Dryden, 1994a), then their hypotheses need to be tested using these representative terms. This is what Bond et al. (in press) and we have attempted to do, and the findings of these experiments have not been supportive of REBT theory.

As noted above, Kendall et al. (1995) indicate that role-playing procedures constitute a viable methodology with which to test questions about psychological causality; and, in this experiment, we have employed role-playing procedures that have previously been demonstrated to be valid and reliable (Geller, 1978; Mixon, 1979). Nevertheless, the conclusions of the present study would be strengthened, if they could be confirmed when employing another type of research design, for example, a prospective, longitudinal, correlational one (Kendall et al.). Using this methodology, REBT and secondary beliefs could be measured initially amongst a non-emotionally disturbed cohort, and the functionality of emotions and inferences could be assessed at follow-up periods. If irrational secondary beliefs predicted dysfunctional emotions and inferences as well as irrational REBT beliefs, we would have further support for our conclusions.

We believe that there are applied implications for the present findings. Specifically, results indicated that secondary beliefs and REBT beliefs affect the helpfulness of inferences to the same extent. Secondary beliefs, however, are shorter and probably easier to remember than REBT beliefs. It could be tentatively recommended, therefore, that clients be encouraged to adopt rational secondary beliefs, instead of rational REBT ones. By doing so, these people may not only produce functional inferences, but it is possible that they could also form functional emotions. For, as noted above, REBT, like other cognitive-behavioural therapies (e.g., Beck, 1976), maintains that rational and irrational beliefs lead, respectively, to functional and dysfunctional inferences *and* emotions. Clearly, further research is required, especially with client populations, in order to be more confident about these applied implications.

To conclude, the present experiment failed to support REBT's prediction that rational and irrational REBT beliefs have a greater effect on the functionality of inferences, than do rational and irrational secondary beliefs. Instead, results suggested that they both have the same magnitude of effect. Consistent with the findings of Bond et al. (in press), these results indicate that demands and preferences do not constitute a principal mechanism through which rational and irrational REBT beliefs affect the functionality of inferences. Instead, it appears that secondary belief contents constitute this key mechanism. Further research, employing different methodologies, is required before this conclusion can be confidently accepted. Nevertheless, the results from this study comprise preliminary, experimental evidence that fails to support a central hypothesis of REBT's theory of psychopathology.

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