Effects of Priming Dialectic Rational Beliefs on Irrational Beliefs

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ABSTRACT. Rational-emotive behavior therapy (REBT) theory describes irrational and rational beliefs as change mechanisms (Ellis, 1994). However, research in REBT theory has scarcely investigated, outside the setting of psychotherapy, changes in irrational beliefs as a function of rational beliefs. Therefore, the goal of the present research was to assess the effectiveness of a priming mechanism, namely dialectic rational beliefs, as a method of changing irrational beliefs. Participants were randomly assigned to either a prime or control condition. Participants in the primed condition were primed with dialectic rational beliefs, whereas those in the control were not. All participants completed a measure of irrational beliefs and state anxiety before and after the experiment. Results suggested that dialectic rational beliefs decrease irrational beliefs, $\eta_p^2 = .26, 95\% CI = [42.46, 48.07]$. Discussions concern limitations to and future directions for using dialectic rational beliefs as a priming mechanism.
found correlational and causal evidence for REBT theory.

Research in REBT has used correlational and experimental designs to assess irrational beliefs. The association between irrational beliefs and emotional distress such as anxiety and depression has been corroborated (Bernard, 1998; David et al., 2002; Macavei, 2005; McDermut, Haaga, & Bilek, 1997; Muran & Motta, 1993; Muran, Kassinove, Ross, & Muran, 1989; Solomon, Arnow, Gotlib, & Wind, 2003). This evidence is limited by its inability to examine the etiopathogenic role of irrational beliefs because correlational designs were used (David et al., 2005). However, several studies have used experimental designs by measuring emotional distress and irrational beliefs during activating experiences. Some have found that irrational beliefs act as a mediator of activating events and emotional distress (Hart, Turner, Hittner, Cardozo, & Paras, 1991; Muran & Motta, 1993; Muran et al., 1989; Solomon et al., 2003), whereas others have not (Chang, 1997; Popov & Popov, 2013; Smith, Houston, & Zurawski, 1984).

These mixed findings might be attributable to the use of antiquated self-report measures. In particular, past research has used measures of irrational beliefs that have been confounded by affective and behavioral items (David et al., 2010). To address this issue, additional measures of irrational beliefs have been developed that omit confounding variables (see Lindner, Kirkby, Wertheim, & Birch, 1999, for a review). For example, the General Attitude and Belief Scale (GABS; DiGiuseppe, Leaf, Exner, & Robin, 1988) has been shown to be one of the most valid measures of irrational beliefs regarding discriminate and construct validity, internal consistency, and factor structure (Bernard, 1998; Owings et al., 2013).

Another possibility that might account for those cases mentioned above in which evidence was not found for the causative role of irrational beliefs in emotional distress might involve using inauthentic activating events. The presence of an activating event, or stressful environmental experience, is requisite to assess the cognitive-vulnerability model because it enables interactions between the postulated vulnerability factors and stressor (David et al., 2010). However, past studies investigating how irrational beliefs relate to emotional distress have employed activating events that are anomalous with Ellis’s (1994) conceptualization of an authentic activating event (DiLorenzo, David, & Montgomery, 2007, 2011; Hart et al., 1991; Malouff, Schutte, & McClelland, 1992). Namely, Ellis argued that an activating event is an experience, environmental or psychological, that impedes or precludes the attainment of an individual’s goals in real time. For example, imagery and retrospective reflection are methods that conflict with this conceptualization because the obstruction of participants’ goals are not assessed in real time.

