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RESPONSE EXPECTANCIES AND IRRATIONAL BELIEFS PREDICT EXAM-RELATED DISTRESS

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Abstract

Individual differences in cognitive factors such as response expectancies and irrational beliefs (IBs) have been shown to contribute to variability in distress associated with stressful situations. However, their independent influence on distress when examined within the same study has not been established, nor has the potential of mediational relationships. The purpose of this study was to investigate the contribution of response expectancies and IBs (both general and exam-specific) to exam-related distress in a prospective study. Results revealed that both response expectancies and general IBs separately predicted exam-related distress (p 's $< .05$; $N = 105$). Observed effects of general IBs were perfectly mediated by, and observed effects of exam-specific IBs were partially mediated by, response expectancies using the Baron and Kenny approach. These data support the view that cognitive factors contribute to psychological distress and are consistent with response expectancy and rational emotive behavior theories. The results suggest that interventions focused on response expectancies and IBs might be an effective means to reduce psychological distress associated with real life stressors such as exams. Future research is needed to determine whether this effect generalizes to other stressful situations.

Keywords

distress; irrational beliefs; response expectancy

INTRODUCTION

The role of cognitive factors in human experiences (e.g., behavioral, emotional/subjective, and physiological) is widely recognized (Beck, 1976; Ellis, 1962). The contribution of cognitive factors specifically to psychological distress is no exception (Lazarus, 1991). For example, cognitions are central constructs in explanatory theories of both anxiety and depression (Beck,

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1995; Ellis, 1994). Two of the more influential and recent cognitive constructs which have been shown to be related to psychological distress are response expectancies, the eponymous construct in response expectancy theory (Kirsch, 1999), and irrational beliefs (IBs), the central construct in rational-emotive and cognitive-behavioral theory (Ellis, 1994).

Response Expectancies

The contribution of expectancies to learning (e.g., Tolman & Honzik, 1931) and to the production of behavior (Rotter, 1954) has a long history. However, the description of the role of expectancies in the production of non-volitional outcomes (e.g., distress) is a much more recent theoretical development. Kirsch (1985) was perhaps the first to explicitly theorize on relations between what individuals expect and their experiences of seemingly automatic responses, also known as non-volitional outcomes. He labeled such expectancies concerning non-volitional outcomes as “response expectancies,” and hypothesized that response expectancies are: sufficient to cause non-volitional outcomes, not mediated by other psychological variables, and self-confirming. Since that time, the literature has grown to support the central role of response expectancies as a psychological mechanism for producing non-volitional outcomes in at least three areas of research: (1) placebo effects (Montgomery & Kirsch, 1996, 1997; Price et al., 1999); (2) the effects of hypnotic suggestion (Braffman & Kirsch, 1999, 2001; Montgomery, Weltz, Seltz, & Bovbjerg, 2002; Schoenberger, Kirsch, Gearan, Montgomery, & Pastyrnak, 1997); and (3) the effects of pharmacological agents and medical interventions (Lansky & Wilson, 1981; Montgomery & Bovbjerg, 2000, 2004; Roscoe, Hickok, & Morrow, 2000). Examples of research from each of these areas will be discussed briefly below.

In regard to placebo research, empirical evidence has supported a central role for response expectancies. For example, Montgomery and Kirsch (1997) demonstrated that response expectancies mediated the effects of conditional learning trials in a sample of 48 undergraduates. In that study, the interpretation of the learning trials as evidenced in response expectancies for pain following experimental pain trials was more important than the experience of the learning trials themselves in the production of placebo analgesic effects.

In regard to the effects of hypnotic suggestion, Montgomery et al. (2002) demonstrated that response expectancies mediated the effects of a brief hypnotic intervention on post-surgery distress in a sample of breast cancer surgery patients. That is, hypnotically induced changes in response expectancies for post-surgery distress statistically accounted for the beneficial effects of the hypnosis intervention on post-surgery distress.

Lastly, our research has supported the influence of response expectancies on the experience of post-chemotherapy infusion nausea in 52 breast cancer patients (Montgomery & Bovbjerg, 2000), and in the experience of post-breast cancer surgery pain and fatigue in 63 patients (Montgomery & Bovbjerg, 2004). Together, these studies firmly support the role of response expectancies in experiences of non-volitional outcomes.

Response expectancy theory proposes that a number of potential factors may contribute to response expectancies (Kirsch, 1990). Empirical research on the sources of expectancies for non-volitional outcomes is rare in the literature. In one of the few studies on this topic, Montgomery and Bovbjerg (2003) demonstrated that past experience is one variable that contributes to response expectancies. However, not all of the variance in response expectancies was accounted for by past experience, leaving open the possibility that other psychological factors like IBs may also be an important source of expectancies. For example, IBs prior to an exam may contribute to expectancies for increased exam-related distress. To our knowledge, this possibility has not been examined in the literature, and therefore further study is warranted.

Irrational Beliefs

IBs are defined in rational-emotive and cognitive-behavior theory (REBT) (Ellis, 1994) as: (a) non-pragmatic, in that they prevent people from achieving their basic goals; (b) illogical and absolutist; (c) non-reality-based (i.e., inconsistent with reality); and/or (d) rigid. Conversely, rational beliefs (RBs) are defined as: (a) pragmatic, in that they help people to achieve their basic goals; (b) logical and non-absolutist; (c) reality-based, meaning they are consistent with reality; and/or (d) flexible. A large body of empirical evidence has demonstrated that IBs impact: (1) emotional problems including generalized anxiety (Jones, 1968); social anxiety, speech anxiety, and test anxiety (Goldfried & Sobocinski, 1975); risk for depression (Solomon, Arnow, Gotlib, & Wind, 2003); general psychiatric symptoms (Jones, 1968); assertiveness deficits (Alden, Safran, & Weideman, 1978); type A coronary-prone behavior pattern (Smith & Brehm, 1981); and (2) specific dysfunctional automatic thoughts (e.g., Harrell, Chambless, & Calhoun, 1981). Recent research on IBs continues to support strong relations between IBs and distress (Bernard, 1998; David, Schnur, & Belloiu, 2002; David, Ghinea, Macavei, & Kallay, 2005; Macavei, 2005; Malouff, Schutte, & McClelland, 1992; McDermutt, Haaga, & Bilek, 1997).

Cognitive Factors and Distress

Despite the growing independent literatures on response expectancy theory (Kirsch, 1999), which suggests a predictive relationship between response expectancies and distress, and REBT theory (Ellis, 1994), which suggests a predictive relationship between IBs and distress; little is known about their impact on distress when both are examined in the same study. Based on response expectancy theory (Kirsch, 1999), the effects of response expectancies should not be mediated by other psychological factors, and response expectancy effects should have greater impact when individuals have had experience in the situation under study. Combining these predictions with those derived from REBT theory (Ellis, 1994), the theories together suggest that the effects of response expectancies on distress should not be mediated by the effects of IBs. Furthermore, effects of response expectancies should be greater when individuals have relevant experience. To our knowledge, no study has examined the possibility that response expectancies may mediate the effects of IBs on distress.

The purpose of the present study was to investigate the interrelations among response expectancies and IBs in predicting psychological distress. For this endeavor, we chose a college exam as the stressor. A large literature consistently supports the view that college exams are a reliable stressor (e.g., Malouff et al., 1992). In essence, the college exam serves as a real-life laboratory for the study of distress and its cognitive sources. The present prospective study had three specific goals: (1) To examine the effect of response expectancies on exam-related distress; (2) To examine the effects of IBs on exam-related distress; and (3) To investigate the mediational pathways by which response expectancies and IBs act as contributors to variability in exam-related distress. Based on response expectancy theory, we hypothesize that the effects of response expectancies on distress will not be accounted for by effects of IBs on distress.

Results of the present study will have both theoretical and practical implications. From a theoretical perspective, the results add to the basic understanding of the interrelationships among response expectancies and IBs in accounting for distress levels in stressful situations. From a practical perspective, the present study may provide insight relevant for the development of cognitive-behavioral interventions which target cognitions to reduce distress.

METHOD

Participants

One hundred and five female undergraduate students from Stern College for Women, Yeshiva University, USA, 18 years of age or above ($M = 22$; $SD = 8.21$) completed measures of distress and IBs. Ninety-eight percent of the participants identified themselves as White; 2% as other. All participants were recruited from psychology department classes. Written informed consent was obtained from all participants prior to taking part in the study in accordance with university IRB guidelines.