Although it is important for research on REBT theory to investigate irrational beliefs as a cognitive vulnerability factor, it is equally important to examine the role of irrational beliefs as a mechanism of change within psychotherapy. REBT theory propounds irrational and rational beliefs as mechanisms responsible for cognitive, emotive, and behavioral change during the psychotherapeutic process (David et al., 2010). However, most, if not all, studies that assess these cognitive processes as mechanisms of change are limited in terms of temporality. That is, a great deal of time is required to conduct research on mechanisms of change in psychotherapeutic settings. However, it could be argued that research examining how rational beliefs affect irrational beliefs could be conducted in a more expeditious manner. Namely, investigators could utilize methodologies that enable changes in irrational beliefs to be assessed outside therapy. One viable method by which to experimentally examine the effect of rational beliefs on irrational beliefs is to use priming. For instance, Davies (2008a, 2008b) used a priming method in a study assessing the relationship between irrational beliefs and conditional self-acceptance, such that participants were primed with rational and irrational statements. Davies found that priming participants with irrational belief statements increased conditional self-acceptance and that priming participants with rational belief statements increased unconditional self-acceptance. However, Davies (2008a, 2008b) suggested that rational beliefs should be primed using alternative techniques in future research because using statements alone as a priming method might not be elaborate enough to significantly change irrationality.

One future direction for using a priming mechanism in the context of REBT theory might consist of developing what can be termed dialectic rational beliefs. Unlike rational beliefs that are expressed in the form of a statement, dialectic rational beliefs are rational beliefs in the form of an argument. That is, rational beliefs can be primed in the form of logical argumentation to represent the dialectic discourse involved in psychotherapy.
Dialectic rational beliefs consist of two parts: a logical, empirical, and pragmatic disputation of each of the four irrational cognitive processes discussed above (Beal, Kopec, & DiGiuseppe, 1996) and a conclusion that suggests the adoption of an alternative rational belief. For example, preferences, a type of rational belief, might be primed dialectically by first challenging demandingness, the irrational alternative to preferences, and then concluding that preferences are more adoption-worthy than demands. Thus, priming mechanisms might be more effective if they encompass features of psychotherapy, namely the disputation process.

In sum, REBT theory holds that emotional distress is largely a result of interactions between irrational beliefs and activating events. However, corroboration for this idea has been limited for two reasons. First, the correlational research does not warrant causal inference. Second, the mixed findings of experimental research are, in part, attributable to using antiquated self-report measures and inauthentic activating events. In addition, the time involved in the practice of REBT limits empirical investigation into the effects of change mechanisms (rational and irrational beliefs) on cognition, emotion, and behavior. To address this issue, experimental research can use priming mechanisms as a less time-consuming method to study mechanisms of change and their relation to the cognitions targeted by psychotherapy (Davies, 2008a).

The goal of the present research was to test the effectiveness of dialectical rational beliefs as a priming mechanism. This was accomplished by assessing the degree to which irrational beliefs changed as a function of priming. I hypothesized that priming would decrease irrational beliefs. For this hypothesis to be supported, irrational belief scores should be significantly lower for participants in the priming group, compared to those in the control condition. A second goal was to assess changes in state anxiety as a function of the activating event. It was predicted that the activating event would increase state anxiety. A significant increase in scores of state anxiety as an effect of the activating event would support this hypothesis. The final goal was to quantify the predictive relationship between irrational beliefs and state anxiety. Thus, I hypothesized that irrational beliefs would significantly predict state anxiety. For this prediction to be corroborated, irrational belief scores should predict scores of state anxiety.

### Method

#### Participants

Participants were 47 undergraduate students (27 women and 20 men; \( M_{\text{age}} = 19.22, SD = 1.25 \)) from a small midwestern liberal arts college. Most participants were European American (78.7%), followed by African American (14.9%), Pacific Islander (4.3%), and other (2.1%). All participants were enrolled in an introductory psychology course and received partial course credit for their participation. They were recruited using Sona Systems software, a platform for participant pool management.

#### Materials

The GABS (DiGiuseppe et al., 1988) was used to measure irrational beliefs and the content of those beliefs. It consists of 55 items. Each item was assessed on a 5-point Likert scale denoting level of agreement from 1 (strongly disagree) to 5 (strongly agree). Because the study was conducted in one session and designed for pretest and posttest measurements, the GABS was counterbalanced for each condition and modified to include six of the original seven subscales. The Other-Downing subscale was omitted because it contained too few items for counterbalancing, and the remaining six subscales were also slightly modified to contain one less item: Rationality (8 items), Self-Downing (8 items), Need for Achievement (8 items), Need for Approval (6 items), Need for Comfort (8 items), and Demand for Fairness (8 items). Scores of the GABS were summed to generate a total irrationality score. The GABS retained good reliability subsequent to the deletion of items, \( \alpha = .76 \).