Measures

Participants were asked to complete the following measures of predictor and outcome variables:

Predictor Variables—IB measures were as follows. The Attitude and Beliefs Scale II (ABS-II; DiGiuseppe, Leaf, Exner, & Robin, 1988) is a self-report scale designed to measure general IBs. This measure represents an improvement over previous IB scales in that it is not contaminated by affective items. The ABS-II has 72 items and three components: (1) cognitive processes [demandingness (DEM); awfulizing/catastrophizing (AWF); low frustration tolerance (LFT); global evaluation/self-downing (GE/SD)]; (2) content (approval, achievement, and comfort); and (3) wording modality (items worded in rational terms versus items worded in irrational terms). The ABS-II has been demonstrated (e.g., David et al., 2002; DiGiuseppe et al., 1988) to be a reliable and valid measure of IBs. The total IBs score was obtained by summing up the scores on each irrationally worded item and the reverse scored responses on each rationally worded item. Higher scores indicate a higher level of IBs. Cronbach's alpha in this sample was .79.

In addition to the ABS-II, we also constructed a specific measure of IBs to control for the possibility that the context-specific approach to the assessment of response expectancies was responsible for effects revealed in the present study. This new 8-item scale was constructed to assess IBs specifically associated with an exam (*Exam Beliefs Scale-EBS*, see Appendix A). The scale was based on Walen, DiGiuseppe, & Dryden's (1992) guide to rational-emotive therapy. The items were constructed to reflect the four irrational (DEM, AWF, LFT, and GE/SD) and four rational [(preferences and flexibility rather than demandingness (PRE); negative evaluations rather than awfulizing (BAD); frustration tolerance (FT); Non-GE/SD)] processes measured by the ABS-II (DiGiuseppe et al., 1988). The scale was reviewed and approved by a group of five experts trained in REBT. The total score on the scale was obtained by summing the items, with rational items reverse scored. Cronbach's alpha was .74.

Consistent with the literature, visual analog scales (VASs) were used to assess specific expectations for exam-related distress. This approach has been demonstrated to be effective and efficient in multiple studies (e.g., Montgomery & Bovbjerg, 2004; Montgomery & Kirsch, 1997). Specifically, a 10-cm VAS assessing expectations of distress before the exam was administered. Higher scores indicated higher levels of response expectancies for exam-related distress.

Outcome Variables—Exam-related distress was assessed using the Profile of Mood States-Short Version (SV-POMS) (DiLorenzo, Bovbjerg, Montgomery, Valdimarsdottir, & Jacobsen, 1999; Shacham, 1983). This measure was administered prior to the midterm exam. This measure has 37 items, and yields six subscale scores as well as a total mood disturbance score. The scale has shown satisfactory reliability and validity (DiLorenzo et al., 1999; Shacham, 1983). Cronbach's alpha was .86 for the scale.

Procedure

Participants completed a total of two assessments

Time One: Participants completed the response expectancy measure (VAS), the general IBs measure (ABS-II), the exam-specific IBs measure (EBS), and a measure assessing basic demographic information. Participants were given and asked to complete a questionnaire packet during the first 2 weeks of the semester, prior to any exams. Participants were expected to bring this packet home, complete it, and return it to research personnel.

Time Two: On the day of the midterm exam, just prior to the exam, students completed the measure of exam-related distress (SV-POMS) and again, the measure of exam-specific IBs (EBS).

Data Analysis

Data were entered and then analyzed for significant deviations from assumptions of normal distributions using SPSS. Next, relations between demographic factors (e.g., age) were checked for possible relations with the outcome. Third, relations between each predictor and the outcome were analyzed independently. Fourth, a series of mediation analyses, following the steps described by Baron and Kenny (1986), were conducted to examine the relations between IBs and response expectancies in the prediction of exam-related distress. Specifically, results are consistent with a mediational model if: (1) the predictor is associated with both the hypothesized mediator and the relevant outcome; and (2) after controlling for the effects of the mediator, the relation between predictor and outcome is reduced. The direction of mediation (e.g., whether IBs mediate the effect of response expectancies on exam-related distress, or whether response expectancies mediate the effect of IBs on exam-related distress) was determined by comparison of the relative changes in the parameter estimates.

RESULTS

An alpha level of .05 was used for all statistical tests. Univariate analyses showed no significant deviations from underlying statistical assumptions. No significant relations between the demographic variables (i.e., age, college class, ethnicity) and the outcome (exam-related distress: SV-POMS) were revealed. Therefore, none was included as covariates in subsequent analyses.

Bivariate correlations between general IBs (ABS-II), response expectancies for distress (VAS), and exam-related distress (i.e., SV-POMS scores at exam) are presented in Table 1.