Form Y-1 of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) measures participants’ current anxiety levels. That is, the state anxiety version of the STAI was used. The inventory is comprised of 20 items (e.g., “I feel calm” and “I feel upset”) scored on a 5-point Likert-type scale from 1 (not at all) to 5 (very much so). Because the STAI was divided for pretest and posttest measurements, it was counter-balanced for each condition, in that the pretest STAI was modified to include the former 10 items of the original STAI, and the posttest STAI consisted of the latter 10 items. The STAI retained good reliability, \( \alpha = .78 \).

The priming material consisted of four dialectic rational beliefs, with each one addressing one of the four irrational cognitive processes discussed above (see Appendix A). Dialectic rational beliefs consist of two parts: a logical, empirical,
and pragmatic disputation of irrational cognitive processes, and a conclusion that suggests the adoption of an alternative rational belief. Thus a dialectic rational belief is comprised of sentences that describe and refute an irrational belief and of a concluding sentence that asks participants to renounce their irrational belief. For example, a dialectic rational belief for the catastrophizing belief process is as follows: “Whenever something undesirable happens to you and you view it as a horrible or awful thing, you are holding an extreme and inaccurate belief. This is because, if something was actually awful (100% bad), nothing else could happen to make it worse. Clearly, there are other things that could occur which are worse in any situation. Most of the undesirable things that happen to us are just unfortunate or inconveniencing. Therefore, it does you no good to continue holding onto beliefs about things being awful."

The speech task was developed to elicit rejection and constitutes the activating event. It requires participants to verbally answer 10 opinion-based questions; for example, “What kind of foods do you like?” (see Appendix B). Answers to the subjective questions were not recorded because they were not pertinent to the study.

Procedure
Participants were recruited using Sona Systems after approval from the institutional review board was acquired. Upon arrival to the lab, they were asked to read and sign informed consent. Immediately following, and in one sitting, they completed the STAI Form Y-1 and the GABS pretest measures; order of presentation was counterbalanced across participants and conditions. Participants were then randomly assigned to one of two conditions: priming versus no priming of dialectic rational beliefs. Those in the priming group were each presented four dialectic rational beliefs and instructed to think critically about the paragraphs. Then, all participants completed the speech task, in which they answered 10 opinion-based questions. They were randomly assigned to fail or not fail the speech task (stress, no-stress). Those in the stress condition received a piece of paper denoting failure (task failed) and those in the no-stress condition received no indication of failing the speech task. Subsequently, participants completed the GABS and STAI posttest measures, which were also counterbalanced across participants and conditions. Lastly, participants were debriefed on the nature of the study.

Results
Means and standard deviations for the GABS and STAI as a function of priming and time are presented in Table 1. Priming and activating event served as between-subjects factors. Dependent variables were irrational beliefs and state anxiety. Higher scores on the GABS indicate higher levels of irrationality, and higher scores on the STAI indicate higher levels of state anxiety.

Several analyses were conducted to assess hypotheses. Specifically, a linear regression analysis assessed the degree to which irrational beliefs were predictive of state anxiety. In addition, two Analyses of Covariance (ANCOVAs) examined whether priming dialectic rational beliefs significantly decreased irrational beliefs and whether the activating event (failing the speech task) significantly increased state anxiety.

After adjusting for priming, a linear regression analysis found that GABS scores significantly predicted STAI scores, $\beta = .29$, 95% CI = [9.81, 19.27], $t(45) = 2.05$, $p = .046$. This finding supported the hypothesis that irrational beliefs are predictive of state anxiety.

An ANCOVA [between-subjects factor: priming (present, absent); covariate: GABS pretest scores] revealed a significant effect of priming on GABS posttest scores, $F(1, 46) = 13.31$, $p < .01$, $\eta^2_p = .26$, 95% CI = [42.46, 48.07]. Post-hoc tests (Tukey)
showed that, when priming was present, scores on the GABS significantly decreased from pre to post \( (p = .016) \); whereas there was no significant difference in GABS scores when priming was absent \( (p = .219) \). These results suggested that dialectical rational beliefs decrease irrational beliefs (Figure 1). Also, an ANCOVA [between-subjects factor: activating event (present, absent); covariate: state anxiety pretest scores] indicated that the effect of the activating event on state anxiety was not significant, \( F(1, 46) = 3.03, p = .09, \eta^2_p = .06, 95\% CI = [18.16, 20.07] \), suggested that failing the speech task did not increase state anxiety.

**Discussion**

REBT theory holds that irrational and rational beliefs are mechanisms of change, such that they are responsible for changes in emotion, cognition, and behavior (David et al., 2010; Ellis, 1994). For example, REBT postulates that irrational beliefs largely engender the pathogenesis of psychopathological symptoms (David et al., 2010). Practitioners of REBT, in consequence, facilitate cognitive restructuring by logically, empirically, and pragmatically disputing irrational beliefs (Beal et al., 1996). Clients are encouraged as a result of this disputation process to adopt rational beliefs (functional, logical, and flexible evaluations) as an alternative to irrational ones. However, assessing change in irrational beliefs throughout the course of therapy requires a great deal of time. Investigation into effective methodologies by which to change irrational beliefs outside of therapy might address this temporal limitation.

The current study attempted to address the issue of assessing mechanisms of change over time by developing a novel priming technique, namely, dialectic rational beliefs. Dialectic rational beliefs are a series of arguments that represent the psychotherapeutic process in REBT. Specifically, these arguments dispute the four irrational cognitive processes of demandingness, catastrophizing, frustration intolerance, and depreciation (Ellis & Dryden, 1997), and encourage as a conclusion the assimilation of rational beliefs.

The main empirical question of interest was whether irrational beliefs would change as an effect of using dialectic rational beliefs as a priming mechanism. Results denoted that participants who were primed with dialectic rational beliefs had a significant decrease in total levels of irrational belief, whereas those who were not primed did not have a significant decrease. In light of the experimental design of the present study, these findings suggested that irrational beliefs decrease as an effect of priming dialectic rational beliefs.

Several generalizations can be advanced. The first technical generalization is that the priming mechanism discussed above can be employed to engender changes to irrational beliefs, and the second is that changes in irrational beliefs can be assessed outside psychotherapeutic settings. The main practical generalization consists of the idea that dialectic rational beliefs can help render the psychotherapeutic process of change more expeditious, such that they could be used in conjunction with therapy. For instance, clients could be primed before and/or between therapy sessions. Dialectic rational beliefs could also be implemented into a form of Internet-based cognitive modification program.

However, the present study could not ascertain several things. Namely, it is unclear whether the effects of priming last because the experiment was conducted in one sitting; irrational beliefs were not assessed subsequent to posttest measurements. In fact, the priming effects are probably transient because psychotherapeutic change is often dependent on one frequently re-indoctrinating one’s self with the rational insights acquired in therapy (Ellis, 1994). Thus, it is dubious that the priming effects will persist insofar as participants are not continually primed. One direction for future
research might involve contriving a means by which participants can consistently prime themselves.

Other limitations to the present study concern generalizability and power. Specifically, the present study lacked generalizability because participants were undergraduate psychology students. Therefore, a clinical sample would have rendered the findings of the present study more generalizable. Lastly, power might have been an issue. In particular, none of the analyses were conducted with adequate power (80%): linear regression analysis (14%), first ANCOVA (41%), and second ANCOVA (7%). The best way to address this issue would be to increase sample size. Namely, the minimum sample size requisite to reach adequate power for all three of the analyses used in the present study is 84.