The results revealed that both general IBs (ABS-II) and response expectancies for exam-related distress (VAS) were positively correlated with exam-related distress (SV-POMS). Higher general IBs scores were also associated with higher response expectancy scores for exam-related distress. Exam-specific IBs (EBS) at Time 1 were not related to exam-related distress (SV-POMS) ($p > .05$); however exam-specific IBs at Time 2 were related to exam-related distress (SV-POMS) ($p < .05$). Models describing relations between general IBs (ABS-II), response expectancies for exam-related distress (VAS), and exam-related distress (SV-POMS) were evaluated based on procedures outlined by Baron and Kenny (1986) (see Figures 1A, 1B).

Mediational analyses were consistent with response expectancy theory (see Figures 1A, 1B). The effects of response expectancies for exam-related distress (VAS) on exam-related distress (SV-POMS) were not accounted for by general IBs (ABS-II). Rather, response expectancies perfectly mediated the impact of general IBs on exam-related distress.

To check the role of past experience on expectancy effects, the sample was divided into two groups: (1) students with college exam experience (operationally defined as students enrolled in semester 2 or higher; $N = 64$) and (2) students with no or limited college exam experience (operationally defined as students in their first college semester; $N = 41$). When participants were divided in this way, the conditions of mediation were met only for the exam-experienced group (see Table 2). For this group, the impact of general IBs (ABS-II) on distress was perfectly mediated by response expectancies (VAS) (see Figures 2A, 2B).

In the case of the non-exam-experienced group, the correlations between general IBs (ABS-II) and response expectancies for exam-related distress (VAS) was $r = 0.32$ ($p < 0.05$); the other correlations among investigated variables were all non-significant (p 's $> .05$).

Exam-specific IBs (EBS) at Time 2 also predicted exam-related distress (SV-POMS) (see Figures 3A–D). Mediation analyses were consistent with the view (see Figures 3A–D) that exam-specific IBs (EBS) did not mediate the expectancy effects. Rather, response expectancies (VAS) partially mediated the impact of exam-specific IBs at Time 2 on exam-related distress. When subjects were again divided into exam-experienced ($N = 64$) and non-experienced ($N = 41$) groups, the conditions of the mediation were met only for the exam-experienced group. The impact of exam-specific IBs (EBS) on distress (SV-POMS) was partially mediated by response expectancies for exam-related distress (VAS) (see Figures 3A–D).

DISCUSSION

The impact of cognitive factors on psychological distress was supported by the present research. Consistent with response expectancy and REBT theories, both response expectancies and general IBs contributed to participants' exam-related distress experienced prior to their exam. As hypothesized, the results indicated that response expectancies, at least in part, accounted for effects of IBs on distress.

In the present study, specific IBs were also associated with exam-related distress. The inclusion of specific IBs in the present study acted as a control for the context-specific methodology of response expectancy assessment. Results revealed that it is not simply the method of expectancy assessment (i.e., the specificity of the expectancy items) which accounts for the effects seen here. It is interesting that specific IBs predicted exam-related distress when they were measured immediately prior to the exam, and not when they were measured at the beginning of the semester. This suggests that specific IBs may be sensitive to the timing of the assessment, and may demonstrate greater relations with distress when assessed in an acute context.

The results also suggest that response expectancy effects may be stronger when participants have had experience with the phenomenon under study. This finding is consistent with both the experimental (Montgomery & Kirsch, 1997) and clinical (Montgomery & Bovbjerg, 2000) literatures, as well as with social learning theory (Rotter, 1954). That is, as individuals gain experience in a specific situation, the effects of expectancies take on more relevance for both behavioral and non-volitional outcomes. Prior to experience in a situation, response expectancies have less of an effect. However, once individuals gain experience in a specific situation, then the contribution of response expectancies to distress appears to strengthen.

Based on these results, it is possible to speculate that interventions which target IBs (e.g., REBT (Ellis, 1994)) and response expectancies (e.g., hypnosis (Kirsch, 1990)) may prove useful for controlling or reducing stressor-related psychological distress. Indeed, the use of hypnosis (which has been shown to be effective in changing response expectancies (Montgomery, Weltz, Seltz, & Bovbjerg, 2002)) as an adjunct to cognitive-behavioral interventions has been demonstrated to lead to increased treatment effect sizes (Kirsch, Montgomery, & Sapirstein,

1995). Therefore, an experimental study designed to test the mediational properties of response expectancies on a combined REBT-Hypnosis intervention appears warranted. Within an experimental design, the effects of manipulating response expectancies and IBs via an intervention could provide additional evidence supporting the mediational model.

As with any scientific undertaking, the present study is not without its limitations. First, only women enrolled in a private undergraduate college participated in the present study (as recruitment took place at a women's college). The sample was also predominantly White. Therefore, these results may not generalize to men, students at public schools, or individuals of different age groups or ethnicities. However, a mitigating factor is that the effects of IBs and response expectancies have not typically been found to vary by gender, age or ethnicity (e.g., David et al., 2002; Montgomery & Bovbjerg, 2004; Montgomery & Kirsch, 1997)). Furthermore, the generalizability of the present study results is supported by the design decision to use a real-life stressful situation (an exam) rather than taking a strict laboratory approach. From the perspective of planning a clinical intervention, these results have relevance. At this point, further research is needed to better establish the effects reported here in the context of other stressors (e.g., illness) in more diverse populations. Second, there is some suggestion in the literature that IBs and RBs should not be considered as opposite end points on the same continuum (Bernard, 1998). Rather IBs and RBs should perhaps be considered separate constructs and assessed accordingly. Therefore, if that literature continues to grow, it might be important for future research to confirm the present results using such a two-construct approach. Third, when participants were divided into exam-experienced and non-experienced groups, we may have failed to see an effect in the non-experienced group due to reduced sample size. Future studies should be sufficiently powered to further explore that possibility.

To our knowledge, the present study is the first to investigate relations between IBs and response expectancies and stressor-related psychological distress. The results have both theoretical and clinical implications that are likely to benefit the field, as well as individuals confronting distress in real-life situations.

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APPENDIX A

Exam-Related Beliefs Scale

Using the following scale, indicate in the space provided how true each of these statements is for you.

1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree
 4. Strongly Disagree
1.I absolutely must get a good grade on this exam.
 2.I really want to get a good grade on this exam, but I do not absolutely have to.
 3.It will be awful if I don't get a good grade on this exam.
 4.It will be really bad if I don't get a good grade on this exam, but not awful.
 5.If I don't get a good grade on this exam, I am not worthwhile.
 6.If I don't get a good grade on this exam it is because I did not prepare myself well enough not because I am worthless.
 7.If I don't get a good grade on this exam, I won't be able to stand it.
 8.I could stand it if I don't get a good grade on this exam.

Figure 1.

(A) Model of general IBs as a mediator of the relationship between expected exam-related distress and experienced exam-related distress ($N = 105$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns). (B) Model of expected exam-related distress as a mediator of the relationship between general IBs and experienced exam-related distress ($N = 105$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns).

Figure 2.

(A) Model of general IBs as a mediator of the relationship between expected exam-related distress and experienced exam-related distress in the exam-experienced group ($N = 64$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns). (B) Model of expected exam-related distress as a mediator of the relationship between general IBs and experienced exam-related distress in the exam-experienced group ($N = 64$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns).

Figure 3.

(A) Model of exam-specific IBs (measured at Time 2) as a mediator of the relationship between expected exam-related distress and experienced exam-related distress ($N = 105$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns). (B) Model of expected exam-related distress as a mediator of the relationship between exam-specific IBs (measured at Time 2) and experienced exam-related distress ($N = 105$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns). (C)

Model of exam-specific IBs (measured at Time 2) as a mediator of the relationship between expected exam-related distress and experienced exam-related distress in the exam-experienced group ($N = 64$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns). (D) Model of expected exam-related distress as a mediator of the relationship between exam-specific IBs (measured at Time 2) and experienced exam-related distress in the exam-experienced group ($N = 64$). Values presented are standardized parameter estimates. Values above lines reflect bivariate relations; values below lines reflect multivariate relations accounting for other predictors in the regression equation. All relations are significant ($p < .05$) unless indicated otherwise (ns).

Table 1Intercorrelations among the Investigated Variables in the Sample^a

	Exam-Related Distress (SV-POMS)	General Irrational Beliefs (ABS-II)	Response Expectancy for Exam-Related Distress (VAS)
Exam-Related Distress (SV-POMS)		0.20	0.35
General Irrational Beliefs (ABS-II)			0.37

Note. All correlations are significant ($ps < .05$).

^a $N = 105$.

Table 2Intercorrelations among the Investigated Variables in the Exam-Experienced Group^a

	Exam-Related Distress (SV-POMS)	General Irrational Beliefs (ABS-II)	Response Expectancy for Exam-Related Distress (VAS)
Exam-Related Distress (SV-POMS)		0.29	0.46
General Irrational Beliefs (ABS-II)			0.40

Note. All correlations are significant ($ps < .05$).

^a $N = 64$.