The minor hypothesis of interest was to use an activating event in accordance with Ellis’s definition (1962) of an activating event, namely, to obstruct goal achievement in real time. This was done by giving a piece of paper on which the words task failed were written to individuals who answered the opinion-based speech task. However, the present data did not support a significant effect of the activating event. Several explanations can be raised for this nonsignificant finding. One possibility is that the activating event was designed on the presupposition that participants had the goal of not being rejected. Another possibility might involve the power of the analysis that assessed this hypothesis, as discussed above. Future research on activating events should screen participants by measuring relevant goals and desires prior to conducting the experiment because this would ensure that the activating event would obstruct participants’ goals.

In line with previous findings (Malouff et al., 1992), the hypothesis that irrational beliefs predict state anxiety was supported. However, the causative effects of irrational beliefs on state anxiety such as mediating the relationship between the activating event and state anxiety could not be instantiated in the present study because the requisite pathways between the activating event, irrational beliefs, and state anxiety were not satisfied (Baron & Kenny, 1986). Specifically, the relationship between the activating event and state anxiety was not instantiated.

In sum, the strength of the present study was in its experimental design and novel approach to using a priming mechanism to change irrational beliefs. Its weakness was not having an effective activating event, whereby evidence for the mediating role of irrational beliefs could be attained. The finding that dialectical rational beliefs can be used as a priming mechanism to decrease irrational beliefs was important because of what can follow from it. Namely, investigators could improve this priming technique to engender longer lasting effects, as well as implement it in conjunction with psychotherapy. Lastly, the use of priming mechanisms to investigate the ways in which cognitive vulnerability factors can be changed has the practical applicability of informing all CBT-based schools of psychotherapy and of possibly expediting the psychotherapeutic process of change.

References
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APPENDIX A

Dialectic Rational Beliefs

Directions: Please carefully read the following views. Take as much time as you see fit to understand and seriously think about the views and their meanings; you understanding of the following will be tested.

1. Whenever you think things should go the way you want them to and that people should not act in certain ways toward you, you are holding an extreme, inflexible, and illogical belief that contradicts reality. This is because things will occur in your life that are completely out of your control, and people will act rudely toward you despite your thinking that they shouldn’t; you don’t own the universe. Therefore, it does you no good to continue holding onto beliefs that demand things to be a certain way when they are not that way. Instead, maintain your preferences toward what you desire; just don’t escalate them into demands.

2. Whenever something undesirable happens to you, and you view it as a horrible or awful thing, you are holding an extreme and inaccurate belief. This is because, if something was actually awful (100% bad), nothing else could happen to make it worse. Clearly, there are other things that could occur that are worse in any situation. Most of the undesirable things that happen to us are just unfortunate or inconveniencing. Therefore, it does you no good to continue holding onto beliefs about things being awful.

3. Whenever you think you can’t stand something or someone, you are holding an extreme unrealistic belief. This is because of the fact that, if you really could not stand someone or something you don’t like, you would be dead. You may not like something someone does, but you can stand it. Therefore, it does you little good to continue holding onto a belief that places imaginary limits on what you can deal with.

4. Whenever something undesirable happens such as failing at something or someone thinking of you in a negative way, and you feel hurt, rejected, or worthless, you are holding an extreme unrealistic belief that makes a magical connection. This is because, even if nobody in the world liked or accepted you, or even if you fail at literally everything, you only really become worthless to yourself when you agree with others by thinking that you have to place the same value on yourself as they do, and that you have to define your worth as a person in terms of your failures. Therefore, it does you no good to continue holding onto beliefs about how good, bad, worthy, or worthless of a person you are. You are a human being who is too complex to be labeled or rated in terms of a few undesirable events or traits. Instead, accept yourself whether you succeed or fail, or are liked or disliked.

APPENDIX B

Questions of Speech Task

1. What is your favorite color?
2. What kinds of food do you like?
3. What is your favorite season?
4. What type of music do you like?
5. What is your favorite animal?
6. Do you like school?
7. Do you have a favorite sport?
8. Are you religious?
9. Which political party, if any, do you mostly agree with?
10. Do you think people can do morally right or wrong things?